

Appendix A - ADS506-01-FA22 - Final Project

Team 1

12/05/2022

RMarkdown global setup

```
knitr::opts_chunk$set(  
  fig.align    = 'center', # how to align graphics in the final doc. 'left', 'right',  
  ↪   'center'  
  tidy         = TRUE,  
  message      = FALSE,    # if FALSE knitr will not display any messages generated by  
  ↪   code  
  strip.white = TRUE,     # if FALSE knitr won't remove white spaces at beg/end of code  
  ↪   chunk  
  warning      = FALSE)   # if FALSE knitr will not display any warning messages in the  
  ↪   final
```

Load packages

```
library(car)  
library(caret)  
library(class)  
library(corrplot)  
library(forecast)  
library(gridExtra)  
library(here)  
library(imputeTS)  
library(lubridate)  
library(padr)  
library(psych)  
library(reshape2)  
library(scales)  
library(tidyverse)  
library(timetk)  
library(tseries)  
library(zoo)  
  
set.seed(1699)
```

Import and merge data sets

```
# Import 4 separate CSV files  
curr_dir01 <- here("data/Ocean Water/water_quality_1990_1999_datasd.csv")  
#curr_dir01
```

```

curr_dir02 <- here("data/Ocean Water/water_quality_2000_2010_datasd.csv")
#curr_dir02
curr_dir03 <- here("data/Ocean Water/water_quality_2011_2019_datasd.csv")
#curr_dir03
curr_dir04 <- here("data/Ocean Water/water_quality_2020_2021_datasd.csv")
#curr_dir04

# Reading in the csv files
#owt_df01a <- read.csv("water_quality_1990_1999_datasd.csv", header = TRUE, sep = ",")
#owt_df01b <- read.csv("water_quality_2000_2010_datasd.csv", header = TRUE, sep = ",")
#owt_df01c <- read.csv("water_quality_2011_2019_datasd.csv", header = TRUE, sep = ",")
#owt_df01d <- read.csv("water_quality_2020_2021_datasd.csv", header = TRUE, sep = ",")

owt_df01a <- read.csv(curr_dir01, header = TRUE, sep = ",")
owt_df01b <- read.csv(curr_dir02, header = TRUE, sep = ",")
owt_df01c <- read.csv(curr_dir03, header = TRUE, sep = ",")
owt_df01d <- read.csv(curr_dir04, header = TRUE, sep = ",")

# Merge 4 seperate dataframes into 1
owt_df01 <- rbind(owt_df01a, owt_df01b, owt_df01c, owt_df01d)

# DF Sort & Reindex Citation:
# https://gist.github.com/makexu93/05ef0f34306d3ab6c9ca8ddcd702cee1
owt_df01 <- owt_df01[order(owt_df01$date_sample, decreasing = FALSE), ]
row.names(owt_df01) <- NULL

print(head(owt_df01, 7))

##      sample station depth_m date_sample time project    parameter qualifier
## 1 9011158743      C5      9 1990-11-15     PLOO CHLOROPHYLL
## 2 9011158743      C5      9 1990-11-15     PLOO      DENSITY
## 3 9011158743      C5      9 1990-11-15     PLOO        DO
## 4 9011158743      C5      9 1990-11-15     PLOO        PH
## 5 9011158743      C5      9 1990-11-15     PLOO    SALINITY
## 6 9011158743      C5      9 1990-11-15     PLOO       TEMP
## 7 9011158743      C5      9 1990-11-15     PLOO       XMS
##      value   units
## 1  0.870 ug/L
## 2 23.855 sigma-t
## 3  6.550 mg/L
## 4   8.080    pH
## 5 33.617     ppt
## 6 19.430      C
## 7 44.850      %

describe(owt_df01)

##          vars      n   mean      sd min   max range    se
## sample      1 1236769    NaN     NA Inf -Inf -Inf    NA
## station     2 1236769    NaN     NA Inf -Inf -Inf    NA
## depth_m     3 1152608 19.38  25.07   1    116   115 0.02
## date_sample 4 1236769    NaN     NA Inf -Inf -Inf    NA
## time        5 1236769    NaN     NA Inf -Inf -Inf    NA
## project     6 1236769    NaN     NA Inf -Inf -Inf    NA

```

```

## parameter      7 1236769     NaN      NA Inf      -Inf      -Inf     NA
## qualifier      8 1236769     NaN      NA Inf      -Inf      -Inf     NA
## value          9 1231466 124.24 1785.21 -37 1100000 1100037 1.61
## units         10 1236769     NaN      NA Inf      -Inf      -Inf     NA

```

Create custom function to generate boxplots and descriptive statistics for continuous variables

```

box_comp <- function(xcol = c(),
                      df = NA,
                      rtn_met = TRUE,
                      grph_title = "All",
                      box = TRUE) {
  # Define function to produce formatted boxplots & basic descriptive stats
  sig <- 3
  metrics_df01 <- data.frame(metric = c("",

                                         "Total N:",
                                         "Count",
                                         "NA Count",
                                         "Mean",
                                         "Median",
                                         "Standard Deviation",
                                         "Variance",
                                         "Range",
                                         "Min",
                                         "Max",
                                         "25th Percentile",
                                         "75th Percentile",
                                         "Subset w/o Outliers:",
                                         "Count",
                                         "%",
                                         "Outlier %",
                                         "NA Count",
                                         "Mean",
                                         "Median",
                                         "Standard Deviation",
                                         "Variance",
                                         "Range",
                                         "Min",
                                         "Max"
                                         )))

  for(var in xcol) {
    df_s1 <- df[, var]
    df_s1s1 <- data.frame(df_s1)
    df_s1_fit <- preProcess(df_s1s1,
                             method = c("center", "scale"))
    df_s1_trans <- predict(df_s1_fit, df_s1s1)

    # Calculate quartiles
    var_iqr_lim <- IQR(df_s1) * 1.5
    var_q1 <- quantile(df_s1, probs = c(.25))
    var_otlow <- var_q1 - var_iqr_lim
    var_q3 <- quantile(df_s1, probs = c(.75))
  }
}

```

```

var_othigh <- var_q3 + var_iqr_lim

# Subset non-outlier data
var_non_otlr_df01 <- subset(df, (abs(df_s1_trans) <= 3))
df_s2 <- var_non_otlr_df01[, var]

# Begin calculating measures of centrality & dispersion
var_mean <- mean(df_s1, na.remove = TRUE)
var_non_otlr_df01_trunc_mean <- mean(df_s2, na.remove = TRUE)
var_med <- median(df_s1)
var_non_otlr_df01_trunc_med <- median(df_s2)
var_mode <- mode(df_s1)
var_non_otlr_df01_trunc_mode <- mode(df_s2)
var_stde <- sd(df_s1)
var_non_otlr_df01_trunc_stde <- sd(df_s2)
var_vari <- var(df_s1)
var_non_otlr_df01_trunc_vari <- var(df_s2)
var01_min <- min(df[, var])
var01_max <- max(df[, var])
var01_range <- var01_max - var01_min
var02_min <- min(var_non_otlr_df01[, var])
var02_max <- max(var_non_otlr_df01[, var])
var02_range <- var02_max - var02_min

# Configure y-axis min & max to sync graphs
plot_min <- min(var01_min, var02_min)
plot_max <- max(var01_max, var02_max)
nonoutlier_perc <- round((as.numeric(dim(var_non_otlr_df01)[1] /
as.numeric(dim(df)[1]))) * 100, 1)

# Fill in metrics table
measure_val01 <- c(paste0("Variable: ", var),
                     "", 
                     as.character(dim(df)[1]),
                     sum(is.na(df_s1)),
                     round(var_mean, sig),
                     round(var_med, sig),
                     round(var_stde, sig),
                     round(var_vari, sig),
                     round(var01_range, sig),
                     round(var01_min, sig),
                     round(var01_max, sig),
                     round(var_q1, sig),
                     round(var_q3, sig),
                     "", 
                     as.character(dim(var_non_otlr_df01)[1]),
                     paste0(nonoutlier_perc, "%"),
                     paste0(round(100 - nonoutlier_perc, 1), "%"),
                     sum(is.na(df_s2)),
                     round(var_non_otlr_df01_trunc_mean, sig),
                     round(var_non_otlr_df01_trunc_med, sig),
                     round(var_non_otlr_df01_trunc_stde, sig),
                     round(var_non_otlr_df01_trunc_vari, sig),
                     "")

```

```

        round(var02_range, sig),
        round(var02_min, sig),
        round(var02_max, sig)
    )

var_name <- paste0("Variable: ", var)
metrics_df01[, ncol(metrics_df01) + 1] <- measure_val01
}

# Format boxplot titles based on number of plots
if(box == TRUE) {
    if(length(xcol == 1)) {
        boxplot(df,
            ylab = "Parameter Values",
            main = paste0("Boxplot for ", xcol, " (", grph_title, ")"))
    }
    else {
        boxplot(df,
            ylab = "Parameter Values",
            main = paste0("Boxplot for Multiple Parameters", " (", grph_title, ")"))

    }
}
# Return & print metrics table(s)
if(rtn_met == TRUE) {
    print(metrics_df01)
    return(metrics_df01)
}
}

```

Factorize and format column types; print NA counts

```

# List of parameter values
param_lst01 <- c("CHLOROPHYLL",
                 "DENSITY",
                 "DO",
                 "ENTERO",
                 "FECAL",
                 "OG",
                 "PH",
                 "SALINITY",
                 "SUSO",
                 "TEMP",
                 "TOTAL",
                 "XMS")

# List of col names
col_lst01 <- c("sample",
               "station",
               "date_sample",
               "time",
               "project",
               "parameter",

```

```

    "qualifier",
    "units")

# Convert categorical features to factors
owt_df02 <- owt_df01
for(c in col_lst01) {
  owt_df02[, c] <- as.factor(owt_df02[, c])
}

# Generate NA Summary Tables Citation:
# https://www.geeksforgeeks.org/replace-character-value-with-na-in-r/
owt_df02[owt_df02 == ""] <- NA
print(head(owt_df02, 7))

##           sample station depth_m date_sample time project parameter qualifier
## 1 9011158743      C5      9 1990-11-15 <NA>    PLOO CHLOROPHYLL     <NA>
## 2 9011158743      C5      9 1990-11-15 <NA>    PLOO     DENSITY     <NA>
## 3 9011158743      C5      9 1990-11-15 <NA>    PLOO       DO     <NA>
## 4 9011158743      C5      9 1990-11-15 <NA>    PLOO      PH     <NA>
## 5 9011158743      C5      9 1990-11-15 <NA>    PLOO  SALINITY     <NA>
## 6 9011158743      C5      9 1990-11-15 <NA>    PLOO     TEMP     <NA>
## 7 9011158743      C5      9 1990-11-15 <NA>    PLOO      XMS     <NA>
##           value   units
## 1 0.870 ug/L
## 2 23.855 sigma-t
## 3 6.550 mg/L
## 4 8.080 pH
## 5 33.617 ppt
## 6 19.430 C
## 7 44.850 %

owt_df02_na <- sapply(owt_df02, function(x) sum(is.na(x)))
owt_df02_notna <- sapply(owt_df02, function(x) sum(!is.na(x)))
owt_df02_tbl01 <- rbind(owt_df02_notna, owt_df02_na)
owt_df02_tbl02 <- rbind(owt_df02_tbl01, round(prop.table(owt_df02_tbl01, margin = 2), 4))
print("All parameters")

## [1] "All parameters"

print(owt_df02_tbl02)

##           sample station depth_m date_sample      time project
## owt_df02_notna 1236769 1236769 1152608.000 1236769 1075929.00 1236769
## owt_df02_na      0      0  84161.000          0 160840.00      0
## owt_df02_notna     1      1      0.932          1      0.87      1
## owt_df02_na      0      0      0.068          0      0.13      0
##           parameter qualifier      value   units
## owt_df02_notna 1236769 394867.0000 1231466.0000 1236769
## owt_df02_na      0 841902.0000 5303.0000      0
## owt_df02_notna     1      0.3193      0.9957      1
## owt_df02_na      0      0.6807      0.0043      0

owt_df02a <- owt_df02[which(is.na(owt_df02), arr.ind=TRUE), ]
#print(head(owt_df02a, 7))

```

```

for(p in param_lst01) {
  df = owt_df02[owt_df02$parameter == p, ]
  print(head(df[which(is.na(df$value), arr.ind=TRUE), ], 7))
  df_na <- sapply(df, function(x) sum(is.na(x)))
  df_notna <- sapply(df, function(x) sum(!is.na(x)))
  df_tb101 <- rbind(df_notna, df_na)
  df_tb102 <- rbind(df_tb101, round(prop.table(df_tb101, margin = 2), 4))
  rownames(df_tb102) <- c("Not NA n", "NA n", "Not NA %", "NA %")
  print(p)
  print(df_tb102) # This table w/ null counts and proportions for each feature not
  → displayed for space purposes
}

```

```

##           sample station depth_m date_sample time project parameter
## 272260 1229972635     B10    1.5 1997-12-29 <NA>    PL00 CHLOROPHYLL
## 272267 1229972638     B10   42.7 1997-12-29 <NA>    PL00 CHLOROPHYLL
## 272274 1229972633     B10   61.0 1997-12-29 <NA>    PL00 CHLOROPHYLL
## 272281 1229972634     B10   79.2 1997-12-29 <NA>    PL00 CHLOROPHYLL
## 272288 1229972637     B10   97.5 1997-12-29 <NA>    PL00 CHLOROPHYLL
## 272295 1229972636     B10  115.8 1997-12-29 <NA>    PL00 CHLOROPHYLL
## 272302 1229972643     B11    1.5 1997-12-29 <NA>    PL00 CHLOROPHYLL
##           qualifier value units
## 272260      <NA>   NA ug/L
## 272267      <NA>   NA ug/L
## 272274      <NA>   NA ug/L
## 272281      <NA>   NA ug/L
## 272288      <NA>   NA ug/L
## 272295      <NA>   NA ug/L
## 272302      <NA>   NA ug/L
## [1] "CHLOROPHYLL"
##           sample station depth_m date_sample      time project parameter
## Not NA n  88471    88471    88471    88471 74093.0000 88471    88471
## NA n      0        0        0        0 14378.0000 0        0
## Not NA %   1        1        1        1  0.8375  1        1
## NA %      0        0        0        0  0.1625  0        0
##           qualifier      value units
## Not NA n      0 87911.0000 88471
## NA n        88471  560.0000 0
## Not NA %      0    0.9937 1
## NA %        1    0.0063 0
##           sample station depth_m date_sample      time project parameter
## 429235 1018012132     E16    1.5 2001-10-18 8:32:00 PST    PL00 DENSITY
## 503878 513032821      C8     1.0 2003-05-13 10:30:00 PST    PL00 DENSITY
## 547108 601042705      C4     1.0 2004-06-01 11:37:00 PST    PL00 DENSITY
## 720423 702082492      A6     1.0 2008-07-02 9:42:00 PST    PL00 DENSITY
## 720433 702082490      A6    12.0 2008-07-02 9:42:00 PST    PL00 DENSITY
## 720443 702082491      A6    18.0 2008-07-02 9:42:00 PST    PL00 DENSITY
## 720453 702082495      A7     1.0 2008-07-02 9:05:00 PST    PL00 DENSITY
##           qualifier value units
## 429235      <NA>   NA sigma-t
## 503878      <NA>   NA sigma-t
## 547108      <NA>   NA sigma-t
## 720423      <NA>   NA sigma-t

```

```

## 720433      <NA>    NA sigma-t
## 720443      <NA>    NA sigma-t
## 720453      <NA>    NA sigma-t
## [1] "DENSITY"
##           sample station depth_m date_sample      time project parameter
## Not NA n   88317    88317    88317      88317 73999.0000 88317    88317
## NA n       0        0        0          0 14318.0000 0        0
## Not NA %    1        1        1          1 0.8379 1        1
## NA %       0        0        0          0 0.1621 0        0
##           qualifier      value units
## Not NA n    0 88256.0000 88317
## NA n       88317    61.0000 0
## Not NA %    0        0.9993 1
## NA %       1        0.0007 0
##           sample station depth_m date_sample      time project parameter
## 82185     CTD014940 A11     42.7 1993-05-06 10:45:00 PST  PL00    DO
## 168703    1024942994 A1       1.5 1994-10-24 9:10:00 PST  PL00    DO
## 168713    1024942995 A1       3.0 1994-10-24 9:10:00 PST  PL00    DO
## 168723    1024942996 A1       6.1 1994-10-24 9:10:00 PST  PL00    DO
## 168733    1024942997 A1      12.2 1994-10-24 9:10:00 PST  PL00    DO
## 168734    1024942998 A1      12.2 1994-10-24 9:10:00 PST  PL00    DO
## 168748    1024942999 A1      18.3 1994-10-24 9:10:00 PST  PL00    DO
##           qualifier value units
## 82185      <NA>    NA mg/L
## 168703      <NA>    NA mg/L
## 168713      <NA>    NA mg/L
## 168723      <NA>    NA mg/L
## 168733      <NA>    NA mg/L
## 168734      <NA>    NA mg/L
## 168748      <NA>    NA mg/L
## [1] "DO"
##           sample station depth_m date_sample      time project parameter
## Not NA n  109542   109542   109542      109542 83392.0000 109542   109542
## NA n       0        0        0          0 26150.0000 0        0
## Not NA %    1        1        1          1 0.7613 1        1
## NA %       0        0        0          0 0.2387 0        0
##           qualifier      value units
## Not NA n    0 109437.000 109542
## NA n       109542    105.000 0
## Not NA %    0        0.999 1
## NA %       1        0.001 0
##           sample station depth_m date_sample      time project parameter
## 25057     M0001828  A2       1.0 1991-10-09 8:27:00 PST  PL00    ENTERO
## 81650     SH000903  D5       NA 1993-05-04      <NA>  PL00    ENTERO
## 103629    1208931380 A2       3.0 1993-12-08 8:20:00 PST  PL00    ENTERO
## 103642    1208931381 A2       6.1 1993-12-08 8:20:00 PST  PL00    ENTERO
## 103655    1208931382 A2      12.2 1993-12-08 8:20:00 PST  PL00    ENTERO
## 103668    1208931383 A2      18.3 1993-12-08 8:20:00 PST  PL00    ENTERO
## 103701    1208931385 A2      30.5 1993-12-08 8:20:00 PST  PL00    ENTERO
##           qualifier value units
## 25057      e      NA CFU/100 mL
## 81650      <NA>  NA CFU/100 mL
## 103629      <NA>  NA CFU/100 mL
## 103642      <NA>  NA CFU/100 mL

```

```

## 103655      <NA>    NA CFU/100 mL
## 103668      <NA>    NA CFU/100 mL
## 103701      <NA>    NA CFU/100 mL
## [1] "ENTERO"
##           sample station   depth_m date_sample      time project parameter
## Not NA n 144341 144341 116186.0000 144341 144012.0000 144341 144341
## NA n      0      0 28155.0000      0 329.0000      0      0
## Not NA %  1      1 0.8049      1 0.9977      1      1
## NA %      0      0 0.1951      0 0.0023      0      0
##           qualifier value units
## Not NA n 136251.000 143075.0000 144341
## NA n     8090.000 1266.0000      0
## Not NA %  0.944  0.9912      1
## NA %     0.056  0.0088      0
##           sample station depth_m date_sample      time project parameter
## 39760    M0003378 B3    61.0 1992-03-04 9:23:00 PST  PLO0  FECAL
## 73538    M0002093 A4    79.2 1993-02-03 9:15:00 PST  PLO0  FECAL
## 81651    SH000903 D5    NA 1993-05-04      <NA>  PLO0  FECAL
## 82671    SH001257 D7    NA 1993-05-11 9:43:00 PST  PLO0  FECAL
## 103630   1208931380 A2    3.0 1993-12-08 8:20:00 PST  PLO0  FECAL
## 103643   1208931381 A2    6.1 1993-12-08 8:20:00 PST  PLO0  FECAL
## 103656   1208931382 A2   12.2 1993-12-08 8:20:00 PST  PLO0  FECAL
##           qualifier value units
## 39760      <NA> CFU/100 mL
## 73538      <NA> CFU/100 mL
## 81651      <NA> CFU/100 mL
## 82671      <NA> CFU/100 mL
## 103630     <NA> CFU/100 mL
## 103643     <NA> CFU/100 mL
## 103656     <NA> CFU/100 mL
## [1] "FECAL"
##           sample station   depth_m date_sample      time project parameter
## Not NA n 137649 137649 109633.0000 137649 137322.0000 137649 137649
## NA n      0      0 28016.0000      0 327.0000      0      0
## Not NA %  1      1 0.7965      1 0.9976      1      1
## NA %      0      0 0.2035      0 0.0024      0      0
##           qualifier value units
## Not NA n 127994.0000 136405.0000 137649
## NA n     9655.0000 1244.0000      0
## Not NA %  0.9299  0.991      1
## NA %     0.0701  0.009      0
##           sample station depth_m date_sample      time project parameter
## 112401   112941961 A1    12.2 1994-01-12 8:36:00 PST  PLO0  OG
## 125289   309941665 A4    79.2 1994-03-09 10:06:00 PST  PLO0  OG
## 136304   503941704 B5    1.5 1994-05-03 10:24:00 PST  PLO0  OG
## 136346   503941705 B5   24.4 1994-05-03 10:24:00 PST  PLO0  OG
## 136396   503941706 B5   61.0 1994-05-03 10:24:00 PST  PLO0  OG
## 136772   504941833 A2   24.4 1994-05-04 8:02:00 PST  PLO0  OG
## 137186   504941844 A6    1.5 1994-05-04 9:17:00 PST  PLO0  OG
##           qualifier value units
## 112401     <NA>  NA mg/L
## 125289     <NA>  NA mg/L
## 136304     <NA>  NA mg/L
## 136346     <NA>  NA mg/L

```

```

## 136396      <NA>    NA mg/L
## 136772      <NA>    NA mg/L
## 137186      <NA>    NA mg/L
## [1] "OG"
##           sample station depth_m date_sample      time project parameter
## Not NA n    7944     7944     7944          7944 7940.0000    7944     7944
## NA n        0         0         0            0   4.0000       0         0
## Not NA %     1         1         1            1   0.9995       1         1
## NA %        0         0         0            0   0.0005       0         0
##           qualifier      value units
## Not NA n 7673.0000 7922.0000 7944
## NA n      271.0000 22.0000 0
## Not NA %   0.9659  0.9972 1
## NA %      0.0341  0.0028 0
##           sample station depth_m date_sample      time project parameter
## 168706 1024942994     A1     1.5 1994-10-24 9:10:00 PST  PLOO     PH
## 168716 1024942995     A1     3.0 1994-10-24 9:10:00 PST  PLOO     PH
## 168726 1024942996     A1     6.1 1994-10-24 9:10:00 PST  PLOO     PH
## 168737 1024942997     A1    12.2 1994-10-24 9:10:00 PST  PLOO     PH
## 168738 1024942998     A1    12.2 1994-10-24 9:10:00 PST  PLOO     PH
## 168751 1024942999     A1    18.3 1994-10-24 9:10:00 PST  PLOO     PH
## 332755 923992590     A1     1.5 1999-09-23 7:40:00 PST  PLOO     PH
##           qualifier value units
## 168706      <NA>    NA pH
## 168716      <NA>    NA pH
## 168726      <NA>    NA pH
## 168737      <NA>    NA pH
## 168738      <NA>    NA pH
## 168751      <NA>    NA pH
## 332755      <NA>    NA pH
## [1] "PH"
##           sample station depth_m date_sample      time project parameter
## Not NA n 107818 107818 107818          107818 81668.0000 107818 107818
## NA n      0         0         0            0   26150.0000       0         0
## Not NA %   1         1         1            1   0.7575       1         1
## NA %      0         0         0            0   0.2425       0         0
##           qualifier      value units
## Not NA n     0 107564.0000 107818
## NA n      107818 254.0000 0
## Not NA %     0     0.9976 1
## NA %      1     0.0024 0
##           sample station depth_m date_sample      time project parameter
## 82188 CTD014940     A11    42.7 1993-05-06 10:45:00 PST  PLOO SALINITY
## 168707 1024942994     A1     1.5 1994-10-24 9:10:00 PST  PLOO SALINITY
## 168717 1024942995     A1     3.0 1994-10-24 9:10:00 PST  PLOO SALINITY
## 168727 1024942996     A1     6.1 1994-10-24 9:10:00 PST  PLOO SALINITY
## 168739 1024942997     A1    12.2 1994-10-24 9:10:00 PST  PLOO SALINITY
## 168740 1024942998     A1    12.2 1994-10-24 9:10:00 PST  PLOO SALINITY
## 168752 1024942999     A1    18.3 1994-10-24 9:10:00 PST  PLOO SALINITY
##           qualifier value units
## 82188      <NA>    NA ppt
## 168707      <NA>    NA ppt
## 168717      <NA>    NA ppt
## 168727      <NA>    NA ppt

```

```

## 168739      <NA>    NA   ppt
## 168740      <NA>    NA   ppt
## 168752      <NA>    NA   ppt
## [1] "SALINITY"
##           sample station depth_m date_sample      time project parameter
## Not NA n 109492  109492  109492       109492 83351.0000 109492  109492
## NA n      0       0       0          0 26141.0000 0       0
## Not NA %   1       1       1          1 0.7613  1       1
## NA %      0       0       0          0 0.2387  0       0
##           qualifier      value units
## Not NA n      0 109318.0000 109492
## NA n      109492 174.0000 0
## Not NA %      0       0.9984 1
## NA %      1       0.0016 0
##           sample station depth_m date_sample      time project parameter
## 182188 119951890     B1    61.0 1995-01-19 7:25:00 PST  PLOO  SUSO
## 197840 413951394     B9    97.5 1995-04-13 11:32:00 PST  PLOO  SUSO
## 236137 821961617     B9    1.5 1996-08-21 8:23:00 PST  PLOO  SUSO
## 236146 821961618     B9    42.7 1996-08-21 8:23:00 PST  PLOO  SUSO
## 236171 821961619     B9    97.5 1996-08-21 8:23:00 PST  PLOO  SUSO
## 236208 821961620     E10   1.5 1996-08-21 10:58:00 PST  PLOO  SUSO
## 236217 821961621     E10   42.7 1996-08-21 10:58:00 PST  PLOO  SUSO
##           qualifier value units
## 182188      <NA>    NA mg/L
## 197840      <NA>    NA mg/L
## 236137      <NA>    NA mg/L
## 236146      <NA>    NA mg/L
## 236171      <NA>    NA mg/L
## 236208      <NA>    NA mg/L
## 236217      <NA>    NA mg/L
## [1] "SUSO"
##           sample station depth_m date_sample      time project parameter
## Not NA n 27543  27543  27543       27543 27538.0000 27543  27543
## NA n      0       0       0          0 5.0000 0       0
## Not NA %   1       1       1          1 0.9998 1       1
## NA %      0       0       0          0 0.0002 0       0
##           qualifier      value units
## Not NA n 1290.0000 27515.000 27543
## NA n      26253.0000 28.000 0
## Not NA %   0.0468  0.999 1
## NA %      0.9532  0.001 0
##           sample station depth_m date_sample      time project parameter
## 81483 CTD013369     K4    18.3 1993-05-03 7:07:00 PST  PLOO  TEMP
## 82189 CTD014940     A11   42.7 1993-05-06 10:45:00 PST  PLOO  TEMP
## 82454 CTD013374     K4    18.3 1993-05-06 8:52:00 PST  PLOO  TEMP
## 82871 CTD013384     K4    18.3 1993-05-12 7:36:00 PST  PLOO  TEMP
## 83293 CTD008245     C6    1.5 1993-05-19 12:10:00 PST  PLOO  TEMP
## 83297 CTD008246     C6    3.0 1993-05-19 12:10:00 PST  PLOO  TEMP
## 83301 CTD008247     C6    6.1 1993-05-19 12:10:00 PST  PLOO  TEMP
##           qualifier value units
## 81483      <NA>    NA   C
## 82189      <NA>    NA   C
## 82454      <NA>    NA   C
## 82871      <NA>    NA   C

```

```

## 83293      <NA>    NA     C
## 83297      <NA>    NA     C
## 83301      <NA>    NA     C
## [1] "TEMP"
##           sample station depth_m date_sample      time project parameter
## Not NA n 139066  139066  139066       139066 112709.0000 139066  139066
## NA n      0        0        0          0 26357.0000 0        0
## Not NA %   1        1        1          1 0.8105 1        1
## NA %      0        0        0          0 0.1895 0        0
##           qualifier      value  units
## Not NA n      0 139046.0000 139066
## NA n      139066 20.0000 0
## Not NA %      0 0.9999 1
## NA %      1 0.0001 0
##           sample station depth_m date_sample      time project parameter
## 81652 SH000903 D5     NA 1993-05-04 <NA> PLOO  TOTAL
## 82672 SH001257 D7     NA 1993-05-11 9:43:00 PST PLOO  TOTAL
## 101335 1124931032 C6     1.5 1993-11-24 8:23:00 PST PLOO  TOTAL
## 103637 1208931380 A2     3.0 1993-12-08 8:20:00 PST PLOO  TOTAL
## 103650 1208931381 A2     6.1 1993-12-08 8:20:00 PST PLOO  TOTAL
## 103663 1208931382 A2    12.2 1993-12-08 8:20:00 PST PLOO  TOTAL
## 103676 1208931383 A2    18.3 1993-12-08 8:20:00 PST PLOO  TOTAL
##           qualifier value  units
## 81652      <NA>  NA CFU/100 mL
## 82672      <NA>  NA CFU/100 mL
## 101335      <NA>  NA CFU/100 mL
## 103637      <NA>  NA CFU/100 mL
## 103650      <NA>  NA CFU/100 mL
## 103663      <NA>  NA CFU/100 mL
## 103676      <NA>  NA CFU/100 mL
## [1] "TOTAL"
##           sample station depth_m date_sample      time project parameter
## Not NA n 137584  137584 109594.0000       137584 137257.0000 137584  137584
## NA n      0        0 27990.0000          0 327.0000 0        0
## Not NA %   1        1 0.7966            1 0.9976 1        1
## NA %      0        0 0.2034            0 0.0024 0        0
##           qualifier      value  units
## Not NA n 121659.0000 136141.0000 137584
## NA n      15925.0000 1443.0000 0
## Not NA %  0.8843 0.9895 1
## NA %      0.1157 0.0105 0
##           sample station depth_m date_sample      time project parameter
## 81485 CTD013369 K4     18.3 1993-05-03 7:07:00 PST PLOO  XMS
## 82191 CTD014940 A11    42.7 1993-05-06 10:45:00 PST PLOO  XMS
## 82456 CTD013374 K4     18.3 1993-05-06 8:52:00 PST PLOO  XMS
## 82873 CTD013384 K4     18.3 1993-05-12 7:36:00 PST PLOO  XMS
## 83497 CTD013399 K4     18.3 1993-05-20 7:20:00 PST PLOO  XMS
## 83564 CTD004913 A7     1.5 1993-05-24 8:31:00 PST PLOO  XMS
## 83569 CTD004914 A7     3.0 1993-05-24 8:31:00 PST PLOO  XMS
##           qualifier value  units
## 81485      <NA>  NA %
## 82191      <NA>  NA %
## 82456      <NA>  NA %
## 82873      <NA>  NA %

```

```

## 83497      <NA>    NA    %
## 83564      <NA>    NA    %
## 83569      <NA>    NA    %
## [1] "XMS"
##           sample station depth_m date_sample          time project parameter
## Not NA n 139002 139002 139002      139002 112648.0000 139002 139002
## NA n      0       0       0       0   26354.0000      0       0
## Not NA %    1       1       1       1   0.8104      1       1
## NA %      0       0       0       0   0.1896      0       0
##           qualifier      value units
## Not NA n      0 138876.0000 139002
## NA n      139002 126.0000      0
## Not NA %      0       0.9991      1
## NA %      1       0.0009      0

```

```

# Display Value Summaries Citation:
# Hurst, D. (n.d.). ADS 506 [Course materials].
feature_cats01 <- owt_df02 %>%
  mutate(cat = paste(parameter, qualifier, units)) %>%
  count(cat)
print(feature_cats01)

```

```

##           cat      n
## 1 CHLOROPHYLL NA ug/L 88471
## 2 DENSITY NA sigma-t 88317
## 3 DO NA mg/L 109542
## 4 ENTERO < CFU/100 mL 95848
## 5 ENTERO > CFU/100 mL 452
## 6 ENTERO e CFU/100 mL 39766
## 7 ENTERO LA CFU/100 mL 23
## 8 ENTERO NA CFU/100 mL 8090
## 9 ENTERO ND CFU/100 mL 1
## 10 ENTERO NR CFU/100 mL 1
## 11 ENTERO NS CFU/100 mL 160
## 12 FECAL < CFU/100 mL 85819
## 13 FECAL > CFU/100 mL 746
## 14 FECAL e CFU/100 mL 41255
## 15 FECAL LA CFU/100 mL 8
## 16 FECAL NA CFU/100 mL 9655
## 17 FECAL ND CFU/100 mL 1
## 18 FECAL NR CFU/100 mL 4
## 19 FECAL NS CFU/100 mL 161
## 20 OG < mg/L 7673
## 21 OG NA mg/L 271
## 22 PH NA pH 107818
## 23 SALINITY NA ppt 109492
## 24 SUSO < mg/L 1290
## 25 SUSO NA mg/L 26253
## 26 TEMP NA C 139066
## 27 TOTAL < CFU/100 mL 66655
## 28 TOTAL > CFU/100 mL 2844
## 29 TOTAL >= CFU/100 mL 3
## 30 TOTAL e CFU/100 mL 51924
## 31 TOTAL LA CFU/100 mL 14

```

```

## 32 TOTAL NA CFU/100 mL 15925
## 33 TOTAL ND CFU/100 mL 54
## 34 TOTAL NR CFU/100 mL 4
## 35 TOTAL NS CFU/100 mL 161
## 36 XMS NA % 139002

feature_cats02 <- owt_df02 %>%
  mutate(cat = paste(date_sample, time)) %>%
  count(cat)
print(head(feature_cats02, 7))

```

```

##                               cat   n
## 1 1990-11-15 NA 14
## 2 1991-01-02 7:00:00 PST 25
## 3 1991-01-02 7:18:00 PST 25
## 4 1991-01-02 7:40:00 PST 15
## 5 1991-01-02 7:55:00 PST 15
## 6 1991-01-02 8:10:00 PST 25
## 7 1991-01-02 8:30:00 PST 15

```

Bin depth_m variable

```

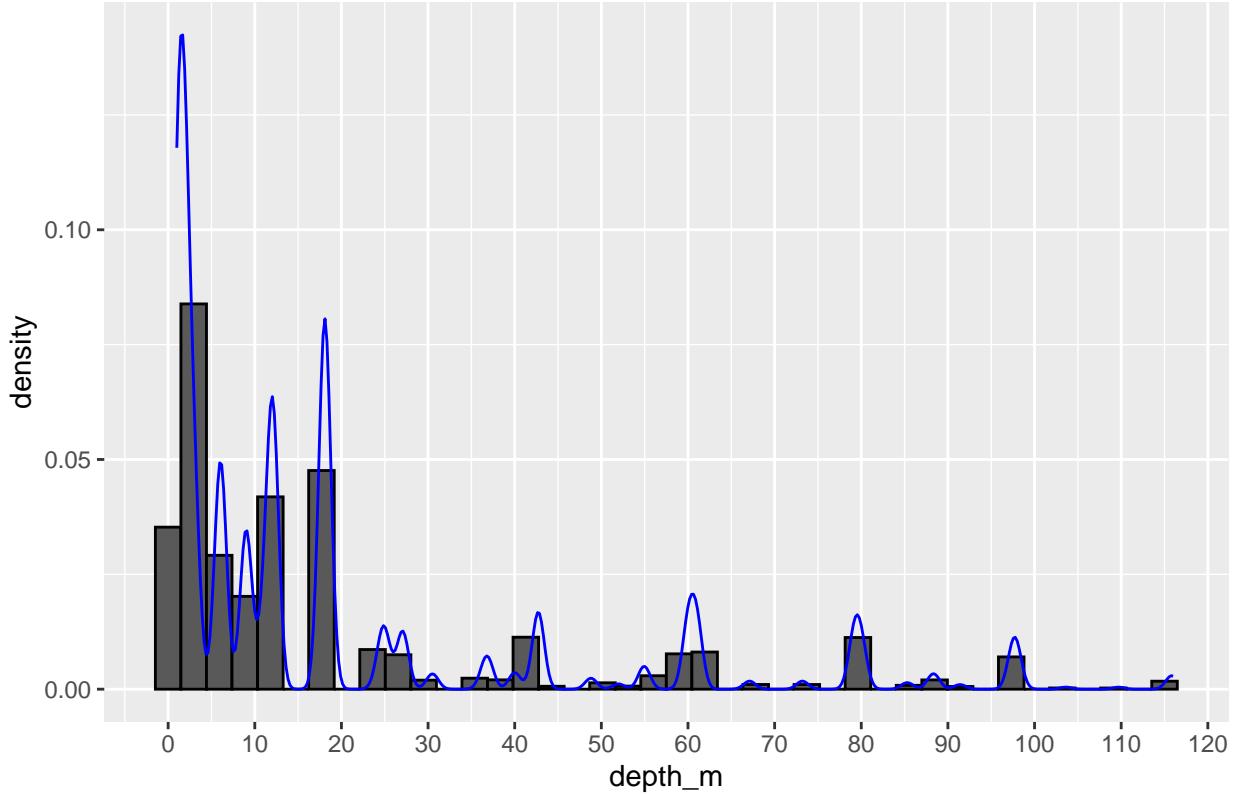
owt_df02$date_sample <- as.Date(owt_df02$date_sample, "%Y-%m-%d")

# Create bins for depth_m values
depth_lvls01 <- c("[0,8)",
                  "[8,33)",
                  "[33,47)",
                  "[47,70)",
                  "[70,90)",
                  "[90,112)",
                  "[112,120]",
                  "Unknown")

# Plot distribution of depth_m values
# Plot Formatting Citation:
#
# → https://community.rstudio.com/t/ggplot-x-axis-y-axis-ticks-labels-breaks-and-limits/119123/2
ggplot(owt_df02, aes(x = depth_m)) +
  geom_histogram(color = "black", bins = 40, aes(y = stat(density))) +
  geom_density(col = "blue") +
  labs(title = "Histogram of `depth_m` Feature") +
  scale_x_continuous(breaks=seq(0,120,10)) +
  theme(plot.title = element_text(hjust = 0.5, size = 12))

```

Histogram of `depth_m` Feature



```
# Create new column with bins
# Add Columns Using mutate() Citation:
#
# https://www.marsja.se/r-add-column-to-dataframe-based-on-other-columns-conditions-dplyr/
owt_df02 <- mutate(owt_df02, depth_m_bin = case_when(depth_m < 8 ~ "[0,8)",
                                                 depth_m < 33 ~ "[8,33)",
                                                 depth_m < 47 ~ "[33,47)",
                                                 depth_m < 70 ~ "[47,70)",
                                                 depth_m < 90 ~ "[70,90)",
                                                 depth_m < 112 ~ "[90,112)",
                                                 depth_m >= 112 ~ "[112,120]"))

# Replace NAs with "Unknown"
# Citation: https://statisticsglobe.com/r-replace-na-with-0/
owt_df02$depth_m_bin <- replace_na(owt_df02$depth_m_bin, "Unknown")

# Sort Bars Citation:
# https://www.statology.org/order-bars-ggplot2-bar-chart/
owt_df02$depth_m_bin_factr = factor(owt_df02$depth_m_bin, levels = depth_lvls01)
print(head(owt_df02, 7))
```

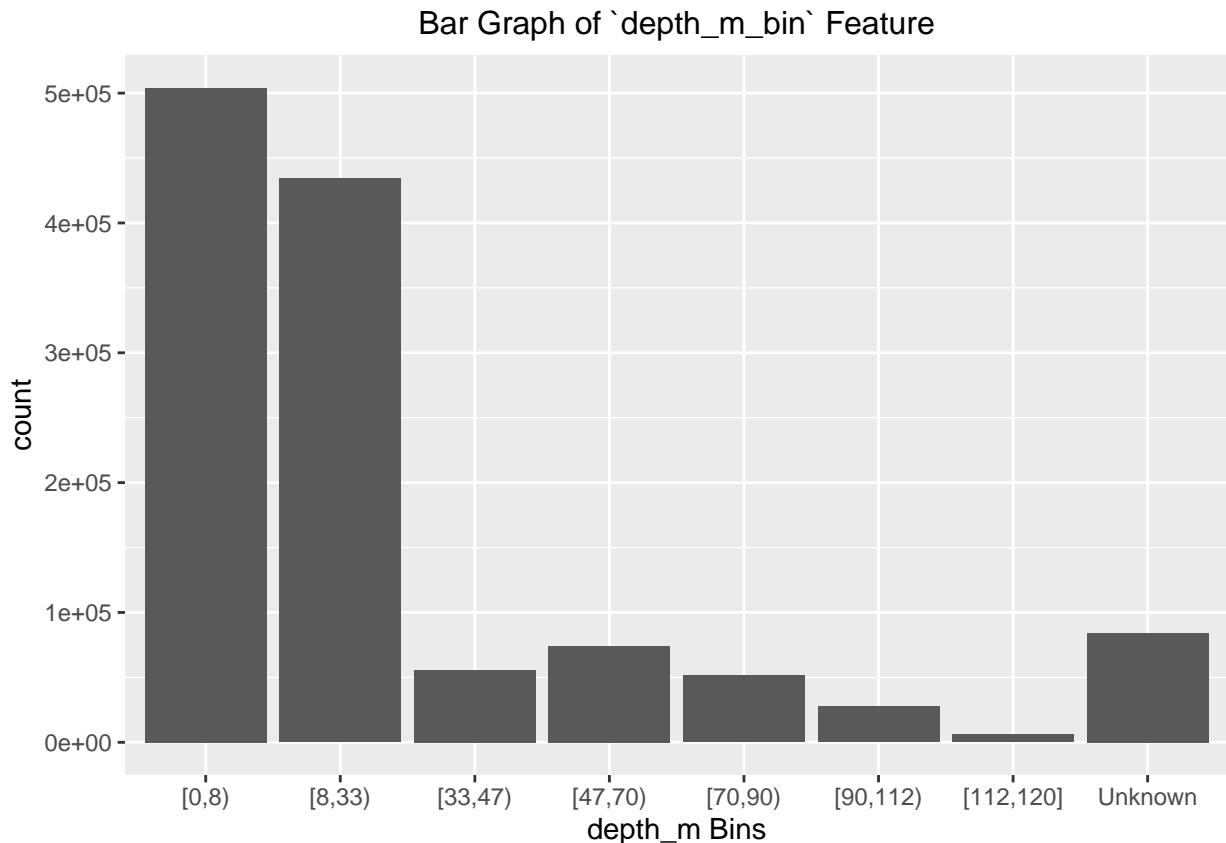
```
##      sample station depth_m date_sample time project parameter qualifier
## 1 9011158743      C5      9 1990-11-15 <NA>     PLOO CHLOROPHYLL      <NA>
## 2 9011158743      C5      9 1990-11-15 <NA>     PLOO    DENSITY      <NA>
## 3 9011158743      C5      9 1990-11-15 <NA>     PLOO        DO      <NA>
## 4 9011158743      C5      9 1990-11-15 <NA>     PLOO        PH      <NA>
```

```

## 5 9011158743      C5      9 1990-11-15 <NA>    PLOO    SALINITY    <NA>
## 6 9011158743      C5      9 1990-11-15 <NA>    PLOO    TEMP       <NA>
## 7 9011158743      C5      9 1990-11-15 <NA>    PLOO    XMS       <NA>
##   value  units depth_m_bin depth_m_bin_factr
## 1 0.870 ug/L   [8,33)      [8,33)
## 2 23.855 sigma-t [8,33)      [8,33)
## 3 6.550 mg/L   [8,33)      [8,33)
## 4 8.080 pH     [8,33)      [8,33)
## 5 33.617 ppt    [8,33)      [8,33)
## 6 19.430 C      [8,33)      [8,33)
## 7 44.850 %      [8,33)      [8,33)

# Display transformed bar chart
ggplot(owt_df02, aes(x = depth_m_bin_factr)) +
  geom_bar() +
  labs(title = "Bar Graph of `depth_m_bin` Feature") +
  xlab("depth_m Bins") +
  theme(plot.title = element_text(hjust = 0.5, size = 12))

```



Perform several aggregations on the data for performing EDA at multiple levels

```

# Display aggregations by different features
owt_df02_gb01 <- owt_df02 %>%
  group_by(station) %>%
  summarise(Count = n())

```

```

print(owt_df02_gb01[owt_df02_gb01$Count == min(owt_df02_gb01$Count), ])

## # A tibble: 2 x 2
##   station Count
##   <fct>    <int>
## 1 A15        30
## 2 A16        30

print(owt_df02_gb01[owt_df02_gb01$Count == max(owt_df02_gb01$Count), ])

## # A tibble: 1 x 2
##   station Count
##   <fct>    <int>
## 1 A1       55217

owt_df02_gb02 <- owt_df02 %>%
  group_by(project) %>%
  summarise(Count = n())

owt_df02_gb03 <- owt_df02 %>%
  group_by(date_sample) %>%
  summarise(Count = n())

# Main DF1
owt_df02_gb04 <- owt_df02 %>%
  group_by(date_sample, parameter) %>%
  summarise(Avg = mean(value, na.remove = TRUE))

owt_df02_gb05 <- owt_df02 %>%
  group_by(parameter) %>%
  summarise(Count = n())

owt_df02_gb06 <- owt_df02 %>%
  group_by(depth_m) %>%
  summarise(Count = n())

# Main DF3
owt_df02_gb07 <- owt_df02 %>%
  group_by(date_sample, project, depth_m_bin, parameter) %>%
  summarise(Avg = mean(value, na.remove = TRUE))

owt_df02_gb08 <- owt_df02 %>%
  group_by(depth_m_bin) %>%
  summarise(Count = n())

# Main DF2
owt_df02_gb09 <- owt_df02 %>%
  group_by(date_sample, project, parameter) %>%
  summarise(Avg = mean(value, na.remove = TRUE))

print(owt_df02_gb01)

## # A tibble: 157 x 2
##   station Count
##   <fct>    <int>
## 1 A15        30
## 2 A16        30
## 3 A17        30
## 4 A18        30
## 5 A19        30
## 6 A20        30
## 7 A21        30
## 8 A22        30
## 9 A23        30
## 10 A24        30
## 11 A25        30
## 12 A26        30
## 13 A27        30
## 14 A28        30
## 15 A29        30
## 16 A30        30
## 17 A31        30
## 18 A32        30
## 19 A33        30
## 20 A34        30
## 21 A35        30
## 22 A36        30
## 23 A37        30
## 24 A38        30
## 25 A39        30
## 26 A40        30
## 27 A41        30
## 28 A42        30
## 29 A43        30
## 30 A44        30
## 31 A45        30
## 32 A46        30
## 33 A47        30
## 34 A48        30
## 35 A49        30
## 36 A50        30
## 37 A51        30
## 38 A52        30
## 39 A53        30
## 40 A54        30
## 41 A55        30
## 42 A56        30
## 43 A57        30
## 44 A58        30
## 45 A59        30
## 46 A60        30
## 47 A61        30
## 48 A62        30
## 49 A63        30
## 50 A64        30
## 51 A65        30
## 52 A66        30
## 53 A67        30
## 54 A68        30
## 55 A69        30
## 56 A70        30
## 57 A71        30
## 58 A72        30
## 59 A73        30
## 60 A74        30
## 61 A75        30
## 62 A76        30
## 63 A77        30
## 64 A78        30
## 65 A79        30
## 66 A80        30
## 67 A81        30
## 68 A82        30
## 69 A83        30
## 70 A84        30
## 71 A85        30
## 72 A86        30
## 73 A87        30
## 74 A88        30
## 75 A89        30
## 76 A90        30
## 77 A91        30
## 78 A92        30
## 79 A93        30
## 80 A94        30
## 81 A95        30
## 82 A96        30
## 83 A97        30
## 84 A98        30
## 85 A99        30
## 86 A100       30
## 87 A101       30
## 88 A102       30
## 89 A103       30
## 90 A104       30
## 91 A105       30
## 92 A106       30
## 93 A107       30
## 94 A108       30
## 95 A109       30
## 96 A110       30
## 97 A111       30
## 98 A112       30
## 99 A113       30
## 100 A114       30
## 101 A115       30
## 102 A116       30
## 103 A117       30
## 104 A118       30
## 105 A119       30
## 106 A120       30
## 107 A121       30
## 108 A122       30
## 109 A123       30
## 110 A124       30
## 111 A125       30
## 112 A126       30
## 113 A127       30
## 114 A128       30
## 115 A129       30
## 116 A130       30
## 117 A131       30
## 118 A132       30
## 119 A133       30
## 120 A134       30
## 121 A135       30
## 122 A136       30
## 123 A137       30
## 124 A138       30
## 125 A139       30
## 126 A140       30
## 127 A141       30
## 128 A142       30
## 129 A143       30
## 130 A144       30
## 131 A145       30
## 132 A146       30
## 133 A147       30
## 134 A148       30
## 135 A149       30
## 136 A150       30
## 137 A151       30
## 138 A152       30
## 139 A153       30
## 140 A154       30
## 141 A155       30
## 142 A156       30
## 143 A157       30

```

```
##      <fct>   <int>
## 1 A1      55217
## 2 A10     5852
## 3 A11     6602
## 4 A12     5812
## 5 A13     6599
## 6 A14     5886
## 7 A15      30
## 8 A16      30
## 9 A17    2961
## 10 A2     7572
## # ... with 147 more rows
print(dim(owt_df02_gb01))
```

```
## [1] 157    2
```

```
print(owt_df02_gb02)
```

```
## # A tibble: 2 x 2
##   project  Count
##   <fct>    <int>
## 1 PL00     805915
## 2 SB00     430854
```

```
print(dim(owt_df02_gb02))
```

```
## [1] 2 2
```

```
print(head(owt_df02_gb03, 7))
```

```
## # A tibble: 7 x 2
##   date_sample  Count
##   <date>        <int>
## 1 1990-11-15     14
## 2 1991-01-02    195
## 3 1991-01-03    195
## 4 1991-01-07    190
## 5 1991-01-08    181
## 6 1991-01-09    577
## 7 1991-01-10    200
```

```
print(dim(owt_df02_gb03))
```

```
## [1] 5580    2
```

```
print(head(owt_df02_gb04, 7))
```

```
## # A tibble: 7 x 3
## # Groups:   date_sample [1]
##   date_sample parameter     Avg
##   <date>      <fct>     <dbl>
## 1 1990-11-15 CHLOROPHYLL  1.07
## 2 1990-11-15 DENSITY     23.9
## 3 1990-11-15 DO          6.98
## 4 1990-11-15 PH          8.13
## 5 1990-11-15 SALINITY    33.6
```

```

## 6 1990-11-15 TEMP      19.4
## 7 1990-11-15 XMS      60.2
print(dim(owt_df02_gb04))

## [1] 36811     3
print(owt_df02_gb05)

## # A tibble: 12 x 2
##   parameter  Count
##   <fct>     <int>
## 1 CHLOROPHYLL 88471
## 2 DENSITY     88317
## 3 DO          109542
## 4 ENTERO      144341
## 5 FECAL       137649
## 6 OG          7944
## 7 PH          107818
## 8 SALINITY    109492
## 9 SUSO         27543
## 10 TEMP        139066
## 11 TOTAL       137584
## 12 XMS         139002
print(dim(owt_df02_gb05))

## [1] 12  2
print(owt_df02_gb06)

## # A tibble: 51 x 2
##   depth_m  Count
##   <dbl>   <int>
## 1 1       119858
## 2 1.5     93937
## 3 2       120007
## 4 3       71058
## 5 6       55762
## 6 6.1     43265
## 7 9       65616
## 8 9.1    3052
## 9 11      23069
## 10 12     80308
## # ... with 41 more rows
print(dim(owt_df02_gb06))

## [1] 51  2
print(head(owt_df02_gb07, 7))

## # A tibble: 7 x 5
## # Groups:   date_sample, project, depth_m_bin [1]
##   date_sample project depth_m_bin parameter      Avg
##   <date>      <fct>    <chr>      <fct>     <dbl>
## 1 1990-11-15 PL00     [8,33]    CHLOROPHYLL  0.87

```

```

## 2 1990-11-15 PL00 [8,33) DENSITY 23.9
## 3 1990-11-15 PL00 [8,33) DO 6.55
## 4 1990-11-15 PL00 [8,33) PH 8.08
## 5 1990-11-15 PL00 [8,33) SALINITY 33.6
## 6 1990-11-15 PL00 [8,33) TEMP 19.4
## 7 1990-11-15 PL00 [8,33) XMS 44.8

print(dim(owt_df02_gb07))

## [1] 121286      5

print(owt_df02_gb08)

## # A tibble: 8 x 2
##   depth_m_bin  Count
##   <chr>        <int>
## 1 [0,8)        503887
## 2 [112,120]    5908
## 3 [33,47)      55629
## 4 [47,70)      74036
## 5 [70,90)      51358
## 6 [8,33)       434169
## 7 [90,112)     27621
## 8 Unknown      84161

print(dim(owt_df02_gb08))

## [1] 8 2

print(head(owt_df02_gb09, 7))

## # A tibble: 7 x 4
## # Groups:   date_sample, project [1]
##   date_sample project parameter     Avg
##   <date>      <fct>   <fct>      <dbl>
## 1 1990-11-15 PL00   CHLOROPHYLL  0.87
## 2 1990-11-15 PL00   DENSITY     23.9
## 3 1990-11-15 PL00   DO          6.55
## 4 1990-11-15 PL00   PH          8.08
## 5 1990-11-15 PL00   SALINITY    33.6
## 6 1990-11-15 PL00   TEMP         19.4
## 7 1990-11-15 PL00   XMS         44.8

print(dim(owt_df02_gb09))

## [1] 48395      4

```

Create custom function to perform df mutation/casting and boxplot display

```

ts_eda <- function(ts_df = NA,
                    form_lead = c(),
                    form_cast = c(),
                    param_lst = c(),
                    l1_col = c(),
                    l1_param = c(),
                    l2_col = c(),

```

```

l2_param = c(),
rtn_met = TRUE,
grph_title = "All",
box = TRUE,
week_agg = FALSE,
out_rm = FALSE) {

# Define function to dcast, print boxplot, and print desc stats for each parameter
dcast_form <- as.formula(paste(form_lead, collapse = "+"), form_cast, sep = "~"))
#print(dcast_form)
#print(head(ts_df))

counter <- 1
# Loop to dcast parameters to cols
for(p in param_lst) {
  param_df <- ts_df[ts_df[, form_cast] == p, ]
  param_df <- param_df %>%
    drop_na()
  #print(param_df)

  #
#-----#
# If keyword set to TRUE, convert daily TS data to weekly
if(week_agg == TRUE) {
  param_df02a <- param_df
  param_df02a$week <- isoweek(param_df02a$date_sample)

  # Date Handling Citation:
  # https://lubridate.tidyverse.org/reference/round_date.html
  param_df02a$week_end <- ceiling_date(param_df02a$date_sample,
                                         unit = "week",
                                         week_start = getOption("lubridate.week.start",
                                         ↴ 1))

  #print(head(param_df02a, 7))
  param_df$date_sample <- param_df02a$week_end
}

# Casting Citation:
# https://www.datasciencemadesimple.com/melting-casting-r/
param_df_cast <- dcast(param_df, dcast_form, mean)
#print(head(param_df_cast, 7))

#
#-----#
# If keyword set to TRUE, remove outliers
if(out_rm == TRUE) {
  #print(head(ts_df_mrgd01c, 7))
  #print(dim(ts_df_mrgd01c))
  ts_df_mrgd01c_s1 <- subset(x = param_df_cast, select = p)
  ts_df_mrgd01c_s1_fit <- preProcess(ts_df_mrgd01c_s1,
                                       method = c("center", "scale"))
  ts_df_mrgd01c_s1_trans <- predict(ts_df_mrgd01c_s1_fit,
                                      ts_df_mrgd01c_s1)

  # Subset non-outlier data
  print(dim(param_df_cast))
}

```

```

param_df_cast <- subset(param_df_cast,
                        (abs(ts_df_mrgd01c_s1_trans) <= 3))
dfs1b <- param_df_cast[, p]
#print(head(param_df_cast, 7))
}

# For first item in vector, no merge is needed
if(counter == 1) {
  ts_df_mrgd <- param_df_cast
}
# For 2-n items in vector, merge dataframes iteratively
else {
  # Merge individual casted parameter df's into 1 df
  # DF Merge Citation:
  # https://www.geeksforgeeks.org/joining-of-dataframes-in-r-programming/
  ts_df_mrgd <- merge(x = ts_df_mrgd,
                        y = param_df_cast,
                        by = form_lead,
                        all = TRUE)
}

# Run custom function to ID outliers and generate boxplot
ts_df_mrgd01a <- na.omit(param_df_cast)
#print(head(ts_df_mrgd01a, 7))
#print(dim(ts_df_mrgd01a))
dfs1 <- subset(x = ts_df_mrgd01a, select = p)
dfs1a <- dfs1
#print(head(dfs1a, 7))

dfs1a$Groups <- as.factor(grph_title)
box_comp(xcol = p,
          df = dfs1,
          rtn_met = rtn_met,
          box = box)
#print(dfs_lst)

#
# -----
# Create subplots based on additional agg layers
#print(paste0("L2 length = ", length(l2_param)))
if(length(l2_param) == 0) {
  for(l1 in l1_param) {
    ts_df_mrgd_chl_dmb1 <- ts_df_mrgd01a[(ts_df_mrgd01a[, l1_col] == l1), ]

    # Run custom function to ID outliers and generate boxplot
    #print(head(ts_df_mrgd_chl_dmb1))
    # Error Handling Citation:
    # https://www.geeksforgeeks.org/handling-errors-in-r-programming/
    dfs2 <- subset(x = ts_df_mrgd_chl_dmb1, select = p)
    dfs2a <- dfs2
    try(dfs2a$Groups <- as.factor(l1))
    try(box_comp(xcol = p,
                 df = dfs2,
                 rtn_met = rtn_met,

```

```

                grph_title = 11,
                box = box),
            silent = TRUE)
    dfs1a <- rbind(dfs1a, dfs2a)
}
}
else {
  for(l1_in l1_param) {
    for(l2_in l2_param) {
      ts_df_mrgd_chl_dmb1 <- ts_df_mrgd01a[(ts_df_mrgd01a[, l1_col] == l1) &
→ (ts_df_mrgd01a[, l2_col] == l2), ]

      # Run custom function to ID outliers and generate boxplot
      #print(head(ts_df_mrgd_chl_dmb1))
      dfs3 <- subset(x = ts_df_mrgd_chl_dmb1, select = p)
      dfs3a <- dfs3

try(dfs3a$Groups <- as.factor(paste0(l1, ":", l2)))
try(box_comp(xcol = p,
              df = dfs3,
              rtn_met = rtn_met,
              grph_title = paste0(l1, ":", l2),
              box = box),
              silent = TRUE)
      dfs1a <- rbind(dfs1a, dfs3a)
    }
  }
}

#-----
#print(dim(dfs1a))
#print(head(dfs1a, 7))
bx_form <- as.formula(paste(p, "Groups", sep = "~"))
#print(bx_form)
#print(head(dfs1a, 7))

boxplot(bx_form,
        dfs1a,
        main = "Boxplot(s)")

  counter <- counter + 1
}
print(head(ts_df_mrgd, 7))
print(describe(ts_df_mrgd))

# Display summary of NA count
ts_df_na <- sapply(ts_df, function(x) sum(is.na(x)))
ts_df_notna <- sapply(ts_df, function(x) sum(!is.na(x)))
ts_df_tbl01 <- rbind(ts_df_notna, ts_df_na)
ts_df_tbl02 <- rbind(ts_df_tbl01, round(prop.table(ts_df_tbl01, margin = 2), 4))
rownames(ts_df_tbl02) <- c("Not NA n", "NA n", "Not NA %", "NA %")
print(ts_df_tbl02) # This table w/ null counts and proportions for each feature not
→ displayed for space purposes

```

```

    return(ts_df_mrgd)
}

```

Run custom function on data aggregated by `date_sample` and `parameter`

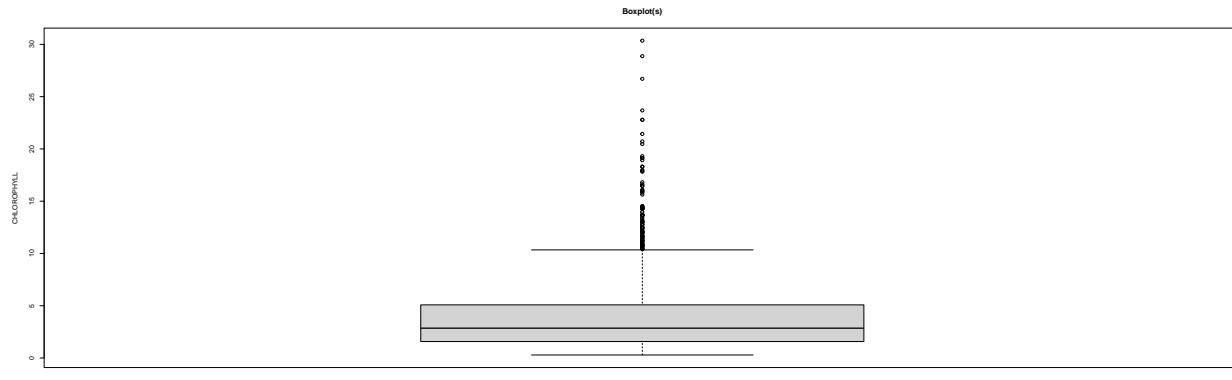
```

param_lst02 <- c("CHLOROPHYLL",
                 "DENSITY",
                 "DO",
                 "ENTERO",
                 "FECAL",
                 "OG",
                 "PH",
                 "SALINITY",
                 "SUSO",
                 "TEMP",
                 "XMS")

owt_df02_gb04_mrgd = ts_eda(ts_df = owt_df02_gb04,
                             form_lead = "date_sample",
                             form_cast = "parameter",
                             param_lst = param_lst02,
                             rtn_met = TRUE,
                             box = FALSE,
                             week_agg = FALSE
                             )

```

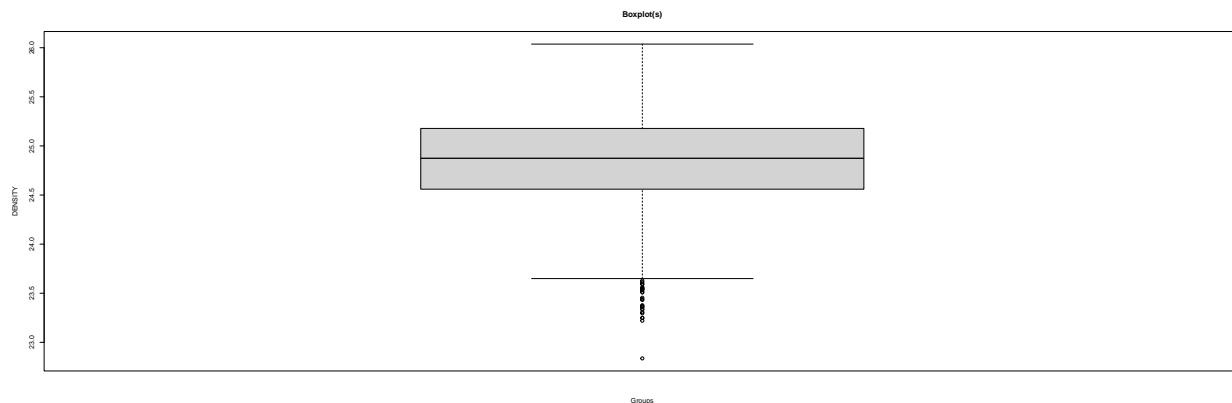
##	metric	V2
## 1	Variable:	CHLOROPHYLL
## 2	Total N:	
## 3	Count	2092
## 4	NA Count	0
## 5	Mean	3.91
## 6	Median	2.853
## 7	Standard Deviation	3.411
## 8	Variance	11.633
## 9	Range	30.064
## 10	Min	0.29
## 11	Max	30.353
## 12	25th Percentile	1.576
## 13	75th Percentile	5.083
## 14	Subset w/o Outliers:	
## 15	Count	2050
## 16	%	98%
## 17	Outlier %	2%
## 18	NA Count	0
## 19	Mean	3.626
## 20	Median	2.791
## 21	Standard Deviation	2.74
## 22	Variance	7.507
## 23	Range	13.676
## 24	Min	0.29
## 25	Max	13.965



```

##           metric      V2
## 1          Variable: DENSITY
## 2          Total N:
## 3          Count      2246
## 4          NA Count     0
## 5          Mean       24.85
## 6          Median     24.874
## 7          Standard Deviation   0.466
## 8          Variance     0.217
## 9          Range        3.2
## 10         Min         22.837
## 11         Max         26.037
## 12         25th Percentile 24.56
## 13         75th Percentile 25.178
## 14 Subset w/o Outliers:
## 15         Count      2232
## 16         %          99.4%
## 17         Outlier %    0.6%
## 18         NA Count     0
## 19         Mean       24.86
## 20         Median     24.877
## 21         Standard Deviation   0.451
## 22         Variance     0.203
## 23         Range        2.583
## 24         Min         23.454
## 25         Max         26.037

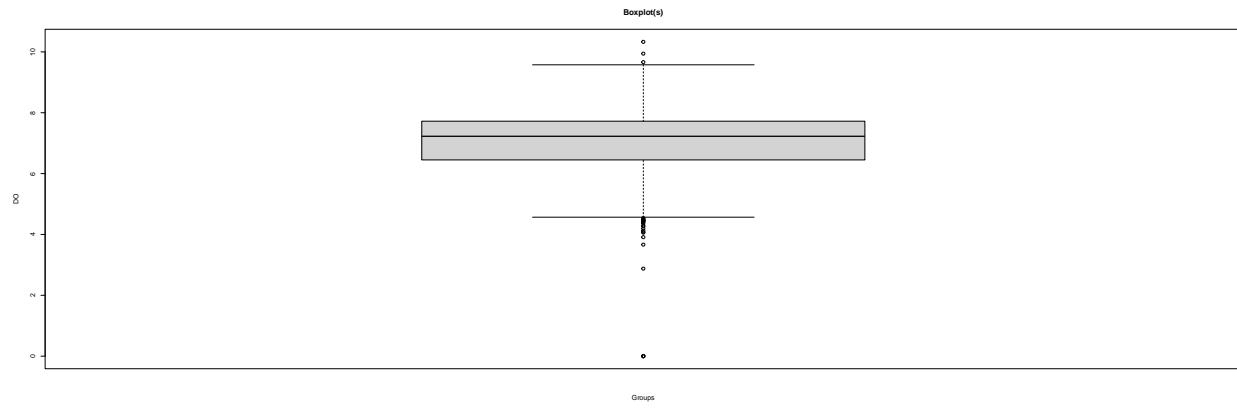
```



```

##               metric      V2
## 1          Variable: D0
## 2          Total N:
## 3             Count     2504
## 4        NA Count      0
## 5            Mean    7.041
## 6            Median   7.226
## 7 Standard Deviation   0.99
## 8            Variance   0.98
## 9            Range    10.329
## 10           Min       0
## 11           Max    10.329
## 12 25th Percentile   6.451
## 13 75th Percentile   7.722
## 14 Subset w/o Outliers:
## 15           Count     2494
## 16           %    99.6%
## 17        Outlier %    0.4%
## 18        NA Count      0
## 19            Mean    7.057
## 20            Median   7.232
## 21 Standard Deviation   0.937
## 22            Variance   0.877
## 23            Range    5.822
## 24           Min     4.12
## 25           Max    9.942

```



```

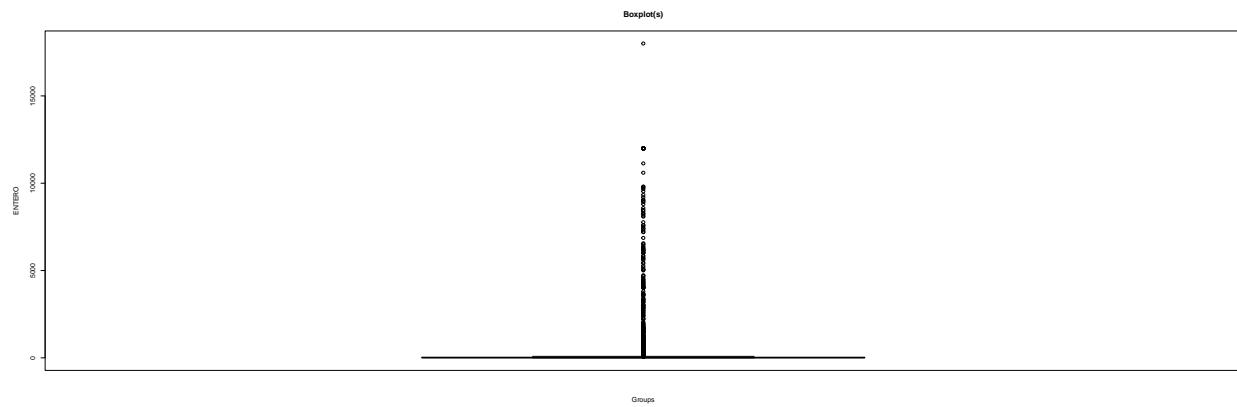
##               metric      V2
## 1          Variable: ENTERO
## 2          Total N:
## 3             Count     5197
## 4        NA Count      0
## 5            Mean    284.213
## 6            Median   7.333
## 7 Standard Deviation  1325.881
## 8            Variance 1757960.571
## 9            Range    18000
## 10           Min       0
## 11           Max    18000
## 12 25th Percentile   2.75
## 13 75th Percentile   35.455

```

```

## 14 Subset w/o Outliers:
## 15             Count      5090
## 16             %       97.9%
## 17        Outlier %      2.1%
## 18        NA Count       0
## 19             Mean    112.006
## 20             Median       7
## 21 Standard Deviation   417.536
## 22             Variance 174336.299
## 23             Range   4233.333
## 24             Min       0
## 25             Max   4233.333

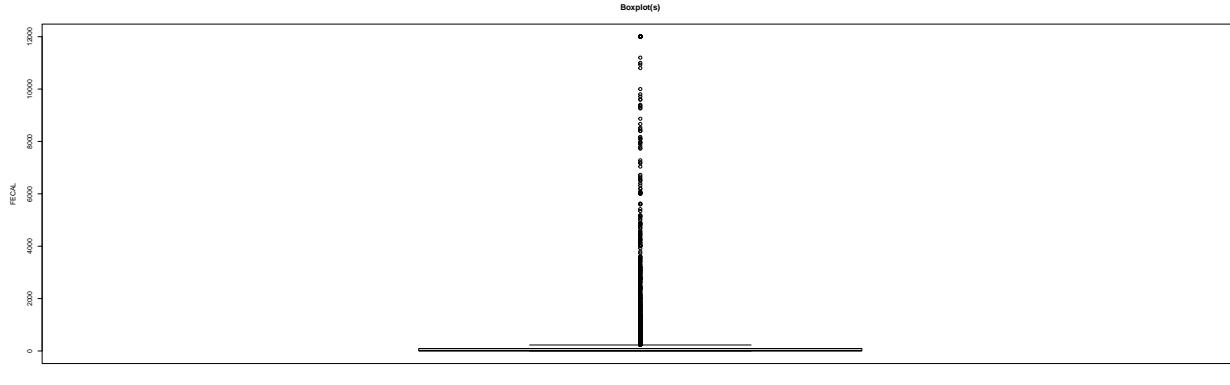
```



```

##               metric      V2
## 1          Variable: FECAL
## 2        Total N:      5078
## 3             Count      5078
## 4        NA Count       0
## 5             Mean    409.934
## 6             Median     10.564
## 7 Standard Deviation   1513.552
## 8             Variance 2290838.653
## 9             Range    12000
## 10            Min       0
## 11            Max    12000
## 12        25th Percentile    3.404
## 13        75th Percentile   94.095
## 14 Subset w/o Outliers:
## 15             Count      4965
## 16             %       97.8%
## 17        Outlier %      2.2%
## 18        NA Count       0
## 19             Mean    208.248
## 20             Median       10
## 21 Standard Deviation   600.094
## 22             Variance 360113.198
## 23             Range    4900
## 24             Min       0
## 25             Max    4900

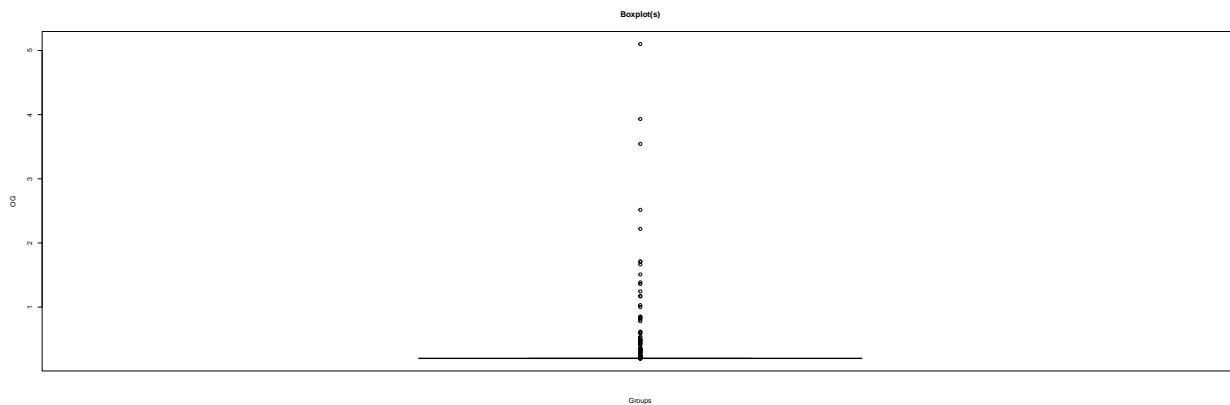
```



```

##           metric      V2
## 1          Variable: OG
## 2          Total N:
## 3          Count      937
## 4          NA Count     0
## 5          Mean       0.244
## 6          Median      0.2
## 7          Standard Deviation 0.286
## 8          Variance     0.082
## 9          Range        4.9
## 10         Min         0.2
## 11         Max         5.1
## 12         25th Percentile 0.2
## 13         75th Percentile 0.2
## 14 Subset w/o Outliers:
## 15         Count      923
## 16         %         98.5%
## 17         Outlier %    1.5%
## 18         NA Count     0
## 19         Mean       0.215
## 20         Median      0.2
## 21         Standard Deviation 0.078
## 22         Variance     0.006
## 23         Range        0.83
## 24         Min         0.2
## 25         Max         1.03

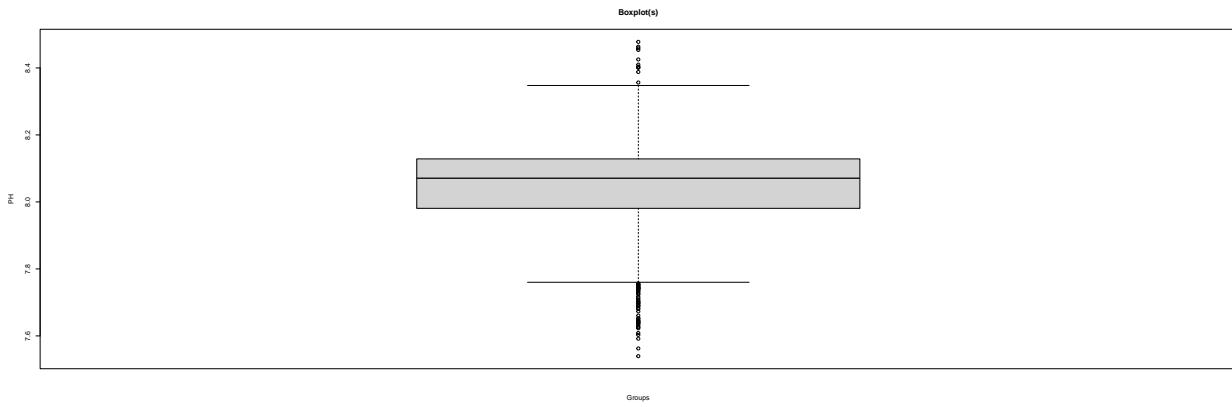
```



```

##               metric      V2
## 1            Variable: PH
## 2            Total N:
## 3             Count     2469
## 4            NA Count     0
## 5             Mean      8.05
## 6             Median     8.071
## 7            Standard Deviation 0.117
## 8             Variance    0.014
## 9             Range      0.938
## 10            Min       7.54
## 11            Max       8.478
## 12            25th Percentile 7.981
## 13            75th Percentile 8.128
## 14 Subset w/o Outliers:
## 15            Count     2435
## 16             %      98.6%
## 17            Outlier %     1.4%
## 18            NA Count     0
## 19             Mean      8.053
## 20             Median     8.071
## 21            Standard Deviation 0.108
## 22             Variance    0.012
## 23             Range      0.702
## 24            Min       7.7
## 25            Max       8.402

```



```

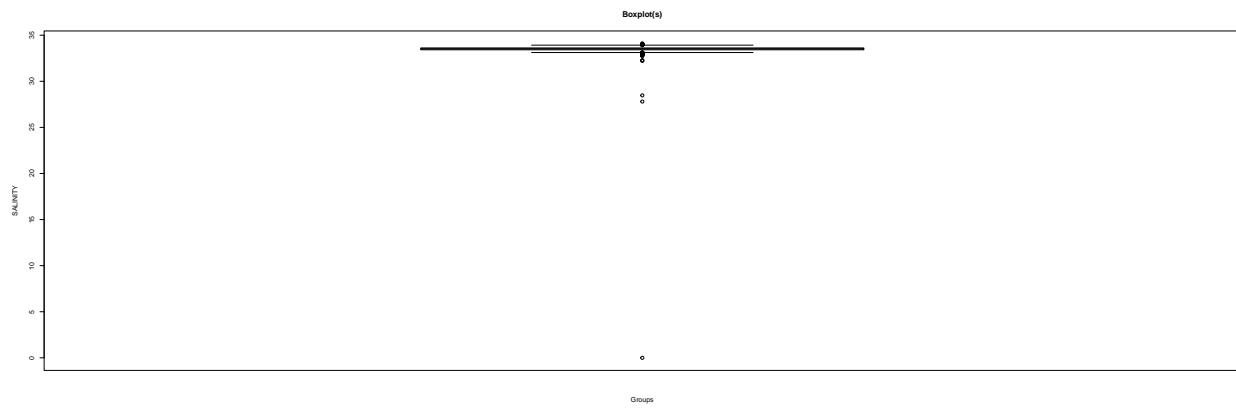
##               metric      V2
## 1            Variable: SALINITY
## 2            Total N:
## 3             Count     2505
## 4            NA Count     0
## 5             Mean      33.502
## 6             Median     33.527
## 7            Standard Deviation 0.706
## 8             Variance    0.499
## 9             Range      34.098
## 10            Min       0
## 11            Max      34.098
## 12            25th Percentile 33.418
## 13            75th Percentile 33.62

```

```

## 14 Subset w/o Outliers:
## 15             Count      2502
## 16             %       99.9%
## 17        Outlier %      0.1%
## 18        NA Count       0
## 19             Mean    33.519
## 20             Median   33.527
## 21 Standard Deviation  0.165
## 22             Variance  0.027
## 23             Range    1.888
## 24             Min     32.21
## 25             Max     34.098

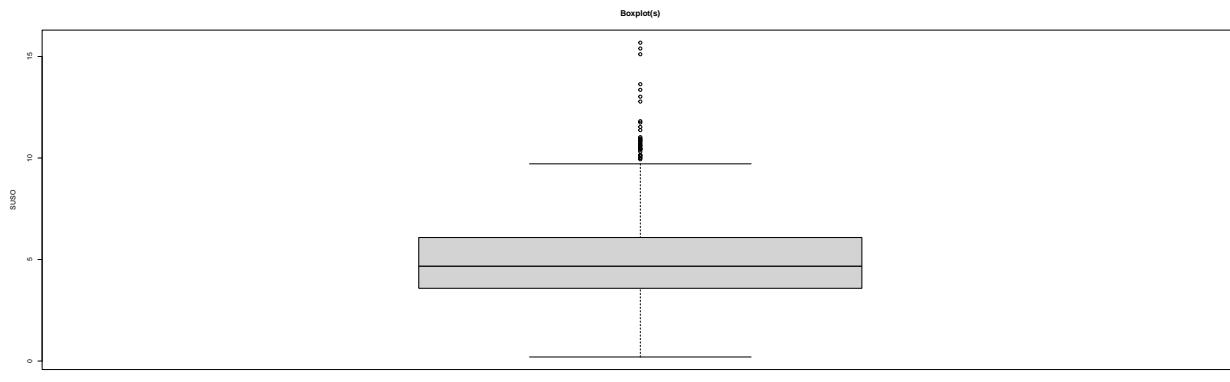
```



```

##               metric      V2
## 1          Variable: SUSO
## 2        Total N:
## 3             Count      976
## 4        NA Count       0
## 5             Mean     4.993
## 6             Median    4.67
## 7 Standard Deviation  2.164
## 8             Variance   4.681
## 9             Range     15.48
## 10            Min      0.2
## 11            Max     15.68
## 12        25th Percentile 3.583
## 13        75th Percentile 6.083
## 14 Subset w/o Outliers:
## 15             Count      966
## 16             %       99%
## 17        Outlier %      1%
## 18        NA Count       0
## 19             Mean     4.906
## 20             Median   4.639
## 21 Standard Deviation  1.991
## 22             Variance  3.966
## 23             Range    11.172
## 24            Min      0.2
## 25            Max     11.372

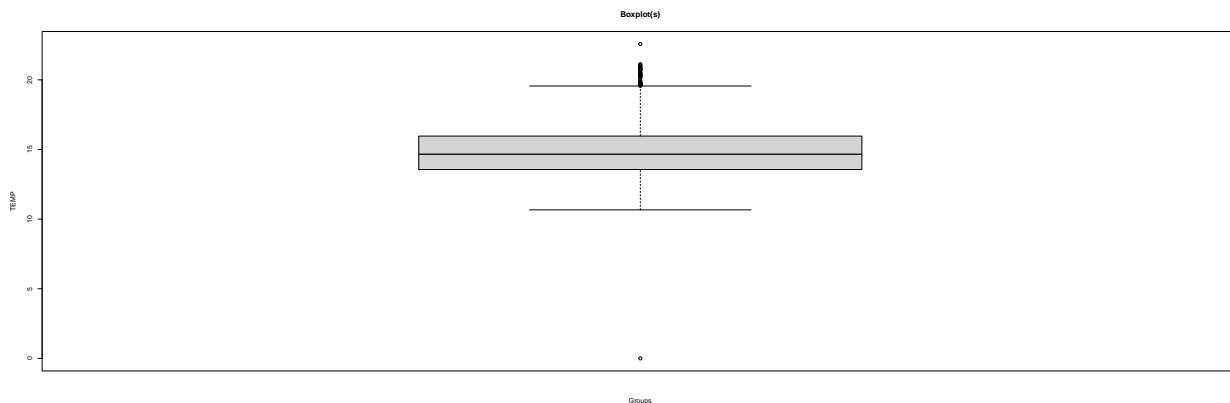
```



```

##           metric      V2
## 1          Variable: TEMP
## 2          Total N:
## 3          Count      3373
## 4          NA Count     0
## 5          Mean       14.843
## 6          Median      14.661
## 7          Standard Deviation   1.879
## 8          Variance      3.53
## 9          Range        22.568
## 10         Min          0
## 11         Max        22.568
## 12         25th Percentile 13.561
## 13         75th Percentile 15.964
## 14 Subset w/o Outliers:
## 15         Count      3357
## 16         %         99.5%
## 17         Outlier %    0.5%
## 18         NA Count     0
## 19         Mean       14.82
## 20         Median      14.65
## 21         Standard Deviation   1.821
## 22         Variance      3.315
## 23         Range        9.794
## 24         Min          10.666
## 25         Max        20.46

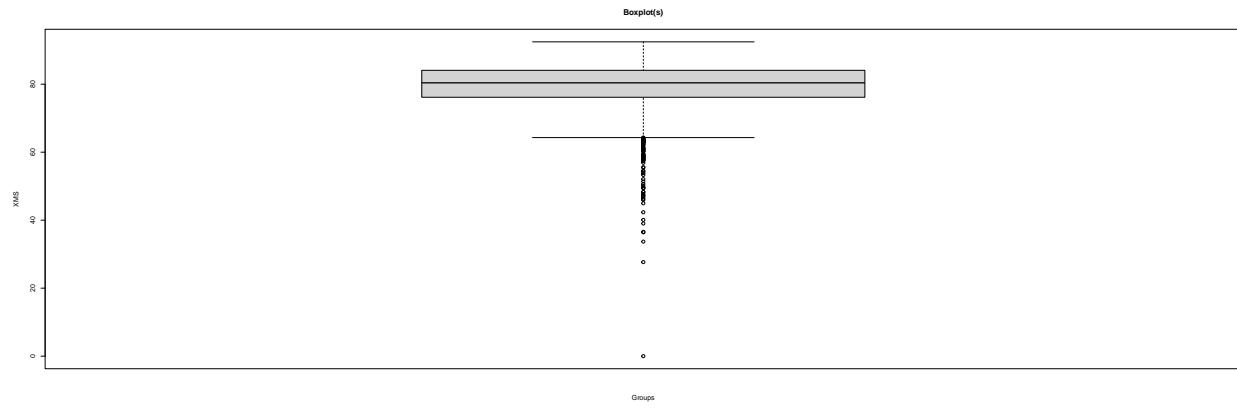
```



```

##               metric      V2
## 1             Variable: XMS
## 2       Total N:
## 3           Count     3344
## 4       NA Count      0
## 5           Mean    79.402
## 6           Median   80.4
## 7 Standard Deviation   6.979
## 8           Variance  48.713
## 9           Range    92.456
## 10          Min      0
## 11          Max    92.456
## 12 25th Percentile  76.156
## 13 75th Percentile  84.084
## 14 Subset w/o Outliers:
## 15          Count    3302
## 16          %     98.7%
## 17 Outlier %     1.3%
## 18       NA Count      0
## 19           Mean   79.791
## 20           Median  80.486
## 21 Standard Deviation  5.988
## 22           Variance 35.857
## 23           Range   33.88
## 24          Min    58.577
## 25          Max    92.456

```



```

##   date_sample CHLOROPHYLL DENSITY      DO      ENTERO      FECAL OG      PH SALINITY
## 1 1990-11-15        1.07 23.854 6.98000      NA      NA NA 8.130 33.59550
## 2 1991-01-02        NA     NA      NA 32.05128 125.64103 NA      NA      NA
## 3 1991-01-03        NA     NA      NA 18.71795 51.28205 NA      NA      NA
## 4 1991-01-07        NA     NA      NA 106.15385 80.76923 NA      NA      NA
## 5 1991-01-08        NA     NA      NA 40.00000 40.55556 NA      NA      NA
## 6 1991-01-09        NA     NA 5.47625 20.33898 40.50847 NA 8.195 33.51938
## 7 1991-01-10        NA     NA 5.50000 40.22727 78.18182 NA      NA 33.49300
##   SUSO      TEMP      XMS
## 1  NA 19.37000 60.22500
## 2  NA 14.50769 80.02564
## 3  NA 14.39231 83.89744
## 4  NA 14.54103 78.97436
## 5  NA 13.43000 80.20000

```

```

## 6    NA 14.26889 86.21111
## 7    NA 13.75000 80.45833
##          vars   n   mean      sd median trimmed   mad   min     max
## date_sample 1 5450    NaN      NA     NA    NaN    NA Inf -Inf
## CHLOROPHYLL 2 2092    3.91    3.41    2.85    3.33    2.28   0.29 30.35
## DENSITY     3 2246    24.85    0.47   24.87   24.87    0.46 22.84 26.04
## DO          4 2504    7.04    0.99    7.23    7.11    0.86   0.00 10.33
## ENTERO      5 5197 284.21 1325.88    7.33   25.74    7.91   0.00 18000.00
## FECAL       6 5078 409.93 1513.55   10.56   69.45   12.57   0.00 12000.00
## OG          7  937    0.24    0.29    0.20    0.20   0.00 0.20  5.10
## PH          8 2469    8.05    0.12    8.07    8.06   0.10 7.54  8.48
## SALINITY    9 2505   33.50    0.71   33.53   33.52   0.15   0.00 34.10
## SUSO        10  976    4.99    2.16    4.67    4.80   1.80  0.20 15.68
## TEMP        11 3373   14.84    1.88   14.66   14.75   1.78   0.00 22.57
## XMS         12 3344   79.40    6.98   80.40   80.08   5.76   0.00 92.46
##          range skew kurtosis   se
## date_sample -Inf    NA      NA    NA
## CHLOROPHYLL 30.06   2.25    7.84  0.07
## DENSITY      3.20   -0.42    0.25  0.01
## DO          10.33  -1.05    3.72  0.02
## ENTERO      18000.00   6.95   53.47 18.39
## FECAL       12000.00   5.81   36.94 21.24
## OG          4.90   10.89  144.21  0.01
## PH          0.94   -0.66   1.32  0.00
## SALINITY    34.10  -42.97 2021.03  0.01
## SUSO        15.48   1.09   2.23  0.07
## TEMP        22.57   0.35   1.15  0.03
## XMS         92.46  -1.86   9.43  0.12
##          date_sample parameter      Avg
## Not NA n    36811    36811 35669.000
## NA n        0        0 1142.000
## Not NA %    1        1  0.969
## NA %        0        0  0.031

owt_df02_gb04_wkly = ts_eda(ts_df = owt_df02_gb04,
                             form_lead = "date_sample",
                             form_cast = "parameter",
                             param_lst = param_lst02,
                             rtn_met = TRUE,
                             box = FALSE,
                             week_agg = TRUE
)

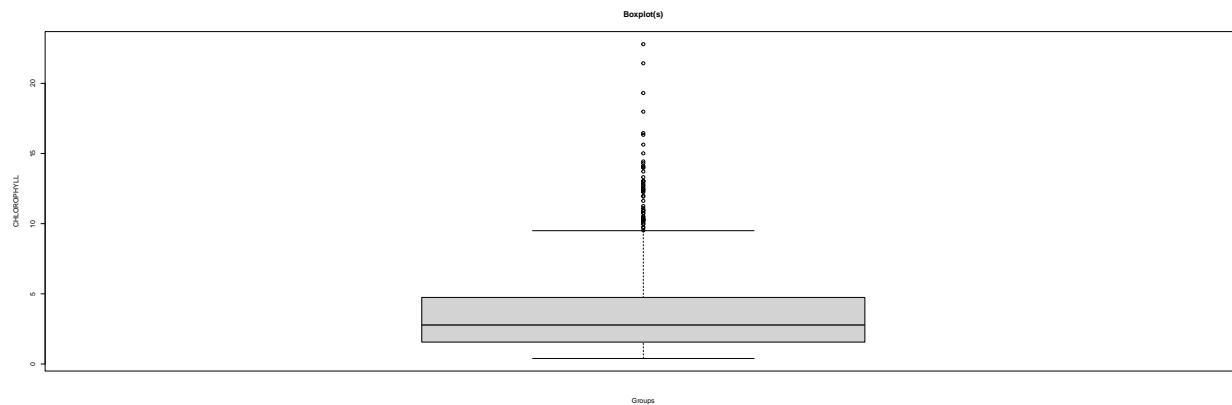
```

	metric	V2
## 1	Variable:	CHLOROPHYLL
## 2	Total N:	
## 3	Count	1071
## 4	NA Count	0
## 5	Mean	3.664
## 6	Median	2.778
## 7	Standard Deviation	2.98
## 8	Variance	8.879
## 9	Range	22.399
## 10	Min	0.393

```

## 11          Max      22.792
## 12    25th Percentile     1.56
## 13    75th Percentile    4.744
## 14 Subset w/o Outliers:
## 15          Count     1049
## 16          %      97.9%
## 17    Outlier %      2.1%
## 18    NA Count        0
## 19          Mean     3.423
## 20          Median    2.726
## 21 Standard Deviation   2.465
## 22          Variance   6.074
## 23          Range     12.205
## 24          Min      0.393
## 25          Max      12.599

```



```

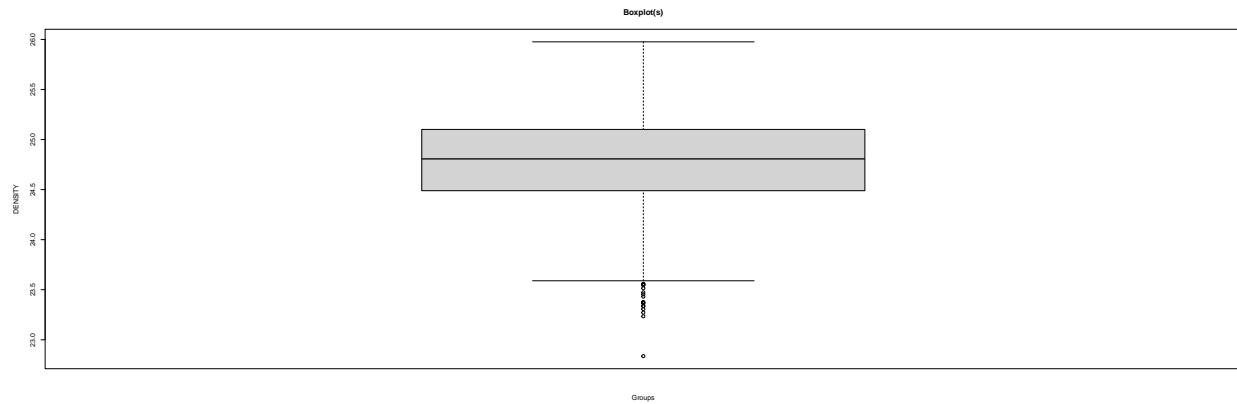
##          metric      V2
## 1 Variable: DENSITY
## 2 Total N: 1098
## 3          Count     1098
## 4    NA Count        0
## 5          Mean     24.78
## 6          Median    24.807
## 7 Standard Deviation 0.467
## 8          Variance   0.218
## 9          Range     3.139
## 10         Min      22.837
## 11         Max      25.976
## 12    25th Percentile 24.489
## 13    75th Percentile 25.1
## 14 Subset w/o Outliers:
## 15          Count     1089
## 16          %      99.2%
## 17    Outlier %      0.8%
## 18    NA Count        0
## 19          Mean     24.793
## 20          Median    24.812
## 21 Standard Deviation 0.448
## 22          Variance   0.201
## 23          Range     2.545
## 24          Min      23.431

```

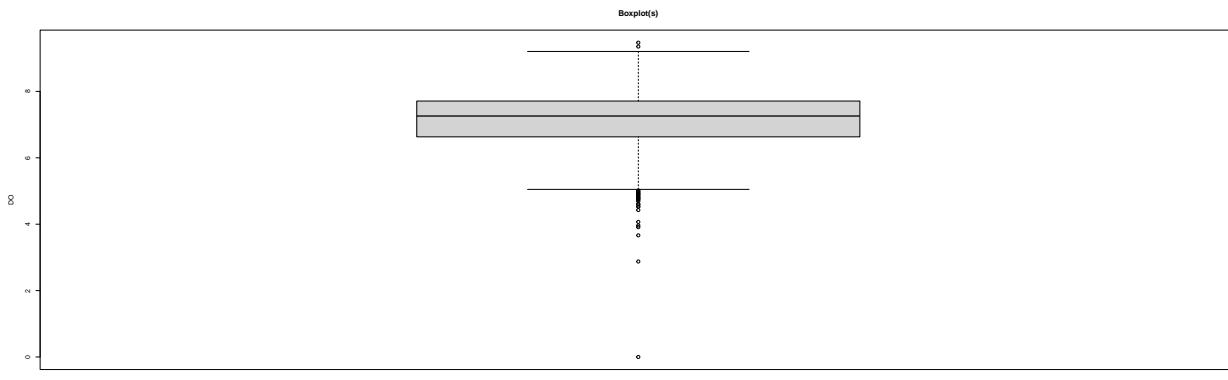
```
## 25
```

```
Max
```

```
25.976
```



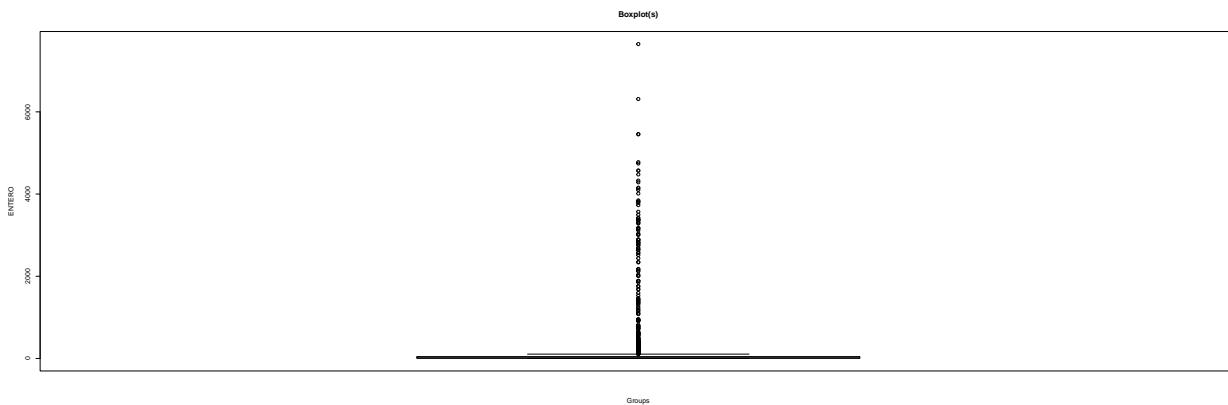
```
##          metric      V2
## 1        Variable: DO
## 2        Total N:
## 3            Count    1203
## 4       NA Count     0
## 5            Mean    7.102
## 6            Median   7.259
## 7  Standard Deviation  0.876
## 8            Variance  0.767
## 9            Range    9.468
## 10           Min     0
## 11           Max    9.468
## 12      25th Percentile 6.632
## 13      75th Percentile 7.71
## 14 Subset w/o Outliers:
## 15            Count    1196
## 16            %    99.4%
## 17        Outlier %    0.6%
## 18       NA Count     0
## 19            Mean    7.125
## 20            Median   7.265
## 21  Standard Deviation  0.821
## 22            Variance  0.674
## 23            Range    4.942
## 24           Min    4.527
## 25           Max    9.468
```



```

##               metric      V2
## 1             Variable: ENTERO
## 2       Total N:
## 3           Count     1614
## 4       NA Count      0
## 5           Mean    214.198
## 6           Median   12.258
## 7   Standard Deviation 718.919
## 8           Variance 516845.04
## 9           Range   7646.278
## 10          Min      2
## 11          Max   7648.278
## 12      25th Percentile  5.434
## 13      75th Percentile 45.567
## 14 Subset w/o Outliers:
## 15           Count    1557
## 16           %    96.5%
## 17       Outlier %    3.5%
## 18       NA Count      0
## 19           Mean   91.784
## 20           Median  11.698
## 21   Standard Deviation 275.13
## 22           Variance 75696.459
## 23           Range   2344.566
## 24          Min      2
## 25          Max   2346.566

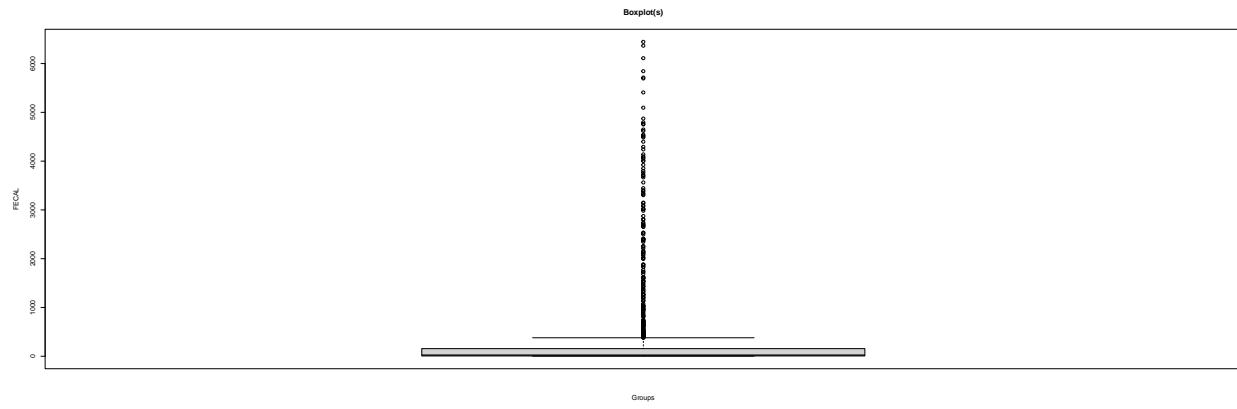
```



```

##               metric      V2
## 1          Variable: FECAL
## 2          Total N:
## 3             Count     1614
## 4        NA Count      0
## 5            Mean   304.597
## 6            Median  23.303
## 7 Standard Deviation    826.25
## 8            Variance 682689.747
## 9            Range   6443.07
## 10           Min      2
## 11           Max  6445.07
## 12      25th Percentile    6.236
## 13      75th Percentile  156.176
## 14 Subset w/o Outliers:
## 15           Count     1562
## 16           %     96.8%
## 17        Outlier %    3.2%
## 18        NA Count      0
## 19            Mean  177.977
## 20            Median 20.506
## 21 Standard Deviation 421.323
## 22            Variance 177512.97
## 23            Range  2737.584
## 24           Min      2
## 25           Max  2739.584

```



```

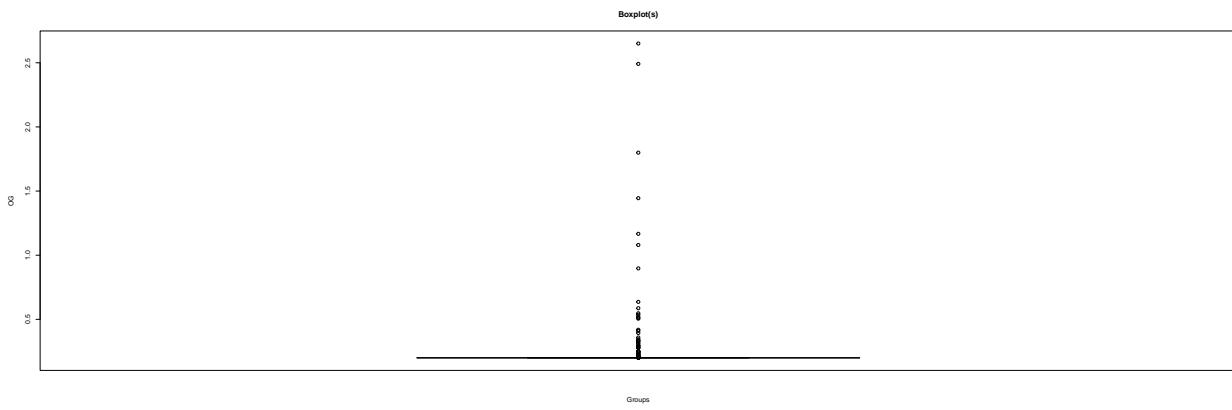
##               metric      V2
## 1          Variable: OG
## 2          Total N:
## 3             Count     351
## 4        NA Count      0
## 5            Mean   0.244
## 6            Median  0.2
## 7 Standard Deviation 0.227
## 8            Variance 0.052
## 9            Range   2.45
## 10           Min      0.2
## 11           Max   2.65
## 12      25th Percentile  0.2
## 13      75th Percentile  0.2

```

```

## 14 Subset w/o Outliers:
## 15             Count      345
## 16             %       98.3%
## 17        Outlier %      1.7%
## 18        NA Count       0
## 19             Mean     0.218
## 20             Median     0.2
## 21 Standard Deviation   0.068
## 22             Variance    0.005
## 23             Range      0.697
## 24             Min       0.2
## 25             Max      0.897

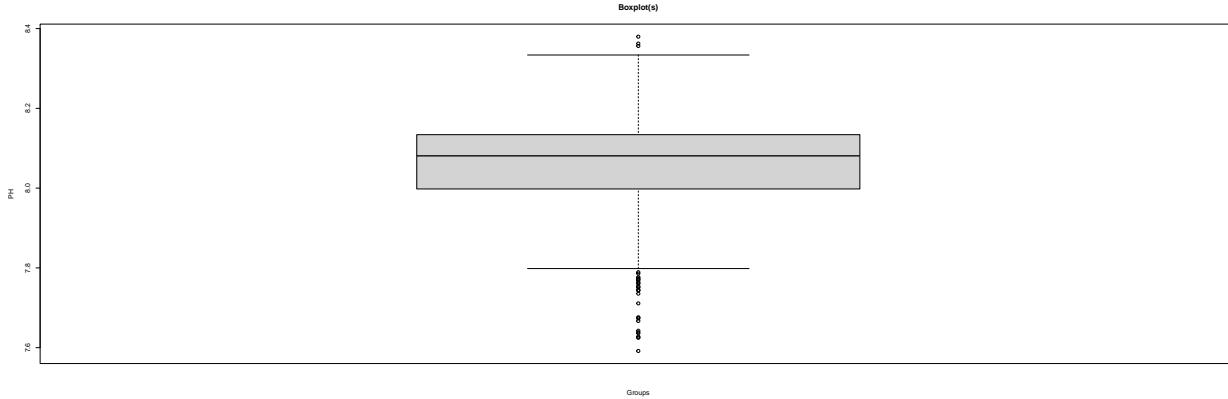
```



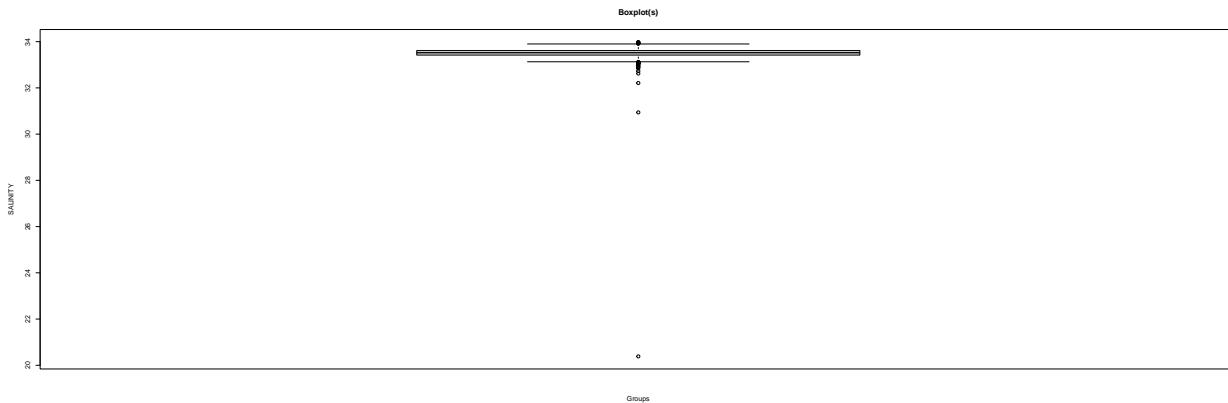
```

##          metric      V2
## 1 Variable: PH
## 2 Total N:
## 3        Count     1205
## 4        NA Count      0
## 5             Mean    8.062
## 6             Median   8.081
## 7 Standard Deviation   0.11
## 8             Variance  0.012
## 9             Range     0.788
## 10            Min      7.592
## 11            Max      8.38
## 12 25th Percentile    7.998
## 13 75th Percentile    8.134
## 14 Subset w/o Outliers:
## 15             Count     1193
## 16             %       99%
## 17        Outlier %      1%
## 18        NA Count       0
## 19             Mean     8.066
## 20             Median   8.082
## 21 Standard Deviation   0.102
## 22             Variance  0.01
## 23             Range     0.644
## 24            Min      7.735
## 25            Max      8.38

```



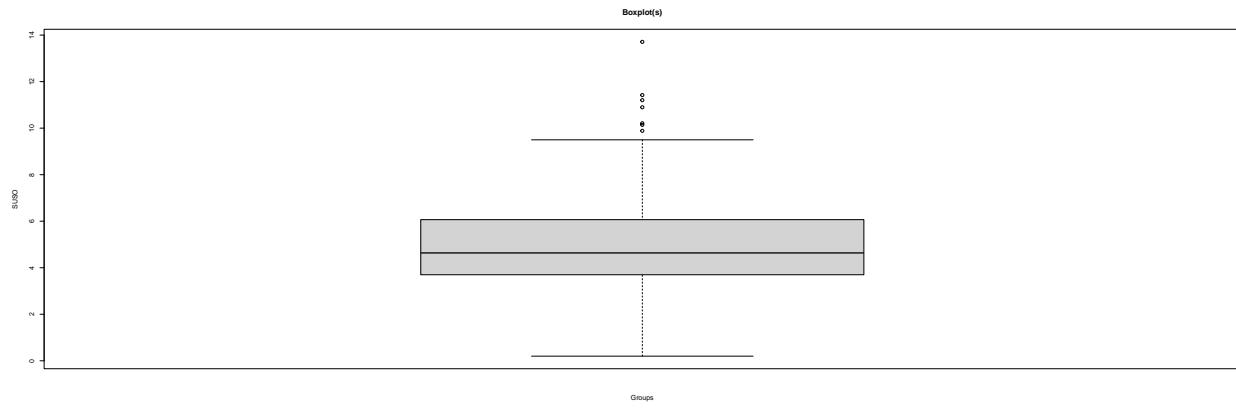
```
##           metric      V2
## 1          Variable: SALINITY
## 2          Total N:
## 3          Count      1198
## 4          NA Count     0
## 5          Mean       33.501
## 6          Median      33.521
## 7          Standard Deviation   0.42
## 8          Variance      0.177
## 9          Range        13.596
## 10         Min         20.385
## 11         Max         33.981
## 12         25th Percentile 33.418
## 13         75th Percentile 33.615
## 14 Subset w/o Outliers:
## 15         Count      1195
## 16         %         99.7%
## 17         Outlier %    0.3%
## 18         NA Count     0
## 19         Mean       33.516
## 20         Median      33.522
## 21         Standard Deviation   0.161
## 22         Variance      0.026
## 23         Range        1.36
## 24         Min         32.621
## 25         Max         33.981
```



```

##               metric      V2
## 1          Variable: SUSO
## 2          Total N:
## 3             Count     367
## 4        NA Count      0
## 5            Mean    4.914
## 6            Median   4.637
## 7 Standard Deviation   1.85
## 8            Variance  3.424
## 9            Range   13.509
## 10           Min     0.2
## 11           Max   13.709
## 12      25th Percentile 3.699
## 13      75th Percentile 6.067
## 14 Subset w/o Outliers:
## 15             Count     363
## 16             %    98.9%
## 17        Outlier %    1.1%
## 18        NA Count      0
## 19            Mean    4.838
## 20            Median   4.611
## 21 Standard Deviation   1.708
## 22            Variance  2.918
## 23            Range   10.009
## 24           Min     0.2
## 25           Max   10.209

```



```

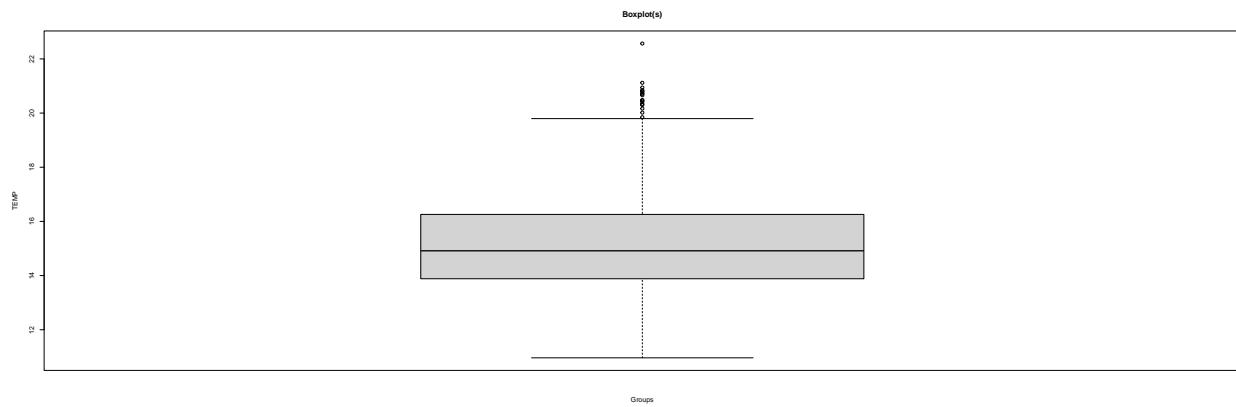
##               metric      V2
## 1          Variable: TEMP
## 2          Total N:
## 3             Count    1547
## 4        NA Count      0
## 5            Mean   15.145
## 6            Median  14.915
## 7 Standard Deviation   1.783
## 8            Variance  3.179
## 9            Range   11.605
## 10           Min   10.963
## 11           Max   22.568
## 12      25th Percentile 13.883
## 13      75th Percentile 16.258

```

```

## 14 Subset w/o Outliers:
## 15             Count      1538
## 16             %       99.4%
## 17        Outlier %      0.6%
## 18        NA Count       0
## 19             Mean     15.11
## 20             Median    14.897
## 21 Standard Deviation   1.73
## 22             Variance   2.992
## 23             Range      9.52
## 24             Min      10.963
## 25             Max      20.483

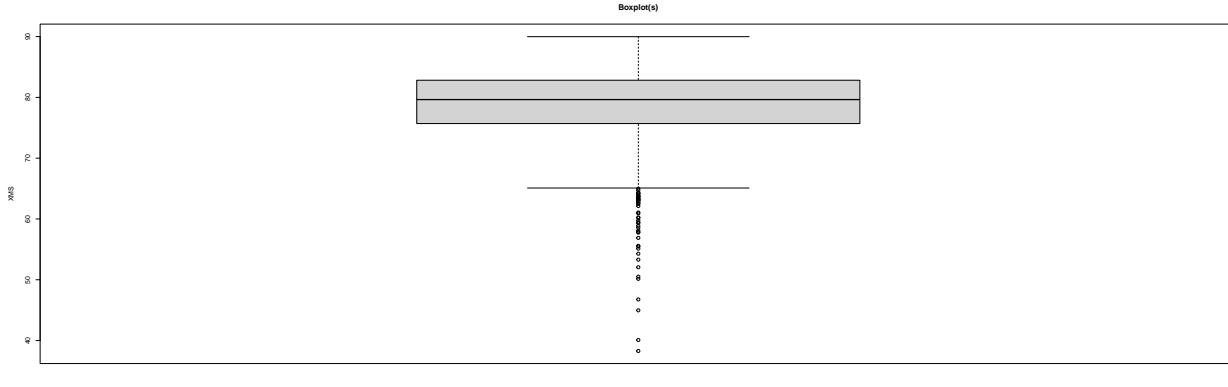
```



```

##          metric      V2
## 1 Variable: XMS
## 2 Total N: 1540
## 3        Count      0
## 4       NA Count   1540
## 5             Mean    78.614
## 6             Median   79.642
## 7 Standard Deviation 6.152
## 8             Variance 37.845
## 9             Range     51.708
## 10            Min     38.282
## 11            Max     89.99
## 12 25th Percentile 75.699
## 13 75th Percentile 82.824
## 14 Subset w/o Outliers:
## 15             Count      1519
## 16             %       98.6%
## 17        Outlier %      1.4%
## 18        NA Count       0
## 19             Mean     78.961
## 20             Median    79.742
## 21 Standard Deviation   5.384
## 22             Variance 28.987
## 23             Range     29.778
## 24             Min      60.212
## 25             Max     89.99

```



```

##   date_sample CHLOROPHYLL DENSITY      DO     ENTERO     FECAL OG     PH
## 1 1990-11-19       1.07 23.854 6.980000      NA      NA NA NA 8.130
## 2 1991-01-07        NA     NA      NA 25.38462 88.46154 NA     NA
## 3 1991-01-14        NA     NA 5.445417 58.12973 137.21730 NA 8.195
## 4 1991-01-21        NA     NA      NA 23.20513 59.61538 NA     NA
## 5 1991-01-28        NA     NA      NA 31.81891 69.78365 NA     NA
## 6 1991-02-04        NA     NA      NA 154.23077 428.58974 NA     NA
## 7 1991-02-11        NA     NA      NA 16.83814 14.63141 NA     NA
##   SALINITY SUSO      TEMP      XMS
## 1 33.59550    NA 19.37000 60.22500
## 2      NA     NA 14.45000 81.96154
## 3 33.50113    NA 14.07478 82.04876
## 4      NA     NA 14.54487 70.19231
## 5      NA     NA 14.28846 77.61167
## 6      NA     NA 14.23462 81.83333
## 7      NA     NA 14.46154 70.83333
##   vars     n   mean     sd median trimmed   mad   min   max range
##   date_sample 1 1616    NaN     NA    NA    NaN    NA Inf -Inf -Inf
##   CHLOROPHYLL 2 1071    3.66    2.98    2.78    3.16   2.07  0.39  22.79 22.40
##   DENSITY     3 1098    24.78    0.47   24.81   24.80   0.45 22.84  25.98  3.14
##   DO          4 1203     7.10    0.88    7.26    7.18   0.74  0.00  9.47  9.47
##   ENTERO      5 1614   214.20  718.92   12.26   35.21 13.56  2.00 7648.28 7646.28
##   FECAL       6 1614   304.60  826.25   23.30   86.48 29.92  2.00 6445.07 6443.07
##   OG          7  351     0.24    0.23    0.20    0.20   0.00  0.20  2.65  2.45
##   PH          8 1205     8.06    0.11    8.08    8.07   0.10  7.59  8.38  0.79
##   SALINITY    9 1198    33.50    0.42   33.52   33.52   0.15 20.38  33.98 13.60
##   SUSO         10  367     4.91    1.85    4.64    4.81   1.61  0.20  13.71 13.51
##   TEMP         11 1547    15.14    1.78   14.92   15.04   1.75 10.96  22.57 11.61
##   XMS          12 1540    78.61    6.15   79.64   79.25   5.14 38.28  89.99 51.71
##   skew kurtosis se
##   date_sample    NA     NA     NA
##   CHLOROPHYLL  1.97    5.38  0.09
##   DENSITY      -0.45    0.37  0.01
##   DO           -1.19    4.14  0.03
##   ENTERO       4.84   26.56 17.89
##   FECAL        4.13   18.61 20.57
##   OG           7.92   70.11  0.01
##   PH           -0.84   1.63  0.00
##   SALINITY     -25.63  791.34 0.01
##   SUSO         0.79    1.80  0.10

```

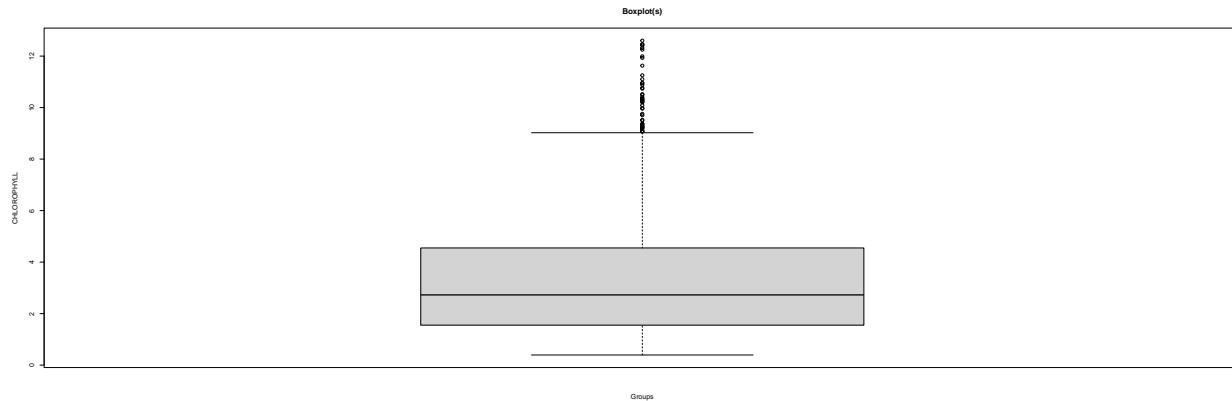
```

## TEMP          0.59      0.20  0.05
## XMS          -1.47     4.30  0.16
##           date_sample parameter      Avg
## Not NA n    36811     36811 35669.000
## NA n         0          0    1142.000
## Not NA %    1          1    0.969
## NA %         0          0    0.031

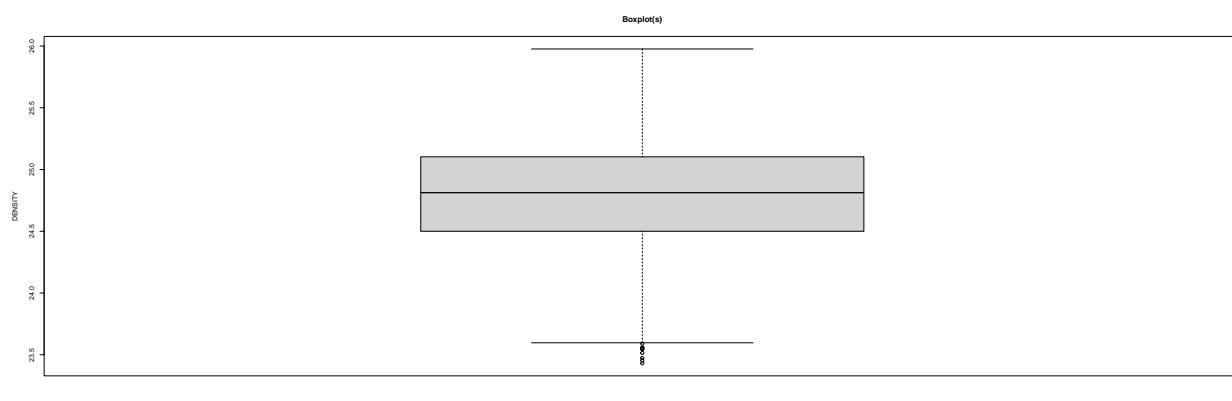
owt_df02_gb04_wkly02 = ts_eda(ts_df = owt_df02_gb04,
                               form_lead = "date_sample",
                               form_cast = "parameter",
                               param_lst = param_lst02,
                               rtn_met = TRUE,
                               box = FALSE,
                               week_agg = TRUE,
                               out_rm = TRUE
)

```

## [1]	1071	2	
##		metric	V2
## 1			Variable: CHLOROPHYLL
## 2		Total N:	
## 3		Count	1049
## 4		NA Count	0
## 5		Mean	3.423
## 6		Median	2.726
## 7		Standard Deviation	2.465
## 8		Variance	6.074
## 9		Range	12.205
## 10		Min	0.393
## 11		Max	12.599
## 12		25th Percentile	1.552
## 13		75th Percentile	4.55
## 14		Subset w/o Outliers:	
## 15		Count	1035
## 16		%	98.7%
## 17		Outlier %	1.3%
## 18		NA Count	0
## 19		Mean	3.31
## 20		Median	2.699
## 21		Standard Deviation	2.278
## 22		Variance	5.188
## 23		Range	10.373
## 24		Min	0.393
## 25		Max	10.767



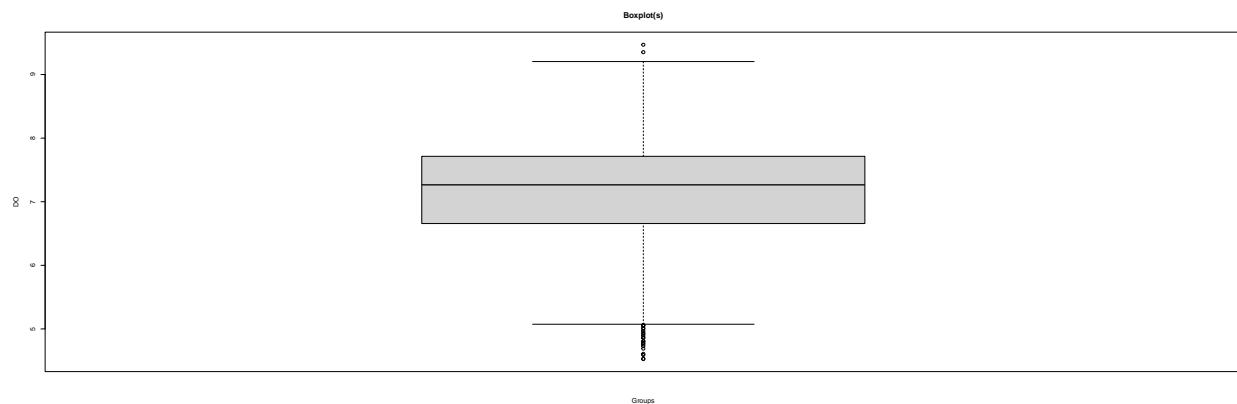
```
## [1] 1098    2
##               metric          V2
## 1                   Variable: DENSITY
## 2                   Total N:
## 3                   Count      1089
## 4                   NA Count     0
## 5                   Mean      24.793
## 6                   Median     24.812
## 7   Standard Deviation     0.448
## 8       Variance        0.201
## 9       Range         2.545
## 10      Min          23.431
## 11      Max          25.976
## 12 25th Percentile     24.5
## 13 75th Percentile     25.103
## 14 Subset w/o Outliers:
## 15      Count      1088
## 16      %        99.9%
## 17  Outlier %     0.1%
## 18  NA Count     0
## 19      Mean      24.794
## 20      Median     24.813
## 21  Standard Deviation     0.446
## 22       Variance     0.199
## 23       Range        2.522
## 24       Min          23.454
## 25       Max          25.976
```



```

## [1] 1203    2
##               metric      V2
## 1                   Variable: DO
## 2           Total N:
## 3             Count     1196
## 4            NA Count     0
## 5             Mean     7.125
## 6             Median    7.265
## 7   Standard Deviation    0.821
## 8             Variance    0.674
## 9             Range     4.942
## 10            Min     4.527
## 11            Max     9.468
## 12   25th Percentile    6.657
## 13   75th Percentile    7.714
## 14 Subset w/o Outliers:
## 15            Count     1192
## 16            %     99.7%
## 17        Outlier %     0.3%
## 18            NA Count     0
## 19             Mean     7.133
## 20             Median    7.267
## 21   Standard Deviation    0.809
## 22             Variance    0.654
## 23             Range     4.778
## 24            Min     4.69
## 25            Max     9.468

```



```

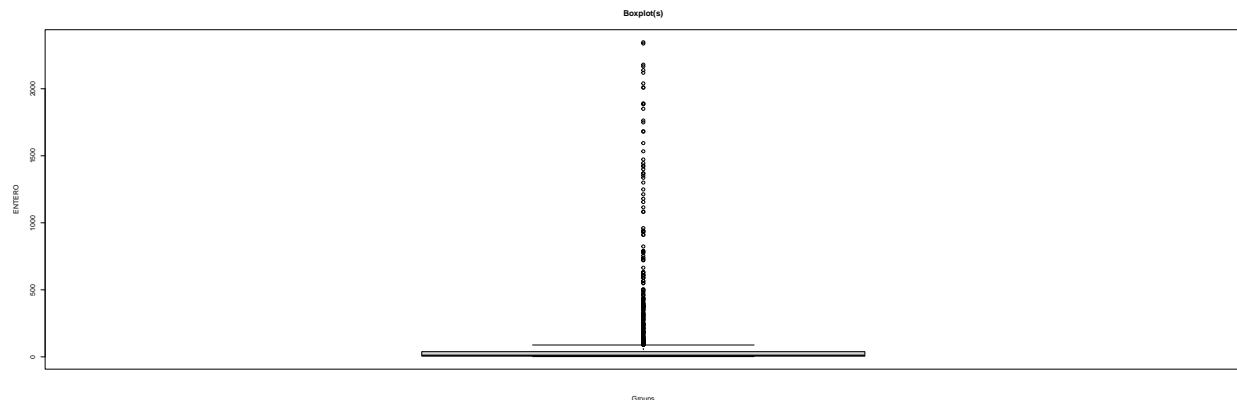
## [1] 1614    2
##               metric      V2
## 1                   Variable: ENTERO
## 2           Total N:
## 3             Count     1557
## 4            NA Count     0
## 5             Mean     91.784
## 6             Median    11.698
## 7   Standard Deviation    275.13
## 8             Variance  75696.459
## 9             Range    2344.566
## 10            Min      2
## 11            Max    2346.566

```

```

## 12      25th Percentile      5.128
## 13      75th Percentile     38.694
## 14 Subset w/o Outliers:
## 15          Count      1516
## 16          %       97.4%
## 17      Outlier %      2.6%
## 18      NA Count        0
## 19          Mean     52.359
## 20          Median    11.146
## 21 Standard Deviation 118.074
## 22          Variance 13941.503
## 23          Range   909.627
## 24          Min       2
## 25          Max   911.627

```

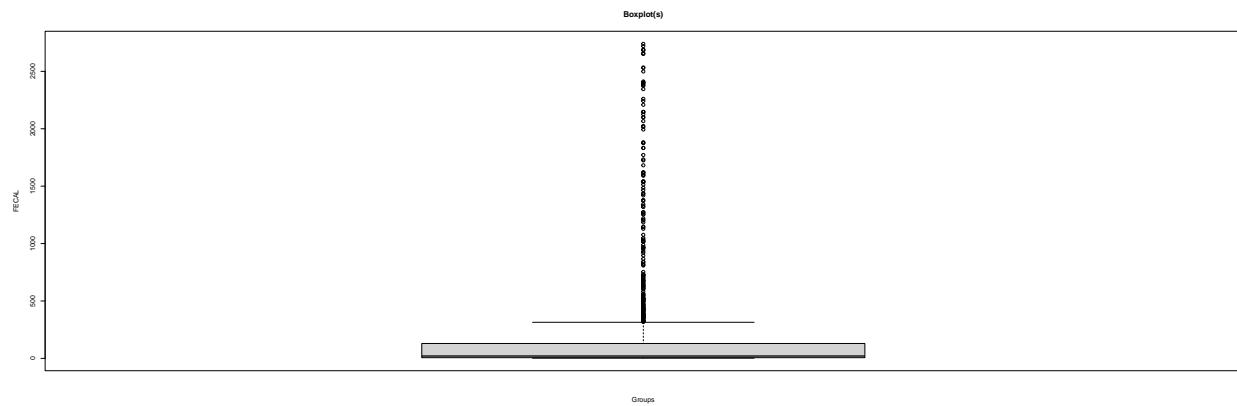


```

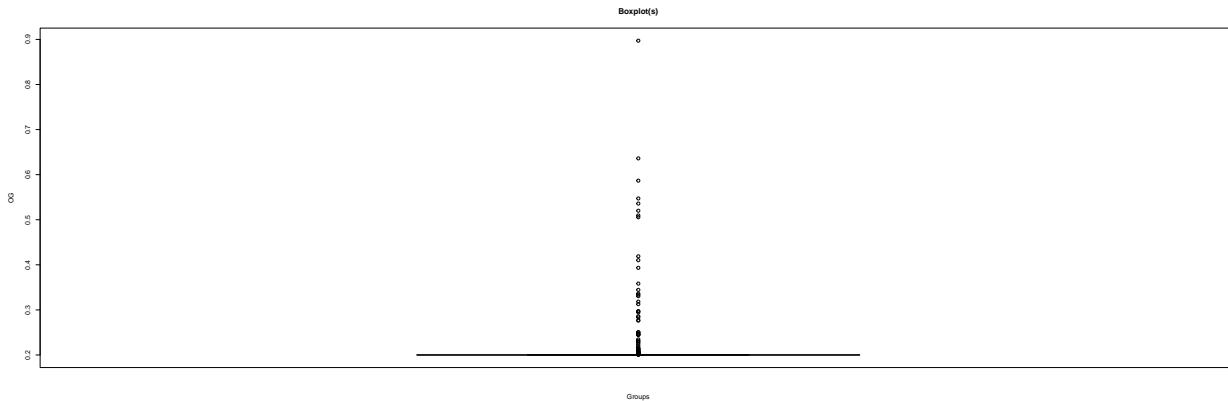
## [1] 1614    2
##               metric      V2
## 1                   Variable: FECAL
## 2      Total N:
## 3          Count      1562
## 4          NA Count        0
## 5          Mean     177.977
## 6          Median    20.506
## 7 Standard Deviation 421.323
## 8          Variance 177512.97
## 9          Range   2737.584
## 10         Min       2
## 11         Max   2739.584
## 12      25th Percentile    6.048
## 13      75th Percentile  129.582
## 14 Subset w/o Outliers:
## 15          Count      1509
## 16          %       96.6%
## 17      Outlier %      3.4%
## 18      NA Count        0
## 19          Mean     111.629
## 20          Median    18.395
## 21 Standard Deviation 219.97
## 22          Variance 48386.762
## 23          Range   1436.388
## 24          Min       2

```

```
## 25          Max      1438.388
```



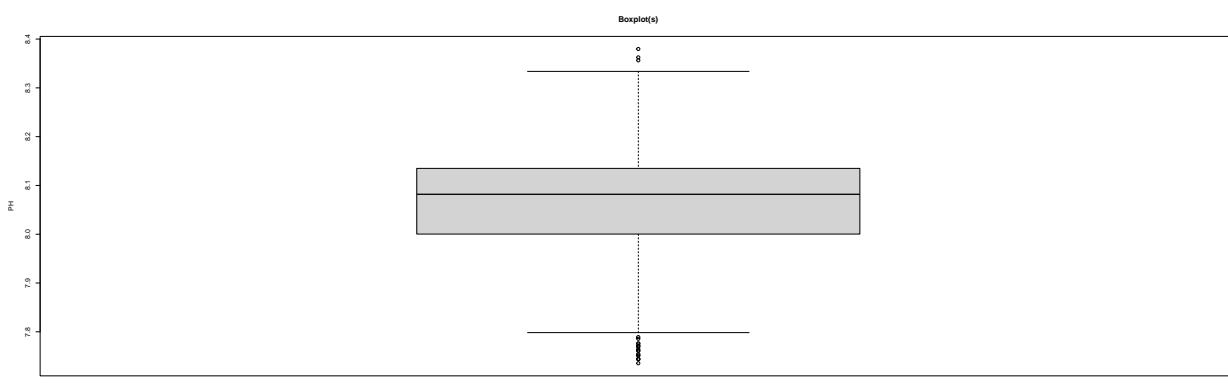
```
## [1] 351    2
##           metric      V2
## 1                   Variable: OG
## 2           Total N:
## 3             Count     345
## 4            NA Count     0
## 5              Mean     0.218
## 6            Median     0.2
## 7  Standard Deviation     0.068
## 8            Variance     0.005
## 9              Range     0.697
## 10            Min      0.2
## 11            Max     0.897
## 12  25th Percentile     0.2
## 13 75th Percentile     0.2
## 14 Subset w/o Outliers:
## 15            Count     337
## 16            %     97.7%
## 17        Outlier %     2.3%
## 18            NA Count     0
## 19              Mean     0.209
## 20            Median     0.2
## 21  Standard Deviation     0.03
## 22            Variance     0.001
## 23              Range     0.219
## 24            Min      0.2
## 25            Max     0.419
```



```

## [1] 1205    2
##           metric      V2
## 1          Variable: PH
## 2          Total N:
## 3          Count     1193
## 4          NA Count   0
## 5          Mean      8.066
## 6          Median     8.082
## 7          Standard Deviation 0.102
## 8          Variance     0.01
## 9          Range       0.644
## 10         Min        7.735
## 11         Max        8.38
## 12         25th Percentile   8
## 13         75th Percentile  8.135
## 14 Subset w/o Outliers:
## 15         Count     1185
## 16         %        99.3%
## 17         Outlier %  0.7%
## 18         NA Count   0
## 19         Mean      8.068
## 20         Median     8.082
## 21         Standard Deviation 0.099
## 22         Variance     0.01
## 23         Range       0.602
## 24         Min        7.761
## 25         Max        8.363

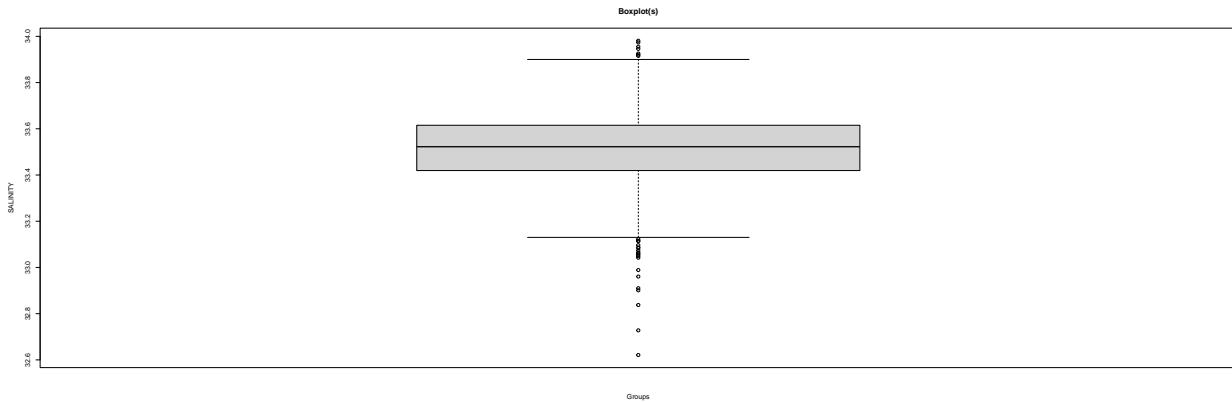
```



```

## [1] 1198    2
##               metric          V2
## 1                  Variable: SALINITY
## 2      Total N:
## 3          Count       1195
## 4          NA Count      0
## 5          Mean        33.516
## 6          Median       33.522
## 7  Standard Deviation     0.161
## 8          Variance      0.026
## 9          Range         1.36
## 10         Min          32.621
## 11         Max          33.981
## 12 25th Percentile      33.419
## 13 75th Percentile      33.615
## 14 Subset w/o Outliers:
## 15         Count       1188
## 16         %         99.4%
## 17  Outlier %        0.6%
## 18          NA Count      0
## 19          Mean        33.52
## 20          Median       33.523
## 21  Standard Deviation     0.152
## 22          Variance      0.023
## 23          Range         0.939
## 24         Min          33.042
## 25         Max          33.981

```



```

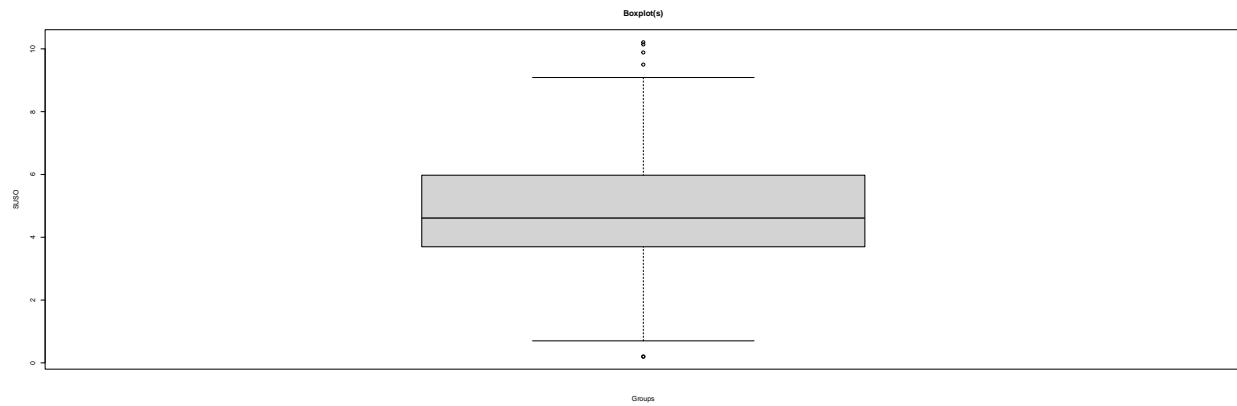
## [1] 367    2
##               metric          V2
## 1                  Variable: SUSO
## 2      Total N:
## 3          Count       363
## 4          NA Count      0
## 5          Mean        4.838
## 6          Median       4.611
## 7  Standard Deviation     1.708
## 8          Variance      2.918
## 9          Range        10.009
## 10         Min          0.2
## 11         Max         10.209

```

```

## 12      25th Percentile      3.697
## 13      75th Percentile      5.977
## 14 Subset w/o Outliers:
## 15          Count      361
## 16          %      99.4%
## 17      Outlier %      0.6%
## 18      NA Count      0
## 19          Mean      4.808
## 20          Median      4.607
## 21 Standard Deviation      1.666
## 22          Variance      2.775
## 23          Range      9.685
## 24          Min      0.2
## 25          Max      9.885

```

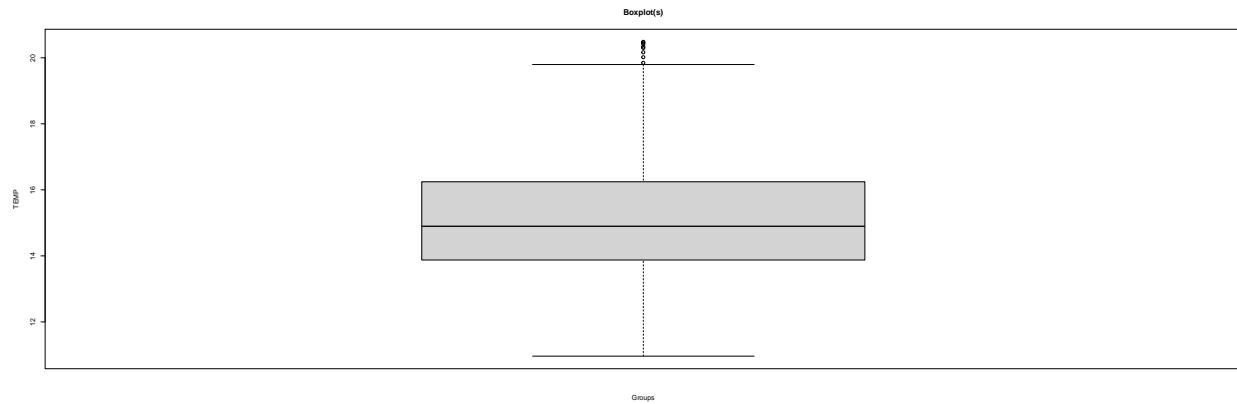


```

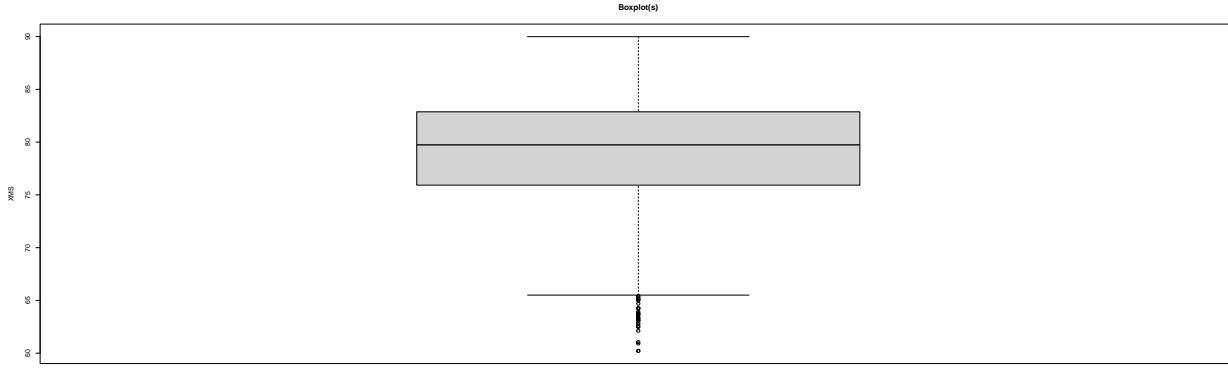
## [1] 1547      2
##                   metric      V2
## 1                      Variable: TEMP
## 2      Total N:
## 3          Count      1538
## 4          NA Count      0
## 5          Mean      15.11
## 6          Median      14.897
## 7 Standard Deviation      1.73
## 8          Variance      2.992
## 9          Range      9.52
## 10         Min      10.963
## 11         Max      20.483
## 12      25th Percentile      13.876
## 13      75th Percentile      16.244
## 14 Subset w/o Outliers:
## 15          Count      1534
## 16          %      99.7%
## 17      Outlier %      0.3%
## 18      NA Count      0
## 19          Mean      15.097
## 20          Median      14.893
## 21 Standard Deviation      1.711
## 22          Variance      2.926
## 23          Range      9.335
## 24          Min      10.963

```

```
## 25          Max      20.298
```



```
## [1] 1540    2
##           metric        V2
## 1                      Variable: XMS
## 2           Total N:
## 3           Count     1519
## 4       NA Count      0
## 5           Mean    78.961
## 6           Median   79.742
## 7 Standard Deviation   5.384
## 8           Variance  28.987
## 9           Range    29.778
## 10          Min     60.212
## 11          Max     89.99
## 12 25th Percentile   75.922
## 13 75th Percentile   82.87
## 14 Subset w/o Outliers:
## 15          Count    1511
## 16            %    99.5%
## 17 Outlier %     0.5%
## 18       NA Count      0
## 19           Mean   79.053
## 20           Median  79.78
## 21 Standard Deviation 5.246
## 22           Variance 27.52
## 23           Range   27.089
## 24          Min     62.901
## 25          Max     89.99
```



```

##   date_sample CHLOROPHYLL DENSITY      DO     ENTERO     FECAL OG     PH
## 1 1990-11-19          1.07 23.854 6.980000      NA      NA NA 8.130
## 2 1991-01-07          NA     NA      NA 25.38462 88.46154 NA     NA
## 3 1991-01-14          NA     NA 5.445417 58.12973 137.21730 NA 8.195
## 4 1991-01-21          NA     NA      NA 23.20513 59.61538 NA     NA
## 5 1991-01-28          NA     NA      NA 31.81891 69.78365 NA     NA
## 6 1991-02-04          NA     NA      NA 154.23077 428.58974 NA     NA
## 7 1991-02-11          NA     NA      NA 16.83814 14.63141 NA     NA
##   SALINITY SUSO      TEMP      XMS
## 1 33.59550  NA 19.37000 60.22500
## 2      NA  NA 14.45000 81.96154
## 3 33.50113  NA 14.07478 82.04876
## 4      NA  NA 14.54487 70.19231
## 5      NA  NA 14.28846 77.61167
## 6      NA  NA 14.23462 81.83333
## 7      NA  NA 14.46154 70.83333
##   vars     n    mean      sd median trimmed   mad    min    max  range
##   date_sample 1 1615    NaN     NA    NA    NaN    NA Inf -Inf -Inf
##   CHLOROPHYLL 2 1049    3.42    2.46    2.73    3.06   1.98  0.39 12.60 12.21
##   DENSITY     3 1089    24.79    0.45   24.81   24.81   0.44 23.43 25.98  2.54
##   DO          4 1196    7.12    0.82    7.27    7.19   0.74  4.53  9.47  4.94
##   ENTERO      5 1557   91.78 275.13   11.70   25.40 12.59  2.00 2346.57 2344.57
##   FECAL       6 1562   177.98 421.32   20.51   68.76 25.72  2.00 2739.58 2737.58
##   OG          7  345    0.22    0.07    0.20    0.20   0.00  0.20  0.90  0.70
##   PH          8 1193    8.07    0.10    8.08    8.07   0.09  7.74  8.38  0.64
##   SALINITY    9 1195   33.52    0.16   33.52   33.52   0.15 32.62 33.98  1.36
##   SUSO        10  363    4.84    1.71    4.61    4.78   1.57  0.20 10.21 10.01
##   TEMP         11 1538   15.11    1.73   14.90   15.02  1.73 10.96 20.48  9.52
##   XMS         12 1519   78.96    5.38   79.74   79.38   5.05 60.21 89.99 29.78
##   skew kurtosis se
##   date_sample  NA     NA    NA
##   CHLOROPHYLL 1.30    1.35  0.08
##   DENSITY     -0.27   -0.11  0.01
##   DO          -0.65    0.23  0.02
##   ENTERO      5.13   29.25  6.97
##   FECAL       3.79   15.29 10.66
##   OG          5.74   40.06  0.00
##   PH          -0.50    0.51  0.00
##   SALINITY    -0.54   1.78  0.00
##   SUSO        0.37    0.29  0.09

```

```

## TEMP          0.48   -0.16  0.04
## XMS          -0.73    0.33  0.14
##      date_sample parameter      Avg
## Not NA n     36811     36811 35669.000
## NA n          0         0   1142.000
## Not NA %      1         1    0.969
## NA %          0         0    0.031

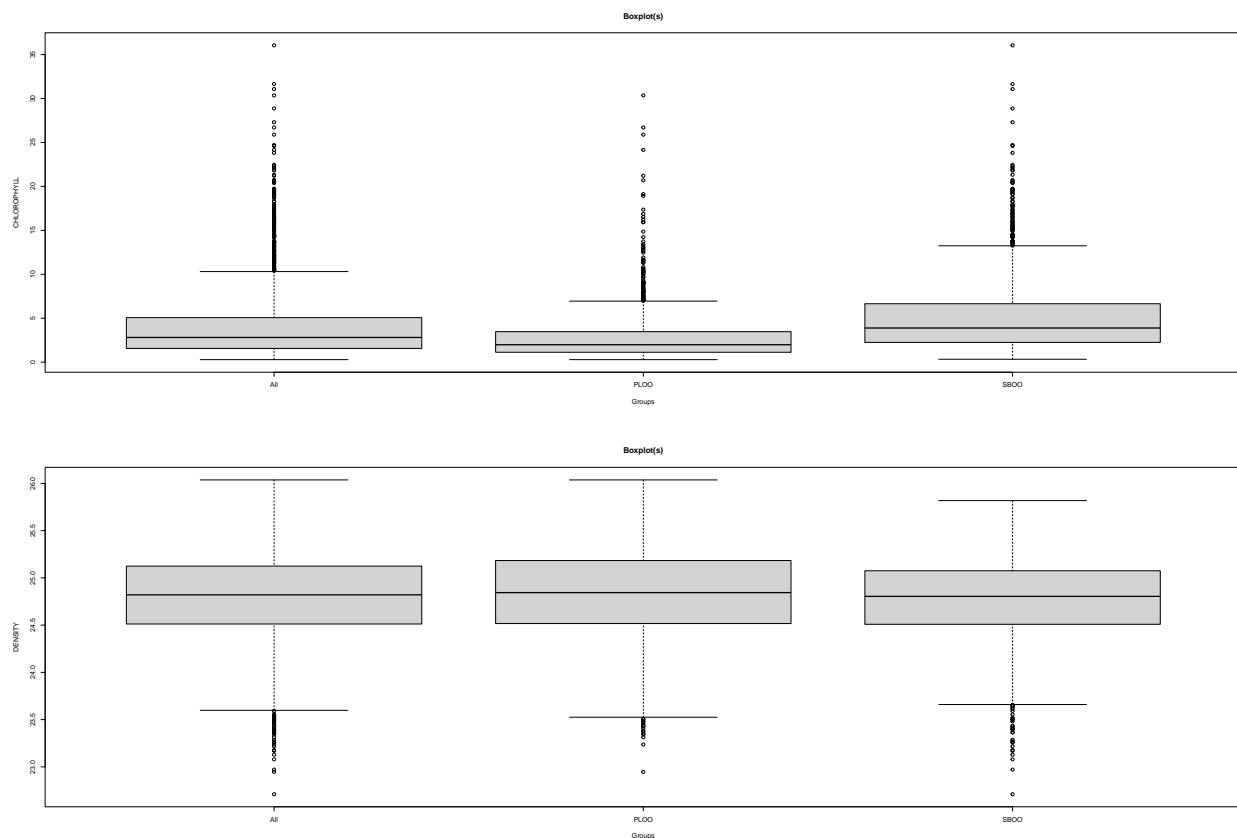
```

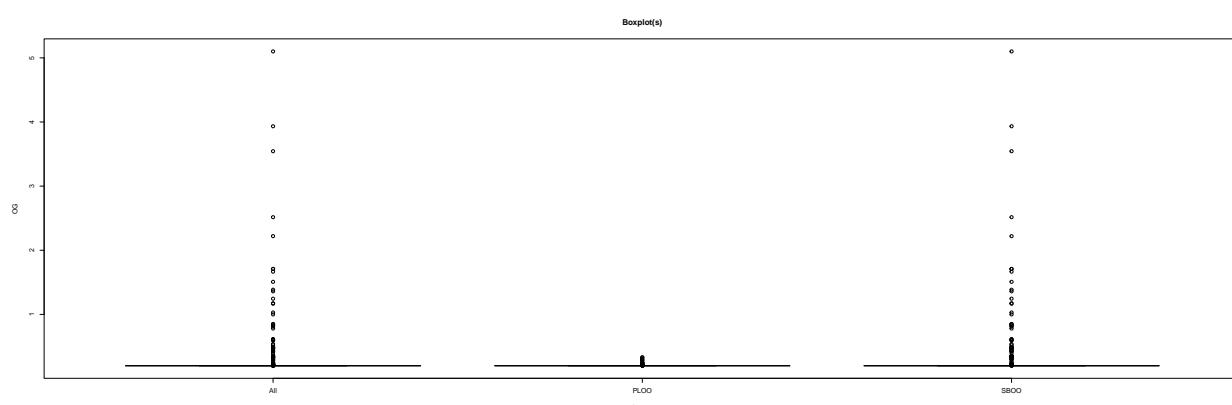
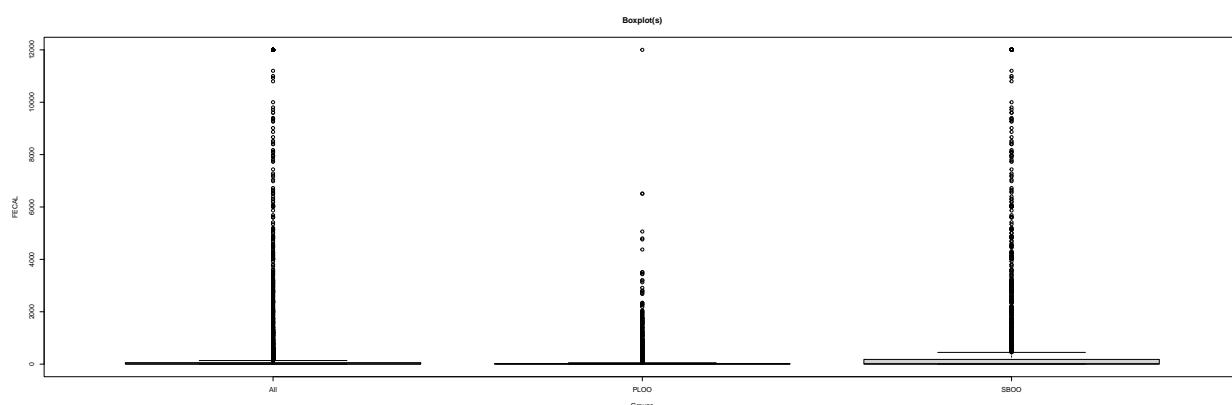
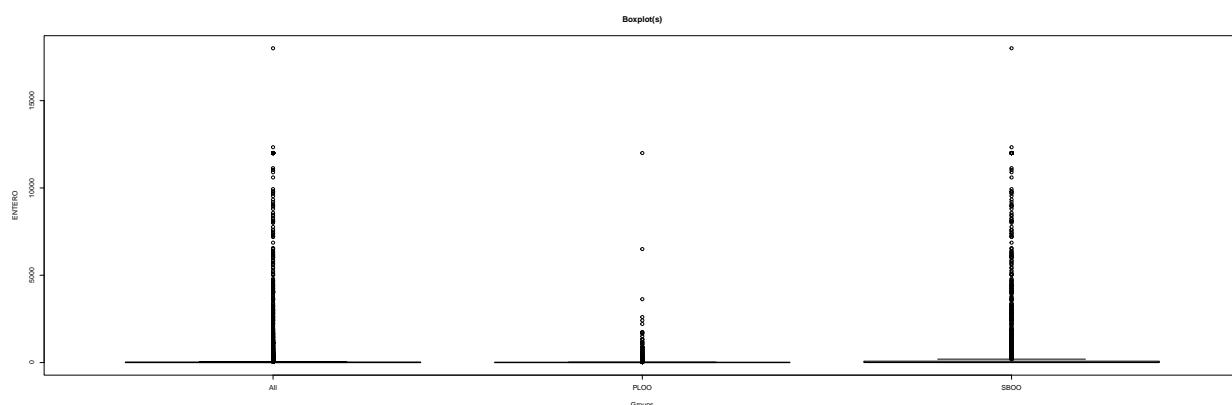
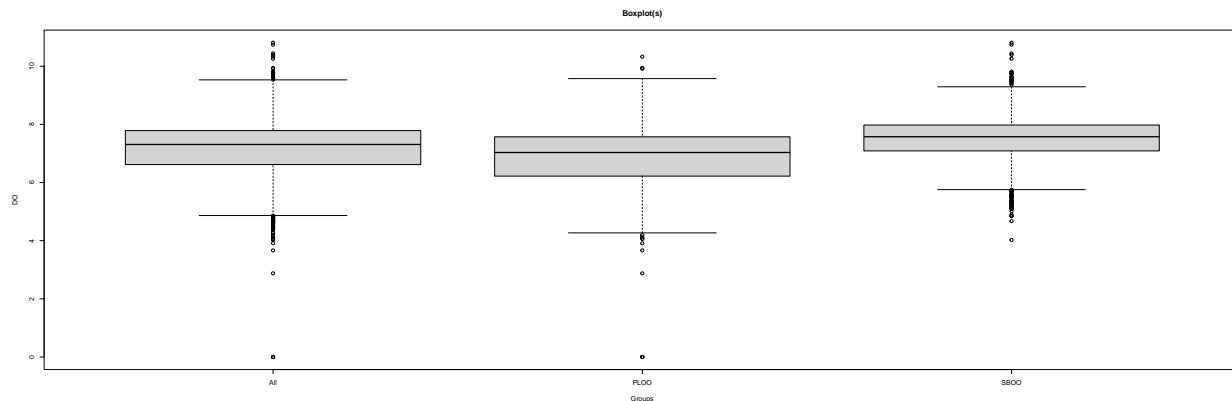
Run custom function on data aggregated by date_sample, project and parameter

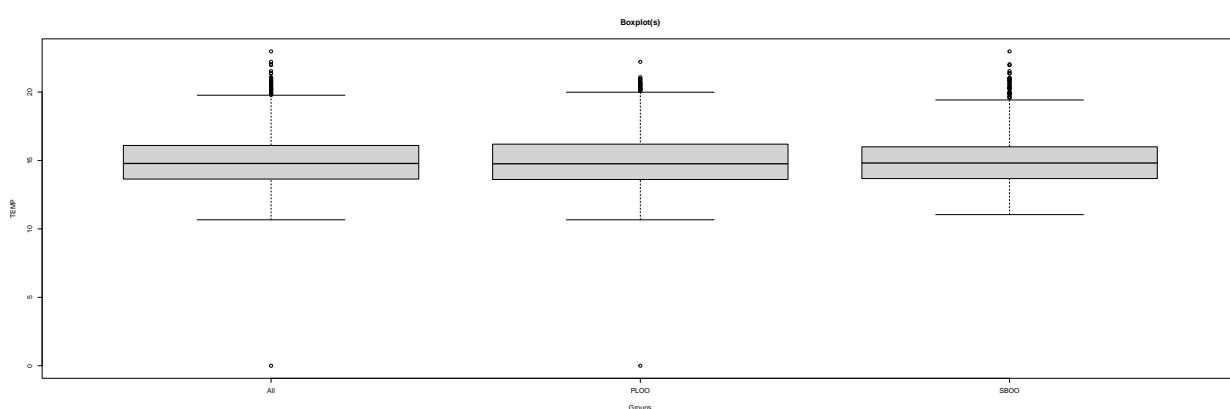
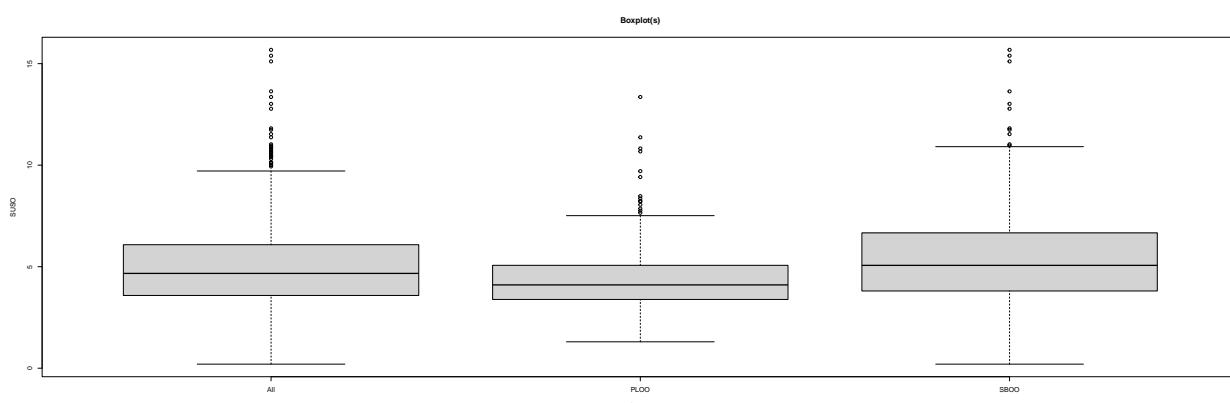
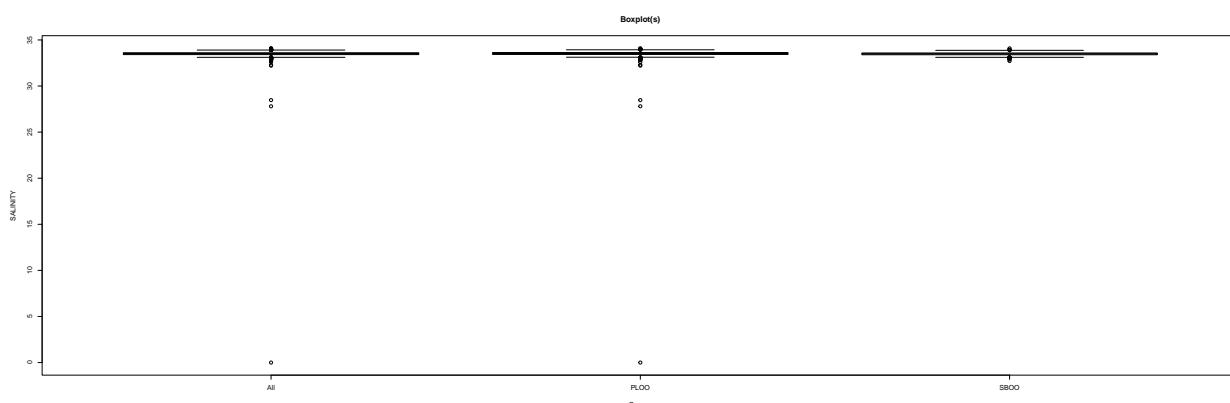
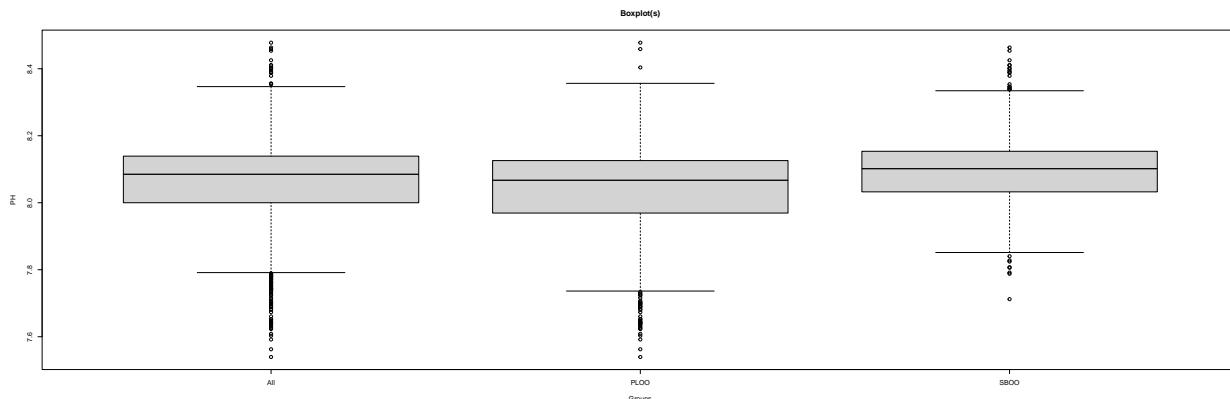
```

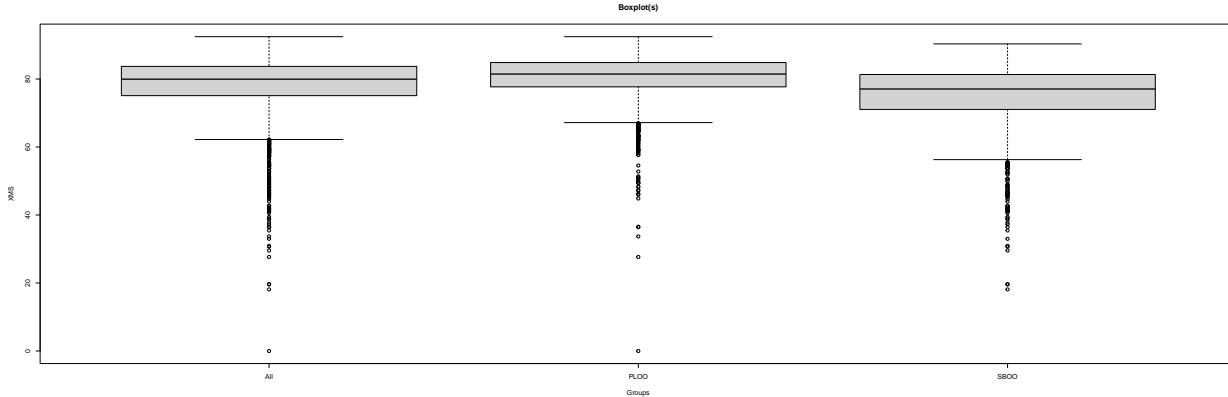
owt_df02_gb09_mrgd = ts_eda(ts_df = owt_df02_gb09,
                             form_lead = c("date_sample", "project"),
                             form_cast = "parameter",
                             param_lst = param_lst02,
                             l1_col = c("project"),
                             l1_param = c("PL00", "SB00"),
                             rtn_met = FALSE,
                             box = FALSE,
                             week_agg = FALSE
)

```









```

##   date_sample project CHLOROPHYLL DENSITY      DO      ENTERO      FECAL OG     PH
## 1 1990-11-15    PL00       0.87 23.855 6.55000      NA      NA NA 8.080
## 2 1990-11-15    SB00       1.27 23.853 7.41000      NA      NA NA 8.180
## 3 1991-01-02    PL00       NA     NA     NA 32.05128 125.64103 NA  NA
## 4 1991-01-03    PL00       NA     NA     NA 18.71795 51.28205 NA  NA
## 5 1991-01-07    PL00       NA     NA     NA 106.15385 80.76923 NA  NA
## 6 1991-01-08    PL00       NA     NA     NA 40.00000 40.55556 NA  NA
## 7 1991-01-09    PL00       NA     NA 5.47625 20.33898 40.50847 NA 8.195
##   SALINITY SUSO      TEMP      XMS
## 1 33.61700    NA 19.43000 44.85000
## 2 33.57400    NA 19.31000 75.60000
## 3    NA        NA 14.50769 80.02564
## 4    NA        NA 14.39231 83.89744
## 5    NA        NA 14.54103 78.97436
## 6    NA        NA 13.43000 80.20000
## 7 33.51938    NA 14.26889 86.21111
##   vars      n      mean       sd median trimmed  mad      min      max
##   date_sample  1    7037     NaN      NA     NA  NaN  NA Inf -Inf
##   project*     2    7037    1.43     0.50    1.00  1.42  0.00  1.00  2.00
##   CHLOROPHYLL 3    3023    4.01     3.81    2.81  3.31  2.27  0.29 36.05
##   DENSITY      4    3177   24.79     0.47   24.82  24.81  0.45 22.71 26.04
##   DO           5    3434    7.15     0.97    7.31  7.22  0.82  0.00 10.81
##   ENTERO       6    6776  253.64  1249.91   5.27 18.53  4.84  0.00 18000.00
##   FECAL        7    6594  355.65  1401.82   7.07 48.93  7.51  0.00 12000.00
##   OG           8     937    0.24     0.29    0.20  0.20  0.00  0.20  5.10
##   PH           9    3396    8.07     0.11    8.08  8.07  0.10  7.54  8.48
##   SALINITY     10   3434    33.50     0.61   33.52  33.51  0.15  0.00 34.10
##   SUSO         11    977    4.99     2.16    4.67  4.80  1.80  0.20 15.68
##   TEMP          12   4524   14.97     1.91   14.78  14.87  1.80  0.00 22.97
##   XMS          13   4494   78.31     8.29   79.96  79.37  6.18  0.00 92.46
##   range      skew kurtosis      se
##   date_sample -Inf     NA      NA  NA
##   project*      1.00   0.26  -1.93  0.01
##   CHLOROPHYLL  35.76   2.56   9.61  0.07
##   DENSITY       3.33  -0.46   0.38  0.01
##   DO            10.81  -0.89   3.49  0.02
##   ENTERO        18000.00  7.41  61.01 15.18
##   FECAL         12000.00  6.25  43.27 17.26
##   OG            4.90  10.89 144.21  0.01
##   PH            0.94  -0.67   1.45  0.00

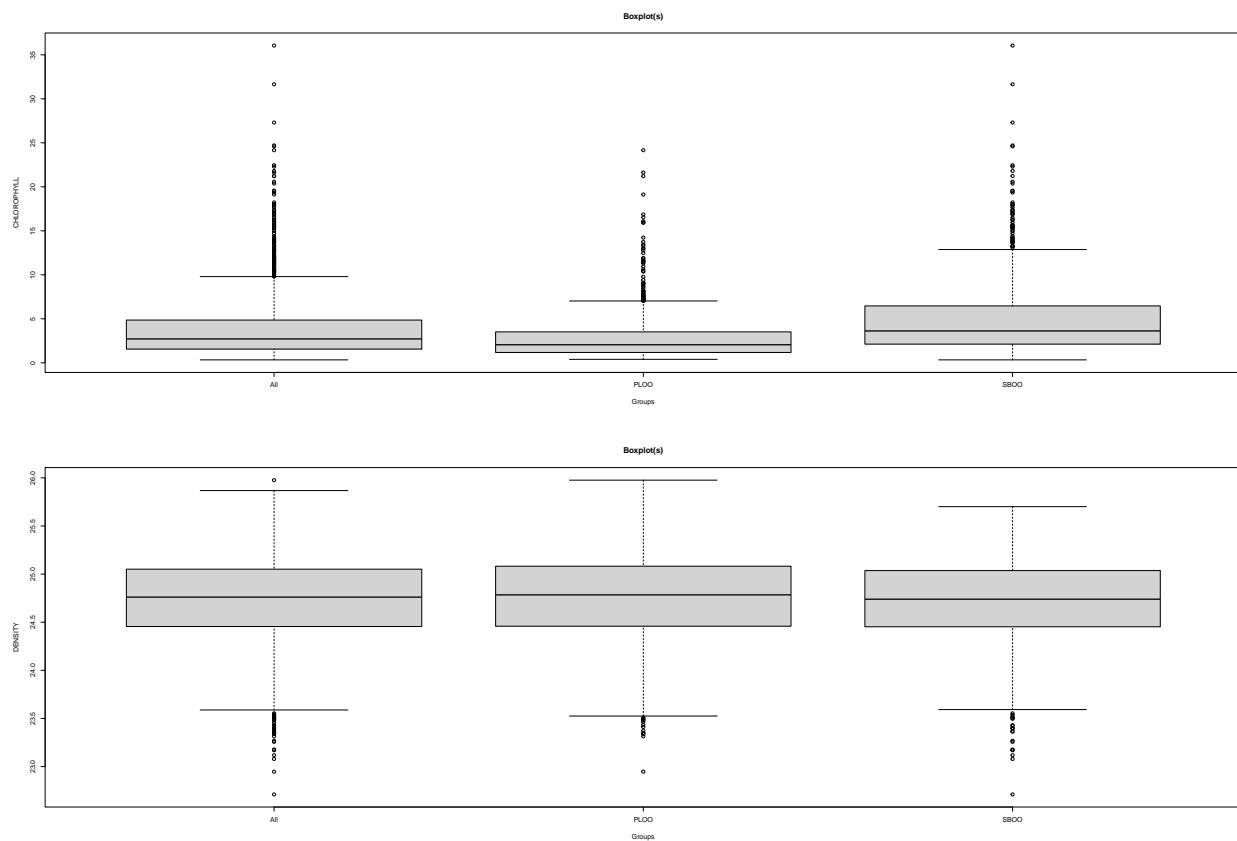
```

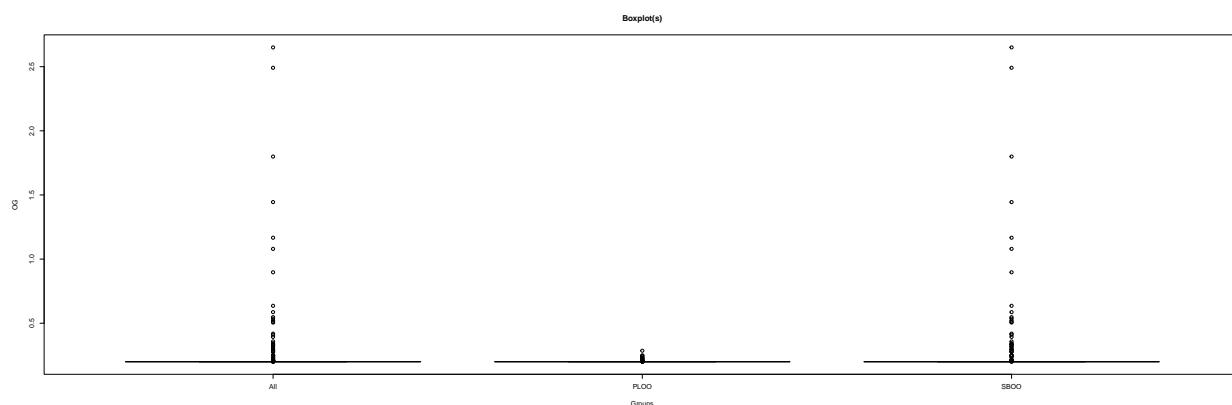
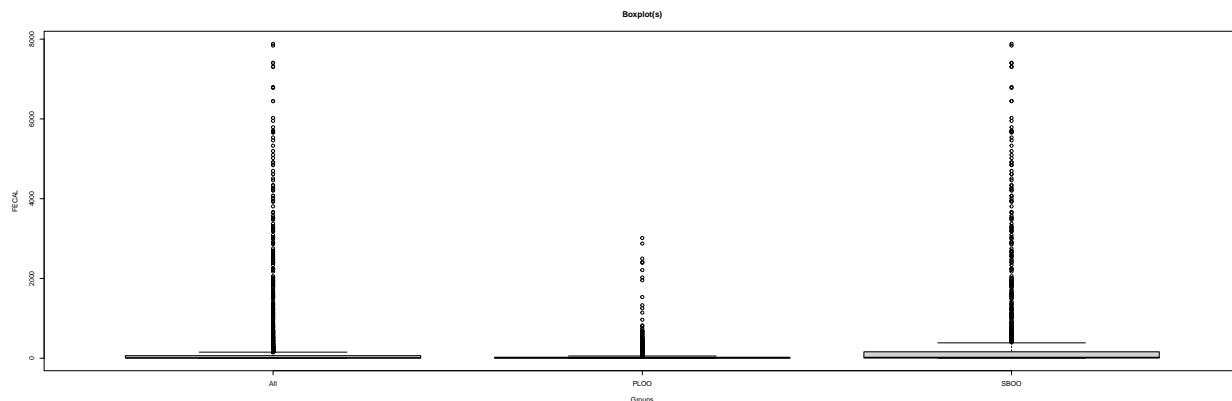
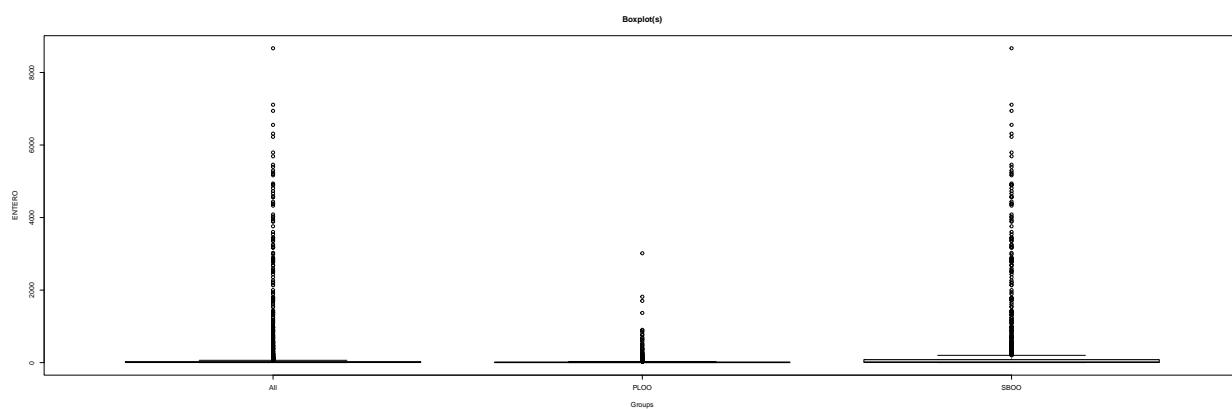
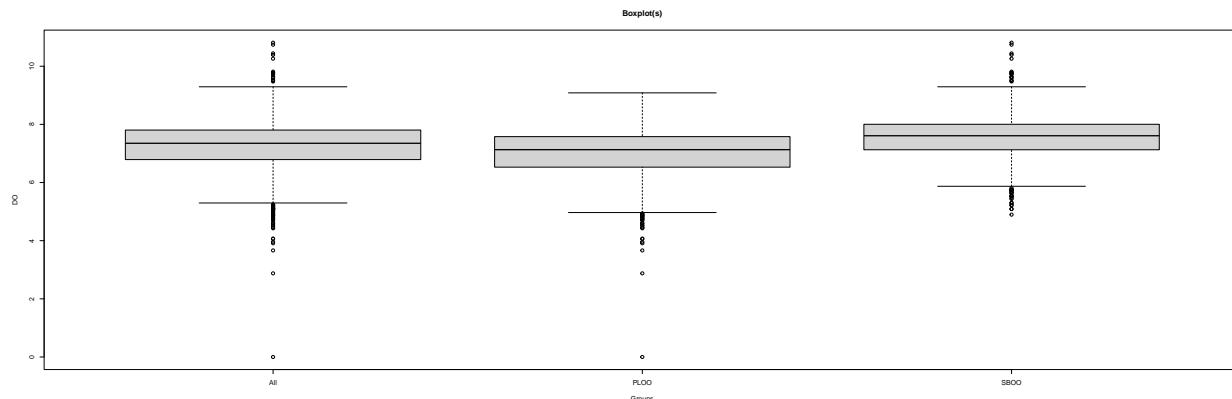
```

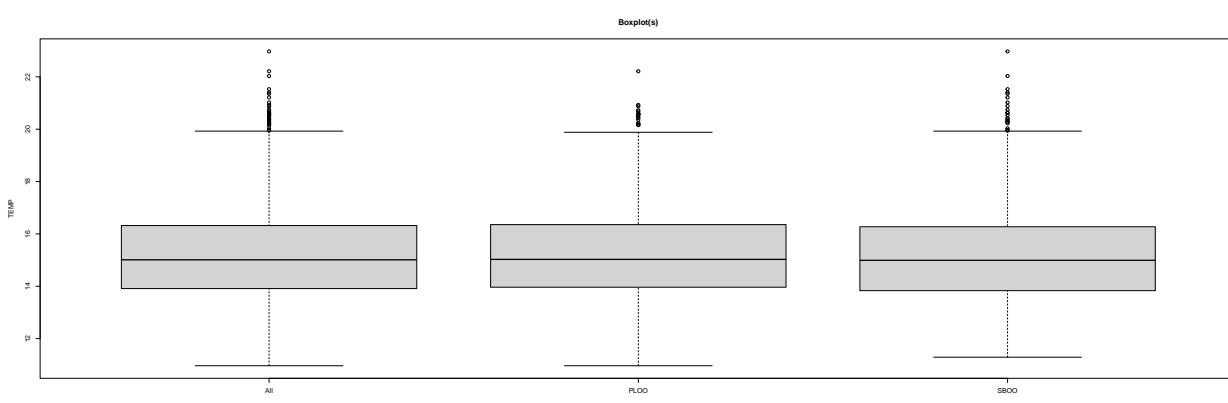
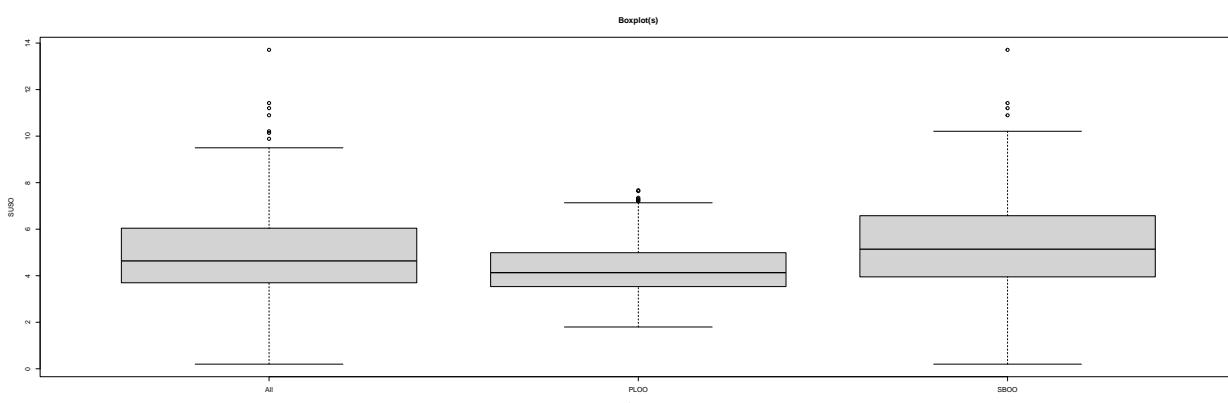
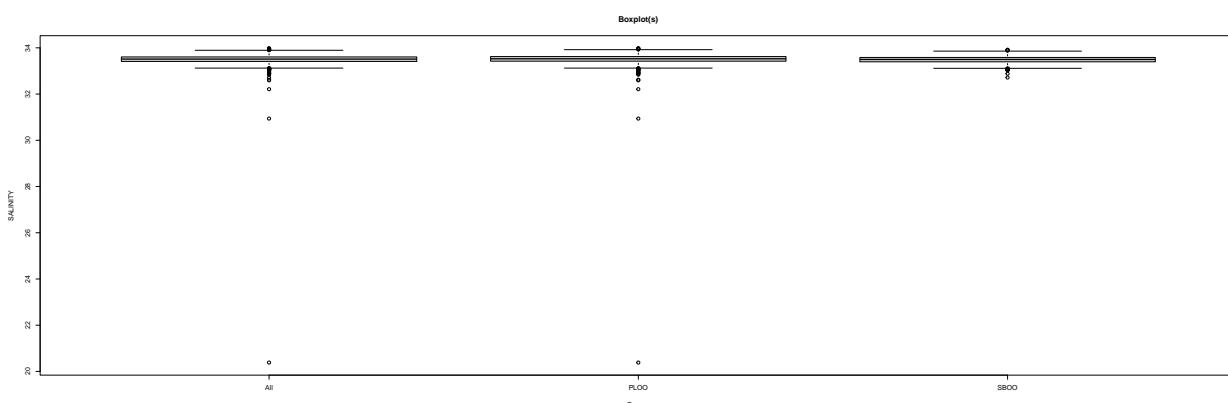
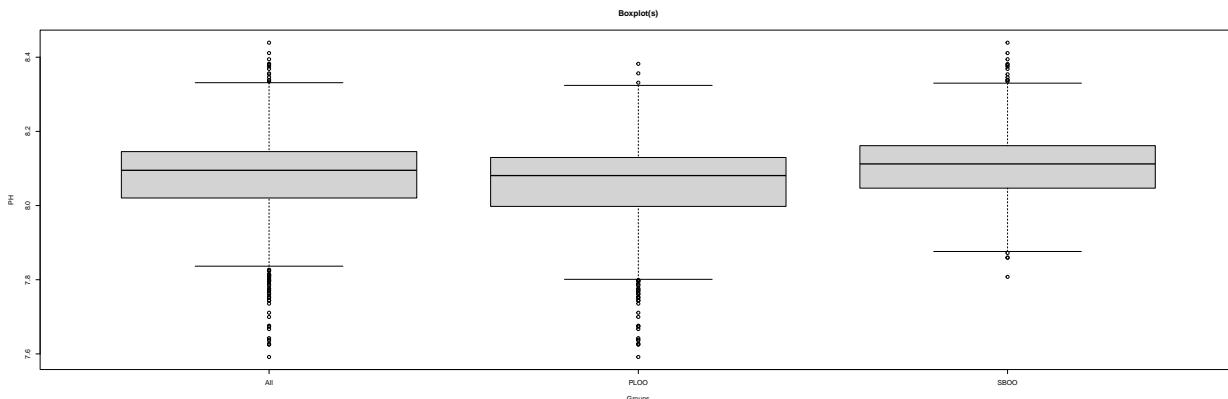
## SALINITY      34.10 -48.98  2674.00  0.01
## SUSO         15.48   1.09     2.23  0.07
## TEMP         22.97   0.43     0.95  0.03
## XMS          92.46  -2.00     7.54  0.12
##           date_sample project parameter      Avg
## Not NA n    48395    48395     48395 47222.0000
## NA n        0        0        0    1173.0000
## Not NA %    1        1        1    0.9758
## NA %        0        0        0    0.0242

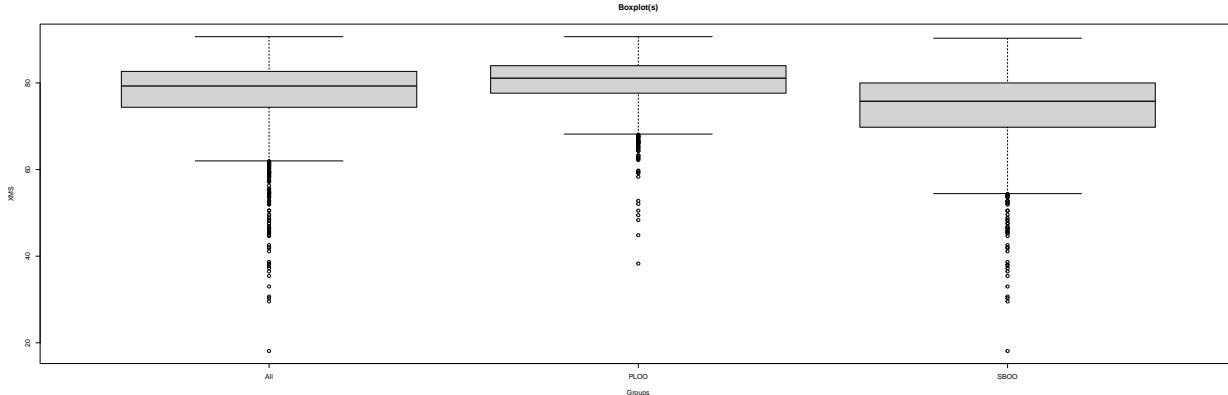
owt_df02_gb09_wkly = ts_eda(ts_df = owt_df02_gb09,
                             form_lead = c("date_sample", "project"),
                             form_cast = "parameter",
                             param_lst = param_lst02,
                             l1_col = c("project"),
                             l1_param = c("PLOO", "SBOO"),
                             rtn_met = FALSE,
                             box = FALSE,
                             week_agg = TRUE
)

```









```

##   date_sample project CHLOROPHYLL DENSITY      DO     ENTERO     FECAL OG     PH
## 1 1990-11-19    PLOO       0.87 23.855 6.550000      NA      NA NA 8.080
## 2 1990-11-19    SB00       1.27 23.853 7.410000      NA      NA NA 8.180
## 3 1991-01-07    PLOO       NA     NA     NA 25.38462 88.46154 NA     NA
## 4 1991-01-14    PLOO       NA     NA     NA 5.445417 58.12973 137.21730 NA 8.195
## 5 1991-01-21    PLOO       NA     NA     NA 23.20513 59.61538 NA     NA
## 6 1991-01-28    PLOO       NA     NA     NA 31.81891 69.78365 NA     NA
## 7 1991-02-04    PLOO       NA     NA     NA 154.23077 428.58974 NA     NA
##   SALINITY SUSO      TEMP     XMS
## 1 33.61700    NA 19.43000 44.85000
## 2 33.57400    NA 19.31000 75.60000
## 3     NA     NA 14.45000 81.96154
## 4 33.50113    NA 14.07478 82.04876
## 5     NA     NA 14.54487 70.19231
## 6     NA     NA 14.28846 77.61167
## 7     NA     NA 14.23462 81.83333
##   vars     n   mean      sd median trimmed   mad   min   max range
##   date_sample 1 2802    NaN     NA     NA    NaN    NA Inf -Inf -Inf
##   project*    2 2802    1.43    0.49    1.00   1.41   0.00  1.00  2.00  1.00
##   CHLOROPHYLL 3 1967    3.89    3.68    2.71   3.19   2.09  0.33 36.05 35.72
##   DENSITY     4 2000    24.73    0.47   24.76  24.75   0.44 22.71 25.98  3.27
##   DO          5 2101    7.24    0.87    7.35   7.29   0.75  0.00 10.81 10.81
##   ENTERO      6 2786   169.27 699.74    7.58  17.88   7.65  2.00 8668.00 8666.00
##   FECAL       7 2786   233.75 815.20    9.45  42.01 10.37  2.00 7881.92 7879.92
##   OG          8  351     0.24    0.23    0.20   0.20   0.00  0.20  2.65  2.45
##   PH          9 2105     8.08    0.10    8.10   8.09   0.09  7.59  8.44  0.85
##   SALINITY    10 2097    33.50    0.33   33.51  33.51   0.14 20.38 33.98 13.60
##   SUSO        11  369     4.91    1.85    4.64   4.80   1.61  0.20 13.71 13.51
##   TEMP         12 2616    15.22    1.83   15.01  15.11   1.77 10.96 22.97 12.01
##   XMS         13 2606    77.43    8.03   79.29  78.55   5.84 18.11 90.68 72.57
##   skew kurtosis se
##   date_sample    NA      NA NA
##   project*      0.30    -1.91 0.01
##   CHLOROPHYLL  2.63    10.24 0.08
##   DENSITY      -0.47     0.46 0.01
##   DO          -0.76     3.34 0.02
##   ENTERO       6.11    42.36 13.26
##   FECAL        5.43    33.41 15.44
##   OG          7.92    70.11 0.01
##   PH          -0.71     1.79 0.00

```

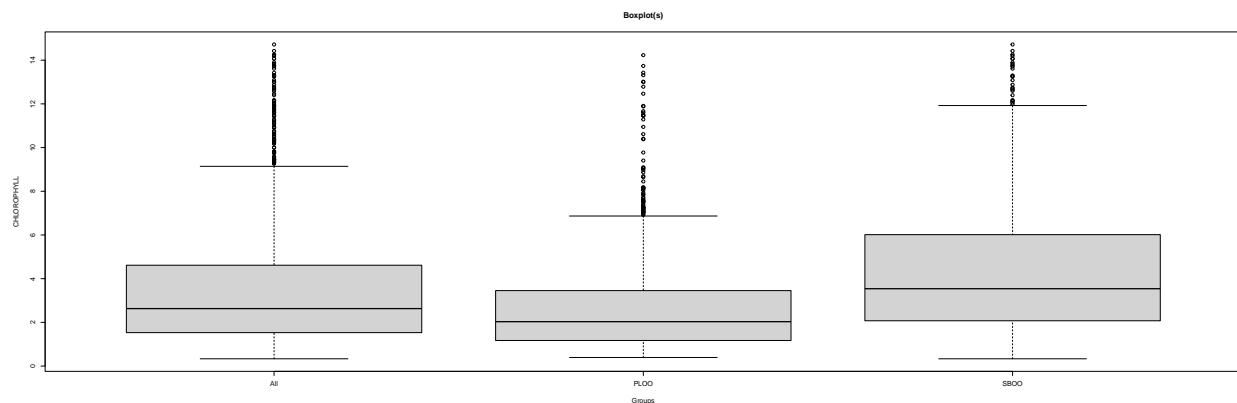
```

## SALINITY      -29.25   1137.46  0.01
## SUSO          0.79     1.80   0.10
## TEMP          0.61     0.27   0.04
## XMS           -1.91    5.85   0.16
##               date_sample project parameter      Avg
## Not NA n      48395    48395    48395 47222.0000
## NA n          0         0         0     1173.0000
## Not NA %      1         1         1     0.9758
## NA %          0         0         0     0.0242

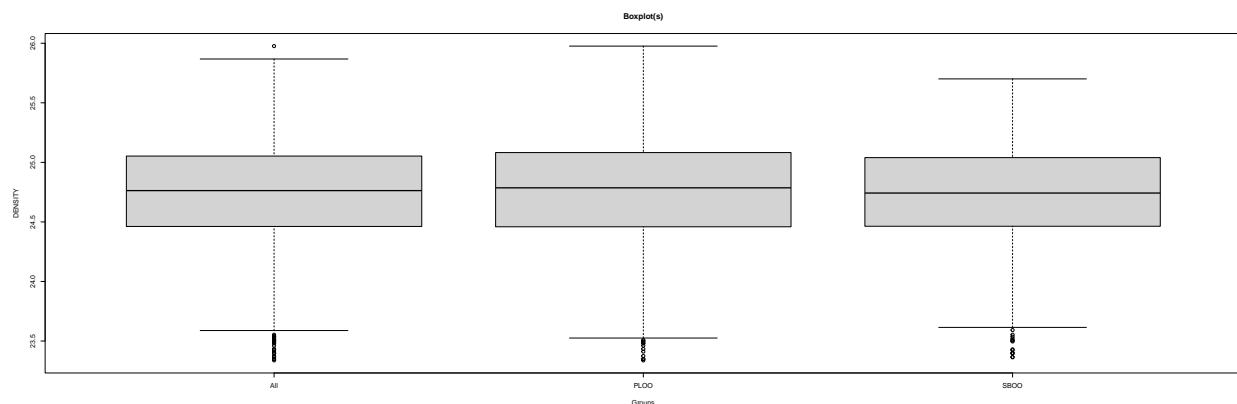
owt_df02_gb09_wkly02 = ts_eda(ts_df = owt_df02_gb09,
                               form_lead = c("date_sample", "project"),
                               form_cast = "parameter",
                               param_lst = param_lst02,
                               l1_col = c("project"),
                               l1_param = c("PLOO", "SBOO"),
                               rtn_met = FALSE,
                               box = FALSE,
                               week_agg = TRUE,
                               out_rm = TRUE
)

```

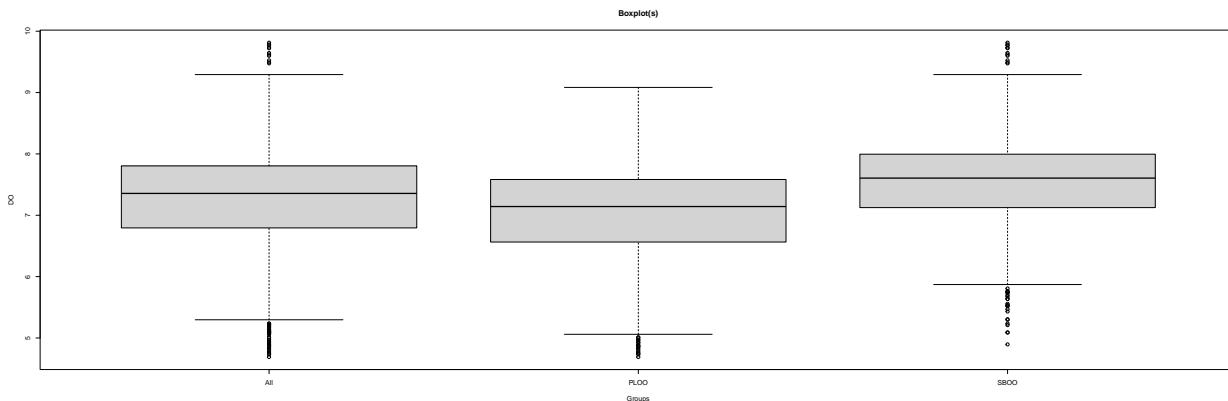
```
## [1] 1967     3
```



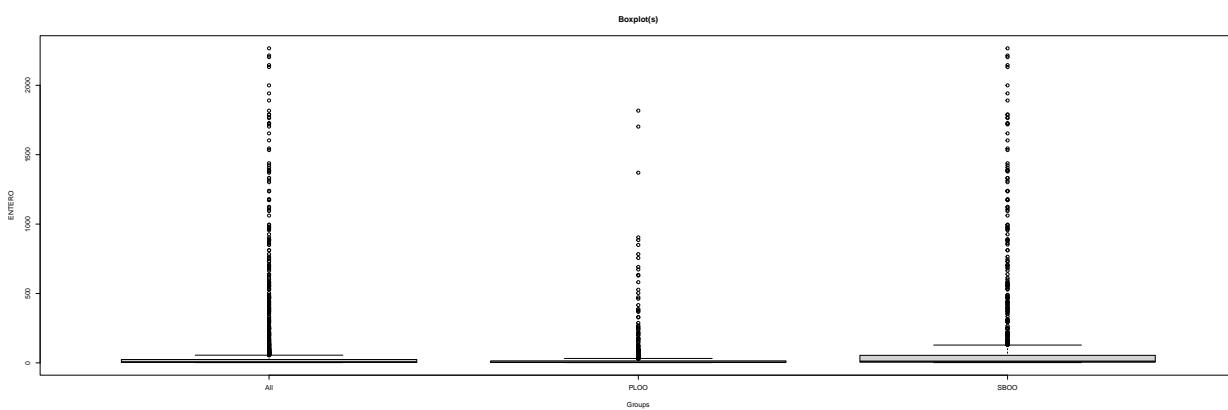
```
## [1] 2000     3
```



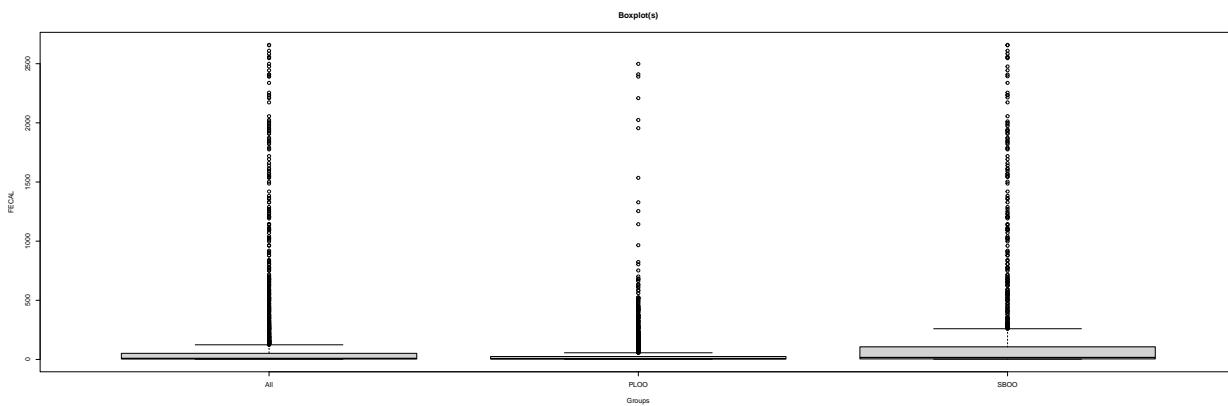
```
## [1] 2101     3
```



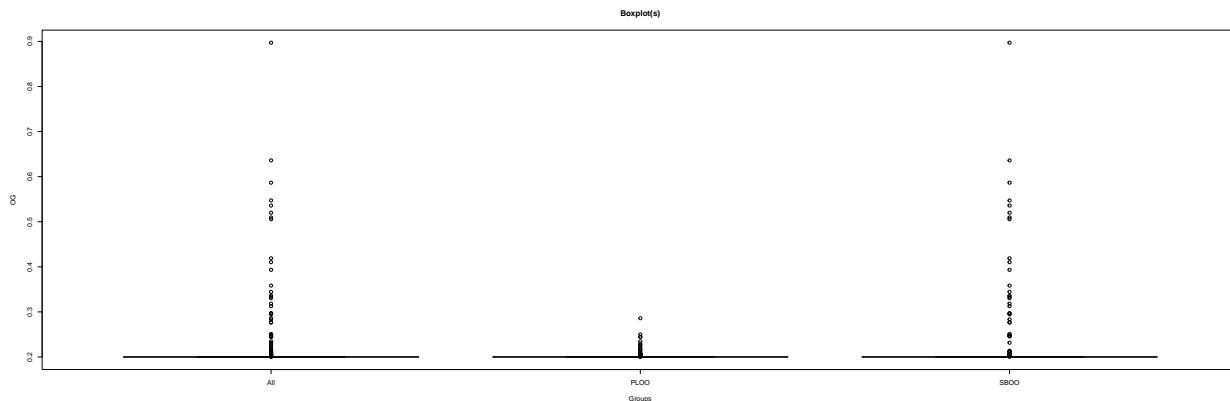
```
## [1] 2786      3
```



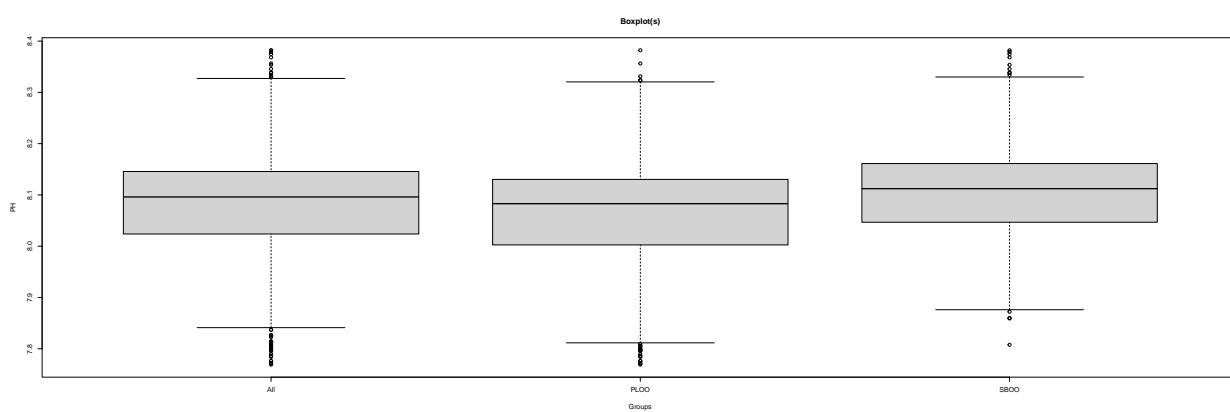
```
## [1] 2786      3
```



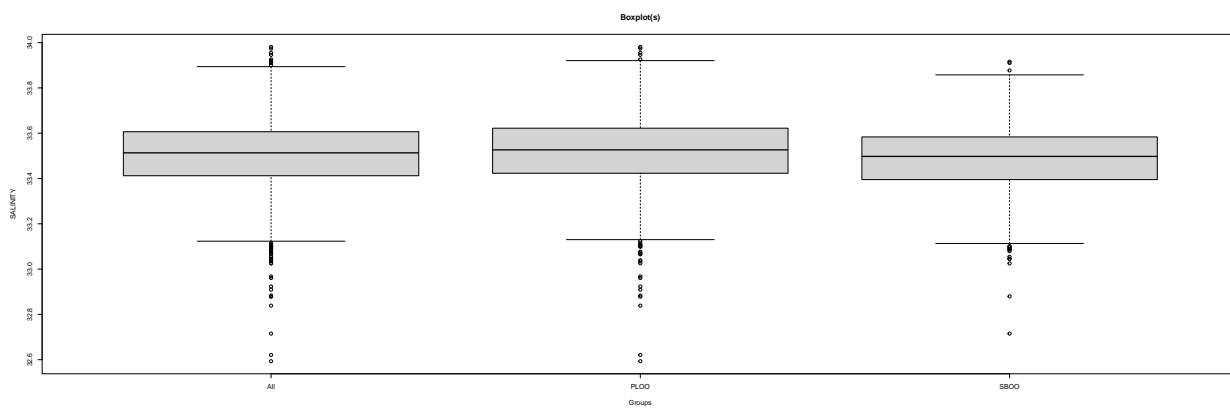
```
## [1] 351      3
```



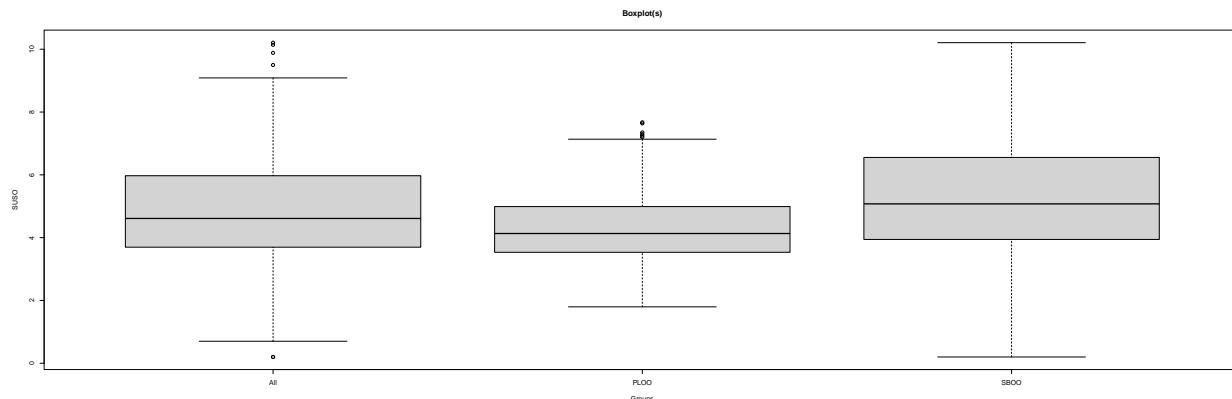
```
## [1] 2105    3
```



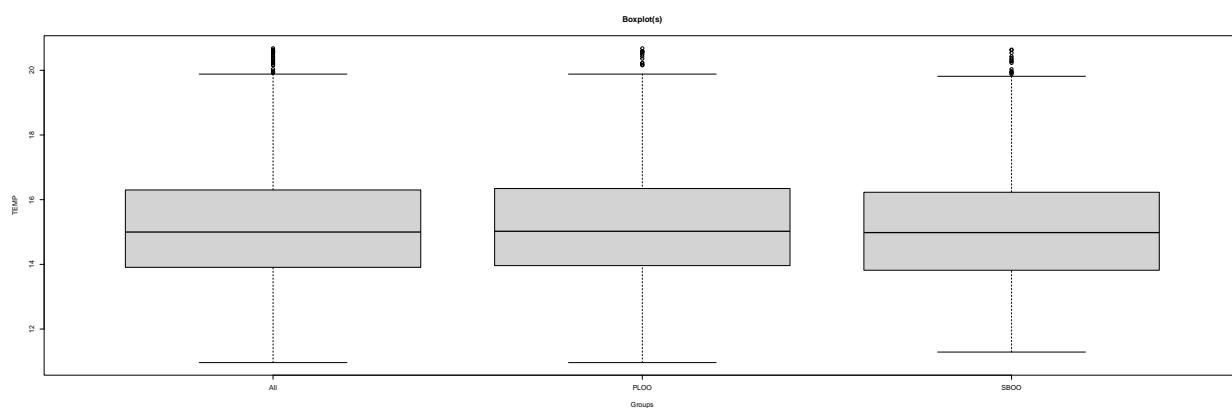
```
## [1] 2097    3
```



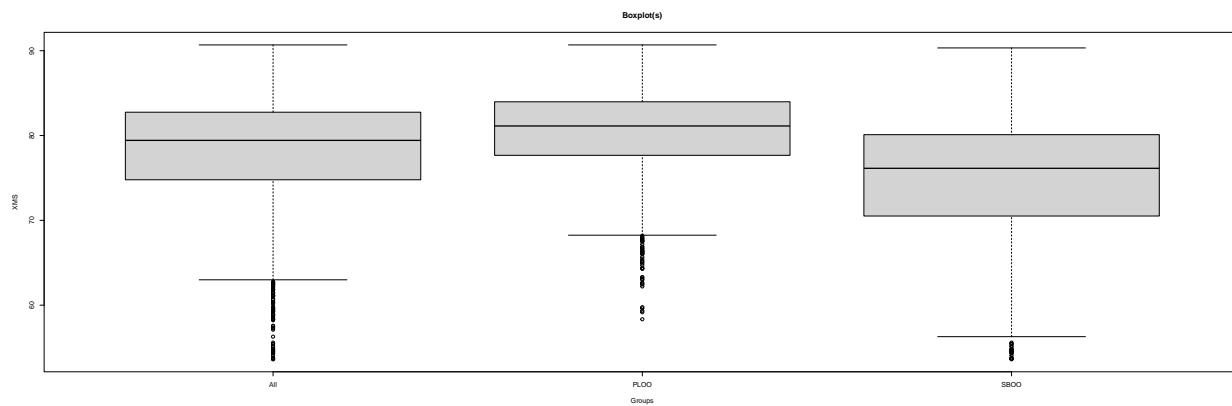
```
## [1] 369     3
```



```
## [1] 2616 3
```



```
## [1] 2606 3
```



```
##   date_sample project CHLOROPHYLL DENSITY      DO    ENTERO    FECAL OG     PH
## 1 1990-11-19    PLOO        0.87 23.855 6.550000    NA      NA NA 8.080
## 2 1990-11-19    SB00        1.27 23.853 7.410000    NA      NA NA 8.180
## 3 1991-01-07    PLOO        NA      NA      NA 25.38462 88.46154 NA     NA
## 4 1991-01-14    PLOO        NA      NA 5.445417 58.12973 137.21730 NA 8.195
## 5 1991-01-21    PLOO        NA      NA      NA 23.20513 59.61538 NA     NA
## 6 1991-01-28    PLOO        NA      NA      NA 31.81891 69.78365 NA     NA
## 7 1991-02-04    PLOO        NA      NA      NA 154.23077 428.58974 NA     NA
##   SALINITY SUSO      TEMP      XMS
## 1 33.61700    NA 19.43000    NA
```

```

## 2 33.57400 NA 19.31000 75.60000
## 3 NA NA 14.45000 81.96154
## 4 33.50113 NA 14.07478 82.04876
## 5 NA NA 14.54487 70.19231
## 6 NA NA 14.28846 77.61167
## 7 NA NA 14.23462 81.83333

##          vars     n   mean      sd median trimmed  mad   min   max range
## date_sample 1 2799    NaN     NA     NA    NaN  NA Inf -Inf -Inf
## project*    2 2799    1.43    0.49    1.00   1.41  0.00  1.00  2.00  1.00
## CHLOROPHYLL 3 1919    3.51    2.75    2.63   3.06  1.98  0.33 14.72 14.38
## DENSITY     4 1990    24.74    0.46   24.76   24.76  0.44 23.34  25.98  2.64
## DO          5 2082     7.26    0.81    7.36   7.30  0.74  4.69  9.81  5.12
## ENTERO      6 2713    66.28   228.34   7.25  14.79  7.15  2.00 2266.55 2264.55
## FECAL       7 2711   115.89   335.46   8.89  33.22  9.50  2.00 2658.87 2656.87
## OG          8 345      0.22    0.07    0.20   0.20  0.00  0.20  0.90  0.70
## PH          9 2079     8.08    0.10    8.10   8.09  0.09  7.77  8.38  0.61
## SALINITY    10 2094    33.50    0.16   33.51   33.51  0.14 32.59  33.98  1.39
## SUSO         11 365      4.83    1.71    4.61   4.77  1.57  0.20 10.21 10.01
## TEMP         12 2603    15.19    1.78   15.00   15.10  1.76 10.96  20.68  9.72
## XMS          13 2560    78.03    6.67   79.43   78.77  5.69 53.63  90.68  37.05

##          skew kurtosis   se
## date_sample  NA     NA  NA
## project*    0.30   -1.91  0.01
## CHLOROPHYLL 1.53    2.20  0.06
## DENSITY     -0.34    0.08  0.01
## DO          -0.46    0.44  0.02
## ENTERO      5.78   37.71  4.38
## FECAL       4.74   24.82  6.44
## OG          5.74   40.06  0.00
## PH          -0.36    0.45  0.00
## SALINITY    -0.53    1.74  0.00
## SUSO         0.37    0.30  0.09
## TEMP         0.50   -0.07  0.03
## XMS         -1.07   1.10  0.13

##          date_sample project parameter      Avg
## Not NA n        48395    48395    48395 47222.0000
## NA n           0        0        0 1173.0000
## Not NA %       1        1        1  0.9758
## NA %           0        0        0  0.0242

owt_df02_gb09_wkly03 <- owt_df02_gb09_wkly
print(head(owt_df02_gb09_wkly03, 7))

```

```

##          date_sample project CHLOROPHYLL DENSITY      DO      ENTERO      FECAL OG      PH
## 1 1990-11-19    PL00      0.87  23.855 6.550000      NA      NA NA NA 8.080
## 2 1990-11-19    SB00      1.27  23.853 7.410000      NA      NA NA NA 8.180
## 3 1991-01-07    PL00      NA     NA     NA 25.38462 88.46154 NA  NA
## 4 1991-01-14    PL00      NA     NA 5.445417 58.12973 137.21730 NA 8.195
## 5 1991-01-21    PL00      NA     NA     NA 23.20513 59.61538 NA  NA
## 6 1991-01-28    PL00      NA     NA     NA 31.81891 69.78365 NA  NA
## 7 1991-02-04    PL00      NA     NA     NA 154.23077 428.58974 NA  NA

##          SALINITY SUSO      TEMP      XMS
## 1 33.61700    NA 19.43000 44.85000
## 2 33.57400    NA 19.31000 75.60000

```

```

## 3      NA  NA 14.45000 81.96154
## 4 33.50113  NA 14.07478 82.04876
## 5      NA  NA 14.54487 70.19231
## 6      NA  NA 14.28846 77.61167
## 7      NA  NA 14.23462 81.83333

```

Displaying (Visually in Histograms) the Data per Project (Overarching Location)

```

# owt_df02_gb09_wkly03
# plotting histograms per project (no depth)

# chlorophyll
hist_chloro <- ggplot(owt_df02_gb09_wkly03, aes(x= CHLOROPHYLL)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "CHLOROPHYLL") +
  theme_classic()

# density
hist_density <- ggplot(owt_df02_gb09_wkly03, aes(x= DENSITY)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "DENSITY")+
  theme_classic()

# DO
hist_do <- ggplot(owt_df02_gb09_wkly03, aes(x= DO)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "DO")+
  theme_classic()

# ENTERO
hist_entero <- ggplot(owt_df02_gb09_wkly03, aes(x= ENTERO)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "ENTERO")+
  theme_classic()

# FECAL
hist_fecal <- ggplot(owt_df02_gb09_wkly03, aes(x= FECAL)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "FECAL")+
  theme_classic()

# OG
hist_og <- ggplot(owt_df02_gb09_wkly03, aes(x= OG)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "OG")+
  theme_classic()

```

```

# PH
hist_ph <- ggplot(owt_df02_gb09_wkly03, aes(x= PH)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "pH")+
  theme_classic()

# SALINITY
hist_salinity <- ggplot(owt_df02_gb09_wkly03, aes(x= SALINITY)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "SALINITY")+
  theme_classic()

# SUSO
hist_suso <- ggplot(owt_df02_gb09_wkly03, aes(x= SUSO)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "SUSO")+
  theme_classic()

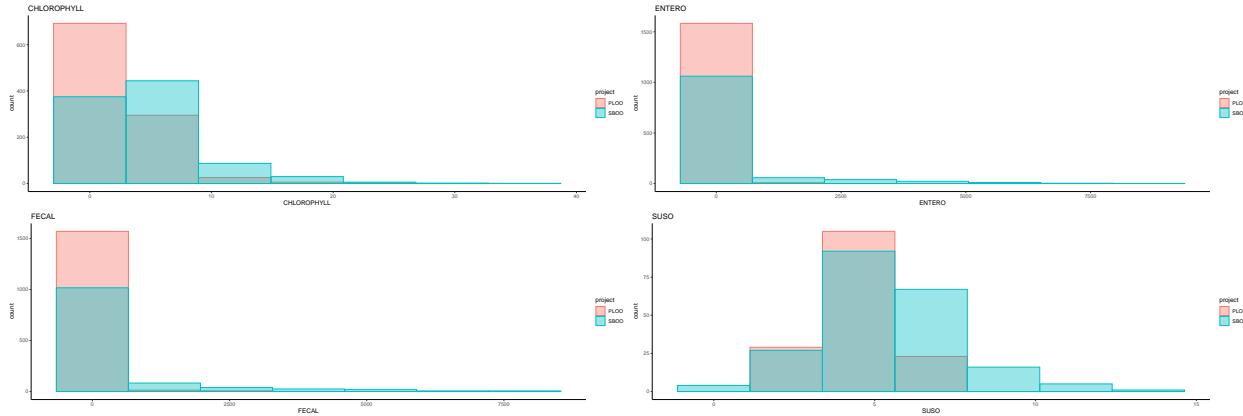
# TEMP
hist_temp <- ggplot(owt_df02_gb09_wkly03, aes(x= TEMP)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "TEMP (C)")+
  theme_classic()

# XMS
hist_xms <- ggplot(owt_df02_gb09_wkly03, aes(x= XMS)) +
  geom_histogram(aes(color= project, fill= project),
                 position= "identity", bins=7, alpha=.4) +
  labs(title= "XMS")+
  theme_classic()

# plotting groups:

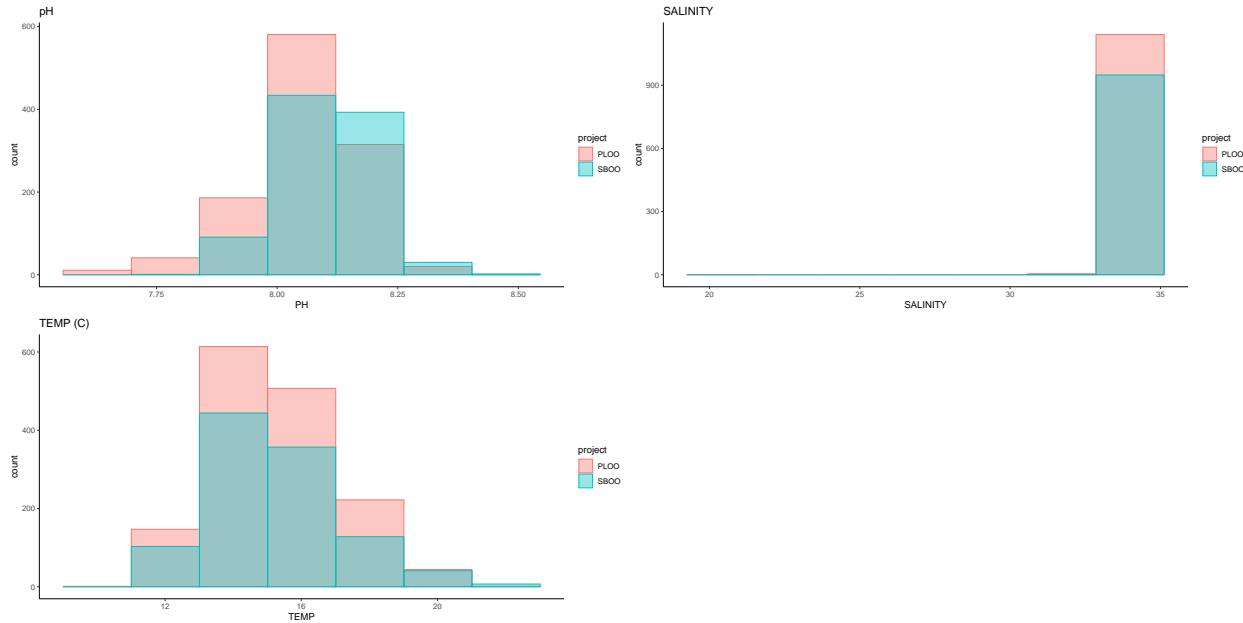
# bacteriological basis (chlorophyll, entero, fecal, suso (dissolved solids))
grid.arrange(hist_chloro, hist_entero, hist_fecal,hist_suso,
             ncol=2, nrow=2) +
  theme(legend.key.size = unit(0.5, "cm"),
        legend.title = element_text(size=10),
        legend.text = element_text(size=8),
        text = element_text(size=10))

```



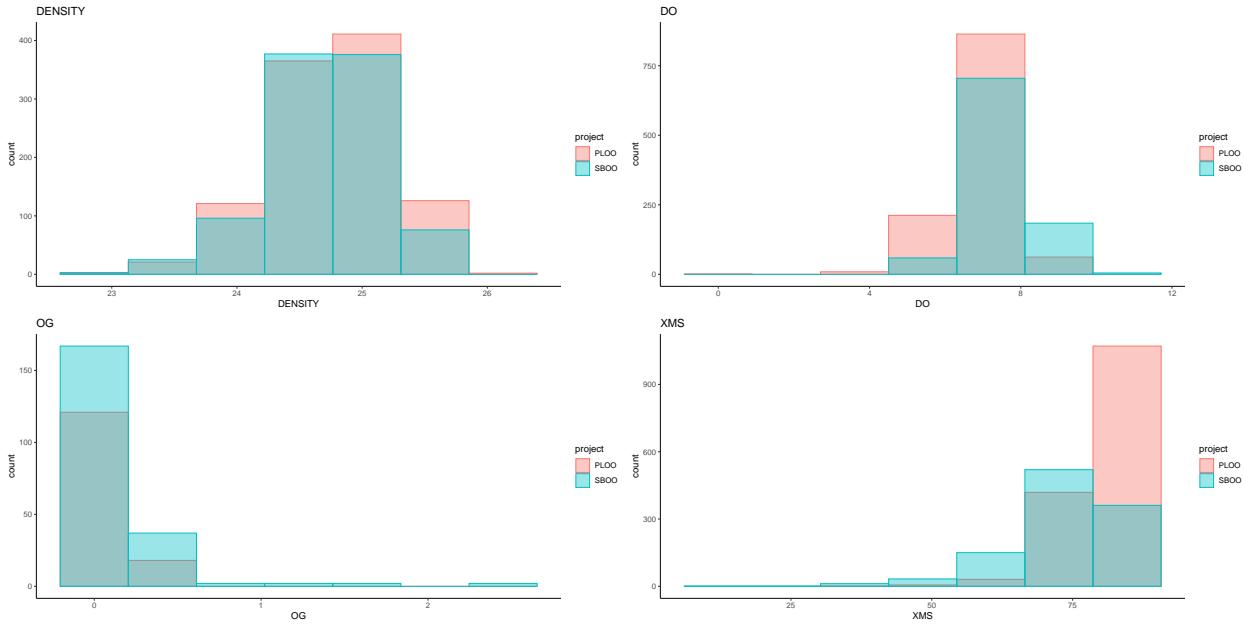
```
## NULL
```

```
# plotting chemical types (pH, salinity, temp)
grid.arrange(hist_ph, hist_salinity, hist_temp,
             ncol=2, nrow=2) +
  theme(legend.key.size = unit(0.5, "cm"),
        legend.title = element_text(size=10),
        legend.text = element_text(size=8),
        text = element_text(size=10))
```



```
## NULL
```

```
# plotting optical-chemical type (density, DO, OG, xms)
grid.arrange(hist_density, hist_do, hist_og, hist_xms,
             ncol=2, nrow=2) +
  theme(legend.key.size = unit(0.5, "cm"),
        legend.title = element_text(size=10),
        legend.text = element_text(size=8),
        text = element_text(size=10))
```



```
## NULL
```

Setting up for Descriptive Statistics and Looking at Non-Time Series Correlations

```
# descriptive stats (no depth) for numeric columns for whole time frame
owt_df02_gb09_wkly03_nums <- subset(owt_df02_gb09_wkly03, select= -c(date_sample))
summary(owt_df02_gb09_wkly03_nums)
```

```
##   project      CHLOROPHYLL        DENSITY         DO
##   PL00:1606   Min.   : 0.3333   Min.   :22.71   Min.   : 0.000
##   SB00:1196   1st Qu.: 1.5610   1st Qu.:24.46   1st Qu.: 6.789
##               Median : 2.7145   Median :24.76   Median : 7.350
##               Mean   : 3.8885   Mean   :24.73   Mean   : 7.243
##               3rd Qu.: 4.8582   3rd Qu.:25.05   3rd Qu.: 7.805
##               Max.   :36.0533   Max.   :25.98   Max.   :10.810
##               NA's   :835      NA's   :802     NA's   :701
##   ENTERO       FECAL          OG            PH
##   Min.   : 2.000   Min.   : 2.000   Min.   :0.2000   Min.   :7.592
##   1st Qu.: 3.279   1st Qu.: 3.709   1st Qu.:0.2000   1st Qu.:8.020
##   Median : 7.579   Median : 9.445   Median :0.2000   Median :8.095
##   Mean   :169.274   Mean   :233.754   Mean   :0.2441   Mean   :8.080
##   3rd Qu.: 27.682   3rd Qu.: 63.223   3rd Qu.:0.2000   3rd Qu.:8.145
##   Max.   :8668.000   Max.   :7881.917   Max.   :2.6500   Max.   :8.439
##   NA's   :16        NA's   :16       NA's   :2451     NA's   :697
##   SALINITY      SUSO          TEMP          XMS
##   Min.   :20.38    Min.   : 0.200   Min.   :10.96   Min.   :18.11
##   1st Qu.:33.41    1st Qu.: 3.697   1st Qu.:13.91   1st Qu.:74.39
##   Median :33.51    Median : 4.637   Median :15.01   Median :79.29
##   Mean   :33.50    Mean   : 4.909   Mean   :15.22   Mean   :77.43
##   3rd Qu.:33.61    3rd Qu.: 6.043   3rd Qu.:16.32   3rd Qu.:82.67
##   Max.   :33.98    Max.   :13.709   Max.   :22.97   Max.   :90.68
##   NA's   :705      NA's   :2433     NA's   :186     NA's   :196
```

If we remove the NA's of the owt_df02_gb09_wkly03 full time frame

```
chlornum <- data.frame("CHLOROPHYLL" = owt_df02_gb09_wkly03_nums$CHLOROPHYLL)
chlornum <- chlornum %>% drop_na()
summary(chlornum)
```

```
##      CHLOROPHYLL
##  Min.   : 0.3333
##  1st Qu.: 1.5610
##  Median : 2.7146
##  Mean   : 3.8885
##  3rd Qu.: 4.8582
##  Max.   :36.0533
```

```
densnum <- data.frame("DENSITY" = owt_df02_gb09_wkly03_nums$DENSITY)
densnum <- densnum %>% drop_na()
summary(densnum)
```

```
##      DENSITY
##  Min.   :22.71
##  1st Qu.:24.46
##  Median :24.76
##  Mean   :24.73
##  3rd Qu.:25.05
##  Max.   :25.98
```

```
donum <- data.frame("DO" = owt_df02_gb09_wkly03_nums$DO)
donum <- donum %>% drop_na()
summary(donum)
```

```
##      DO
##  Min.   : 0.000
##  1st Qu.: 6.789
##  Median : 7.350
##  Mean   : 7.243
##  3rd Qu.: 7.805
##  Max.   :10.810
```

```
enteronum <- data.frame("ENTERO" = owt_df02_gb09_wkly03_nums$ENTERO)
enteronum <- enteronum %>% drop_na()
summary(enteronum)
```

```
##      ENTERO
##  Min.   :  2.000
##  1st Qu.:  3.279
##  Median :  7.579
##  Mean   : 169.274
##  3rd Qu.: 27.682
##  Max.   :8668.000
```

```
fecalnum <- data.frame("FECAL" = owt_df02_gb09_wkly03_nums$FECAL)
fecalnum <- fecalnum %>% drop_na()
summary(fecalnum)
```

```
##      FECAL
##  Min.   :  2.000
```

```

##   1st Qu.: 3.709
##   Median : 9.445
##   Mean    : 233.754
##   3rd Qu.: 63.223
##   Max.    :7881.917

ognum <- data.frame("OG" = owt_df02_gb09_wkly03_nums$OG)
ognum <- ognum %>% drop_na()
summary(ognum)

##          OG
##   Min.    :0.2000
##   1st Qu.:0.2000
##   Median :0.2000
##   Mean    :0.2441
##   3rd Qu.:0.2000
##   Max.    :2.6500

phnum <- data.frame("PH" = owt_df02_gb09_wkly03_nums$PH)
phnum <- phnum %>% drop_na()
summary(phnum)

##          PH
##   Min.    :7.592
##   1st Qu.:8.020
##   Median :8.095
##   Mean    :8.080
##   3rd Qu.:8.145
##   Max.    :8.439

salinnum <- data.frame("SALINITY" = owt_df02_gb09_wkly03_nums$SALINITY)
salinnum <- salinnum %>% drop_na()
summary(salinnum)

##          SALINITY
##   Min.    :20.38
##   1st Qu.:33.41
##   Median :33.51
##   Mean    :33.50
##   3rd Qu.:33.61
##   Max.    :33.98

susunum <- data.frame("SUSO" = owt_df02_gb09_wkly03_nums$SUSO)
susunum <- susunum %>% drop_na()
summary(susunum)

##          SUSO
##   Min.    : 0.200
##   1st Qu.: 3.697
##   Median : 4.637
##   Mean    : 4.909
##   3rd Qu.: 6.043
##   Max.    :13.709

tempnum <- data.frame("TEMP" = owt_df02_gb09_wkly03_nums$TEMP)
tempnum <- tempnum %>% drop_na()

```

```

summary(tempnum)

##      TEMP
##  Min.   :10.96
##  1st Qu.:13.91
##  Median :15.01
##  Mean   :15.22
##  3rd Qu.:16.32
##  Max.   :22.97

xmsnum <- data.frame("XMS" = owt_df02_gb09_wkly03_nums$XMS)
xmsnum <- xmsnum %>% drop_na()
summary(xmsnum)

##      XMS
##  Min.   :18.11
##  1st Qu.:74.39
##  Median :79.29
##  Mean   :77.43
##  3rd Qu.:82.67
##  Max.   :90.68

```

Looking at each column if we remove NA's (for 1/1/2000 onward)

```

# descriptive stats (no depth) for numeric columns for arbitrary after 1/1/2000
owt_df02_gb09_wkly03_nums_2000s <- owt_df02_gb09_wkly03 %>% filter(date_sample >=
  ~ "2000-01-01")
owt_df02_gb09_wkly03_nums_2000s <- subset(owt_df02_gb09_wkly03_nums_2000s, select=
  ~ -c(date_sample))
summary(owt_df02_gb09_wkly03_nums_2000s)

```

```

##    project      CHLOROPHYLL        DENSITY         DO
##  PL00:1141    Min.   : 0.3333    Min.   :22.71    Min.   : 2.876
##  SB00:1146    1st Qu.: 1.5956    1st Qu.:24.45    1st Qu.: 6.852
##                Median : 2.7296    Median :24.75    Median : 7.388
##                Mean   : 3.9388    Mean   :24.72    Mean   : 7.305
##                3rd Qu.: 4.9511    3rd Qu.:25.04    3rd Qu.: 7.819
##                Max.   :36.0533    Max.   :25.98    Max.   :10.810
##                NA's   :386       NA's   :368      NA's   :373
##    ENTERO      FECAL          OG          PH
##    Min.   : 2.000    Min.   : 2.000    Min.   :0.2000    Min.   :7.628
##    1st Qu.: 3.141    1st Qu.: 3.480    1st Qu.:0.2000    1st Qu.:8.031
##    Median : 6.909    Median : 8.333    Median :0.2000    Median :8.100
##    Mean   :197.919    Mean   :255.213    Mean   :0.2652    Mean   :8.088
##    3rd Qu.: 26.498    3rd Qu.: 47.318    3rd Qu.:0.2000    3rd Qu.:8.147
##    Max.   :8668.000    Max.   :7881.917    Max.   :2.6500    Max.   :8.439
##    NA's   :12         NA's   :13        NA's   :2057    NA's   :369
##    SALINITY      SUSO          TEMP         XMS
##    Min.   :32.21     Min.   : 0.200    Min.   :10.96    Min.   :18.11
##    1st Qu.:33.41     1st Qu.: 3.804    1st Qu.:13.92    1st Qu.:73.89
##    Median :33.51     Median : 4.954    Median :15.05    Median :79.06
##    Mean   :33.50     Mean   : 5.173    Mean   :15.25    Mean   :77.02
##    3rd Qu.:33.60     3rd Qu.: 6.423    3rd Qu.:16.33    3rd Qu.:82.45
##    Max.   :33.92     Max.   :13.709    Max.   :22.97    Max.   :90.68

```

```
##   NA's    :377      NA's    :2041      NA's    :167      NA's    :177
```

Dropping NA's

```
chlornum2000s <- data.frame("CHLOROPHYLL" = owt_df02_gb09_wkly03_nums_2000s$CHLOROPHYLL)
chlornum2000s <- chlornum2000s %>% drop_na()
summary(chlornum2000s)
```

```
##      CHLOROPHYLL
##  Min.   : 0.3333
##  1st Qu.: 1.5956
##  Median : 2.7296
##  Mean   : 3.9388
##  3rd Qu.: 4.9511
##  Max.   :36.0533
```

```
densnum2000s <- data.frame("DENSITY" = owt_df02_gb09_wkly03_nums_2000s$DENSITY)
densnum2000s <- densnum2000s %>% drop_na()
summary(densnum2000s)
```

```
##      DENSITY
##  Min.   :22.71
##  1st Qu.:24.45
##  Median :24.75
##  Mean   :24.72
##  3rd Qu.:25.04
##  Max.   :25.98
```

```
donum2000s <- data.frame("DO" = owt_df02_gb09_wkly03_nums_2000s$DO)
donum2000s <- donum2000s %>% drop_na()
summary(donum2000s)
```

```
##      DO
##  Min.   : 2.876
##  1st Qu.: 6.852
##  Median : 7.389
##  Mean   : 7.305
##  3rd Qu.: 7.819
##  Max.   :10.810
```

```
enteronum2000s <- data.frame("ENTERO" = owt_df02_gb09_wkly03_nums_2000s$ENTERO)
enteronum2000s <- enteronum2000s %>% drop_na()
summary(enteronum2000s)
```

```
##      ENTERO
##  Min.   :  2.000
##  1st Qu.:  3.141
##  Median :  6.909
##  Mean   : 197.919
##  3rd Qu.: 26.498
##  Max.   :8668.000
```

```
fecalnum2000s <- data.frame("FECAL" = owt_df02_gb09_wkly03_nums_2000s$FECAL)
fecalnum2000s <- fecalnum2000s %>% drop_na()
summary(fecalnum2000s)
```

```

##      FECAL
##  Min.   : 2.000
##  1st Qu.: 3.480
##  Median : 8.333
##  Mean   : 255.213
##  3rd Qu.: 47.318
##  Max.   :7881.917

ognum2000s <- data.frame("OG" = owt_df02_gb09_wkly03_nums_2000s$OG)
ognum2000s <- ognum2000s %>% drop_na()
summary(ognum2000s)

##      OG
##  Min.   :0.2000
##  1st Qu.:0.2000
##  Median :0.2000
##  Mean   :0.2652
##  3rd Qu.:0.2000
##  Max.   :2.6500

phnum2000s <- data.frame("PH" = owt_df02_gb09_wkly03_nums_2000s$PH)
phnum2000s <- phnum2000s %>% drop_na()
summary(phnum2000s)

##      PH
##  Min.   :7.628
##  1st Qu.:8.031
##  Median :8.100
##  Mean   :8.088
##  3rd Qu.:8.147
##  Max.   :8.439

salinnum2000s <- data.frame("SALINITY" = owt_df02_gb09_wkly03_nums_2000s$SALINITY)
salinnum2000s <- salinnum2000s %>% drop_na()
summary(salinnum2000s)

##      SALINITY
##  Min.   :32.21
##  1st Qu.:33.41
##  Median :33.51
##  Mean   :33.50
##  3rd Qu.:33.60
##  Max.   :33.92

susunum2000s <- data.frame("SUSO" = owt_df02_gb09_wkly03_nums_2000s$SUSO)
susunum2000s <- susunum2000s %>% drop_na()
summary(susunum2000s)

##      SUSO
##  Min.   : 0.200
##  1st Qu.: 3.804
##  Median : 4.954
##  Mean   : 5.173
##  3rd Qu.: 6.423
##  Max.   :13.709

```

```

tempnum2000s <- data.frame("TEMP" = owt_df02_gb09_wkly03_nums_2000s$TEMP)
tempnum2000s <- tempnum2000s %>% drop_na()
summary(tempnum2000s)

##          TEMP
##  Min.   :10.96
##  1st Qu.:13.92
##  Median :15.05
##  Mean   :15.25
##  3rd Qu.:16.33
##  Max.   :22.97

xmsnum2000s <- data.frame("XMS" = owt_df02_gb09_wkly03_nums_2000s$XMS)
xmsnum2000s <- xmsnum2000s %>% drop_na()
summary(xmsnum2000s)

##          XMS
##  Min.   :18.11
##  1st Qu.:73.89
##  Median :79.06
##  Mean   :77.02
##  3rd Qu.:82.45
##  Max.   :90.68

```

looking at non time series correlations out of curiosuty

```

print(paste("chlorophyll", nrow(chlornum), ", density", nrow(densnum), ", DO",
           "nrow(donum),",
           ", entero", nrow(enteronum), ", fecal", nrow(fecalnum), ", OG", nrow(ognum),
           ", pH", nrow(phnum), ", salinity", nrow(salinnum), ", Suso", nrow(susunum),
           ", Temp", nrow(tempnum), ", XMS", nrow(xmsnum)))

## [1] "chlorophyll 1967 , density 2000 , DO 2101 , entero 2786 , fecal 2786 , OG 351 , pH 2105 , salin

# least populated in OG at 351 and SUSO at 369.
# focusing on others, the limit will be Chlorophyll at 1967

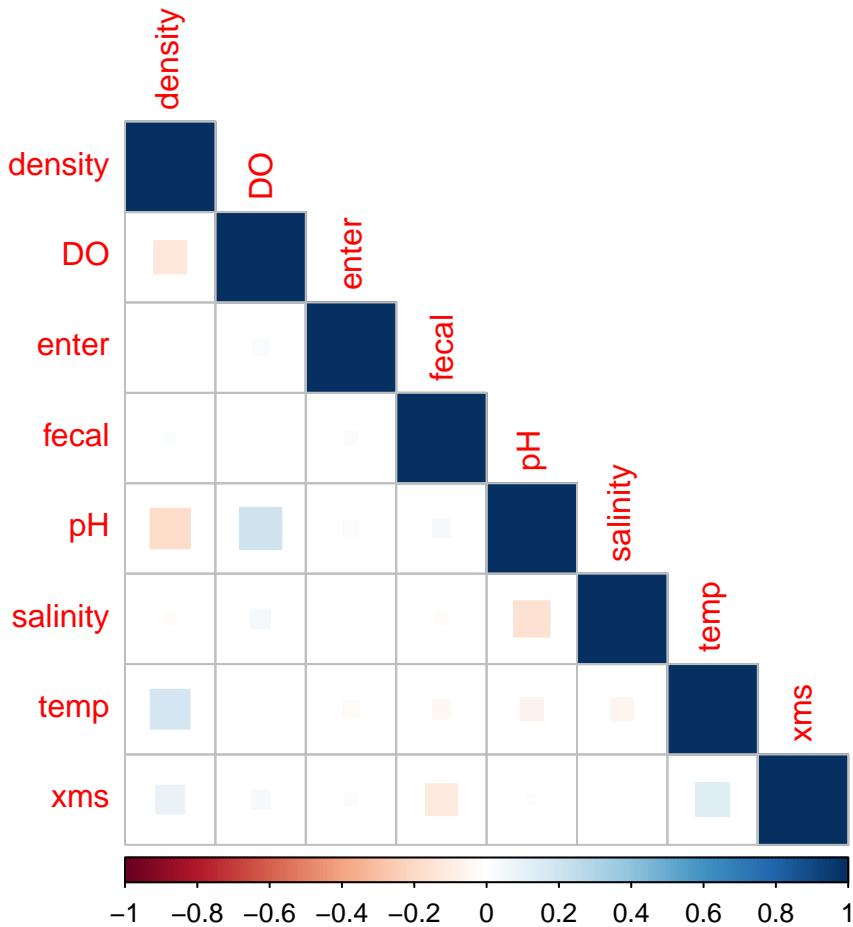
densnum_sub <- densnum[1:1967,]
donum_sub <- donum[1:1967,]
enteronum_sub <- enteronum[1:1967,]
fecalnum_sub <- fecalnum[1:1967,]
phnum_sub <- phnum[1:1967,]
salinnum_sub <- salinnum[1:1967,]
tempnum_sub <- tempnum[1:1967,]
xmsnum_sub <- xmsnum[1:1967,]

splitnum_sub <- data.frame("density" = densnum_sub, "DO" = donum_sub,
                           "enter" = enteronum_sub, "fecal" = fecalnum_sub,
                           "pH" = phnum_sub, "salinity" = salinnum_sub,
                           "temp" = tempnum_sub, "xms" = xmsnum_sub)

corrplot(
  cor(splitnum_sub),
  method = "square",

```

```
type= "lower")
```



```
round(cor(splitnum_sub), 2)
```

```
##          density      DO enter   fecal      pH salinity     temp     xms
## density    1.00 -0.13  0.00  0.02 -0.19 -0.02  0.18  0.10
## DO        -0.13  1.00  0.03 -0.01  0.21  0.04 -0.01  0.04
## enter      0.00  0.03  1.00  0.02  0.03 -0.01 -0.03 -0.02
## fecal      0.02 -0.01  0.02  1.00  0.04 -0.02 -0.04 -0.12
## pH         -0.19  0.21  0.03  0.04  1.00 -0.15 -0.06  0.01
## salinity   -0.02  0.04 -0.01 -0.02 -0.15  1.00 -0.06  0.00
## temp       0.18 -0.01 -0.03 -0.04 -0.06 -0.06  1.00  0.13
## xms        0.10  0.04 -0.02 -0.12  0.01  0.00  0.13  1.00
```

Run custom function on data aggregated by `date_sample`, `project`, `depth_m_bin` and `parameter`

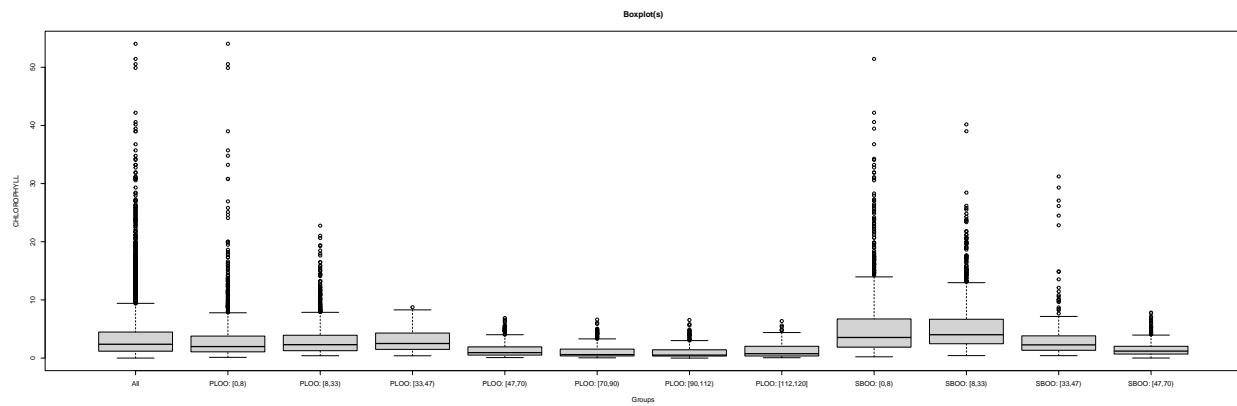
```
owt_df02_gb07_mrgd = ts_eda(ts_df = owt_df02_gb07,
                             form_lead = c("date_sample", "project", "depth_m_bin"),
                             form_cast = "parameter",
                             param_lst = param_lst02,
                             11_col = c("project"),
```

```

    l1_param = c("PL00", "SB00"),
    l2_col = c("depth_m_bin"),
    l2_param = depth_lvls01,
    rtn_met = FALSE,
    box = FALSE
  )

## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PL00: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: Unknown", class =
##   replacement has 1 row, data has 0

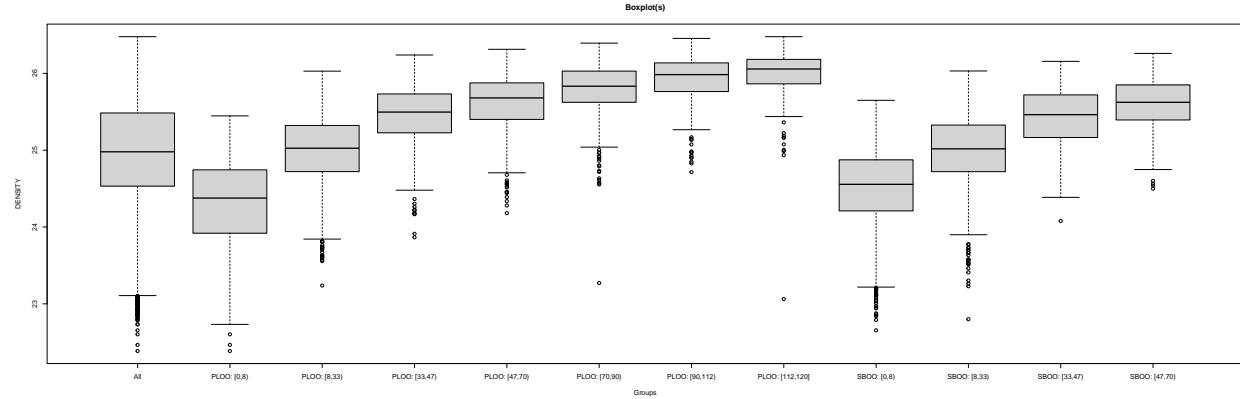
```



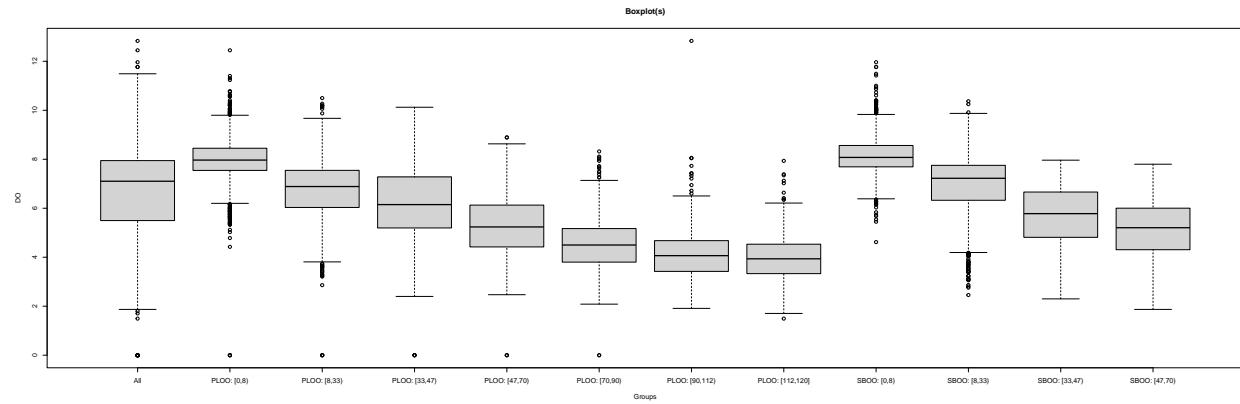
```

## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PL00: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: Unknown", class =
##   replacement has 1 row, data has 0

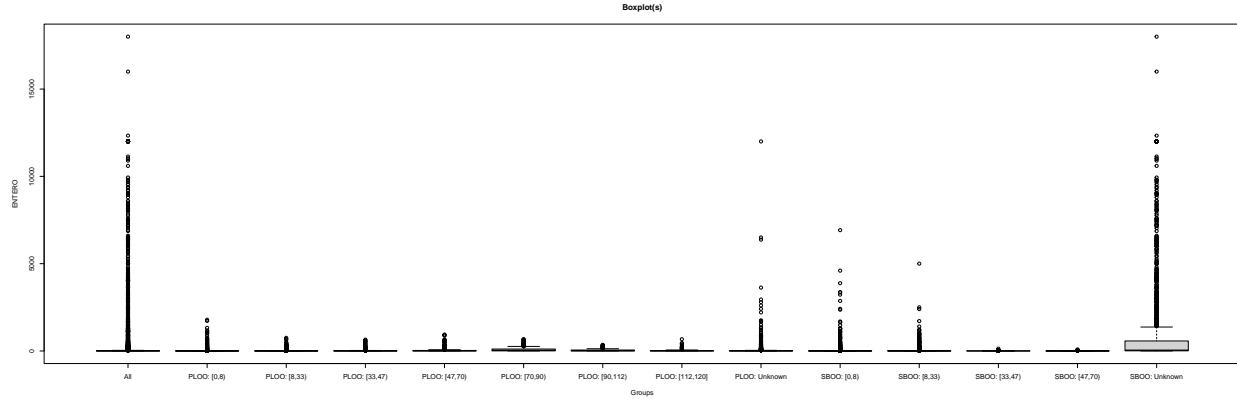
```



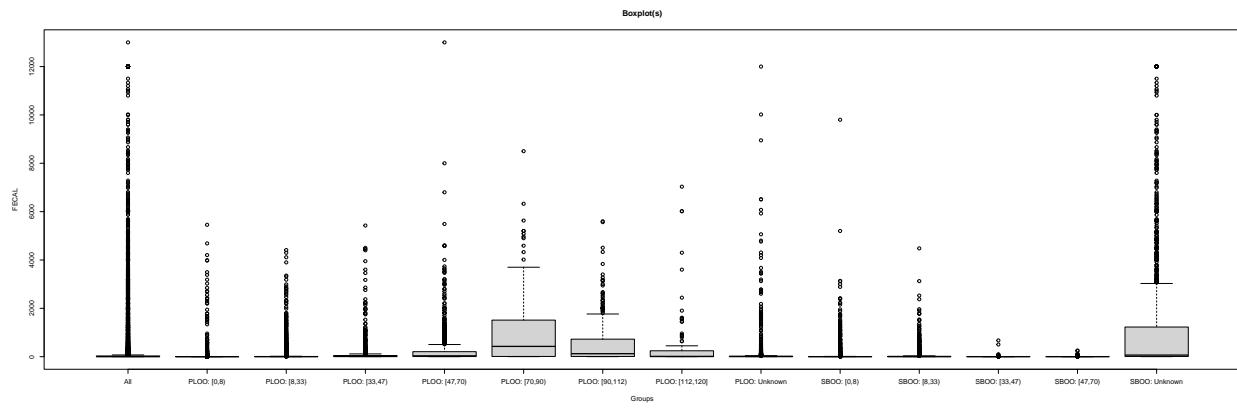
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
##   replacement has 1 row, data has 0
```



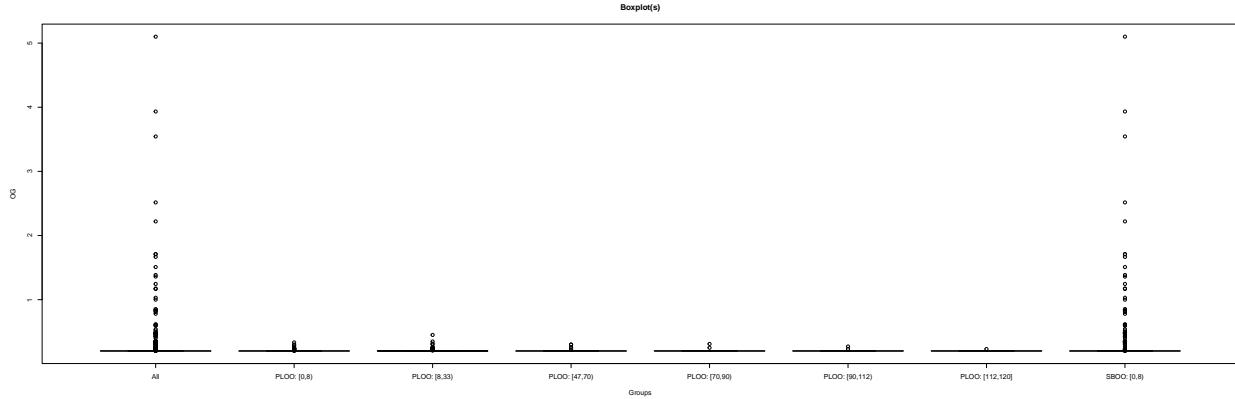
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
```



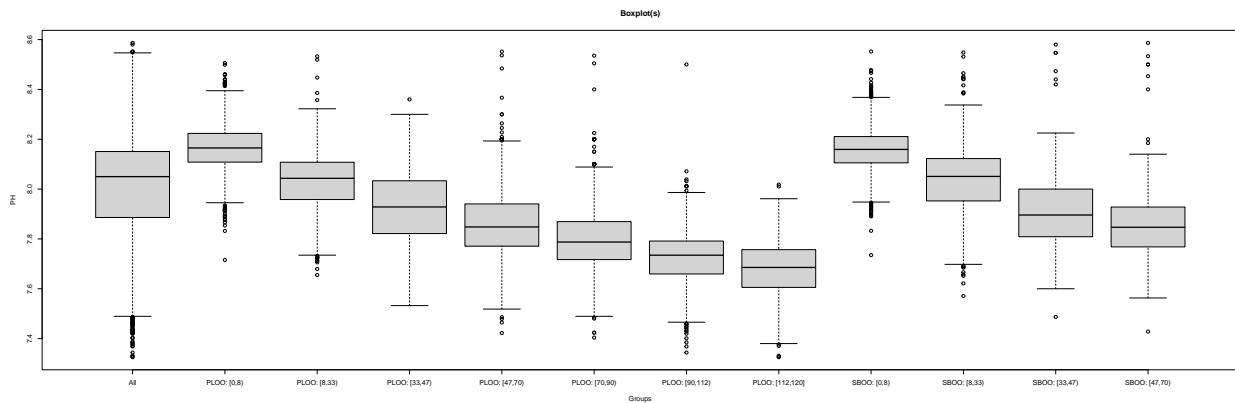
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
```



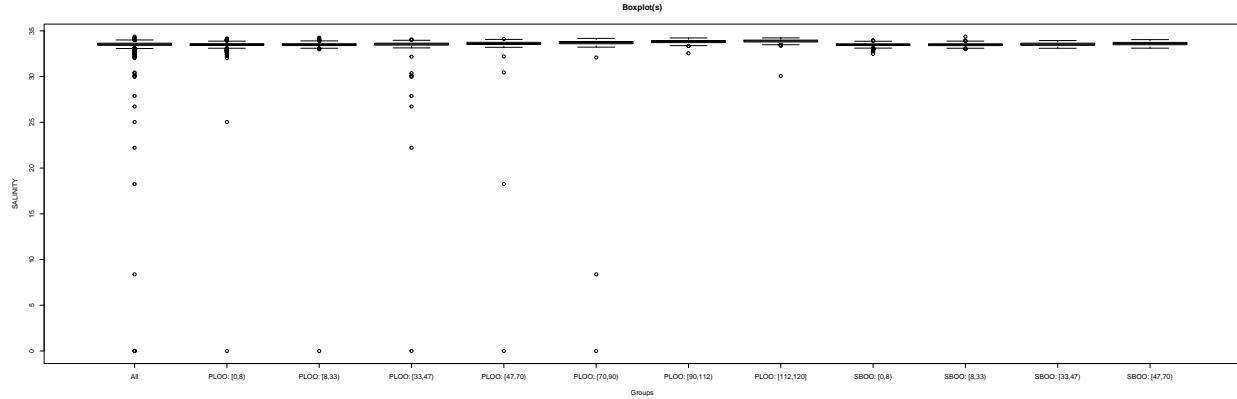
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: [33,47)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [8,33)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [33,47)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [47,70)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
##   replacement has 1 row, data has 0
```



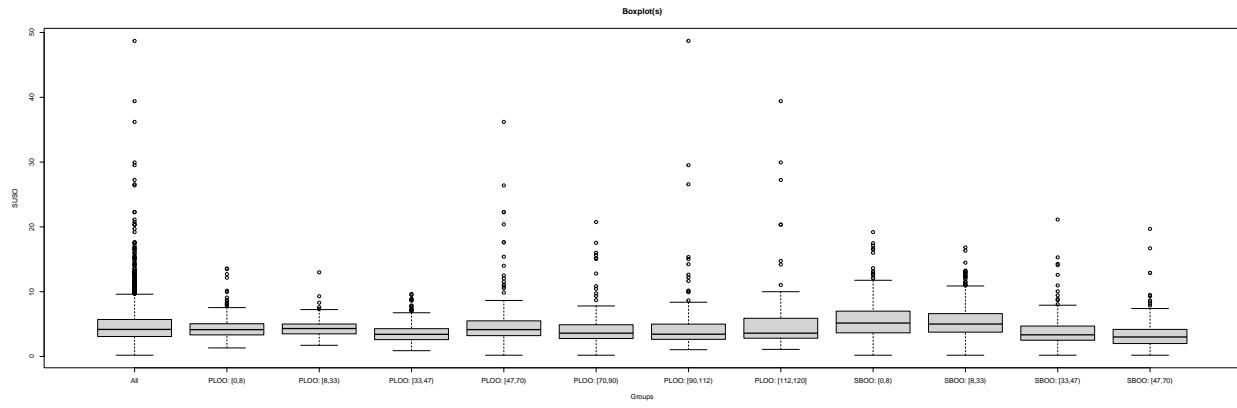
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [70,90]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [90,112]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: Unknown", class =
##   replacement has 1 row, data has 0
```



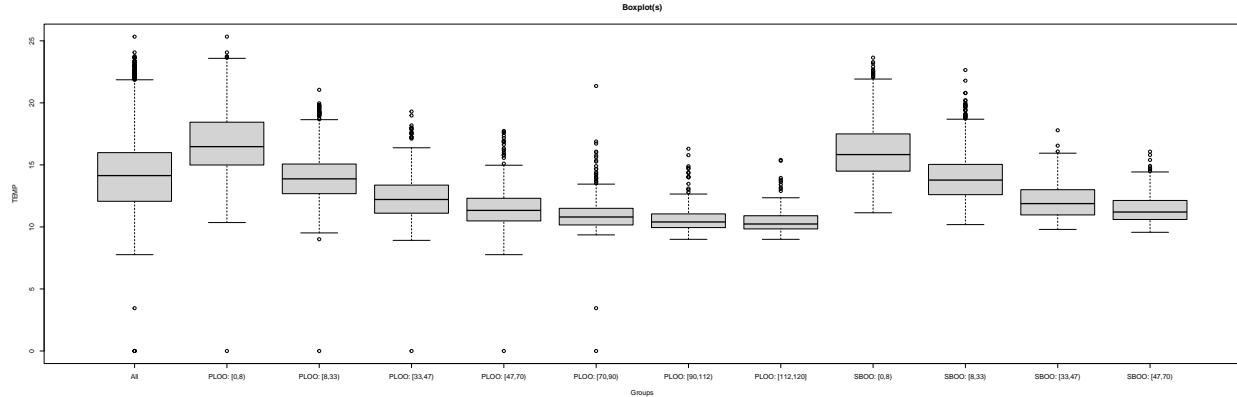
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [70,90]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [90,112]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: Unknown", class =
##   replacement has 1 row, data has 0
```



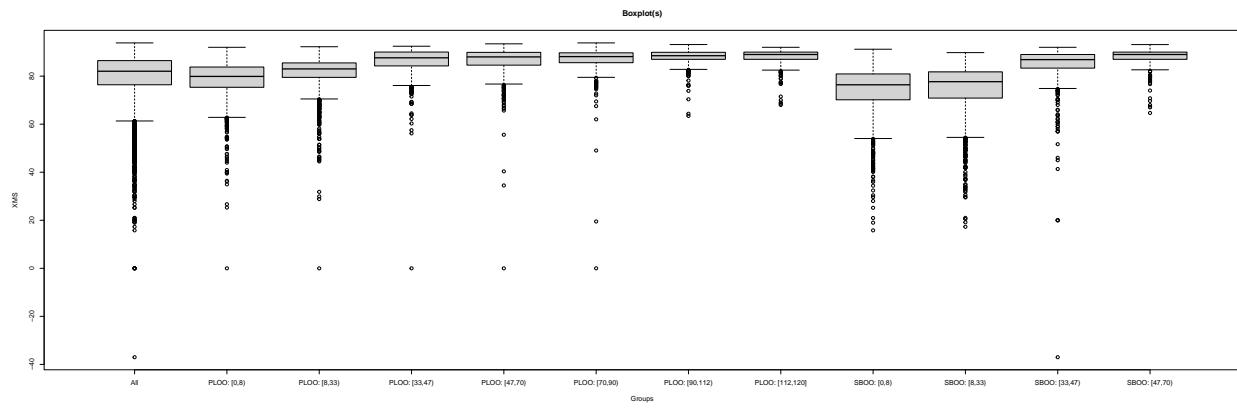
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [70,90]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [90,112]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: Unknown", class =
##   replacement has 1 row, data has 0
```



```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [70,90]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [90,112]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: Unknown", class =
##   replacement has 1 row, data has 0
```



```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
##   replacement has 1 row, data has 0
```



```
##   date_sample project depth_m_bin CHLOROPHYLL DENSITY DO ENTERO FECAL
## 1 1990-11-15    PLOO      [8,33)       0.87 23.855 6.55     NA     NA
## 2 1990-11-15    SBOO      [0,8)        1.27 23.853 7.41     NA     NA
## 3 1991-01-02    PLOO      [0,8)        NA     NA 34.07407 134.81481
## 4 1991-01-02    PLOO      [8,33)       NA     NA 27.50000 105.00000
## 5 1991-01-03    PLOO      [0,8)        NA     NA 17.40741 45.55556
## 6 1991-01-03    PLOO      [8,33)       NA     NA 21.66667 64.16667
## 7 1991-01-07    PLOO      [0,8)        NA     NA 77.40741 44.07407
##   OG PH SALINITY SUSO TEMP XMS
## 1 NA 8.08 33.617  NA 19.43000 44.85000
## 2 NA 8.18 33.574  NA 19.31000 75.60000
## 3 NA  NA 14.56667 77.03704
## 4 NA  NA 14.37500 86.75000
## 5 NA  NA 14.48519 83.55556
## 6 NA  NA 14.18333 84.66667
## 7 NA  NA 14.61852 77.62963
```

```

##          vars     n   mean      sd median trimmed  mad    min    max
## date_sample  1 17003    NaN     NA     NA    NaN  NA Inf -Inf
## project*    2 17003  1.37    0.48  1.00  1.34 0.00  1.00  2.00
## depth_m_bin* 3 17003  4.49    2.61  5.00  4.48 2.97  1.00  8.00
## CHLOROPHYLL 4  8386  3.60    4.09  2.38  2.82 2.13  0.00 54.04
## DENSITY      5  8627 24.96    0.69 24.98 24.99 0.70 22.39 26.48
## DO            6  9842   6.70    1.69  7.10  6.80 1.58  0.00 12.83
## ENTERO        7 15533 150.11 925.42  2.80 10.66 1.19  0.00 18000.00
## FECAL         8 14874 269.82 1129.98  3.85 28.41 2.74  0.00 13000.00
## OG            9  1115   0.24    0.26  0.20  0.20 0.00  0.20  5.10
## PH            10  9695   8.01    0.18  8.05  8.02 0.18  7.33  8.59
## SALINITY      11  9844  33.52    0.86 33.54 33.54 0.17  0.00 34.36
## SUSO          12  3023   4.77    2.99  4.18  4.40 1.89  0.20 48.70
## TEMP          13 12010  14.27    2.80 14.14 14.11 2.90  0.00 25.34
## XMS           14 11969  80.22    9.07 82.04 81.41 7.25 -37.00 93.83
##          range   skew kurtosis    se
## date_sample  -Inf    NA     NA  NA
## project*     1.00   0.54  -1.71 0.00
## depth_m_bin* 7.00  -0.11  -1.42 0.02
## CHLOROPHYLL 54.04   3.70  22.87 0.04
## DENSITY      4.09  -0.36  -0.15 0.01
## DO            12.83  -0.55  -0.16 0.02
## ENTERO       18000.00   9.88 111.40 7.43
## FECAL        13000.00   7.12 59.92 9.27
## OG            4.90  11.87 171.74 0.01
## PH            1.26  -0.50  -0.10 0.00
## SALINITY     34.36 -34.13 1283.78 0.01
## SUSO          48.50   3.91 33.72 0.05
## TEMP          25.34   0.42   0.06 0.03
## XMS           130.83 -2.14   9.79 0.08
##          date_sample project depth_m_bin parameter      Avg
## Not NA n     121286  121286    121286  121286 119635.0000
## NA n        0        0        0        0 1651.0000
## Not NA %     1        1        1        1  0.9864
## NA %        0        0        0        0  0.0136

```

```

owt_df02_gb07_wkly = ts_eda(ts_df = owt_df02_gb07,
                             form_lead = c("date_sample", "project", "depth_m_bin"),
                             form_cast = "parameter",
                             param_lst = param_lst02,
                             l1_col = c("project"),
                             l1_param = c("PLOO", "SBOO"),
                             l2_col = c("depth_m_bin"),
                             l2_param = depth_lvls01,
                             rtn_met = FALSE,
                             box = FALSE,
                             week_agg = TRUE
)

```

```

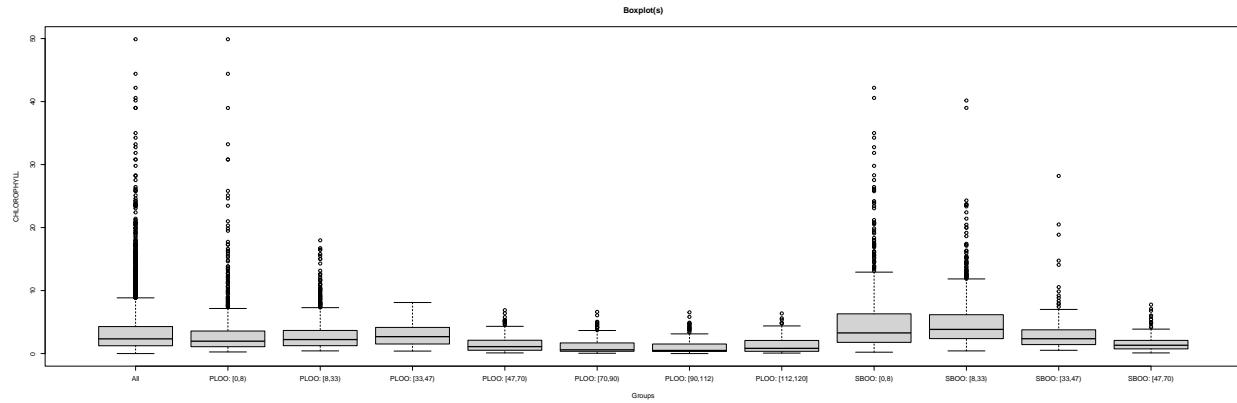
## Error in `$<- .data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<- .data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<- .data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =

```

```

## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
## replacement has 1 row, data has 0

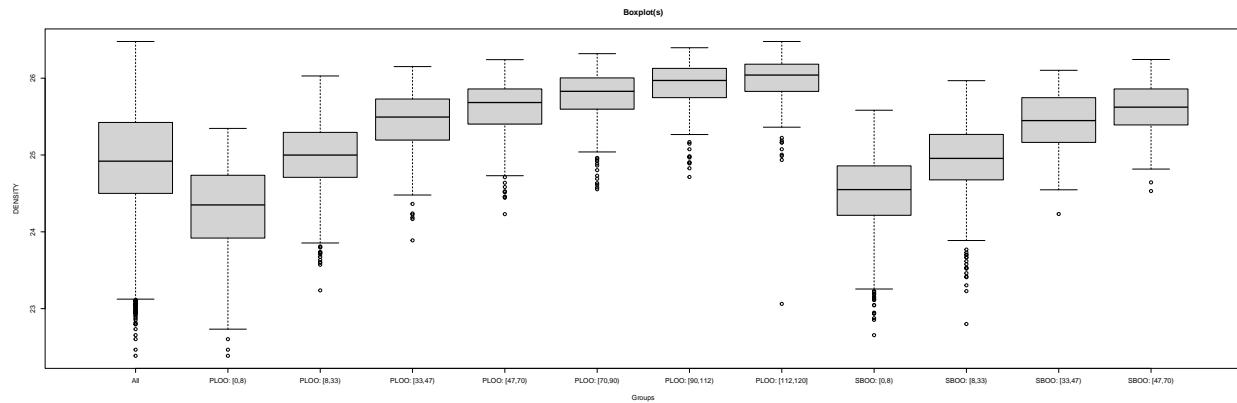
```



```

## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90]", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112]", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
## replacement has 1 row, data has 0

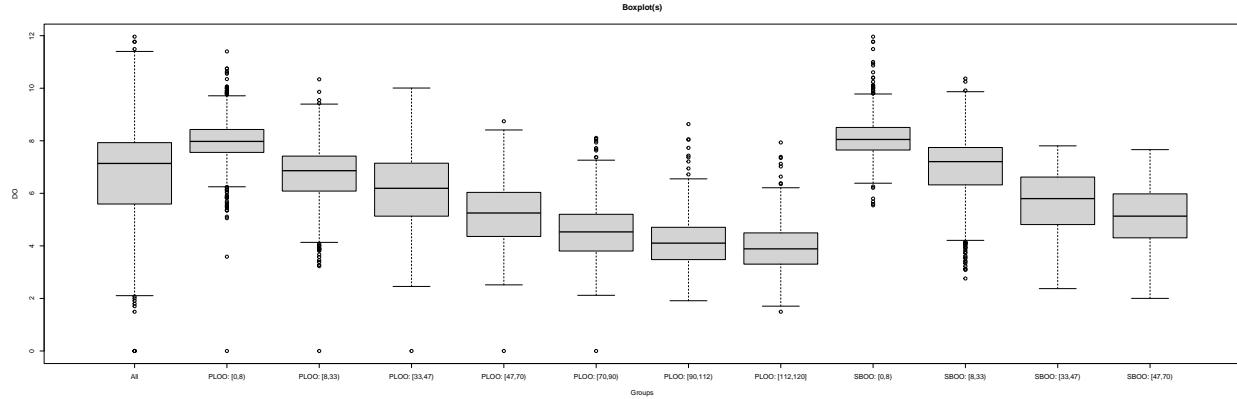
```



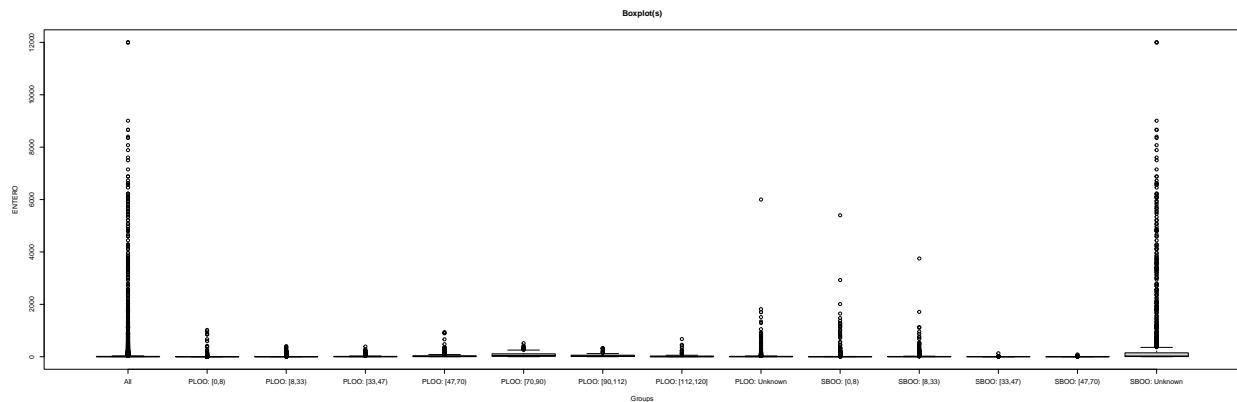
```

## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90]", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112]", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
## replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
## replacement has 1 row, data has 0

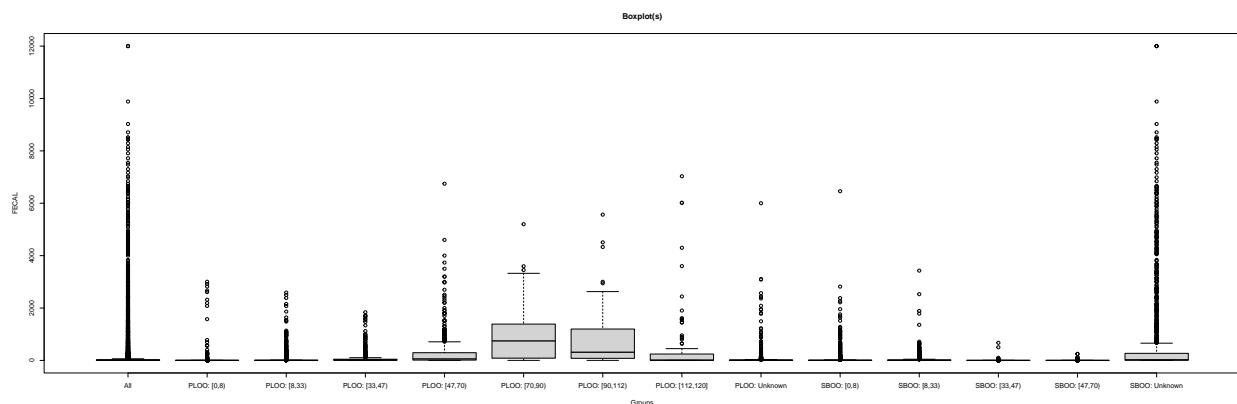
```



```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
```



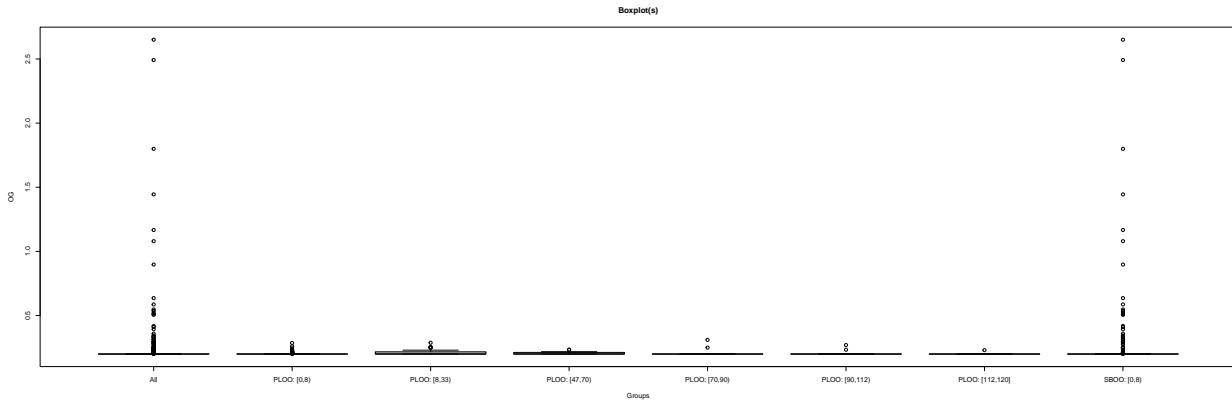
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
```



```

## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: [33,47)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [8,33)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [33,47)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [47,70)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
##   replacement has 1 row, data has 0

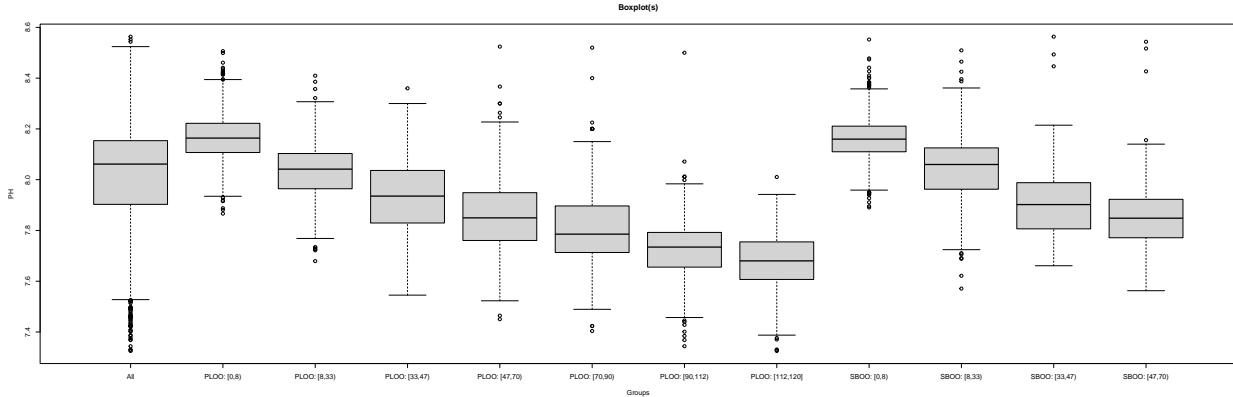
```



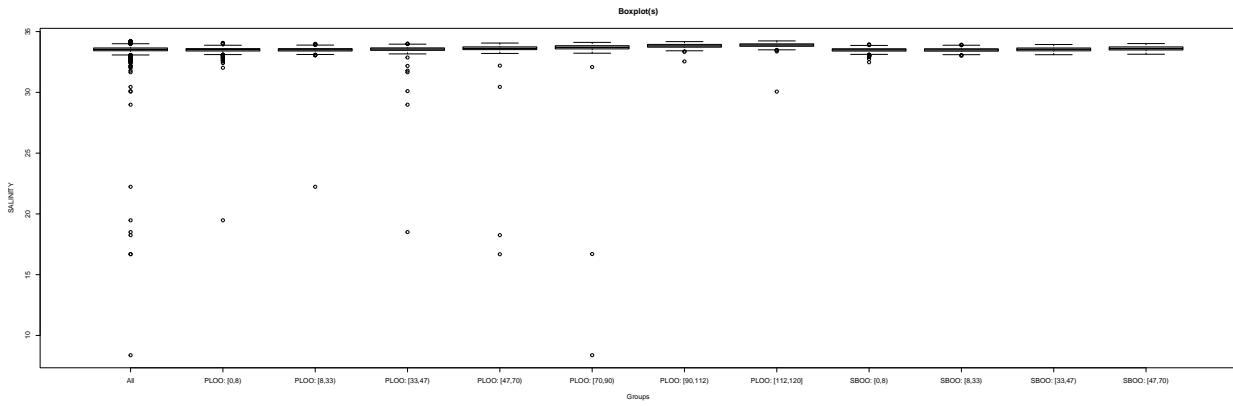
```

## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112)", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
##   replacement has 1 row, data has 0

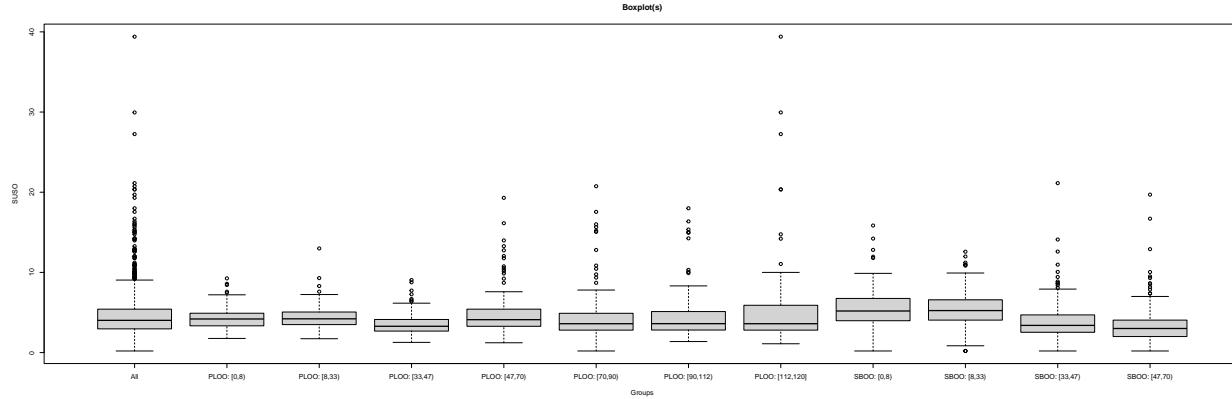
```



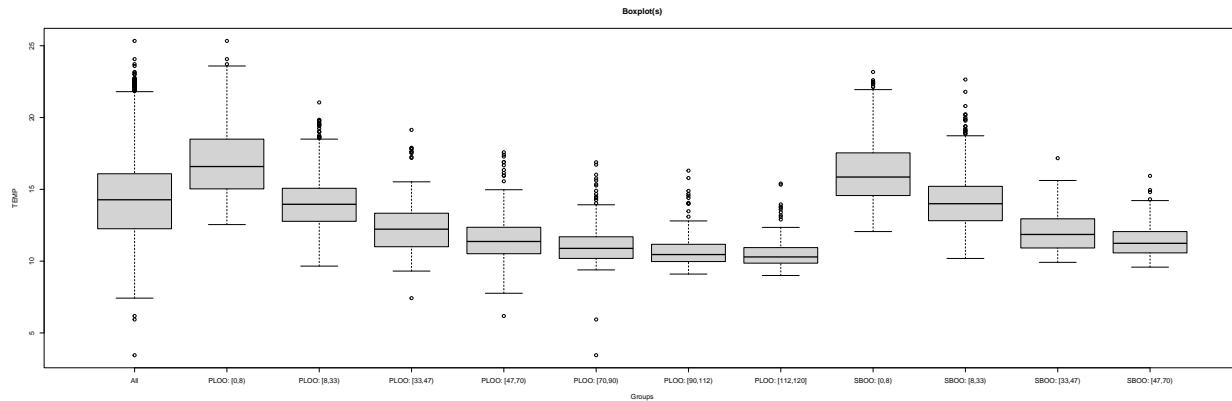
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
##   replacement has 1 row, data has 0
```



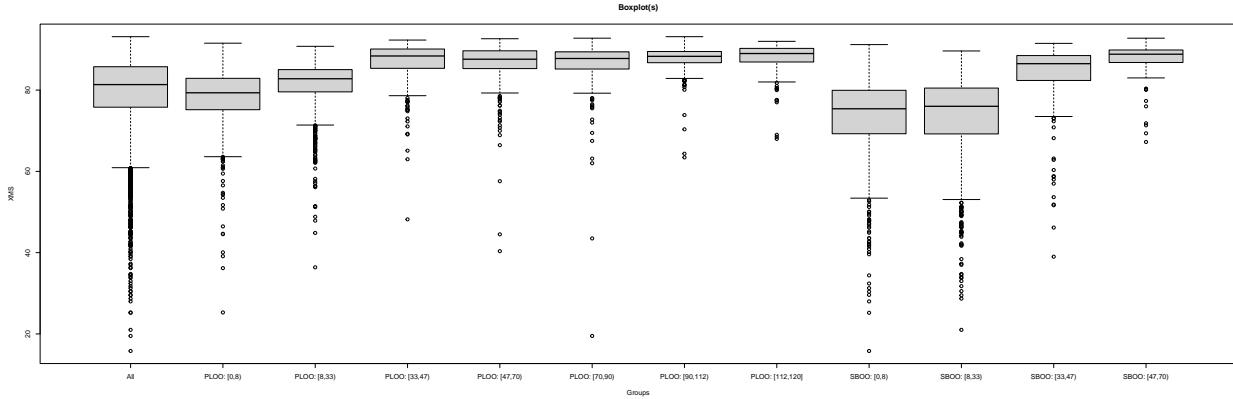
```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [70,90]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [90,112]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SBOO: Unknown", class =
##   replacement has 1 row, data has 0
```



```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [70,90]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [90,112]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: Unknown", class =
##   replacement has 1 row, data has 0
```



```
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "PLOO: Unknown", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [70,90]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [90,112]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: [112,120]", class =
##   replacement has 1 row, data has 0
## Error in `$<-.data.frame`(`*tmp*`, "Groups", value = structure(1L, levels = "SB00: Unknown", class =
##   replacement has 1 row, data has 0
```



```

##   date_sample project depth_m_bin CHLOROPHYLL DENSITY      DO      ENTERO
## 1 1990-11-19    PL00     [8,33)       0.87 23.855 6.550000     NA
## 2 1990-11-19    SB00     [0,8)        1.27 23.853 7.410000     NA
## 3 1991-01-07    PL00     [0,8)        NA     NA     NA 25.74074
## 4 1991-01-07    PL00     [8,33)       NA     NA     NA 24.58333
## 5 1991-01-14    PL00     [0,8)        NA     NA 5.550000 36.09512
## 6 1991-01-14    PL00     [33,47)      NA     NA 5.347222 66.25000
## 7 1991-01-14    PL00     [47,70)      NA     NA 5.300000 13.33333
##          FECAL OG      PH SALINITY SUSO      TEMP      XMS
## 1          NA NA 8.080000 33.61700     NA 19.43000 44.85000
## 2          NA NA 8.180000 33.57400     NA 19.31000 75.60000
## 3 90.18519 NA      NA      NA     NA 14.52593 80.29630
## 4 84.58333 NA      NA      NA     NA 14.27917 85.70833
## 5 33.47643 NA 8.200000 33.49806     NA 14.19729 82.40221
## 6 352.50000 NA 8.200000 33.50861     NA 14.15278 82.25000
## 7 31.66667 NA 8.192857 33.52500     NA 13.70000 85.50000
##           vars      n      mean        sd median trimmed  mad      min      max
## date_sample      1      10371      NaN      NA      NaN      NA Inf -Inf
## project*        2      10371      1.36      0.48      1.00      1.33 0.00 1.00  2.00
## depth_m_bin*     3      10371      4.69      2.66      6.00      4.74 2.97 1.00  8.00
## CHLOROPHYLL     4      5198      3.50      3.91      2.34      2.76 1.97 0.00 49.89
## DENSITY         5      5282     24.93      0.69     24.92     24.95 0.68 22.39 26.48
## DO              6      5851      6.72      1.66      7.14      6.84 1.49 0.00 11.96
## ENTERO          7      9986     92.65     572.67      3.16      9.41 1.72 1.93 12000.00
## FECAL           8      9842    175.67     733.02      4.00     21.43 2.97 1.00 12000.00
## OG              9      458      0.24      0.20      0.20      0.20 0.00 0.20  2.65
## PH              10     5856      8.02      0.18      8.06      8.03 0.17 7.33  8.56
## SALINITY         11     5851     33.52      0.62     33.54     33.54 0.17 8.38 34.23
## SUSO            12     1709      4.54      2.80      4.02      4.19 1.74 0.20 39.40
## TEMP            13     6958     14.37      2.78     14.27     14.23 2.84 3.45 25.34
## XMS             14     6937     79.59      8.90     81.36     80.71 7.23 15.80 93.15
##           range      skew kurtosis      se
## date_sample     -Inf      NA      NA      NA
## project*        1.00      0.56     -1.68 0.00
## depth_m_bin*     7.00     -0.21     -1.42 0.03
## CHLOROPHYLL    49.89      3.74     22.93 0.05
## DENSITY         4.09     -0.29     -0.15 0.01
## DO              11.96     -0.59     -0.20 0.02
## ENTERO          11998.07    10.78    141.08 5.73
## FECAL           11999.00     7.39     68.78 7.39

```

```

## OG          2.45   9.07   92.51 0.01
## PH          1.24  -0.62    0.11 0.00
## SALINITY    25.86 -26.02   816.01 0.01
## SUSO         39.20   3.44   24.87 0.07
## TEMP         21.89   0.42   -0.15 0.03
## XMS          77.35  -1.69    4.81 0.11
##           date_sample project depth_m_bin parameter      Avg
## Not NA n    121286   121286    121286   121286 119635.0000
## NA n        0        0        0        0     1651.0000
## Not NA %    1        1        1        1     0.9864
## NA %        0        0        0        0     0.0136

# Define function that imputes the missing values to parameter dataframe using linear
# interpolation
impute_missing_values <- function(df_data) {

  params <- c("CHLOROPHYLL", "DENSITY", "DO", "ENTERO", "FECAL", "OG", "PH",
  "SALINITY", "SUSO", "TEMP", "XMS")

  for (param in params) {
    print(head(df_data, 7))
    print(param)
    print(date_sample)

    x <- zoo(df_data$param, df_data$date_sample)
    df_data$param <- na.interpolation(x, option = "linear")
    return(df_data)

  }
}

# remove NAs
# Linear Interpolation

# owt_df02_gb04_mrgd
x <- zoo(owt_df02_gb04_mrgd$CHLOROPHYLL, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$CHLOROPHYLL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$DENSITY, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$DENSITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$DO, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$DO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$ENTERO, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$ENTERO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$FECAL, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$FECAL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$OG, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$OG <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$PH, owt_df02_gb04_mrgd$date_sample)

```

```

owt_df02_gb04_mrgd$PH <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$SALINITY, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$SALINITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$SUSO, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$SUSO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$TEMP, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$TEMP <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_mrgd$XMS, owt_df02_gb04_mrgd$date_sample)
owt_df02_gb04_mrgd$XMS <- na.interpolation(x, option = "linear")

# owt_df02_gb04_wkly
x <- zoo(owt_df02_gb04_wkly$CHLOROPHYLL, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$CHLOROPHYLL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$DENSITY, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$DENSITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$DO, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$DO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$ENTERO, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$ENTERO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$FECAL, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$FECAL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$OG, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$OG <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$PH, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$PH <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$SALINITY, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$SALINITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$SUSO, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$SUSO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$TEMP, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$TEMP <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb04_wkly$XMS, owt_df02_gb04_wkly$date_sample)
owt_df02_gb04_wkly$XMS <- na.interpolation(x, option = "linear")

# owt_df02_gb09_mrgd
x <- zoo(owt_df02_gb09_mrgd$CHLOROPHYLL, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$CHLOROPHYLL <- na.interpolation(x, option = "linear")

```

```

x <- zoo(owt_df02_gb09_mrgd$DENSITY, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$DENSITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$DO, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$DO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$ENTERO, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$ENTERO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$FECAL, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$FECAL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$OG, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$OG <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$PH, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$PH <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$SALINITY, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$SALINITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$SUSO, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$SUSO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$TEMP, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$TEMP <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_mrgd$XMS, owt_df02_gb09_mrgd$date_sample)
owt_df02_gb09_mrgd$XMS <- na.interpolation(x, option = "linear")

# owt_df02_gb09_wkly <- impute_missing_values(owt_df02_gb09_wkly)
x <- zoo(owt_df02_gb09_wkly$CHLOROPHYLL, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$CHLOROPHYLL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$DENSITY, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$DENSITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$DO, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$DO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$ENTERO, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$ENTERO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$FECAL, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$FECAL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$OG, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$OG <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$PH, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$PH <- na.interpolation(x, option = "linear")

```

```

x <- zoo(owt_df02_gb09_wkly$SALINITY, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$SALINITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$SUSO, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$SUSO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$TEMP, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$TEMP <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb09_wkly$XMS, owt_df02_gb09_wkly$date_sample)
owt_df02_gb09_wkly$XMS <- na.interpolation(x, option = "linear")

# owt_df02_gb07_mrgd
x <- zoo(owt_df02_gb07_mrgd$CHLOROPHYLL, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$CHLOROPHYLL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$DENSITY, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$DENSITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$D0, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$D0 <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$ENTERO, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$ENTERO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$FECAL, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$FECAL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$OG, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$OG <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$PH, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$PH <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$SALINITY, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$SALINITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$SUSO, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$SUSO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$TEMP, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$TEMP <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_mrgd$XMS, owt_df02_gb07_mrgd$date_sample)
owt_df02_gb07_mrgd$XMS <- na.interpolation(x, option = "linear")

# owt_df02_gb07_mrgd
x <- zoo(owt_df02_gb07_wkly$CHLOROPHYLL, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$CHLOROPHYLL <- na.interpolation(x, option = "linear")

```

```

x <- zoo(owt_df02_gb07_wkly$DENSITY, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$DENSITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$DO, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$DO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$ENTERO, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$ENTERO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$FECAL, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$FECAL <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$OG, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$OG <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$PH, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$PH <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$SALINITY, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$SALINITY <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$SUSO, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$SUSO <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$TEMP, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$TEMP <- na.interpolation(x, option = "linear")

x <- zoo(owt_df02_gb07_wkly$XMS, owt_df02_gb07_wkly$date_sample)
owt_df02_gb07_wkly$XMS <- na.interpolation(x, option = "linear")

```

<https://cran.r-project.org/web/packages/padr/vignettes/padr.html>
library(dplyr)

```

owt_df02_gb04_mrgd %>%
  pad()

```

	date_sample	CHLOROPHYLL	DENSITY	DO	ENTERO	FECAL
## 1	1990-11-15	1.0700000	23.85400	6.9800000	32.051282	125.641026
## 2	1990-11-16	1.0690476	23.85410	6.6792500	32.051282	125.641026
## 3	1990-11-17	1.0680952	23.85420	6.3785000	18.717949	51.282051
## 4	1990-11-18	1.0671429	23.85431	6.0777500	106.153846	80.769231
## 5	1990-11-19	1.0661905	23.85441	5.7770000	40.000000	40.555556
## 6	1990-11-20	1.0652381	23.85451	5.4762500	20.338983	40.508475
## 7	1990-11-21	1.0642857	23.85461	5.5000000	40.227273	78.181818
## 8	1990-11-22	1.0633333	23.85471	5.3600000	83.928571	446.071429
## 9	1990-11-23	1.0623810	23.85482	5.3561364	33.846154	95.641026
## 10	1990-11-24	1.0614286	23.85492	5.3522727	12.564103	23.589744
## 11	1990-11-25	1.0604762	23.85502	5.3484091	20.512821	31.025641
## 12	1990-11-26	1.0595238	23.85512	5.3445455	43.125000	108.541667
## 13	1990-11-27	1.0585714	23.85522	5.3406818	183.076923	427.692308
## 14	1990-11-28	1.0576190	23.85533	5.3368182	125.384615	429.487179
## 15	1990-11-29	1.0566667	23.85543	5.3329545	16.291667	16.750000
## 16	1990-11-30	1.0557143	23.85553	5.3290909	17.384615	12.512821

## 17	1990-12-01	1.0547619	23.85563	5.3252273	51.897436	55.435897
## 18	1990-12-02	1.0538095	23.85573	5.3213636	45.666667	49.925926
## 19	1990-12-03	1.0528571	23.85584	5.3175000	6.700000	33.900000
## 20	1990-12-04	1.0519048	23.85594	5.8800000	36.204082	120.571429
## 21	1990-12-05	1.0509524	23.85604	5.5950000	86.121212	301.818182
## 22	1990-12-06	1.0500000	23.85614	5.4528571	15.500000	27.291667
## 23	1990-12-07	1.0490476	23.85624	5.3107143	2.666667	4.923077
## 24	1990-12-08	1.0480952	23.85635	5.1685714	26.666667	18.410256
## 25	1990-12-09	1.0471429	23.85645	5.0264286	6.358974	11.692308
## 26	1990-12-10	1.0461905	23.85655	4.8842857	122.923077	575.230769
## 27	1990-12-11	1.0452381	23.85665	4.7421429	7.746032	11.841270
## 28	1990-12-12	1.0442857	23.85676	4.6000000	49.240000	374.160000
## 29	1990-12-13	1.0433333	23.85686	4.8700000	3.692308	5.743590
## 30	1990-12-14	1.0423810	23.85696	4.9550000	33.878788	272.787879
## 31	1990-12-15	1.0414286	23.85706	4.9370313	72.717949	406.666667
## 32	1990-12-16	1.0404762	23.85716	4.9190625	18.242424	98.303030
## 33	1990-12-17	1.0395238	23.85727	4.9010938	6.666667	35.000000
## 34	1990-12-18	1.0385714	23.85737	4.8831250	6.974359	10.512821
## 35	1990-12-19	1.0376190	23.85747	4.8651563	173.333333	125.777778
## 36	1990-12-20	1.0366667	23.85757	4.8471875	138.000000	1650.000000
## 37	1990-12-21	1.0357143	23.85767	4.8292187	6500.000000	725.000000
## 38	1990-12-22	1.0347619	23.85778	4.8112500	32.250000	75.950000
## 39	1990-12-23	1.0338095	23.85788	4.7932813	7.333333	5.076923
## 40	1990-12-24	1.0328571	23.85798	4.7753125	22.717949	61.230769
## 41	1990-12-25	1.0319048	23.85808	4.7573438	48.923077	240.923077
## 42	1990-12-26	1.0309524	23.85818	4.7393750	2.000000	2.000000
## 43	1990-12-27	1.0300000	23.85829	4.7214063	65.589744	167.794872
## 44	1990-12-28	1.0290476	23.85839	4.7034375	17.897436	10.820513
## 45	1990-12-29	1.0280952	23.85849	4.6854688	15.074074	21.407407
## 46	1990-12-30	1.0271429	23.85859	4.6675000	168.440000	856.560000
## 47	1990-12-31	1.0261905	23.85869	4.7400000	2.444444	16.518519
## 48	1991-01-01	1.0252381	23.85880	4.7850000	15.866667	46.444444
## 49	1991-01-02	1.0242857	23.85890	4.7770833	41.076923	127.076923
## 50	1991-01-03	1.0233333	23.85900	4.7691667	5.555556	3.555556
## 51	1991-01-04	1.0223810	23.85910	4.7612500	26.307692	101.692308
## 52	1991-01-05	1.0214286	23.85920	4.7533333	4.974359	6.051282
## 53	1991-01-06	1.0204762	23.85931	4.7454167	15.692308	15.230769
## 54	1991-01-07	1.0195238	23.85941	4.7375000	13.025641	42.358974
## 55	1991-01-08	1.0185714	23.85951	4.7295833	3.111111	4.222222
## 56	1991-01-09	1.0176190	23.85961	4.7216667	7.846154	35.435897
## 57	1991-01-10	1.0166667	23.85971	4.7137500	7.435897	7.333333
## 58	1991-01-11	1.0157143	23.85982	4.7058333	15.125000	28.208333
## 59	1991-01-12	1.0147619	23.85992	4.6979167	12.051282	0.000000
## 60	1991-01-13	1.0138095	23.86002	4.6900000	36.476190	152.571429
## 61	1991-01-14	1.0128571	23.86012	4.1200000	27.600000	162.520000
## 62	1991-01-15	1.0119048	23.86022	4.6400000	21.076923	39.589744
## 63	1991-01-16	1.0109524	23.86033	4.6750000	275.272727	1842.242424
## 64	1991-01-17	1.0100000	23.86043	4.7220000	101.179487	124.307692
## 65	1991-01-18	1.0090476	23.86053	4.7690000	52.250000	119.083333
## 66	1991-01-19	1.0080952	23.86063	4.8160000	46.051282	205.384615
## 67	1991-01-20	1.0071429	23.86073	4.8630000	45.250000	362.708333
## 68	1991-01-21	1.0061905	23.86084	4.9100000	6.205128	8.820513
## 69	1991-01-22	1.0052381	23.86094	4.9570000	2.444444	2.000000
## 70	1991-01-23	1.0042857	23.86104	5.0040000	13.179487	69.538462

## 71	1991-01-24	1.0033333	23.86114	5.0510000	16.512821	19.692308
## 72	1991-01-25	1.0023810	23.86124	5.0980000	34.380952	178.126984
## 73	1991-01-26	1.0014286	23.86135	5.1450000	103.800000	849.960000
## 74	1991-01-27	1.0004762	23.86145	6.0500000	27.948718	162.102564
## 75	1991-01-28	0.9995238	23.86155	6.5700000	21.575758	292.000000
## 76	1991-01-29	0.9985714	23.86165	6.5060648	4.666667	18.923077
## 77	1991-01-30	0.9976190	23.86176	6.4421296	3.333333	7.555556
## 78	1991-01-31	0.9966667	23.86186	6.3781944	11.641026	16.256410
## 79	1991-02-01	0.9957143	23.86196	6.3142593	61.076923	189.897436
## 80	1991-02-02	0.9947619	23.86206	6.2503241	8.222222	18.000000
## 81	1991-02-03	0.9938095	23.86216	6.1863889	12.256410	73.384615
## 82	1991-02-04	0.9928571	23.86227	6.1224537	18.564103	48.923077
## 83	1991-02-05	0.9919048	23.86237	6.0585185	2.666667	2.000000
## 84	1991-02-06	0.9909524	23.86247	5.9945833	13.230769	10.717949
## 85	1991-02-07	0.9900000	23.86257	5.9306481	73.743590	1348.564103
## 86	1991-02-08	0.9890476	23.86267	5.8667130	113.904762	798.190476
## 87	1991-02-09	0.9880952	23.86278	5.8027778	61.200000	424.080000
## 88	1991-02-10	0.9871429	23.86288	6.3300000	55.487179	530.051282
## 89	1991-02-11	0.9861905	23.86298	6.6700000	125.757576	1728.000000
## 90	1991-02-12	0.9852381	23.86308	6.6078824	16.102564	65.897436
## 91	1991-02-13	0.9842857	23.86318	6.5457647	24.888889	50.444444
## 92	1991-02-14	0.9833333	23.86329	6.4836471	35.076923	172.205128
## 93	1991-02-15	0.9823810	23.86339	6.4215294	157.897436	1172.666667
## 94	1991-02-16	0.9814286	23.86349	6.3594118	122.820513	925.333333
## 95	1991-02-17	0.9804762	23.86359	6.2972941	19.333333	5.777778
## 96	1991-02-18	0.9795238	23.86369	6.2351765	5.333333	14.222222
## 97	1991-02-19	0.9785714	23.86380	6.1730588	17.128205	298.615385
## 98	1991-02-20	0.9776190	23.86390	6.1109412	16.461538	367.384615
## 99	1991-02-21	0.9766667	23.86400	6.0488235	24.615385	26.794872
## 100	1991-02-22	0.9757143	23.86410	5.9867059	16.444444	7.111111
## 101	1991-02-23	0.9747619	23.86420	5.9245882	38.820513	566.051282
## 102	1991-02-24	0.9738095	23.86431	5.8624706	12.820513	34.615385
## 103	1991-02-25	0.9728571	23.86441	5.8003529	32.444444	480.476190
## 104	1991-02-26	0.9719048	23.86451	5.7382353	11.160000	227.000000
## 105	1991-02-27	0.9709524	23.86461	5.8200000	5.025641	221.538462
## 106	1991-02-28	0.9700000	23.86471	5.8800000	97.515152	1627.818182
## 107	1991-03-01	0.9690476	23.86482	5.8840271	9.666667	172.875000
## 108	1991-03-02	0.9680952	23.86492	5.8880543	69.076923	725.846154
## 109	1991-03-03	0.9671429	23.86502	5.8920814	167.589744	1607.897436
## 110	1991-03-04	0.9661905	23.86512	5.8961086	5.166667	38.916667
## 111	1991-03-05	0.9652381	23.86522	5.9001357	6.666667	41.487179
## 112	1991-03-06	0.9642857	23.86533	5.9041629	6.444444	2.222222
## 113	1991-03-07	0.9633333	23.86543	5.9081900	9.743590	2.358974
## 114	1991-03-08	0.9623810	23.86553	5.9122172	4.410256	19.230769
## 115	1991-03-09	0.9614286	23.86563	5.9162443	8.444444	8.888889
## 116	1991-03-10	0.9604762	23.86573	5.9202715	6.871795	23.179487
## 117	1991-03-11	0.9595238	23.86584	5.9242986	3.897436	8.307692
## 118	1991-03-12	0.9585714	23.86594	5.9283258	19.592593	188.703704
## 119	1991-03-13	0.9576190	23.86604	5.9323529	3.830508	4.677966
## 120	1991-03-14	0.9566667	23.86614	6.3000000	7.076923	3.384615
## 121	1991-03-15	0.9557143	23.86624	6.7650000	2.484848	30.242424
## 122	1991-03-16	0.9547619	23.86635	6.6540196	16.666667	30.000000
## 123	1991-03-17	0.9538095	23.86645	6.5430392	41.128205	518.205128
## 124	1991-03-18	0.9528571	23.86655	6.4320588	12.358974	97.897436

## 125	1991-03-19	0.9519048	23.86665	6.3210784	3.025641	25.743590
## 126	1991-03-20	0.9509524	23.86676	6.2100980	4.000000	7.777778
## 127	1991-03-21	0.9500000	23.86686	6.0991176	2.512821	15.743590
## 128	1991-03-22	0.9490476	23.86696	5.9881373	14.615385	97.282051
## 129	1991-03-23	0.9480952	23.86706	5.8771569	9.619048	31.714286
## 130	1991-03-24	0.9471429	23.86716	5.7661765	15.322344	603.200000
## 131	1991-03-25	0.9461905	23.86727	5.8900000	21.025641	1116.461538
## 132	1991-03-26	0.9452381	23.86737	6.2100000	2.000000	4.424242
## 133	1991-03-27	0.9442857	23.86747	6.1741176	10.256410	23.641026
## 134	1991-03-28	0.9433333	23.86757	6.1382353	7.333333	95.555556
## 135	1991-03-29	0.9423810	23.86767	6.1023529	4.153846	14.923077
## 136	1991-03-30	0.9414286	23.86778	6.0664706	6.974359	139.076923
## 137	1991-03-31	0.9404762	23.86788	6.0305882	15.777778	8.888889
## 138	1991-04-01	0.9395238	23.86798	5.9947059	17.794872	300.358974
## 139	1991-04-02	0.9385714	23.86808	5.9588235	12.717949	11.538462
## 140	1991-04-03	0.9376190	23.86818	5.9229412	141.555556	380.888889
## 141	1991-04-04	0.9366667	23.86829	5.8870588	17.743590	124.000000
## 142	1991-04-05	0.9357143	23.86839	5.8511765	13.743590	79.333333
## 143	1991-04-06	0.9347619	23.86849	5.8152941	21.074074	15.629630
## 144	1991-04-07	0.9338095	23.86859	5.7794118	51.560000	196.920000
## 145	1991-04-08	0.9328571	23.86869	6.0066667	2.000000	3.638889
## 146	1991-04-09	0.9319048	23.86880	6.1711111	44.333333	179.625000
## 147	1991-04-10	0.9309524	23.86890	6.3355556	2.933333	9.066667
## 148	1991-04-11	0.9300000	23.86900	6.5000000	18.222222	142.888889
## 149	1991-04-12	0.9299043	23.86905	6.4151471	20.880000	127.520000
## 150	1991-04-13	0.9298086	23.86911	6.3302941	16.428571	14.285714
## 151	1991-04-14	0.9297129	23.86916	6.2454412	15.025641	71.948718
## 152	1991-04-15	0.9296172	23.86921	6.1605882	25.948718	217.743590
## 153	1991-04-16	0.9295215	23.86926	6.0757353	6.416667	27.541667
## 154	1991-04-17	0.9294258	23.86932	5.9908824	6.615385	26.256410
## 155	1991-04-18	0.9293301	23.86937	5.9060294	24.923077	188.410256
## 156	1991-04-19	0.9292344	23.86942	5.8211765	27.529412	111.235294
## 157	1991-04-20	0.9291388	23.86947	5.7363235	123.904762	1099.238095
## 158	1991-04-21	0.9290431	23.86953	5.6514706	10.640000	280.080000
## 159	1991-04-22	0.9289474	23.86958	5.3600000	5.589744	40.102564
## 160	1991-04-23	0.9288517	23.86963	5.3300000	72.000000	791.142857
## 161	1991-04-24	0.9287560	23.86968	5.3730719	2.058824	6.823529
## 162	1991-04-25	0.9286603	23.86974	5.4161438	5.285714	13.647059
## 163	1991-04-26	0.9285646	23.86979	5.4592157	74.235294	8.352941
## 164	1991-04-27	0.9284689	23.86984	5.5022876	36.232558	6.093023
## 165	1991-04-28	0.9283732	23.86989	5.5453595	87.764706	258.000000
## 166	1991-04-29	0.9282775	23.86995	5.5884314	19.705882	15.823529
## 167	1991-04-30	0.9281818	23.87000	5.6315033	113.466667	623.133333
## 168	1991-05-01	0.9280861	23.87005	5.6745752	26.476190	16.222222
## 169	1991-05-02	0.9279904	23.87011	5.7176471	88.290909	317.864407
## 170	1991-05-03	0.9278947	23.87016	5.6766667	18.833333	172.055556
## 171	1991-05-04	0.9277990	23.87021	5.2036111	497.333333	1991.487179
## 172	1991-05-05	0.9277033	23.87026	4.7305556	33.230769	29.692308
## 173	1991-05-06	0.9276077	23.87032	4.2575000	9.435897	28.256410
## 174	1991-05-07	0.9275120	23.87037	3.7844444	16.153846	39.282051
## 175	1991-05-08	0.9274163	23.87042	3.3113889	3.111111	10.888889
## 176	1991-05-09	0.9273206	23.87047	2.8383333	7.948718	16.631579
## 177	1991-05-10	0.9272249	23.87053	2.3652778	6.717949	13.487179
## 178	1991-05-11	0.9271292	23.87058	1.8922222	68.000000	272.717949

## 179	1991-05-12	0.9270335	23.87063	1.4191667	231.538462	1394.871795
## 180	1991-05-13	0.9269378	23.87068	0.9461111	12.000000	13.272727
## 181	1991-05-14	0.9268421	23.87074	0.4730556	70.000000	427.916667
## 182	1991-05-15	0.9267464	23.87079	0.0000000	78.177215	793.478261
## 183	1991-05-16	0.9266507	23.87084	0.0000000	315.928571	2185.142857
## 184	1991-05-17	0.9265550	23.87089	0.0000000	1151.456790	3205.111111
## 185	1991-05-18	0.9264593	23.87095	0.2476716	504.222222	915.111111
## 186	1991-05-19	0.9263636	23.87100	0.4953431	179.555556	462.000000
## 187	1991-05-20	0.9262679	23.87105	0.7430147	674.604651	4376.000000
## 188	1991-05-21	0.9261722	23.87111	0.9906863	884.444444	2718.666667
## 189	1991-05-22	0.9260766	23.87116	1.2383578	351.125000	1597.208333
## 190	1991-05-23	0.9259809	23.87121	1.4860294	848.222222	3453.555556
## 191	1991-05-24	0.9258852	23.87126	1.7337010	415.625000	1085.291667
## 192	1991-05-25	0.9257895	23.87132	1.9813725	473.555556	732.888889
## 193	1991-05-26	0.9256938	23.87137	2.2290441	754.222222	2772.888889
## 194	1991-05-27	0.9255981	23.87142	2.4767157	241.111111	1648.000000
## 195	1991-05-28	0.9255024	23.87147	2.7243873	122.375000	1143.833333
## 196	1991-05-29	0.9254067	23.87153	2.9720588	413.333333	1564.625000
## 197	1991-05-30	0.9253110	23.87158	3.2197304	75.777778	382.222222
## 198	1991-05-31	0.9252153	23.87163	3.4674020	200.500000	1596.375000
## 199	1991-06-01	0.9251196	23.87168	3.7150735	352.666667	3126.000000
## 200	1991-06-02	0.9250239	23.87174	3.9627451	327.777778	1284.000000
## 201	1991-06-03	0.9249282	23.87179	4.2104167	700.416667	2808.833333
## 202	1991-06-04	0.9248325	23.87184	4.4580882	209.555556	1689.333333
## 203	1991-06-05	0.9247368	23.87189	4.7057598	483.000000	1747.458333
## 204	1991-06-06	0.9246411	23.87195	4.9534314	797.333333	4762.000000
## 205	1991-06-07	0.9245455	23.87200	5.2011029	435.500000	1515.583333
## 206	1991-06-08	0.9244498	23.87205	5.4487745	160.888889	1094.666667
## 207	1991-06-09	0.9243541	23.87211	5.6964461	1650.000000	6506.888889
## 208	1991-06-10	0.9242584	23.87216	5.9441176	35.755102	88.857143
## 209	1991-06-11	0.9241627	23.87221	6.0045588	887.000000	2295.583333
## 210	1991-06-12	0.9240670	23.87226	6.0650000	301.956044	1697.708333
## 211	1991-06-13	0.9239713	23.87232	5.8900000	238.222222	1099.833333
## 212	1991-06-14	0.9238756	23.87237	5.8630607	460.458333	1874.208333
## 213	1991-06-15	0.9237799	23.87242	5.8361213	256.666667	842.222222
## 214	1991-06-16	0.9236842	23.87247	5.8091820	391.555556	1769.777778
## 215	1991-06-17	0.9235885	23.87253	5.7822426	636.666667	1993.000000
## 216	1991-06-18	0.9234928	23.87258	5.7553033	34.888889	57.111111
## 217	1991-06-19	0.9233971	23.87263	5.7283640	213.083333	1354.916667
## 218	1991-06-20	0.9233014	23.87268	5.7014246	370.222222	3435.111111
## 219	1991-06-21	0.9232057	23.87274	5.6744853	674.291667	1548.083333
## 220	1991-06-22	0.9231100	23.87279	5.6475460	44.222222	162.000000
## 221	1991-06-23	0.9230144	23.87284	5.6206066	39.333333	227.333333
## 222	1991-06-24	0.9229187	23.87289	5.5936673	264.041667	1163.791667
## 223	1991-06-25	0.9228230	23.87295	5.5667279	262.666667	1796.000000
## 224	1991-06-26	0.9227273	23.87300	5.5397886	582.958333	2253.333333
## 225	1991-06-27	0.9226316	23.87305	5.5128493	145.333333	352.000000
## 226	1991-06-28	0.9225359	23.87311	5.4859099	652.625000	2266.750000
## 227	1991-06-29	0.9224402	23.87316	5.4589706	2605.777778	6511.777778
## 228	1991-06-30	0.9223445	23.87321	5.4320313	775.777778	1118.000000
## 229	1991-07-01	0.9222488	23.87326	5.4050919	1166.500000	3512.916667
## 230	1991-07-02	0.9221531	23.87332	5.3781526	80.000000	98.888889
## 231	1991-07-03	0.9220574	23.87337	5.3512132	84.708333	598.166667
## 232	1991-07-04	0.9219617	23.87342	5.3242739	750.500000	2913.500000

## 233	1991-07-05	0.9218660	23.87347	5.2973346	256.888889	1587.333333
## 234	1991-07-06	0.9217703	23.87353	5.2703952	534.888889	2781.111111
## 235	1991-07-07	0.9216746	23.87358	5.2434559	436.000000	2678.000000
## 236	1991-07-08	0.9215789	23.87363	5.2165165	288.958333	2054.833333
## 237	1991-07-09	0.9214833	23.87368	5.1895772	1191.777778	5062.888889
## 238	1991-07-10	0.9213876	23.87374	5.1626379	173.458333	1310.666667
## 239	1991-07-11	0.9212919	23.87379	5.1356985	230.444444	3508.444444
## 240	1991-07-12	0.9211962	23.87384	5.1087592	389.291667	2344.833333
## 241	1991-07-13	0.9211005	23.87389	5.0818199	343.777778	3192.000000
## 242	1991-07-14	0.9210048	23.87395	5.0548805	8.222222	16.888889
## 243	1991-07-15	0.9209091	23.87400	5.0279412	51.536232	391.362319
## 244	1991-07-16	0.9208134	23.87405	5.1497386	6.875000	4.960000
## 245	1991-07-17	0.9207177	23.87411	5.2715359	39.458333	107.583333
## 246	1991-07-18	0.9206220	23.87416	5.3933333	51.916667	141.805556
## 247	1991-07-19	0.9205263	23.87421	5.3425408	18.888889	2.851852
## 248	1991-07-20	0.9204306	23.87426	5.2917484	25.897436	86.564103
## 249	1991-07-21	0.9203349	23.87432	5.2409559	50.461538	129.076923
## 250	1991-07-22	0.9202392	23.87437	5.1901634	141.846154	640.000000
## 251	1991-07-23	0.9201435	23.87442	5.1393709	2.444444	3.111111
## 252	1991-07-24	0.9200478	23.87447	5.0885784	6.871795	11.487179
## 253	1991-07-25	0.9199522	23.87453	5.0377859	3.435897	2.871795
## 254	1991-07-26	0.9198565	23.87458	4.9869935	2.102564	3.641026
## 255	1991-07-27	0.9197608	23.87463	4.9362010	2.000000	6.358974
## 256	1991-07-28	0.9196651	23.87468	4.8854085	21.794872	303.102564
## 257	1991-07-29	0.9195694	23.87474	4.8346160	14.539683	95.142857
## 258	1991-07-30	0.9194737	23.87479	4.7838235	51.345455	486.036364
## 259	1991-07-31	0.9193780	23.87484	4.8685784	4.666667	13.555556
## 260	1991-08-01	0.9192823	23.87489	4.9533333	70.296296	306.740741
## 261	1991-08-02	0.9191866	23.87495	4.9768441	2.666667	33.692308
## 262	1991-08-03	0.9190909	23.87500	5.0003548	11.777778	4.222222
## 263	1991-08-04	0.9189952	23.87505	5.0238655	2.051282	2.153846
## 264	1991-08-05	0.9188995	23.87511	5.0473763	44.820513	335.641026
## 265	1991-08-06	0.9188038	23.87516	5.0708870	74.717949	404.512821
## 266	1991-08-07	0.9187081	23.87521	5.0943978	4.888889	10.666667
## 267	1991-08-08	0.9186124	23.87526	5.1179085	167.948718	1503.692308
## 268	1991-08-09	0.9185167	23.87532	5.1414192	9.333333	16.461538
## 269	1991-08-10	0.9184211	23.87537	5.1649300	8.307692	7.538462
## 270	1991-08-11	0.9183254	23.87542	5.1884407	4.000000	7.777778
## 271	1991-08-12	0.9182297	23.87547	5.2119514	36.358974	162.512821
## 272	1991-08-13	0.9181340	23.87553	5.2354622	123.948718	1446.615385
## 273	1991-08-14	0.9180383	23.87558	5.2589729	58.000000	27.333333
## 274	1991-08-15	0.9179426	23.87563	5.2824837	173.076923	972.153846
## 275	1991-08-16	0.9178469	23.87568	5.3059944	22.307692	261.692308
## 276	1991-08-17	0.9177512	23.87574	5.3295051	44.102564	203.384615
## 277	1991-08-18	0.9176555	23.87579	5.3530159	16.000000	4.666667
## 278	1991-08-19	0.9175598	23.87584	5.3765266	10.307692	64.923077
## 279	1991-08-20	0.9174641	23.87589	5.4000373	17.487179	11.025641
## 280	1991-08-21	0.9173684	23.87595	5.4235481	2.380952	26.031746
## 281	1991-08-22	0.9172727	23.87600	5.4470588	57.520000	427.280000
## 282	1991-08-23	0.9171770	23.87605	5.6500000	5.846154	14.307692
## 283	1991-08-24	0.9170813	23.87611	5.7300000	47.636364	306.969697
## 284	1991-08-25	0.9169856	23.87616	5.7832773	44.051282	185.948718
## 285	1991-08-26	0.9168900	23.87621	5.8365546	31.333333	108.500000
## 286	1991-08-27	0.9167943	23.87626	5.8898319	91.589744	796.256410

## 287	1991-08-28	0.9166986	23.87632	5.9431092	53.875000	202.166667
## 288	1991-08-29	0.9166029	23.87637	5.9963866	115.897436	1366.051282
## 289	1991-08-30	0.9165072	23.87642	6.0496639	55.460317	208.126984
## 290	1991-08-31	0.9164115	23.87647	6.1029412	131.280000	1031.920000
## 291	1991-09-01	0.9163158	23.87653	6.7900000	19.128205	553.230769
## 292	1991-09-02	0.9162201	23.87658	6.9800000	4.727273	20.848485
## 293	1991-09-03	0.9161244	23.87663	6.9014916	13.538462	145.641026
## 294	1991-09-04	0.9160287	23.87668	6.8229832	4.222222	9.333333
## 295	1991-09-05	0.9159330	23.87674	6.7444748	22.512821	123.487179
## 296	1991-09-06	0.9158373	23.87679	6.6659664	84.615385	809.743590
## 297	1991-09-07	0.9157416	23.87684	6.5874580	25.025641	165.538462
## 298	1991-09-08	0.9156459	23.87689	6.5089496	2.666667	10.222222
## 299	1991-09-09	0.9155502	23.87695	6.4304412	9.794872	77.179487
## 300	1991-09-10	0.9154545	23.87700	6.3519328	12.512821	109.948718
## 301	1991-09-11	0.9153589	23.87705	6.2734244	140.888889	73.777778
## 302	1991-09-12	0.9152632	23.87711	6.1949160	61.897436	965.230769
## 303	1991-09-13	0.9151675	23.87716	6.1164076	35.894737	363.105263
## 304	1991-09-14	0.9150718	23.87721	6.0378992	161.487179	860.512821
## 305	1991-09-15	0.9149761	23.87726	5.9593908	18.031746	196.222222
## 306	1991-09-16	0.9148804	23.87732	5.8808824	87.680000	816.200000
## 307	1991-09-17	0.9147847	23.87737	6.0900000	23.333333	191.384615
## 308	1991-09-18	0.9146890	23.87742	6.2050000	50.242424	200.909091
## 309	1991-09-19	0.9145933	23.87747	6.1626316	10.358974	106.820513
## 310	1991-09-20	0.9144976	23.87753	6.1202632	23.555556	1227.555556
## 311	1991-09-21	0.9144019	23.87758	6.0778947	81.743590	617.538462
## 312	1991-09-22	0.9143062	23.87763	6.0355263	8.615385	26.051282
## 313	1991-09-23	0.9142105	23.87768	5.9931579	20.820513	114.153846
## 314	1991-09-24	0.9141148	23.87774	5.9507895	4.222222	76.666667
## 315	1991-09-25	0.9140191	23.87779	5.9084211	6.205128	25.846154
## 316	1991-09-26	0.9139234	23.87784	5.8660526	2.958333	20.833333
## 317	1991-09-27	0.9138278	23.87789	5.8236842	13.333333	178.256410
## 318	1991-09-28	0.9137321	23.87795	5.7813158	7.487179	13.179487
## 319	1991-09-29	0.9136364	23.87800	5.7389474	5.777778	36.444444
## 320	1991-09-30	0.9135407	23.87805	5.6965789	44.769231	564.871795
## 321	1991-10-01	0.9134450	23.87811	5.6542105	69.230769	469.384615
## 322	1991-10-02	0.9133493	23.87816	5.6118421	4.205128	21.025641
## 323	1991-10-03	0.9132536	23.87821	5.5694737	7.777778	228.666667
## 324	1991-10-04	0.9131579	23.87826	5.5271053	39.128205	396.153846
## 325	1991-10-05	0.9130622	23.87832	5.4847368	40.769231	271.846154
## 326	1991-10-06	0.9129665	23.87837	5.4423684	23.301587	506.666667
## 327	1991-10-07	0.9128708	23.87842	5.4000000	18.560000	351.240000
## 328	1991-10-08	0.9127751	23.87847	5.8366667	24.138889	353.305556
## 329	1991-10-09	0.9126794	23.87853	5.8085730	5.794872	3.333333
## 330	1991-10-10	0.9125837	23.87858	5.7804793	17.333333	78.888889
## 331	1991-10-11	0.9124880	23.87863	5.7523856	3.384615	6.717949
## 332	1991-10-12	0.9123923	23.87868	5.7242919	8.564103	19.897436
## 333	1991-10-13	0.9122967	23.87874	5.6961983	7.555556	19.333333
## 334	1991-10-14	0.9122010	23.87879	5.6681046	7.641026	3.692308
## 335	1991-10-15	0.9121053	23.87884	5.6400109	54.153846	348.358974
## 336	1991-10-16	0.9120096	23.87889	5.6119172	16.476190	46.539683
## 337	1991-10-17	0.9119139	23.87895	5.5838235	29.640000	371.640000
## 338	1991-10-18	0.9118182	23.87900	5.9700000	56.769231	466.205128
## 339	1991-10-19	0.9117225	23.87905	5.7450000	102.363636	625.212121
## 340	1991-10-20	0.9116268	23.87911	5.7212896	2.717949	17.692308

## 341	1991-10-21	0.9115311	23.87916	5.6975792	6.222222	16.222222
## 342	1991-10-22	0.9114354	23.87921	5.6738688	13.384615	110.666667
## 343	1991-10-23	0.9113397	23.87926	5.6501584	4.512821	35.230769
## 344	1991-10-24	0.9112440	23.87932	5.6264480	2.541667	27.958333
## 345	1991-10-25	0.9111483	23.87937	5.6027376	3.692308	8.358974
## 346	1991-10-26	0.9110526	23.87942	5.5790271	3.589744	21.384615
## 347	1991-10-27	0.9109569	23.87947	5.5553167	4.444444	13.111111
## 348	1991-10-28	0.9108612	23.87953	5.5316063	31.025641	316.461538
## 349	1991-10-29	0.9107656	23.87958	5.5078959	28.256410	253.076923
## 350	1991-10-30	0.9106699	23.87963	5.4841855	97.435897	47.333333
## 351	1991-10-31	0.9105742	23.87968	5.4604751	8.571429	6.793651
## 352	1991-11-01	0.9104785	23.87974	5.4367647	100.000000	153.520000
## 353	1991-11-02	0.9103828	23.87979	5.6833333	29.555556	570.388889
## 354	1991-11-03	0.9102871	23.87984	5.8850000	2.051282	2.256410
## 355	1991-11-04	0.9101914	23.87989	6.0866667	8.871795	41.897436
## 356	1991-11-05	0.9100957	23.87995	6.2883333	7.282051	3.333333
## 357	1991-11-06	0.9100000	23.88000	6.4900000	5.666667	3.794872
## 358	1991-11-07	0.9098333	23.88002	6.4202451	4.051282	4.256410
## 359	1991-11-08	0.9096667	23.88004	6.3504902	3.333333	120.222222
## 360	1991-11-09	0.9095000	23.88007	6.2807353	6.358974	55.692308
## 361	1991-11-10	0.9093333	23.88009	6.2109804	7.794872	17.589744
## 362	1991-11-11	0.9091667	23.88011	6.1412255	26.000000	132.615385
## 363	1991-11-12	0.9090000	23.88013	6.0714706	33.487179	110.000000
## 364	1991-11-13	0.9088333	23.88016	6.0017157	2.222222	16.666667
## 365	1991-11-14	0.9086667	23.88018	5.9319608	73.897436	336.923077
## 366	1991-11-15	0.9085000	23.88020	5.8622059	9.538462	100.307692
## 367	1991-11-16	0.9083333	23.88022	5.7924510	10.333333	2.000000
## 368	1991-11-17	0.9081667	23.88024	5.7226961	29.222222	73.407407
## 369	1991-11-18	0.9080000	23.88027	5.6529412	16.960000	101.160000
## 370	1991-11-19	0.9078333	23.88029	5.7600000	5.384615	35.384615
## 371	1991-11-20	0.9076667	23.88031	5.5250000	41.212121	396.484848
## 372	1991-11-21	0.9075000	23.88033	5.5273529	2.000000	2.421053
## 373	1991-11-22	0.9073333	23.88036	5.5297059	3.333333	6.444444
## 374	1991-11-23	0.9071667	23.88038	5.5320588	25.794872	182.666667
## 375	1991-11-24	0.9070000	23.88040	5.5344118	18.307692	18.102564
## 376	1991-11-25	0.9068333	23.88042	5.5367647	78.153846	409.025641
## 377	1991-11-26	0.9066667	23.88044	5.5391176	85.250000	86.041667
## 378	1991-11-27	0.9065000	23.88047	5.5414706	8.871795	15.692308
## 379	1991-11-28	0.9063333	23.88049	5.5438235	2.000000	2.205128
## 380	1991-11-29	0.9061667	23.88051	5.5461765	2.000000	2.037037
## 381	1991-11-30	0.9060000	23.88053	5.5485294	6.840000	19.440000
## 382	1991-12-01	0.9058333	23.88056	5.5933333	34.333333	157.777778
## 383	1991-12-02	0.9056667	23.88058	5.6251120	62.307692	24.205128
## 384	1991-12-03	0.9055000	23.88060	5.6568908	290.000000	163.333333
## 385	1991-12-04	0.9053333	23.88062	5.6886695	24.153846	8.769231
## 386	1991-12-05	0.9051667	23.88064	5.7204482	348.564103	893.333333
## 387	1991-12-06	0.9050000	23.88067	5.7522269	590.000000	956.733333
## 388	1991-12-07	0.9048333	23.88069	5.7840056	101.555556	159.111111
## 389	1991-12-08	0.9046667	23.88071	5.8157843	37.846154	20.717949
## 390	1991-12-09	0.9045000	23.88073	5.8475630	59.897436	174.974359
## 391	1991-12-10	0.9043333	23.88076	5.8793417	16.222222	26.444444
## 392	1991-12-11	0.9041667	23.88078	5.9111204	8.358974	16.102564
## 393	1991-12-12	0.9040000	23.88080	5.9428992	12.205128	16.102564
## 394	1991-12-13	0.9038333	23.88082	5.9746779	18.000000	17.076923

## 395	1991-12-14	0.9036667	23.88084	6.0064566	18.451613	111.015873
## 396	1991-12-15	0.9035000	23.88087	6.0382353	154.720000	273.660714
## 397	1991-12-16	0.9033333	23.88089	6.1266667	121.888889	436.305556
## 398	1991-12-17	0.9031667	23.88091	6.0608734	35.179487	240.820513
## 399	1991-12-18	0.9030000	23.88093	5.9950802	60.717949	103.538462
## 400	1991-12-19	0.9028333	23.88096	5.9292870	20.974359	27.076923
## 401	1991-12-20	0.9026667	23.88098	5.8634938	57.384615	99.435897
## 402	1991-12-21	0.9025000	23.88100	5.7977005	27.375000	187.875000
## 403	1991-12-22	0.9023333	23.88102	5.7319073	41.333333	46.205128
## 404	1991-12-23	0.9021667	23.88104	5.6661141	74.000000	278.051282
## 405	1991-12-24	0.9020000	23.88107	5.6003209	110.615385	328.102564
## 406	1991-12-25	0.9018333	23.88109	5.5345276	28.820513	39.846154
## 407	1991-12-26	0.9016667	23.88111	5.4687344	69.111111	111.873016
## 408	1991-12-27	0.9015000	23.88113	5.4029412	81.080000	160.440000
## 409	1991-12-28	0.9013333	23.88116	5.7200000	18.194444	32.972222
## 410	1991-12-29	0.9011667	23.88118	5.6653922	12.461538	6.410256
## 411	1991-12-30	0.9010000	23.88120	5.6107843	11.384615	47.435897
## 412	1991-12-31	0.9008333	23.88122	5.5561765	25.333333	97.487179
## 413	1992-01-01	0.9006667	23.88124	5.5015686	2.222222	3.777778
## 414	1992-01-02	0.9005000	23.88127	5.4469608	3.025641	4.256410
## 415	1992-01-03	0.9003333	23.88129	5.3923529	63.333333	130.410256
## 416	1992-01-04	0.9001667	23.88131	5.3377451	152.256410	917.025641
## 417	1992-01-05	0.9000000	23.88133	5.2831373	14.769231	40.871795
## 418	1992-01-06	0.8998333	23.88136	5.2285294	5.166667	4.291667
## 419	1992-01-07	0.8996667	23.88138	5.1739216	39.641026	56.564103
## 420	1992-01-08	0.8995000	23.88140	5.1193137	46.296296	108.481481
## 421	1992-01-09	0.8993333	23.88142	5.0647059	67.320000	238.440000
## 422	1992-01-10	0.8991667	23.88144	5.6933333	73.361111	348.416667
## 423	1992-01-11	0.8990000	23.88147	5.6214480	5.076923	6.769231
## 424	1992-01-12	0.8988333	23.88149	5.5495626	2.222222	2.000000
## 425	1992-01-13	0.8986667	23.88151	5.4776772	21.846154	74.615385
## 426	1992-01-14	0.8985000	23.88153	5.4057919	5.794872	14.871795
## 427	1992-01-15	0.8983333	23.88156	5.3339065	50.256410	288.717949
## 428	1992-01-16	0.8981667	23.88158	5.2620211	7.641026	17.794872
## 429	1992-01-17	0.8980000	23.88160	5.1901357	2.923077	5.384615
## 430	1992-01-18	0.8978333	23.88162	5.1182504	2.222222	10.000000
## 431	1992-01-19	0.8976667	23.88164	5.0463650	8.358974	45.384615
## 432	1992-01-20	0.8975000	23.88167	4.9744796	6.205128	12.871795
## 433	1992-01-21	0.8973333	23.88169	4.9025943	24.769231	6.564103
## 434	1992-01-22	0.8971667	23.88171	4.8307089	51.384615	256.307051
## 435	1992-01-23	0.8970000	23.88173	4.7588235	78.000000	506.050000
## 436	1992-01-24	0.8968333	23.88176	4.7669853	103.965517	546.655172
## 437	1992-01-25	0.8966667	23.88178	4.7751471	70.769231	541.435897
## 438	1992-01-26	0.8965000	23.88180	4.7833088	891.333333	300.435897
## 439	1992-01-27	0.8963333	23.88182	4.7914706	22.410256	59.435897
## 440	1992-01-28	0.8961667	23.88184	4.7996324	96.512821	121.487179
## 441	1992-01-29	0.8960000	23.88187	4.8077941	8.717949	59.948718
## 442	1992-01-30	0.8958333	23.88189	4.8159559	7.111111	61.777778
## 443	1992-01-31	0.8956667	23.88191	4.8241176	2.000000	2.000000
## 444	1992-02-01	0.8955000	23.88193	4.8322794	27.897436	148.717949
## 445	1992-02-02	0.8953333	23.88196	4.8404412	604.666667	8.000000
## 446	1992-02-03	0.8951667	23.88198	4.8486029	45.846154	221.487179
## 447	1992-02-04	0.8950000	23.88200	4.8567647	3.555556	101.777778
## 448	1992-02-05	0.8948333	23.88202	4.8649265	50.564103	192.974359

## 449	1992-02-06	0.8946667	23.88204	4.8730882	28.564103	147.282051
## 450	1992-02-07	0.8945000	23.88207	4.8812500	141.948718	476.307692
## 451	1992-02-08	0.8943333	23.88209	4.8894118	12.444444	4.666667
## 452	1992-02-09	0.8941667	23.88211	4.8975735	11.076923	84.205128
## 453	1992-02-10	0.8940000	23.88213	4.9057353	106.153846	769.435897
## 454	1992-02-11	0.8938333	23.88216	4.9138971	12.465116	118.511628
## 455	1992-02-12	0.8936667	23.88218	4.9220588	72.150000	725.850000
## 456	1992-02-13	0.8935000	23.88220	5.0800000	45.137931	502.482759
## 457	1992-02-14	0.8933333	23.88222	5.1016544	2.000000	2.000000
## 458	1992-02-15	0.8931667	23.88224	5.1233088	37.125000	257.583333
## 459	1992-02-16	0.8930000	23.88227	5.1449632	2.000000	4.000000
## 460	1992-02-17	0.8928333	23.88229	5.1666176	2.102564	2.717949
## 461	1992-02-18	0.8926667	23.88231	5.1882721	83.791667	625.208333
## 462	1992-02-19	0.8925000	23.88233	5.2099265	22.000000	20.000000
## 463	1992-02-20	0.8923333	23.88236	5.2315809	30.000000	398.923077
## 464	1992-02-21	0.8921667	23.88238	5.2532353	2.102564	2.666667
## 465	1992-02-22	0.8920000	23.88240	5.2748897	3.777778	27.333333
## 466	1992-02-23	0.8918333	23.88242	5.2965441	27.076923	64.051282
## 467	1992-02-24	0.8916667	23.88244	5.3181985	3.435897	9.641026
## 468	1992-02-25	0.8915000	23.88247	5.3398529	8.888889	17.111111
## 469	1992-02-26	0.8913333	23.88249	5.3615074	4.450000	3.450000
## 470	1992-02-27	0.8911667	23.88251	5.3831618	2.512821	2.871795
## 471	1992-02-28	0.8910000	23.88253	5.4048162	42.634921	96.920635
## 472	1992-02-29	0.8908333	23.88256	5.4264706	7.098039	96.392157
## 473	1992-03-01	0.8906667	23.88258	5.4333333	8.166667	3.222222
## 474	1992-03-02	0.8905000	23.88260	5.4197415	3.589744	8.871795
## 475	1992-03-03	0.8903333	23.88262	5.4061497	23.333333	180.222222
## 476	1992-03-04	0.8901667	23.88264	5.3925579	19.300000	180.100000
## 477	1992-03-05	0.8900000	23.88267	5.3789661	42.923077	271.230769
## 478	1992-03-06	0.8898333	23.88269	5.3653743	4.153846	5.589744
## 479	1992-03-07	0.8896667	23.88271	5.3517825	2.222222	12.888889
## 480	1992-03-08	0.8895000	23.88273	5.3381907	3.750000	8.250000
## 481	1992-03-09	0.8893333	23.88276	5.3245989	8.461538	30.974359
## 482	1992-03-10	0.8891667	23.88278	5.3110071	14.051282	17.025641
## 483	1992-03-11	0.8890000	23.88280	5.2974153	29.396825	222.857143
## 484	1992-03-12	0.8888333	23.88282	5.2838235	8.392157	123.568627
## 485	1992-03-13	0.8886667	23.88284	5.9233333	28.916667	182.231884
## 486	1992-03-14	0.8885000	23.88287	5.9471919	9.897436	33.435897
## 487	1992-03-15	0.8883333	23.88289	5.9710504	4.666667	12.666667
## 488	1992-03-16	0.8881667	23.88291	5.9949090	26.358974	72.923077
## 489	1992-03-17	0.8880000	23.88293	6.0187675	0.000000	44.820513
## 490	1992-03-18	0.8878333	23.88296	6.0426261	26.666667	616.888889
## 491	1992-03-19	0.8876667	23.88298	6.0664846	49.000000	237.050000
## 492	1992-03-20	0.8875000	23.88300	6.0903431	110.051282	915.333333
## 493	1992-03-21	0.8873333	23.88302	6.1142017	80.708333	732.458333
## 494	1992-03-22	0.8871667	23.88304	6.1380602	34.153846	394.769231
## 495	1992-03-23	0.8870000	23.88307	6.1619188	4.871795	69.743590
## 496	1992-03-24	0.8868333	23.88309	6.1857773	3.282051	13.897436
## 497	1992-03-25	0.8866667	23.88311	6.2096359	16.000000	6.222222
## 498	1992-03-26	0.8865000	23.88313	6.2334944	6.592593	23.333333
## 499	1992-03-27	0.8863333	23.88316	6.2573529	139.160000	931.320000
## 500	1992-03-28	0.8861667	23.88318	6.3666667	2.138889	2.222222
## 501	1992-03-29	0.8860000	23.88320	6.3727839	20.083333	5.541667
## 502	1992-03-30	0.8858333	23.88322	6.3789011	6.000000	12.000000

## 503	1992-03-31	0.8856667	23.88324	6.3850183	13.076923	58.820513
## 504	1992-04-01	0.8855000	23.88327	6.3911355	3.487179	12.307692
## 505	1992-04-02	0.8853333	23.88329	6.3972527	90.000000	108.666667
## 506	1992-04-03	0.8851667	23.88331	6.4033700	2.100000	4.800000
## 507	1992-04-04	0.8850000	23.88333	6.4094872	7.538462	53.948718
## 508	1992-04-05	0.8848333	23.88336	6.4156044	4.410256	12.615385
## 509	1992-04-06	0.8846667	23.88338	6.4217216	6.444444	23.111111
## 510	1992-04-07	0.8845000	23.88340	6.4278388	9.550000	31.450000
## 511	1992-04-08	0.8843333	23.88342	6.4339560	2.000000	2.871795
## 512	1992-04-09	0.8841667	23.88344	6.4400733	5.541667	37.291667
## 513	1992-04-10	0.8840000	23.88347	6.4461905	8.727273	154.109091
## 514	1992-04-11	0.8838333	23.88349	6.4523077	24.840000	521.920000
## 515	1992-04-12	0.8836667	23.88351	5.4300000	2.285714	2.363636
## 516	1992-04-13	0.8835000	23.88353	0.0000000	11.642857	14.181818
## 517	1992-04-14	0.8833333	23.88356	0.3625000	21.000000	26.000000
## 518	1992-04-15	0.8831667	23.88358	0.7250000	2.051282	2.000000
## 519	1992-04-16	0.8830000	23.88360	1.0875000	146.000000	177.555556
## 520	1992-04-17	0.8828333	23.88362	1.4500000	7.047619	23.428571
## 521	1992-04-18	0.8826667	23.88364	1.8125000	28.000000	56.000000
## 522	1992-04-19	0.8825000	23.88367	2.1750000	24.769231	180.615385
## 523	1992-04-20	0.8823333	23.88369	2.5375000	8.666667	77.538462
## 524	1992-04-21	0.8821667	23.88371	2.9000000	7.833333	74.333333
## 525	1992-04-22	0.8820000	23.88373	3.2625000	16.000000	8.000000
## 526	1992-04-23	0.8818333	23.88376	3.6250000	19.230769	58.820513
## 527	1992-04-24	0.8816667	23.88378	3.9875000	18.564103	67.897436
## 528	1992-04-25	0.8815000	23.88380	4.3500000	16.583333	63.875000
## 529	1992-04-26	0.8813333	23.88382	4.7125000	10.000000	54.000000
## 530	1992-04-27	0.8811667	23.88384	5.0750000	7.384615	53.230769
## 531	1992-04-28	0.8810000	23.88387	5.4375000	5.074074	12.777778
## 532	1992-04-29	0.8808333	23.88389	5.8000000	10.000000	106.392157
## 533	1992-04-30	0.8806667	23.88391	5.2433333	5.722222	35.805556
## 534	1992-05-01	0.8805000	23.88393	5.5550000	7.555556	2.888889
## 535	1992-05-02	0.8803333	23.88396	5.8666667	46.871795	273.743590
## 536	1992-05-03	0.8801667	23.88398	6.1783333	16.256410	62.410256
## 537	1992-05-04	0.8800000	23.88400	6.4900000	28.512821	202.564103
## 538	1992-05-05	0.8798830	23.88402	6.4663284	36.153846	134.410256
## 539	1992-05-06	0.8797661	23.88405	6.4426568	6.000000	12.888889
## 540	1992-05-07	0.8796491	23.88407	6.4189853	6.358974	6.358974
## 541	1992-05-08	0.8795322	23.88409	6.3953137	21.435897	14.820513
## 542	1992-05-09	0.8794152	23.88412	6.3716421	2.000000	2.615385
## 543	1992-05-10	0.8792982	23.88414	6.3479705	2.102564	2.102564
## 544	1992-05-11	0.8791813	23.88416	6.3242990	6.153846	21.076923
## 545	1992-05-12	0.8790643	23.88419	6.3006274	108.000000	7.555556
## 546	1992-05-13	0.8789474	23.88421	6.2769558	3.384615	2.307692
## 547	1992-05-14	0.8788304	23.88423	6.2532842	11.631083	27.153846
## 548	1992-05-15	0.8787135	23.88426	7.4965367	19.877551	52.000000
## 549	1992-05-16	0.8785965	23.88428	6.6097509	9.784615	12.800000
## 550	1992-05-17	0.8784795	23.88430	6.8048389	4.769231	3.076923
## 551	1992-05-18	0.8783626	23.88433	6.9999269	4.051282	3.179487
## 552	1992-05-19	0.8782456	23.88435	7.1239043	3.333333	3.282051
## 553	1992-05-20	0.8781287	23.88437	7.2261491	2.615385	3.384615
## 554	1992-05-21	0.8780117	23.88440	7.3283940	2.068966	3.218391
## 555	1992-05-22	0.8778947	23.88442	7.4306388	3.230769	3.230769
## 556	1992-05-23	0.8777778	23.88444	7.5328836	5.897436	2.461538

## 557	1992-05-24	0.8776608	23.88447	7.6351284	2.512821	3.128205
## 558	1992-05-25	0.8775439	23.88449	7.7373732	3.692308	5.333333
## 559	1992-05-26	0.8774269	23.88451	7.8396180	2.444444	3.555556
## 560	1992-05-27	0.8773099	23.88454	7.9418629	2.512821	2.871795
## 561	1992-05-28	0.8771930	23.88456	8.0441077	2.000000	2.871795
## 562	1992-05-29	0.8770760	23.88458	8.1463525	5.272727	4.545455
## 563	1992-05-30	0.8769591	23.88461	7.7147970	4.032915	8.858934
## 564	1992-05-31	0.8768421	23.88463	7.9296952	2.793103	13.172414
## 565	1992-06-01	0.8767251	23.88465	7.6750258	2.000000	7.282051
## 566	1992-06-02	0.8766082	23.88468	7.4203564	7.777778	9.333333
## 567	1992-06-03	0.8764912	23.88470	7.4175935	2.000000	3.230769
## 568	1992-06-04	0.8763743	23.88473	7.4148306	2.000000	2.641026
## 569	1992-06-05	0.8762573	23.88475	7.4831195	2.000000	2.051282
## 570	1992-06-06	0.8761404	23.88477	7.5514083	2.051282	9.692308
## 571	1992-06-07	0.8760234	23.88480	7.6196971	3.538462	2.461538
## 572	1992-06-08	0.8759064	23.88482	7.6879860	16.717949	6.410256
## 573	1992-06-09	0.8757895	23.88484	7.7562748	2.000000	2.000000
## 574	1992-06-10	0.8756725	23.88487	7.8245637	7.375000	3.708333
## 575	1992-06-11	0.8755556	23.88489	7.8928525	6.767241	6.702107
## 576	1992-06-12	0.8754386	23.88491	7.8851421	6.159483	9.695881
## 577	1992-06-13	0.8753216	23.88494	7.9787590	5.551724	12.689655
## 578	1992-06-14	0.8752047	23.88496	7.6818610	4.051282	3.538462
## 579	1992-06-15	0.8750877	23.88498	7.3849631	7.076923	3.589744
## 580	1992-06-16	0.8749708	23.88501	7.0880651	5.256410	2.794872
## 581	1992-06-17	0.8748538	23.88503	5.9766136	3.435897	2.000000
## 582	1992-06-18	0.8747368	23.88505	4.8651622	10.606838	10.333333
## 583	1992-06-19	0.8746199	23.88508	6.9143915	17.777778	18.666667
## 584	1992-06-20	0.8745029	23.88510	7.1184833	16.000000	22.000000
## 585	1992-06-21	0.8743860	23.88512	7.3225752	2.051282	4.512821
## 586	1992-06-22	0.8742690	23.88515	7.5266670	2.256410	2.410256
## 587	1992-06-23	0.8741520	23.88517	7.7307589	2.102564	3.333333
## 588	1992-06-24	0.8740351	23.88519	7.9348507	2.102564	2.051282
## 589	1992-06-25	0.8739181	23.88522	8.1389426	2.000000	2.205128
## 590	1992-06-26	0.8738012	23.88524	8.3430344	2.102564	2.307692
## 591	1992-06-27	0.8736842	23.88526	8.5471263	3.333333	16.666667
## 592	1992-06-28	0.8735673	23.88529	8.7512181	3.550000	14.650000
## 593	1992-06-29	0.8734503	23.88531	8.9553100	103.090909	3.045455
## 594	1992-06-30	0.8733333	23.88533	8.2420666	65.045455	5.591693
## 595	1992-07-01	0.8732164	23.88536	8.0308553	27.000000	8.137931
## 596	1992-07-02	0.8730994	23.88538	7.8346420	7.333333	9.641026
## 597	1992-07-03	0.8729825	23.88540	7.6384287	3.846154	2.102564
## 598	1992-07-04	0.8728655	23.88543	7.4422154	170.888889	1066.222222
## 599	1992-07-05	0.8727485	23.88545	7.2460021	2.093023	2.093023
## 600	1992-07-06	0.8726316	23.88547	7.0497888	8.379845	4.841383
## 601	1992-07-07	0.8725146	23.88550	6.8615583	14.666667	7.589744
## 602	1992-07-08	0.8723977	23.88552	6.6733278	9.358974	6.153846
## 603	1992-07-09	0.8722807	23.88554	6.8996152	4.051282	4.717949
## 604	1992-07-10	0.8721637	23.88557	7.1259026	7.230769	4.000000
## 605	1992-07-11	0.8720468	23.88559	7.3521899	3.500000	6.458333
## 606	1992-07-12	0.8719298	23.88561	7.5784773	2.863636	2.363636
## 607	1992-07-13	0.8718129	23.88564	6.9972805	7.880094	3.612853
## 608	1992-07-14	0.8716959	23.88566	8.3055789	12.896552	4.862069
## 609	1992-07-15	0.8715789	23.88568	7.8916610	3.230769	4.000000
## 610	1992-07-16	0.8714620	23.88571	7.4777430	2.820513	3.692308

## 611	1992-07-17	0.8713450	23.88573	7.0638250	2.410256	8.358974
## 612	1992-07-18	0.8712281	23.88575	6.6499070	3.333333	3.384615
## 613	1992-07-19	0.8711111	23.88578	6.2359890	2.666667	3.111111
## 614	1992-07-20	0.8709942	23.88580	6.0396410	2.000000	2.410256
## 615	1992-07-21	0.8708772	23.88582	5.8432930	2.230769	2.589744
## 616	1992-07-22	0.8707602	23.88585	6.0974162	2.461538	2.769231
## 617	1992-07-23	0.8706433	23.88587	6.3515394	2.000000	2.410256
## 618	1992-07-24	0.8705263	23.88589	6.6056626	2.102564	3.025641
## 619	1992-07-25	0.8704094	23.88592	6.8597859	2.000000	3.282051
## 620	1992-07-26	0.8702924	23.88594	7.1139091	6.045455	4.227273
## 621	1992-07-27	0.8701754	23.88596	6.5139756	4.022727	3.217085
## 622	1992-07-28	0.8700585	23.88599	7.7331207	2.000000	2.206897
## 623	1992-07-29	0.8699415	23.88601	7.6034085	4.461538	2.102564
## 624	1992-07-30	0.8698246	23.88604	7.4736964	2.000000	2.051282
## 625	1992-07-31	0.8697076	23.88606	7.3439843	17.777778	118.444444
## 626	1992-08-01	0.8695906	23.88608	7.2142721	10.000000	86.000000
## 627	1992-08-02	0.8694737	23.88611	7.0845600	5.692308	2.307692
## 628	1992-08-03	0.8693567	23.88613	6.9548478	3.846154	2.153846
## 629	1992-08-04	0.8692398	23.88615	6.8915440	2.000000	2.000000
## 630	1992-08-05	0.8691228	23.88618	6.8282401	6.333333	2.222222
## 631	1992-08-06	0.8690058	23.88620	6.9021026	10.666667	2.444444
## 632	1992-08-07	0.8688889	23.88622	6.9759651	10.256410	5.384615
## 633	1992-08-08	0.8687719	23.88625	7.0498276	18.974359	3.025641
## 634	1992-08-09	0.8686550	23.88627	7.1236901	2.000000	2.051282
## 635	1992-08-10	0.8685380	23.88629	7.1975526	2.222222	5.555556
## 636	1992-08-11	0.8684211	23.88632	7.2714151	4.102564	3.333333
## 637	1992-08-12	0.8683041	23.88634	7.3452775	8.358974	2.256410
## 638	1992-08-13	0.8681871	23.88636	7.4191400	2.222222	2.000000
## 639	1992-08-14	0.8680702	23.88639	7.4930025	2.153846	5.435897
## 640	1992-08-15	0.8679532	23.88641	7.5668650	5.794872	3.538462
## 641	1992-08-16	0.8678363	23.88643	7.6407275	123.875000	7.416667
## 642	1992-08-17	0.8677193	23.88646	7.7145900	24.136364	7.136364
## 643	1992-08-18	0.8676023	23.88648	7.5864465	20.688871	5.016458
## 644	1992-08-19	0.8674854	23.88650	8.7135324	17.241379	2.896552
## 645	1992-08-20	0.8673684	23.88653	7.9235537	4.410256	2.461538
## 646	1992-08-21	0.8672515	23.88655	7.1335750	18.444444	7.777778
## 647	1992-08-22	0.8671345	23.88657	7.0367289	2.102564	2.461538
## 648	1992-08-23	0.8670175	23.88660	6.9398829	2.666667	4.102564
## 649	1992-08-24	0.8669006	23.88662	7.1831561	3.230769	5.743590
## 650	1992-08-25	0.8667836	23.88664	7.4264293	3.041667	6.708333
## 651	1992-08-26	0.8666667	23.88667	7.6697024	4.461538	2.000000
## 652	1992-08-27	0.8665497	23.88669	7.9129756	3.344406	3.886364
## 653	1992-08-28	0.8664327	23.88671	6.6736892	2.227273	5.772727
## 654	1992-08-29	0.8663158	23.88674	6.8077935	2.000000	4.000000
## 655	1992-08-30	0.8661988	23.88676	7.7734655	46.413793	438.379310
## 656	1992-08-31	0.8660819	23.88678	7.7350211	2.000000	2.102564
## 657	1992-09-01	0.8659649	23.88681	7.6965768	7.777778	10.444444
## 658	1992-09-02	0.8658480	23.88683	7.6581324	4.000000	6.000000
## 659	1992-09-03	0.8657310	23.88685	7.6196880	12.205128	2.000000
## 660	1992-09-04	0.8656140	23.88688	7.5812436	3.230769	2.000000
## 661	1992-09-05	0.8654971	23.88690	7.5427993	3.333333	3.111111
## 662	1992-09-06	0.8653801	23.88692	7.5043549	3.230769	3.333333
## 663	1992-09-07	0.8652632	23.88695	7.4659105	2.000000	2.666667
## 664	1992-09-08	0.8651462	23.88697	7.4274661	2.564103	3.333333

## 665	1992-09-09	0.8650292	23.88699	7.3890217	8.079772	5.111111
## 666	1992-09-10	0.8649123	23.88702	7.1496872	13.595442	6.888889
## 667	1992-09-11	0.8647953	23.88704	7.5241233	19.111111	8.666667
## 668	1992-09-12	0.8646784	23.88706	7.8985595	12.000000	5.230769
## 669	1992-09-13	0.8645614	23.88709	8.2729957	115.333333	233.333333
## 670	1992-09-14	0.8644444	23.88711	8.6474318	2.266667	3.244444
## 671	1992-09-15	0.8643275	23.88713	8.4449146	4.667816	2.742912
## 672	1992-09-16	0.8642105	23.88716	8.3231034	7.068966	2.241379
## 673	1992-09-17	0.8640936	23.88718	8.3353146	3.538462	4.717949
## 674	1992-09-18	0.8639766	23.88720	8.3475257	4.444444	7.777778
## 675	1992-09-19	0.8638596	23.88723	8.3597368	4.461538	2.000000
## 676	1992-09-20	0.8637427	23.88725	8.3719480	5.111111	2.000000
## 677	1992-09-21	0.8636257	23.88727	8.3841591	4.272727	6.363636
## 678	1992-09-22	0.8635088	23.88730	8.2770690	2.066667	5.400000
## 679	1992-09-23	0.8633918	23.88732	8.3028780	5.654955	4.051351
## 680	1992-09-24	0.8632749	23.88735	8.9337143	9.243243	2.702703
## 681	1992-09-25	0.8631579	23.88737	8.7626736	2.000000	2.000000
## 682	1992-09-26	0.8630409	23.88739	8.5916328	3.384615	2.000000
## 683	1992-09-27	0.8629240	23.88742	8.4205921	18.888889	11.111111
## 684	1992-09-28	0.8628070	23.88744	8.2495514	11.222222	7.444444
## 685	1992-09-29	0.8626901	23.88746	8.0785107	3.555556	3.777778
## 686	1992-09-30	0.8625731	23.88749	7.9074699	9.726496	2.914530
## 687	1992-10-01	0.8624561	23.88751	7.8810145	15.897436	2.051282
## 688	1992-10-02	0.8623392	23.88753	7.8545590	11.118529	5.742622
## 689	1992-10-03	0.8622222	23.88756	8.4362727	6.339623	9.433962
## 690	1992-10-04	0.8621053	23.88758	8.2676071	3.714286	3.714286
## 691	1992-10-05	0.8619883	23.88760	8.5352222	4.457143	3.990476
## 692	1992-10-06	0.8618713	23.88763	8.6629667	5.200000	4.266667
## 693	1992-10-07	0.8617544	23.88765	8.3262306	12.461538	4.102564
## 694	1992-10-08	0.8616374	23.88767	7.9894945	2.444444	2.666667
## 695	1992-10-09	0.8615205	23.88770	7.6527584	2.222222	2.461538
## 696	1992-10-10	0.8614035	23.88772	7.8057921	2.000000	2.256410
## 697	1992-10-11	0.8612865	23.88774	7.9588258	23.333333	2.222222
## 698	1992-10-12	0.8611696	23.88777	8.1118596	13.333333	2.393162
## 699	1992-10-13	0.8610526	23.88779	8.0879876	3.333333	2.564103
## 700	1992-10-14	0.8609357	23.88781	8.0641157	3.333333	2.222222
## 701	1992-10-15	0.8608187	23.88784	8.0402438	3.282051	4.512821
## 702	1992-10-16	0.8607018	23.88786	8.0163719	6.000000	8.000000
## 703	1992-10-17	0.8605848	23.88788	7.9925000	7.681818	16.545455
## 704	1992-10-18	0.8604678	23.88791	7.7699444	3.888889	59.222222
## 705	1992-10-19	0.8603509	23.88793	7.8848171	3.276353	40.216524
## 706	1992-10-20	0.8602339	23.88795	7.9091935	2.663818	21.210826
## 707	1992-10-21	0.8601170	23.88798	7.5769019	2.051282	2.205128
## 708	1992-10-22	0.8600000	23.88800	7.2446102	3.515670	50.507123
## 709	1992-10-23	0.8602098	23.88803	7.6376099	4.980057	98.809117
## 710	1992-10-24	0.8604196	23.88806	7.6771246	6.444444	147.111111
## 711	1992-10-25	0.8606294	23.88808	7.7166392	3.024390	6.439024
## 712	1992-10-26	0.8608392	23.88811	7.7561539	3.794872	2.205128
## 713	1992-10-27	0.8610490	23.88814	7.7956686	2.974359	10.923077
## 714	1992-10-28	0.8612587	23.88817	7.8351833	15.333333	67.777778
## 715	1992-10-29	0.8614685	23.88820	7.8746979	9.666667	34.888889
## 716	1992-10-30	0.8616783	23.88822	7.9142126	4.000000	2.000000
## 717	1992-10-31	0.8618881	23.88825	7.9537273	6.636364	3.272727
## 718	1992-11-01	0.8620979	23.88828	7.1947561	5.518182	4.003030

## 719	1992-11-02	0.8623077	23.88831	7.7671333	4.400000	4.733333
## 720	1992-11-03	0.8625175	23.88834	7.9194615	3.714286	2.214286
## 721	1992-11-04	0.8627273	23.88836	6.7083880	3.549451	2.132784
## 722	1992-11-05	0.8629371	23.88839	6.5872258	3.384615	2.051282
## 723	1992-11-06	0.8631469	23.88842	6.4660636	2.000000	2.256410
## 724	1992-11-07	0.8633566	23.88845	6.3449014	2.025641	2.384615
## 725	1992-11-08	0.8635664	23.88848	6.5445146	2.051282	2.512821
## 726	1992-11-09	0.8637762	23.88850	6.7441278	19.777778	7.333333
## 727	1992-11-10	0.8639860	23.88853	6.9437410	14.452991	7.743590
## 728	1992-11-11	0.8641958	23.88856	7.1433542	9.128205	8.153846
## 729	1992-11-12	0.8644056	23.88859	7.3429674	39.609557	50.849650
## 730	1992-11-13	0.8646154	23.88862	7.5181136	70.090909	93.545455
## 731	1992-11-14	0.8648252	23.88864	5.8326104	40.183386	48.945141
## 732	1992-11-15	0.8650350	23.88867	6.3540862	10.275862	4.344828
## 733	1992-11-16	0.8652448	23.88870	5.7453821	8.371942	4.298261
## 734	1992-11-17	0.8654545	23.88873	5.9861944	6.468022	4.251695
## 735	1992-11-18	0.8656643	23.88876	6.2270067	4.564103	4.205128
## 736	1992-11-19	0.8658741	23.88878	6.4678190	8.871795	3.025641
## 737	1992-11-20	0.8660839	23.88881	6.7086313	6.461538	6.102564
## 738	1992-11-21	0.8662937	23.88884	6.9494436	37.555556	19.333333
## 739	1992-11-22	0.8665035	23.88887	7.1902559	42.000000	18.666667
## 740	1992-11-23	0.8667133	23.88890	7.4310682	3.863636	4.136364
## 741	1992-11-24	0.8669231	23.88892	7.5278281	10.086991	3.430251
## 742	1992-11-25	0.8671329	23.88895	8.2166533	16.310345	2.724138
## 743	1992-11-26	0.8673427	23.88898	7.7391229	9.538462	2.102564
## 744	1992-11-27	0.8675524	23.88901	7.2615924	81.766382	64.364672
## 745	1992-11-28	0.8677622	23.88903	7.1009775	153.994302	126.626781
## 746	1992-11-29	0.8679720	23.88906	7.3202780	226.222222	188.888889
## 747	1992-11-30	0.8681818	23.88909	7.5395785	38.000000	30.000000
## 748	1992-12-01	0.8683916	23.88912	7.7588790	10.800000	2.600000
## 749	1992-12-02	0.8686014	23.88915	7.9781794	48.000000	18.000000
## 750	1992-12-03	0.8688112	23.88917	8.1974799	9.846154	5.897436
## 751	1992-12-04	0.8690210	23.88920	8.4167804	4.461538	2.102564
## 752	1992-12-05	0.8692308	23.88923	8.6360809	7.555556	17.111111
## 753	1992-12-06	0.8694406	23.88926	8.8553813	12000.000000	12000.000000
## 754	1992-12-07	0.8696503	23.88929	9.0746818	42.954545	38.818182
## 755	1992-12-08	0.8698601	23.88931	8.5992317	27.063480	23.840125
## 756	1992-12-09	0.8700699	23.88934	8.8388448	11.172414	8.862069
## 757	1992-12-10	0.8702797	23.88937	7.7121010	9.333333	9.333333
## 758	1992-12-11	0.8704895	23.88940	6.5853571	9.358974	8.538462
## 759	1992-12-12	0.8706993	23.88943	6.3172494	9.384615	7.743590
## 760	1992-12-13	0.8709091	23.88945	6.0491417	22.666667	15.555556
## 761	1992-12-14	0.8711189	23.88948	5.7810339	94.000000	52.000000
## 762	1992-12-15	0.8713287	23.88951	5.5129262	71.435897	39.897436
## 763	1992-12-16	0.8715385	23.88954	6.3039715	48.871795	27.794872
## 764	1992-12-17	0.8717483	23.88957	5.9234444	26.307692	15.692308
## 765	1992-12-18	0.8719580	23.88959	5.6949821	3.743590	3.589744
## 766	1992-12-19	0.8721678	23.88962	5.6049423	5.743590	7.589744
## 767	1992-12-20	0.8723776	23.88965	5.5149025	16.888889	5.333333
## 768	1992-12-21	0.8725874	23.88968	5.4248627	2.083333	126.916667
## 769	1992-12-22	0.8727972	23.88971	5.3348229	18.531746	109.087302
## 770	1992-12-23	0.8730070	23.88973	5.2447831	34.980159	91.257937
## 771	1992-12-24	0.8732168	23.88976	5.5375800	51.428571	73.428571
## 772	1992-12-25	0.8734266	23.88979	5.1796905	86.727273	522.545455

## 773	1992-12-26	0.8736364	23.88982	5.7654972	49.113636	263.314394
## 774	1992-12-27	0.8738462	23.88985	6.4830588	11.500000	4.083333
## 775	1992-12-28	0.8740559	23.88987	6.2892311	17.083333	8.833333
## 776	1992-12-29	0.8742657	23.88990	6.0954033	6.888889	36.222222
## 777	1992-12-30	0.8744755	23.88993	5.9015755	49.333333	18.666667
## 778	1992-12-31	0.8746853	23.88996	5.7077478	9.916667	23.583333
## 779	1993-01-01	0.8748951	23.88999	5.5139200	7.000000	36.142857
## 780	1993-01-02	0.8751049	23.89001	8.5644545	2.666667	2.909091
## 781	1993-01-03	0.8753147	23.89004	6.7272683	2.000000	2.200000
## 782	1993-01-04	0.8755245	23.89007	4.7412337	10.767677	6.193939
## 783	1993-01-05	0.8757343	23.89010	4.4753006	19.535354	10.187879
## 784	1993-01-06	0.8759441	23.89013	4.8090555	28.303030	14.181818
## 785	1993-01-07	0.8761538	23.89015	5.1428104	12.000000	14.000000
## 786	1993-01-08	0.8763636	23.89018	5.4765654	2.083333	2.083333
## 787	1993-01-09	0.8765734	23.89021	5.8103203	7.212121	4.181818
## 788	1993-01-10	0.8767832	23.89024	6.1440752	4.606061	6.424242
## 789	1993-01-11	0.8769930	23.89027	6.4778301	86.000000	250.000000
## 790	1993-01-12	0.8772028	23.89029	6.8115851	2.606061	5.757576
## 791	1993-01-13	0.8774126	23.89032	7.1453400	10.000000	28.714286
## 792	1993-01-14	0.8776224	23.89035	7.4751707	2.200000	4.400000
## 793	1993-01-15	0.8778322	23.89038	7.9042059	10.500000	10.333333
## 794	1993-01-16	0.8780420	23.89041	6.6786328	5.636364	8.969697
## 795	1993-01-17	0.8782517	23.89043	5.4530598	6.212121	7.969697
## 796	1993-01-18	0.8784615	23.89046	5.4685327	6.787879	6.969697
## 797	1993-01-19	0.8786713	23.89049	5.4840056	7.424242	8.090909
## 798	1993-01-20	0.8788811	23.89052	5.4976554	8.060606	9.212121
## 799	1993-01-21	0.8790909	23.89055	5.5113052	3.454545	4.484848
## 800	1993-01-22	0.8793007	23.89057	5.5249549	13.996503	446.953963
## 801	1993-01-23	0.8795105	23.89060	5.0785294	24.538462	889.423077
## 802	1993-01-24	0.8797203	23.89063	5.7174076	40.606061	4.727273
## 803	1993-01-25	0.8799301	23.89066	6.3562857	6.000000	15.000000
## 804	1993-01-26	0.8801399	23.89069	5.6736000	2.400000	7.400000
## 805	1993-01-27	0.8803497	23.89071	7.2800417	23.666667	2.333333
## 806	1993-01-28	0.8805594	23.89074	7.1822465	3.757576	28.363636
## 807	1993-01-29	0.8807692	23.89077	7.0844512	2.000000	4.000000
## 808	1993-01-30	0.8809790	23.89080	6.9866560	10.000000	2.181818
## 809	1993-01-31	0.8811888	23.89083	6.8888608	4.000000	12.000000
## 810	1993-02-01	0.8813986	23.89085	6.7910656	2.000000	24.000000
## 811	1993-02-02	0.8816084	23.89088	6.6932704	2.000000	2.000000
## 812	1993-02-03	0.8818182	23.89091	6.5954752	6.181818	3.757576
## 813	1993-02-04	0.8820280	23.89094	6.4976800	60.538462	502.500000
## 814	1993-02-05	0.8822378	23.89097	6.0728627	35.435897	252.333333
## 815	1993-02-06	0.8824476	23.89099	6.9507696	10.333333	2.166667
## 816	1993-02-07	0.8826573	23.89102	7.8286765	25.555556	8.888889
## 817	1993-02-08	0.8828671	23.89105	8.7065833	2.000000	2.000000
## 818	1993-02-09	0.8830769	23.89108	8.4361429	2.133333	3.333333
## 819	1993-02-10	0.8832867	23.89110	8.2450000	2.000000	3.600000
## 820	1993-02-11	0.8834965	23.89113	8.1750238	13.555556	2.222222
## 821	1993-02-12	0.8837063	23.89116	8.1050476	3.000000	3.666667
## 822	1993-02-13	0.8839161	23.89119	8.0350714	68.909091	366.000000
## 823	1993-02-14	0.8841259	23.89122	7.9650952	2.000000	12.000000
## 824	1993-02-15	0.8843357	23.89124	7.8951190	3.575758	6.060606
## 825	1993-02-16	0.8845455	23.89127	7.8251429	25.142857	124.571429
## 826	1993-02-17	0.8847552	23.89130	8.5787917	3.666667	3.833333

## 827	1993-02-18	0.8849650	23.89133	7.4667000	29.200000	231.000000
## 828	1993-02-19	0.8851748	23.89136	6.3657127	8.121212	2.545455
## 829	1993-02-20	0.8853846	23.89138	5.2647255	6.080808	2.272727
## 830	1993-02-21	0.8855944	23.89141	5.5433846	4.040404	2.000000
## 831	1993-02-22	0.8858042	23.89144	5.5791019	2.000000	2.166667
## 832	1993-02-23	0.8860140	23.89147	5.6148193	8.000000	2.000000
## 833	1993-02-24	0.8862238	23.89150	5.6505366	3.636364	2.303030
## 834	1993-02-25	0.8864336	23.89152	5.6862539	2.000000	2.000000
## 835	1993-02-26	0.8866434	23.89155	5.7219713	133.111111	33.777778
## 836	1993-02-27	0.8868531	23.89158	5.7576886	2.000000	3.000000
## 837	1993-02-28	0.8870629	23.89161	5.7934059	92.096154	324.865385
## 838	1993-03-01	0.8872727	23.89164	5.2955577	182.192308	646.730769
## 839	1993-03-02	0.8874825	23.89166	6.0889931	2.121212	2.303030
## 840	1993-03-03	0.8876923	23.89169	6.8824286	9.000000	18.142857
## 841	1993-03-04	0.8879021	23.89172	5.9310000	14.000000	84.800000
## 842	1993-03-05	0.8881119	23.89175	7.3413750	4.060606	4.424242
## 843	1993-03-06	0.8883217	23.89178	7.1245937	589.333333	94.888889
## 844	1993-03-07	0.8885315	23.89180	6.9078125	2.000000	2.083333
## 845	1993-03-08	0.8887413	23.89183	6.6910312	44.000000	26.000000
## 846	1993-03-09	0.8889510	23.89186	6.4742500	2.750000	18.750000
## 847	1993-03-10	0.8891608	23.89189	7.0094103	7.000000	4.900000
## 848	1993-03-11	0.8893706	23.89192	6.5236061	2.000000	2.000000
## 849	1993-03-12	0.8895804	23.89194	6.0378020	11.961538	222.115385
## 850	1993-03-13	0.8897902	23.89197	6.1336863	21.923077	442.230769
## 851	1993-03-14	0.8900000	23.89200	6.3000000	2.000000	2.000000
## 852	1993-03-15	0.8687211	23.89202	6.4004388	4.000000	2.000000
## 853	1993-03-16	0.8474423	23.89204	6.5008776	80.666667	61.333333
## 854	1993-03-17	0.8261634	23.89207	6.6013163	6.000000	2.083333
## 855	1993-03-18	0.8048846	23.89209	6.7017551	10.416667	2.583333
## 856	1993-03-19	0.7836057	23.89211	6.8021939	10.444444	14.000000
## 857	1993-03-20	0.7623269	23.89213	6.9026327	6.500000	6.750000
## 858	1993-03-21	0.7410480	23.89215	7.0030714	5.428571	13.714286
## 859	1993-03-22	0.7197691	23.89218	6.7753333	10.250000	2.166667
## 860	1993-03-23	0.6984903	23.89220	7.3783000	4.600000	27.800000
## 861	1993-03-24	0.6772114	23.89222	6.3182186	9.454545	6.121212
## 862	1993-03-25	0.6559326	23.89224	5.2581373	35.304196	386.829837
## 863	1993-03-26	0.6346537	23.89226	5.6931154	61.153846	767.538462
## 864	1993-03-27	0.6133749	23.89228	5.8748150	2.083333	2.666667
## 865	1993-03-28	0.5920960	23.89231	6.0565147	2.166667	3.000000
## 866	1993-03-29	0.5708171	23.89233	6.2382143	7.652174	29.043478
## 867	1993-03-30	0.5495383	23.89235	7.0215833	18.583333	4.333333
## 868	1993-03-31	0.5282594	23.89237	7.4406000	29.636364	385.818182
## 869	1993-04-01	0.5069806	23.89239	6.7816235	12.250000	4.666667
## 870	1993-04-02	0.4857017	23.89242	6.1226471	144.307692	1073.807692
## 871	1993-04-03	0.4644228	23.89244	6.0051244	20.000000	36.888889
## 872	1993-04-04	0.4431440	23.89246	5.8876018	5.416667	4.583333
## 873	1993-04-05	0.4218651	23.89248	5.7700792	4.611111	4.333333
## 874	1993-04-06	0.4005863	23.89250	6.4255882	3.805556	4.083333
## 875	1993-04-07	0.4062829	23.89253	6.5289940	3.000000	3.833333
## 876	1993-04-08	0.4119795	23.89255	6.6323998	3.833333	6.833333
## 877	1993-04-09	0.4176761	23.89257	6.7358055	65.777778	136.444444
## 878	1993-04-10	0.4233727	23.89259	6.8392113	878.000000	1922.000000
## 879	1993-04-11	0.4290693	23.89261	6.9426170	4.000000	3.250000
## 880	1993-04-12	0.4347659	23.89264	7.0460228	2.000000	4.416667

## 881	1993-04-13	0.4404626	23.89266	7.1494286	6.142857	5.142857
## 882	1993-04-14	0.4461592	23.89268	6.9820000	2.000000	2.000000
## 883	1993-04-15	0.4518558	23.89270	8.4575833	2.000000	2.416667
## 884	1993-04-16	0.4575524	23.89272	7.2417367	12.000000	8.000000
## 885	1993-04-17	0.4632490	23.89274	6.0258900	57.519231	264.038462
## 886	1993-04-18	0.4689456	23.89277	5.7824706	103.038462	520.076923
## 887	1993-04-19	0.4746422	23.89279	5.9162850	2.500000	3.833333
## 888	1993-04-20	0.4803388	23.89281	6.0500994	10.416667	2.000000
## 889	1993-04-21	0.4860354	23.89283	6.1839139	2.888889	11.555556
## 890	1993-04-22	0.4917321	23.89285	6.3177283	2.000000	2.833333
## 891	1993-04-23	0.4974287	23.89288	6.4515427	2.000000	2.500000
## 892	1993-04-24	0.5031253	23.89290	6.5853571	6.000000	3.428571
## 893	1993-04-25	0.5088219	23.89292	7.6523043	2.083333	3.083333
## 894	1993-04-26	0.5145185	23.89294	7.2853333	2.000000	22.600000
## 895	1993-04-27	0.5202151	23.89296	5.5194038	189.076923	593.500000
## 896	1993-04-28	0.5259117	23.89299	5.1077451	102.316239	308.416667
## 897	1993-04-29	0.5316083	23.89301	5.1134338	15.555556	23.333333
## 898	1993-04-30	0.5373050	23.89303	5.1191225	2.916667	4.333333
## 899	1993-05-01	0.5430016	23.89305	5.1248113	11.333333	91.833333
## 900	1993-05-02	0.5486982	23.89307	5.1305000	35.000000	2.000000
## 901	1993-05-03	0.5543948	23.89309	5.1361887	108.000000	10.000000
## 902	1993-05-04	0.5600914	23.89312	5.1418775	4.083333	6.333333
## 903	1993-05-05	0.5657880	23.89314	5.1475662	2.416667	9.750000
## 904	1993-05-06	0.5714846	23.89316	5.1532549	85.615385	1203.423077
## 905	1993-05-07	0.57771812	23.89318	5.0955000	48.029915	611.267094
## 906	1993-05-08	0.5828778	23.89320	6.3639375	10.444444	19.111111
## 907	1993-05-09	0.5885745	23.89323	7.6323750	3.666667	10.916667
## 908	1993-05-10	0.5942711	23.89325	6.0377917	39.500000	12.416667
## 909	1993-05-11	0.5999677	23.89327	5.9931097	6.416667	2.000000
## 910	1993-05-12	0.6056643	23.89329	5.9484278	2.000000	5.000000
## 911	1993-05-13	0.6113609	23.89331	5.9037458	5.777778	3.333333
## 912	1993-05-14	0.6170575	23.89334	5.8590639	10.250000	5.416667
## 913	1993-05-15	0.6227541	23.89336	5.8143819	2.484848	4.727273
## 914	1993-05-16	0.6284507	23.89338	5.7697000	26.200000	45.400000
## 915	1993-05-17	0.6341474	23.89340	6.7875000	6.000000	16.285714
## 916	1993-05-18	0.6398440	23.89342	9.0058750	2.000000	2.250000
## 917	1993-05-19	0.6455406	23.89345	5.1739314	34.229508	93.534836
## 918	1993-05-20	0.6512372	23.89347	5.5310385	66.459016	184.819672
## 919	1993-05-21	0.6569338	23.89349	5.7481736	4.083333	2.000000
## 920	1993-05-22	0.6626304	23.89351	5.9653088	2.888889	2.444444
## 921	1993-05-23	0.6683270	23.89353	6.1824440	2.000000	2.000000
## 922	1993-05-24	0.6740236	23.89355	6.3995791	3.555556	7.111111
## 923	1993-05-25	0.6797202	23.89358	6.6167143	15.428571	2.000000
## 924	1993-05-26	0.6854169	23.89360	7.5704783	4.083333	2.000000
## 925	1993-05-27	0.6911135	23.89362	6.1944000	3.800000	10.000000
## 926	1993-05-28	0.6968101	23.89364	5.9543042	2.888889	5.555556
## 927	1993-05-29	0.7025067	23.89366	5.7142083	2.000000	2.000000
## 928	1993-05-30	0.7082033	23.89369	5.4741125	2.000000	2.000000
## 929	1993-05-31	0.7138999	23.89371	5.2340166	2.222222	2.888889
## 930	1993-06-01	0.7195965	23.89373	4.9939208	45.034188	83.636752
## 931	1993-06-02	0.7252931	23.89375	5.1538269	87.846154	164.384615
## 932	1993-06-03	0.7309897	23.89377	5.3531653	4.000000	2.083333
## 933	1993-06-04	0.7366864	23.89380	5.5525037	4.000000	2.083333
## 934	1993-06-05	0.7423830	23.89382	5.7518420	2.222222	2.444444

## 935	1993-06-06	0.7480796	23.89384	5.9511804	2.083333	3.250000
## 936	1993-06-07	0.7537762	23.89386	6.1505188	7.333333	7.333333
## 937	1993-06-08	0.7594728	23.89388	6.3498571	28.285714	250.142857
## 938	1993-06-09	0.7651694	23.89391	7.9825000	2.000000	4.000000
## 939	1993-06-10	0.7708660	23.89393	5.3586000	8.200000	58.200000
## 940	1993-06-11	0.7765626	23.89395	5.3308779	4.444444	25.111111
## 941	1993-06-12	0.7822593	23.89397	5.3031558	2.000000	2.166667
## 942	1993-06-13	0.7879559	23.89399	5.2754337	2.444444	2.222222
## 943	1993-06-14	0.7936525	23.89401	5.2477115	47.923077	773.807692
## 944	1993-06-15	0.7993491	23.89404	4.8729314	24.961538	388.070513
## 945	1993-06-16	0.8050457	23.89406	5.4461985	2.000000	2.333333
## 946	1993-06-17	0.8107423	23.89408	6.0194657	117.939394	14.060606
## 947	1993-06-18	0.8164389	23.89410	6.5927328	6.000000	2.666667
## 948	1993-06-19	0.8221355	23.89412	7.1660000	10.869565	17.130435
## 949	1993-06-20	0.8278321	23.89415	7.0467000	16.400000	2.400000
## 950	1993-06-21	0.8335288	23.89417	7.9263750	18.500000	2.333333
## 951	1993-06-22	0.8392254	23.89419	7.4381246	7.111111	14.444444
## 952	1993-06-23	0.8449220	23.89421	6.9498742	2.000000	4.250000
## 953	1993-06-24	0.8506186	23.89423	6.4616238	2.000000	3.125000
## 954	1993-06-25	0.8563152	23.89426	6.4944753	2.000000	2.000000
## 955	1993-06-26	0.8620118	23.89428	6.5273269	6.196721	354.524590
## 956	1993-06-27	0.8677084	23.89430	6.8127564	2.166667	5.083333
## 957	1993-06-28	0.8734050	23.89432	7.0981859	8.222222	137.111111
## 958	1993-06-29	0.8791017	23.89434	7.3836154	2.000000	48.000000
## 959	1993-06-30	0.8847983	23.89436	7.6690449	2.000000	2.083333
## 960	1993-07-01	0.8904949	23.89439	7.9544744	2.222222	2.000000
## 961	1993-07-02	0.8961915	23.89441	8.2399038	2.083333	13.666667
## 962	1993-07-03	0.9018881	23.89443	8.5253333	2.083333	4.833333
## 963	1993-07-04	0.9075847	23.89445	7.9400122	2.000000	10.916667
## 964	1993-07-05	0.9132813	23.89447	7.3546911	116.888889	4.888889
## 965	1993-07-06	0.9189779	23.89450	6.7693700	68.502137	155.021368
## 966	1993-07-07	0.9246745	23.89452	6.9927692	20.115385	305.153846
## 967	1993-07-08	0.9303712	23.89454	6.9345410	2.000000	4.000000
## 968	1993-07-09	0.9360678	23.89456	6.8763128	4.000000	13.777778
## 969	1993-07-10	0.9417644	23.89458	6.8180846	4.083333	5.166667
## 970	1993-07-11	0.9474610	23.89461	6.7598564	4.888889	10.222222
## 971	1993-07-12	0.9531576	23.89463	6.7016282	2.000000	4.833333
## 972	1993-07-13	0.9588542	23.89465	6.6434000	11.000000	45.000000
## 973	1993-07-14	0.9645508	23.89467	7.1370714	7.913043	31.478261
## 974	1993-07-15	0.9702474	23.89469	7.5849167	2.250000	2.000000
## 975	1993-07-16	0.9759440	23.89472	7.6180410	175.333333	299.111111
## 976	1993-07-17	0.9816407	23.89474	7.6511654	3.000000	4.000000
## 977	1993-07-18	0.9873373	23.89476	7.6842897	4.166667	2.166667
## 978	1993-07-19	0.9930339	23.89478	7.7174141	3.500000	5.333333
## 979	1993-07-20	0.9987305	23.89480	7.7505385	59.409836	654.196721
## 980	1993-07-21	1.0044271	23.89482	7.4260454	2.000000	2.000000
## 981	1993-07-22	1.0101237	23.89485	7.1015524	5.214286	21.714286
## 982	1993-07-23	1.0158203	23.89487	6.7770594	2.714286	2.714286
## 983	1993-07-24	1.0215169	23.89489	6.2608313	5.272727	23.151515
## 984	1993-07-25	1.0272136	23.89491	5.7446031	35.000000	26.000000
## 985	1993-07-26	1.0329102	23.89493	5.2283750	5.166667	6.416667
## 986	1993-07-27	1.0386068	23.89496	5.4725000	4.000000	2.000000
## 987	1993-07-28	1.0443034	23.89498	5.8312500	4.166667	2.166667
## 988	1993-07-29	1.0500000	23.89500	6.1900000	6.305556	2.194444

## 989	1993-07-30	1.0125319	23.96153	6.3183558	8.444444	2.222222
## 990	1993-07-31	0.9750637	24.02807	6.4467115	57.692308	542.307692
## 991	1993-08-01	0.9375956	24.09460	6.1825686	30.512821	277.862179
## 992	1993-08-02	0.9001275	24.16114	6.3940827	3.333333	13.416667
## 993	1993-08-03	0.8626593	24.22767	6.6055968	4.166667	9.833333
## 994	1993-08-04	0.8251912	24.29420	6.8171109	2.222222	2.888889
## 995	1993-08-05	0.7877230	24.36074	7.0286250	9.166667	38.416667
## 996	1993-08-06	0.7502549	24.42727	7.5027083	13.583333	6.916667
## 997	1993-08-07	0.7127868	24.49380	7.0212286	3.166667	7.000000
## 998	1993-08-08	0.6753186	24.56034	6.5397489	8.363636	2.606061
## 999	1993-08-09	0.6378505	24.62687	6.0582692	23.769231	260.769231
## 1000	1993-08-10	0.6003824	24.69341	6.0639118	14.000000	12.000000
## 1001	1993-08-11	0.5629142	24.75994	6.4192544	2.000000	2.166667
## 1002	1993-08-12	0.5254461	24.82647	6.7745971	2.000000	2.000000
## 1003	1993-08-13	0.4879779	24.89301	7.1299397	4.888889	22.222222
## 1004	1993-08-14	0.4505098	24.95954	7.4852824	2.083333	2.333333
## 1005	1993-08-15	0.4130417	25.02607	7.8406250	4.083333	8.916667
## 1006	1993-08-16	0.4193208	25.28558	6.7653750	75.666667	314.916667
## 1007	1993-08-17	0.4155739	25.30111	6.6974176	1039.777778	479.333333
## 1008	1993-08-18	0.4118270	25.31665	6.6294603	122.400000	74.000000
## 1009	1993-08-19	0.4080801	25.33218	6.5615029	2.000000	4.083333
## 1010	1993-08-20	0.4043332	25.34772	6.4935456	2.416667	6.583333
## 1011	1993-08-21	0.4005863	25.36325	6.4255882	166.769231	818.423077
## 1012	1993-08-22	0.4304683	25.34881	6.4979505	84.551282	411.711538
## 1013	1993-08-23	0.4512429	25.38724	6.6105566	2.333333	5.000000
## 1014	1993-08-24	0.4720175	25.42568	6.7231627	3.111111	8.888889
## 1015	1993-08-25	0.4927921	25.46411	6.8357689	2.083333	10.583333
## 1016	1993-08-26	0.5135667	25.50254	6.9483750	9.000000	16.166667
## 1017	1993-08-27	0.5460417	25.54097	7.6870417	2.500000	3.000000
## 1018	1993-08-28	0.5283656	25.57941	6.9984381	2.000000	2.303030
## 1019	1993-08-29	0.5106895	25.61784	6.3098346	10.666667	5.333333
## 1020	1993-08-30	0.4930134	25.65627	5.6212310	2.500000	6.583333
## 1021	1993-08-31	0.4753373	25.69470	4.9326275	90.038462	349.576923
## 1022	1993-09-01	0.4607545	25.76662	4.8654950	46.019231	177.010684
## 1023	1993-09-02	0.7036043	25.51559	6.3339975	2.000000	4.444444
## 1024	1993-09-03	0.9464542	25.26456	7.8025000	2.583333	3.333333
## 1025	1993-09-04	0.5079958	25.45370	6.2973750	7.583333	23.083333
## 1026	1993-09-05	0.4816964	25.49462	6.0394362	2.000000	2.333333
## 1027	1993-09-06	0.4553969	25.53555	5.7814975	8.060606	3.212121
## 1028	1993-09-07	0.4290975	25.57647	5.5235588	2.000000	2.833333
## 1029	1993-09-08	0.4027980	25.61739	5.2656200	132.192308	1047.500000
## 1030	1993-09-09	0.3999465	25.64865	5.2059596	67.346154	524.958333
## 1031	1993-09-10	0.4153657	25.49573	5.8124314	2.500000	2.416667
## 1032	1993-09-11	0.4307849	25.34282	6.4189032	2.222222	2.000000
## 1033	1993-09-12	0.4462042	25.18991	7.0253750	3.916667	12.666667
## 1034	1993-09-13	0.5586167	24.83966	8.3332083	2.000000	2.833333
## 1035	1993-09-14	0.5279276	25.05520	7.5126191	2.000000	3.666667
## 1036	1993-09-15	0.4972385	25.27073	6.6920299	2.000000	2.000000
## 1037	1993-09-16	0.4665495	25.48627	5.8714407	2.000000	2.000000
## 1038	1993-09-17	0.4358604	25.70181	5.0508515	109.980769	316.326923
## 1039	1993-09-18	0.4178192	25.72990	5.1255769	217.961538	630.653846
## 1040	1993-09-19	0.4635632	25.59637	5.4582516	119.132284	316.357226
## 1041	1993-09-20	0.5093073	25.46284	5.7909263	20.303030	2.060606
## 1042	1993-09-21	0.5550513	25.32931	6.1236010	5.333333	4.222222

##	1043	1993-09-22	0.6007953	25.19578	6.4562756	2.083333	2.250000
##	1044	1993-09-23	0.6465393	25.06225	6.7889503	2.333333	2.333333
##	1045	1993-09-24	0.6922833	24.92873	7.1216250	3.000000	10.166667
##	1046	1993-09-25	2.0893583	24.02102	9.5001667	55.388889	6.305556
##	1047	1993-09-26	1.2729850	24.72270	7.4858186	107.777778	2.444444
##	1048	1993-09-27	0.4566118	25.42439	5.4714706	2.000000	2.000000
##	1049	1993-09-28	0.4467213	25.39292	5.5914757	2.000000	2.250000
##	1050	1993-09-29	0.4368308	25.36145	5.7114808	104.692308	1895.692308
##	1051	1993-09-30	0.4424071	25.26330	5.8185513	13.111111	69.777778
##	1052	1993-10-01	0.4479835	25.16515	5.9256218	12.000000	4.000000
##	1053	1993-10-02	0.4535598	25.06701	6.0326923	2.000000	2.000000
##	1054	1993-10-03	0.4591362	24.96886	6.1397628	3.333333	6.000000
##	1055	1993-10-04	0.4647125	24.87071	6.2468333	25.666667	322.083333
##	1056	1993-10-05	0.7101125	24.11960	7.7550417	2.000000	3.416667
##	1057	1993-10-06	0.6016850	24.59381	6.8422286	17.777778	86.888889
##	1058	1993-10-07	0.4932576	25.06803	5.9294155	3.920000	14.800000
##	1059	1993-10-08	0.3848301	25.54225	5.0166024	4.444444	2.222222
##	1060	1993-10-09	0.4171567	25.46766	5.6738507	39.192308	1048.500000
##	1061	1993-10-10	0.4395077	25.29683	5.9915978	2.000000	2.083333
##	1062	1993-10-11	0.4618586	25.12600	6.3093449	2.121212	4.242424
##	1063	1993-10-12	0.4842096	24.95517	6.6270920	2.000000	2.000000
##	1064	1993-10-13	0.5065606	24.78434	6.9448391	2.000000	3.583333
##	1065	1993-10-14	0.5289115	24.61352	7.2625862	2.444444	3.333333
##	1066	1993-10-15	0.5512625	24.44269	7.5803333	2.583333	4.833333
##	1067	1993-10-16	0.4713417	24.83196	6.5817500	14.916667	325.666667
##	1068	1993-10-17	0.4479519	25.39206	5.3582115	74.423077	1390.192308
##	1069	1993-10-18	0.4384171	25.33597	5.6124612	2.000000	2.666667
##	1070	1993-10-19	0.4288824	25.27989	5.8667109	12.500000	2.333333
##	1071	1993-10-20	0.4193476	25.22380	6.1209606	20.888889	27.111111
##	1072	1993-10-21	0.4098128	25.16772	6.3752103	2.000000	2.000000
##	1073	1993-10-22	0.4002780	25.11163	6.6294600	3.888889	3.000000
##	1074	1993-10-23	0.4236372	24.99504	6.9935222	5.777778	4.000000
##	1075	1993-10-24	0.4469964	24.87845	7.3575844	4.000000	4.916667
##	1076	1993-10-25	0.4703557	24.76186	7.7216467	10.888889	6.000000
##	1077	1993-10-26	0.4937149	24.64527	8.0857089	2.000000	2.083333
##	1078	1993-10-27	0.5170741	24.52868	8.4497711	4.000000	7.555556
##	1079	1993-10-28	0.5404333	24.41209	8.8138333	2.083333	5.250000
##	1080	1993-10-29	0.4534250	24.88048	7.1030385	78.692308	821.076923
##	1081	1993-10-30	0.5917583	23.86565	9.2438750	2.000000	4.000000
##	1082	1993-10-31	0.5543827	24.03935	8.7658060	12.000000	250.666667
##	1083	1993-11-01	0.5170070	24.21305	8.2877370	2.400000	7.280000
##	1084	1993-11-02	0.4796313	24.38674	7.8096680	2.000000	5.416667
##	1085	1993-11-03	0.4422557	24.56044	7.3315990	2.444444	2.444444
##	1086	1993-11-04	0.4048800	24.73414	6.8535300	4.222222	2.222222
##	1087	1993-11-05	0.4300937	24.59941	7.0183792	6.000000	2.000000
##	1088	1993-11-06	0.4553075	24.46468	7.1832283	6.000000	4.444444
##	1089	1993-11-07	0.4805213	24.32995	7.3480775	2.000000	2.250000
##	1090	1993-11-08	0.5057350	24.19522	7.5129267	2.000000	2.000000
##	1091	1993-11-09	0.5309488	24.06049	7.6777758	2.888889	4.444444
##	1092	1993-11-10	0.5561625	23.92576	7.8426250	6.166667	2.333333
##	1093	1993-11-11	0.4762292	24.23198	7.9285000	7.333333	7.000000
##	1094	1993-11-12	0.4416667	24.46900	7.7027843	24.500000	877.230769
##	1095	1993-11-13	0.4412197	24.44481	7.7617522	164.888889	3.555556
##	1096	1993-11-14	0.4407727	24.42063	7.8207201	4.000000	4.666667

##	1097	1993-11-15	0.4403257	24.39644	7.8796880	8.000000	2.166667
##	1098	1993-11-16	0.4398787	24.37226	7.9386559	10.000000	19.777778
##	1099	1993-11-17	0.4394317	24.34807	7.9976238	6.000000	10.888889
##	1100	1993-11-18	0.4353633	24.36616	7.9677074	2.000000	2.000000
##	1101	1993-11-19	0.4312950	24.38424	7.9377910	2.666667	5.111111
##	1102	1993-11-20	0.4272267	24.40233	7.9078747	16.333333	4.166667
##	1103	1993-11-21	0.4231583	24.42041	7.8779583	6.545455	112.060606
##	1104	1993-11-22	0.4197160	24.65221	7.7762800	28.423077	1213.769231
##	1105	1993-11-23	0.5135792	24.02755	7.9774167	15.363054	610.339161
##	1106	1993-11-24	0.4629385	24.21577	7.9445820	2.303030	6.909091
##	1107	1993-11-25	0.4122978	24.40400	7.9117473	3.151515	4.496212
##	1108	1993-11-26	0.4185921	24.27111	7.7067375	4.000000	2.083333
##	1109	1993-11-27	0.4248864	24.13822	7.5017278	74.000000	100.666667
##	1110	1993-11-28	0.4311807	24.00533	7.2967181	4.000000	3.250000
##	1111	1993-11-29	0.4374750	23.87245	7.0917083	8.166667	13.166667
##	1112	1993-11-30	0.4071588	24.26412	7.7582549	41.192308	448.653846
##	1113	1993-12-01	0.4298042	23.83694	7.1936250	20.666667	6.545455
##	1114	1993-12-02	1.2300000	23.89600	6.1600000	15.361111	4.272727
##	1115	1993-12-03	1.0626943	24.01709	6.4593465	10.055556	2.000000
##	1116	1993-12-04	0.8953885	24.13818	6.7586931	4.750000	7.833333
##	1117	1993-12-05	0.7280828	24.25927	7.0580396	10.250000	2.000000
##	1118	1993-12-06	0.5607770	24.38035	7.3573861	2.000000	2.000000
##	1119	1993-12-07	0.3934713	24.50144	7.6567327	6.333333	3.111111
##	1120	1993-12-08	0.4003461	24.41219	7.6938079	10.666667	4.222222
##	1121	1993-12-09	0.4072210	24.32293	7.7308831	10.608696	2.250000
##	1122	1993-12-10	0.4140958	24.23367	7.7679583	63.666667	195.833333
##	1123	1993-12-11	0.3754188	24.52170	7.6150312	18.187500	812.687500
##	1124	1993-12-12	0.3858000	24.43867	7.6079333	7.066667	127.200000
##	1125	1993-12-13	0.4468655	24.43566	7.9288276	46.896552	953.034483
##	1126	1993-12-14	0.7189916	24.47034	7.7911697	10.222222	8.666667
##	1127	1993-12-15	0.9911176	24.50501	7.6535118	4.000000	2.250000
##	1128	1993-12-16	1.2632436	24.53969	7.5158540	2.000000	2.083333
##	1129	1993-12-17	1.5353697	24.57437	7.3781961	43.111111	14.000000
##	1130	1993-12-18	1.8074957	24.58471	4.9187974	2.166667	2.666667
##	1131	1993-12-19	2.0796218	24.59504	2.4593987	26.833333	2.083333
##	1132	1993-12-20	2.3517478	24.60538	0.0000000	41.246855	190.475629
##	1133	1993-12-21	2.6109880	24.64546	7.0857314	55.660377	378.867925
##	1134	1993-12-22	3.3651542	24.60319	7.7145958	5.000000	25.250000
##	1135	1993-12-23	2.9234974	24.71686	7.1853669	14.333333	10.416667
##	1136	1993-12-24	2.4818406	24.83053	6.6561379	8.333333	8.750000
##	1137	1993-12-25	2.6741000	24.78975	6.8565614	2.333333	7.083333
##	1138	1993-12-26	2.8663594	24.74896	7.0569849	58.000000	29.555556
##	1139	1993-12-27	3.0586187	24.70818	7.2574084	49.805556	25.870370
##	1140	1993-12-28	3.2508781	24.66739	7.4578319	41.611111	22.185185
##	1141	1993-12-29	3.4431375	24.62661	7.6582554	33.416667	18.500000
##	1142	1993-12-30	2.9389255	24.78953	6.7645022	17.730769	61.538462
##	1143	1993-12-31	2.9916750	24.59386	7.3774221	41.636364	12.969697
##	1144	1994-01-01	3.0444246	24.75041	6.9168219	250.000000	40.000000
##	1145	1994-01-02	3.0971741	24.90696	6.4562216	126.333333	21.000000
##	1146	1994-01-03	3.1499236	25.06350	5.9956214	2.666667	2.000000
##	1147	1994-01-04	3.2026732	25.22005	5.5350212	12.000000	10.541667
##	1148	1994-01-05	3.2554227	25.11124	6.0040266	21.333333	19.083333
##	1149	1994-01-06	3.3081722	25.00242	6.4730320	20.666667	17.777778
##	1150	1994-01-07	3.3609218	24.89361	6.9420375	32.000000	8.000000

##	1151	1994-01-08	3.4136713	24.78479	7.4110429	8.583333	8.583333
##	1152	1994-01-09	3.4664208	24.67598	7.8800483	18.500000	2.333333
##	1153	1994-01-10	3.3428273	24.94494	7.0765030	6.083333	32.750000
##	1154	1994-01-11	3.2192337	25.21732	6.3072408	34.730769	586.115385
##	1155	1994-01-12	3.0956401	25.18621	6.4312269	22.363636	3.878788
##	1156	1994-01-13	2.9720466	25.15511	6.5552130	19.640152	4.897727
##	1157	1994-01-14	2.8484530	25.14776	6.6715763	16.916667	5.916667
##	1158	1994-01-15	2.7248594	25.14042	6.7879396	172.444444	51.111111
##	1159	1994-01-16	2.6012658	25.13307	6.9043030	3.461538	9.615385
##	1160	1994-01-17	2.4776723	25.12573	7.0206663	5.000000	5.416667
##	1161	1994-01-18	2.3540787	25.11839	7.1370296	2.000000	2.250000
##	1162	1994-01-19	2.2304851	25.11104	7.2533929	4.121212	10.969697
##	1163	1994-01-20	2.1068916	25.37577	6.0038929	22.083333	169.750000
##	1164	1994-01-21	1.9832980	25.78804	4.7017534	17.169811	345.396226
##	1165	1994-01-22	2.1173646	25.70396	4.6141912	2.250000	8.916667
##	1166	1994-01-23	2.2514311	25.61988	4.5266290	2.569444	9.125000
##	1167	1994-01-24	2.3854977	25.50355	4.9853251	2.888889	9.333333
##	1168	1994-01-25	2.5195643	25.38722	5.4440211	2.320000	3.680000
##	1169	1994-01-26	2.6536308	25.27090	5.9027172	2.000000	2.000000
##	1170	1994-01-27	2.7876974	25.15457	6.3614133	232.444444	1416.222222
##	1171	1994-01-28	2.9217639	25.03824	6.8201094	2.000000	6.000000
##	1172	1994-01-29	3.0558305	24.92192	7.2788055	2.000000	3.333333
##	1173	1994-01-30	3.1898971	25.21591	5.6101408	3.416667	8.000000
##	1174	1994-01-31	3.3239636	25.47394	5.1798498	20.384615	661.615385
##	1175	1994-02-01	3.4580302	25.48214	5.1165943	158.666667	253.555556
##	1176	1994-02-02	3.5920968	25.49034	5.0533389	9.000000	72.000000
##	1177	1994-02-03	3.7261633	25.49854	4.9900834	2.060606	2.545455
##	1178	1994-02-04	3.8602299	25.50674	4.9268279	6.363636	7.814394
##	1179	1994-02-05	3.9942965	25.40359	5.2511861	10.666667	13.083333
##	1180	1994-02-06	4.1283630	25.30045	5.5755443	2.444444	2.000000
##	1181	1994-02-07	4.2624296	25.19730	5.8999025	2.000000	2.250000
##	1182	1994-02-08	4.3964961	25.09415	6.2242607	2.000000	2.000000
##	1183	1994-02-09	4.5305627	24.99100	6.5486189	2.000000	3.555556
##	1184	1994-02-10	4.6646293	24.88785	6.8729771	4.166667	3.333333
##	1185	1994-02-11	4.7986958	25.10279	6.8961762	12.250000	31.916667
##	1186	1994-02-12	4.7491106	25.46306	5.6500989	84.461538	1710.500000
##	1187	1994-02-13	4.6995254	25.44177	5.7800904	7.111111	18.000000
##	1188	1994-02-14	4.6499402	25.42049	5.9100818	4.080000	14.080000
##	1189	1994-02-15	4.6003549	25.39921	6.0400733	15.498333	8.040000
##	1190	1994-02-16	4.5507697	25.33570	6.2176112	26.916667	2.000000
##	1191	1994-02-17	4.5011845	25.27219	6.3951491	4.666667	4.222222
##	1192	1994-02-18	4.4515992	25.20868	6.5726870	20.000000	100.000000
##	1193	1994-02-19	4.4020140	25.14517	6.7502250	2.000000	2.000000
##	1194	1994-02-20	4.3524288	25.08166	6.9277629	3.575758	13.272727
##	1195	1994-02-21	4.3028436	25.01815	7.1053008	2.000000	6.000000
##	1196	1994-02-22	4.2532583	24.95464	7.2828387	12.500000	10.500000
##	1197	1994-02-23	7.2718979	25.34558	6.7451398	27.692308	331.115385
##	1198	1994-02-24	10.2905375	24.70418	9.9423662	2.363636	2.787879
##	1199	1994-02-25	6.7068045	24.91738	8.3573803	4.333333	2.333333
##	1200	1994-02-26	3.1230714	25.13059	6.7723943	5.500000	18.166667
##	1201	1994-02-27	3.2416399	25.05586	6.9185705	6.666667	34.000000
##	1202	1994-02-28	3.3602083	24.98114	7.0647467	14.000000	50.000000
##	1203	1994-03-01	3.4787768	24.90642	7.2109229	4.166667	7.458333
##	1204	1994-03-02	3.5973452	24.83169	7.3570990	242.666667	29.333333

##	1205	1994-03-03	3.7159137	24.75697	7.5032752	2.083333	8.416667
##	1206	1994-03-04	3.8344821	24.68225	7.6494514	10.333333	5.583333
##	1207	1994-03-05	3.9530506	24.60752	7.7956276	2.666667	6.000000
##	1208	1994-03-06	4.0716190	24.53280	7.9418038	10.333333	18.833333
##	1209	1994-03-07	4.1901875	24.45808	8.0879800	2.363636	7.151515
##	1210	1994-03-08	3.9013833	24.69610	7.8564342	2.316498	6.101010
##	1211	1994-03-09	3.4552327	24.86780	7.6283573	2.269360	5.050505
##	1212	1994-03-10	3.4161050	24.88170	7.3887795	2.222222	4.000000
##	1213	1994-03-11	3.3769773	24.89559	7.1492017	4.000000	5.416667
##	1214	1994-03-12	3.3378497	24.90949	6.9096239	7.333333	2.444444
##	1215	1994-03-13	3.2987220	24.92338	6.6700461	8.833333	3.847222
##	1216	1994-03-14	2.9925565	24.83685	7.1012187	10.333333	5.250000
##	1217	1994-03-15	2.6863911	24.75032	7.5323913	2.000000	2.166667
##	1218	1994-03-16	2.3802256	24.66379	7.9635639	6.666667	16.222222
##	1219	1994-03-17	2.0740601	24.57726	8.3947365	2.000000	4.083333
##	1220	1994-03-18	1.7678946	24.49073	8.8259091	4.222222	2.666667
##	1221	1994-03-19	1.4617292	24.40420	9.2570817	2.166667	2.416667
##	1222	1994-03-20	1.6479463	24.89415	6.9633191	4.416667	10.208333
##	1223	1994-03-21	1.8341634	24.89452	6.9737284	6.666667	18.000000
##	1224	1994-03-22	2.0203806	24.89490	6.9841378	18.583333	2.083333
##	1225	1994-03-23	2.2065977	24.89528	6.9945471	11.291667	13.708333
##	1226	1994-03-24	2.3928148	24.82194	7.0636383	4.000000	25.333333
##	1227	1994-03-25	2.5790319	24.74861	7.1327295	6.500000	243.666667
##	1228	1994-03-26	2.7652491	24.67527	7.2018206	6.000000	2.000000
##	1229	1994-03-27	2.9514662	24.60194	7.2709118	2.000000	10.916667
##	1230	1994-03-28	3.1376833	24.52860	7.3400029	9.212121	41.636364
##	1231	1994-03-29	3.4182028	24.89319	6.8685830	29.614035	440.175439
##	1232	1994-03-30	3.6987222	25.11103	6.3355681	16.727273	518.690909
##	1233	1994-03-31	3.9792417	25.13286	6.1452410	5.111111	5.333333
##	1234	1994-04-01	4.2597611	25.15470	5.9549139	2.000000	10.250000
##	1235	1994-04-02	4.5402806	25.17654	5.7645869	2.083333	6.875000
##	1236	1994-04-03	4.8208000	25.03081	6.1680124	2.166667	3.500000
##	1237	1994-04-04	5.1013194	24.88508	6.5714380	4.333333	4.666667
##	1238	1994-04-05	5.3818389	24.73936	6.9748636	2.888889	9.555556
##	1239	1994-04-06	5.6623583	24.59363	7.3782892	2.000000	2.666667
##	1240	1994-04-07	1.8257458	24.87494	7.1496133	21.583333	28.666667
##	1241	1994-04-08	1.8596366	25.17820	6.4958837	30.076923	1083.115385
##	1242	1994-04-09	1.8935274	25.19926	6.3432328	8.500000	6.500000
##	1243	1994-04-10	1.9274182	25.22032	6.1905819	10.250000	2.000000
##	1244	1994-04-11	1.9613090	25.24139	6.0379310	4.444444	8.000000
##	1245	1994-04-12	1.9951998	25.26245	5.8852801	2.083333	5.333333
##	1246	1994-04-13	2.0290906	25.28352	5.7326292	2.000000	2.000000
##	1247	1994-04-14	2.0629814	25.30458	5.5799783	18.000000	7.000000
##	1248	1994-04-15	2.0968722	25.38397	5.4379717	34.000000	12.000000
##	1249	1994-04-16	2.1307630	25.46336	5.2959651	2.250000	4.916667
##	1250	1994-04-17	2.1646538	25.54274	5.1539585	49.576923	524.423077
##	1251	1994-04-18	2.9860417	25.33336	5.5837325	59.166667	164.500000
##	1252	1994-04-19	4.5063042	25.18432	6.3259117	5.000000	12.500000
##	1253	1994-04-20	4.1661140	25.28463	6.0043458	8.222222	4.000000
##	1254	1994-04-21	3.8259238	25.38495	5.6827799	2.583333	4.166667
##	1255	1994-04-22	3.4857337	25.48526	5.3612141	3.291667	3.541667
##	1256	1994-04-23	3.6080586	25.42610	5.6655470	4.000000	2.916667
##	1257	1994-04-24	3.7303836	25.36695	5.9698799	3.111111	4.444444
##	1258	1994-04-25	3.8527085	25.30779	6.2742129	2.166667	3.500000

##	1259	1994-04-26	3.9750334	25.24863	6.5785458	3.250000	7.416667
##	1260	1994-04-27	4.0973584	25.18948	6.8828787	2.250000	11.833333
##	1261	1994-04-28	4.2196833	25.13032	7.1872117	6.333333	4.750000
##	1262	1994-04-29	4.3698923	25.07031	7.1720812	6.000000	3.757576
##	1263	1994-04-30	4.5201013	25.31702	6.2839068	45.230769	273.700000
##	1264	1994-05-01	4.6703103	25.33222	6.1612013	72.727273	123.818182
##	1265	1994-05-02	4.8205193	25.34742	6.0384957	3.818182	3.151515
##	1266	1994-05-03	4.9707283	25.36262	5.9157902	19.835017	353.750000
##	1267	1994-05-04	5.1209373	25.37783	5.7930847	35.851852	390.114286
##	1268	1994-05-05	5.2711463	25.34460	6.8868948	888.101695	718.169492
##	1269	1994-05-06	5.4213553	25.22979	7.7111622	198.888889	119.555556
##	1270	1994-05-07	5.5715642	25.21151	8.0360596	2.000000	169.000000
##	1271	1994-05-08	5.7217732	25.19323	8.3609570	23.818182	39.393939
##	1272	1994-05-09	5.8719822	25.17494	8.6858544	5.333333	45.342857
##	1273	1994-05-10	5.2666253	25.21664	8.3817212	63.625000	54.250000
##	1274	1994-05-11	4.6612683	25.28857	8.1083034	10.055556	88.888889
##	1275	1994-05-12	4.5175240	25.31711	8.0350131	108.060606	78.121212
##	1276	1994-05-13	4.3737796	25.34565	7.9617228	5.333333	3.333333
##	1277	1994-05-14	4.2300353	25.37420	7.8884325	277.454545	282.454545
##	1278	1994-05-15	4.0862910	25.40274	7.8151422	170.949495	754.000000
##	1279	1994-05-16	3.9425466	25.43128	7.7418519	64.444444	11.777778
##	1280	1994-05-17	3.7988023	25.45982	7.6685616	35.555556	145.500000
##	1281	1994-05-18	3.6550580	25.48836	7.5952713	6.666667	13.454545
##	1282	1994-05-19	3.5113137	25.51691	7.5219810	488.545455	33.090909
##	1283	1994-05-20	3.3675693	25.54545	7.4486907	7.757576	59.560976
##	1284	1994-05-21	3.2238250	25.57399	7.3754004	5.083333	228.312500
##	1285	1994-05-22	5.6028676	25.92533	4.8787416	139.111111	1061.428571
##	1286	1994-05-23	7.9819103	25.79384	5.5531154	15.416667	22.666667
##	1287	1994-05-24	10.3609529	25.70183	7.4609583	7.777778	15.764706
##	1288	1994-05-25	12.7399956	25.60982	9.3688011	2.000000	4.962963
##	1289	1994-05-26	11.8853738	25.52976	8.0173006	38.437500	112.000000
##	1290	1994-05-27	11.0307521	25.51350	8.1908351	21.944444	438.666667
##	1291	1994-05-28	10.1761304	25.48815	8.2797559	12.699495	408.750000
##	1292	1994-05-29	9.3215086	25.46280	8.3686768	3.454545	2.181818
##	1293	1994-05-30	8.4668869	25.43745	8.4575976	74.909091	112.909091
##	1294	1994-05-31	7.6122652	25.41210	8.5465184	52.848485	39.750000
##	1295	1994-06-01	6.7576435	25.38674	8.6354392	30.787879	17.939394
##	1296	1994-06-02	5.9030217	25.36139	8.7243600	5.777778	6.444444
##	1297	1994-06-03	5.0484000	25.33604	8.8132808	3.259259	17.185185
##	1298	1994-06-04	4.5084600	25.66640	6.4259793	91.307692	308.076923
##	1299	1994-06-05	4.2114924	25.85643	5.2872535	153.904762	1011.320000
##	1300	1994-06-06	3.9145247	25.74964	6.0469610	9.894737	72.315789
##	1301	1994-06-07	3.6175571	25.68919	6.3331789	12.311005	19.750000
##	1302	1994-06-08	3.3205895	25.62875	6.6193968	14.727273	8.727273
##	1303	1994-06-09	3.0236219	25.56830	6.9056148	2.060606	2.969697
##	1304	1994-06-10	2.7266542	25.50785	7.1918327	11.111111	8.888889
##	1305	1994-06-11	2.4296866	25.44740	7.4780506	3.957447	20.085106
##	1306	1994-06-12	2.1327190	25.38696	7.7642685	5.200000	56.266667
##	1307	1994-06-13	1.8357514	25.41308	7.4927384	141.106383	696.297872
##	1308	1994-06-14	1.5387837	25.24285	8.0519364	336.228571	481.885714
##	1309	1994-06-15	1.2418161	24.58020	7.6117258	4.722222	22.722222
##	1310	1994-06-16	0.9448485	23.91755	7.1715152	6.227778	29.872222
##	1311	1994-06-17	1.1047081	24.28973	6.8992361	7.733333	37.022222
##	1312	1994-06-18	1.2645678	24.66192	6.6269570	264.727273	224.909091

##	1313	1994-06-19	1.4244274	25.03411	6.3546779	41.333333	58.666667
##	1314	1994-06-20	1.5842870	25.40630	6.0823988	5.722222	92.888889
##	1315	1994-06-21	1.7441467	25.77848	5.8101197	27.363636	256.545455
##	1316	1994-06-22	3.6596714	25.51554	7.2912500	7.461538	32.153846
##	1317	1994-06-23	5.5751961	25.77726	5.1481054	9.333333	134.952381
##	1318	1994-06-24	7.4907208	24.95150	8.4401108	3.259259	40.518519
##	1319	1994-06-25	6.9353928	25.11889	8.0948322	4.900000	3.400000
##	1320	1994-06-26	6.3800647	25.28628	7.7495536	5.111111	20.166667
##	1321	1994-06-27	5.8247366	25.45367	7.4042750	4.190476	11.238095
##	1322	1994-06-28	5.2694085	25.48226	7.5510762	11.392857	164.642857
##	1323	1994-06-29	4.7140804	25.51241	7.7561719	2.074074	3.037037
##	1324	1994-06-30	4.1587523	25.52180	7.4193834	2.000000	2.611111
##	1325	1994-07-01	3.6034243	25.53119	7.0825949	4.042553	22.127660
##	1326	1994-07-02	3.0480962	25.54059	6.7458065	9.111111	12.000000
##	1327	1994-07-03	2.4927681	25.54998	6.4090180	15.157895	135.052632
##	1328	1994-07-04	1.9374400	25.24668	7.1530693	44.055138	891.407268
##	1329	1994-07-05	2.2762010	25.59256	7.6376887	72.952381	1647.761905
##	1330	1994-07-06	2.6149619	24.81500	8.1843471	2.740741	7.407407
##	1331	1994-07-07	2.9537229	24.93294	8.0189210	3.111111	6.666667
##	1332	1994-07-08	3.2924838	25.05089	7.8534949	63.777778	367.666667
##	1333	1994-07-09	3.6312448	25.16884	7.6880688	28.909091	38.181818
##	1334	1994-07-10	3.9700057	25.28679	7.5226428	17.500000	89.944444
##	1335	1994-07-11	4.3087667	25.40473	7.3572167	13.861111	48.861111
##	1336	1994-07-12	5.1925892	25.39674	7.5182613	10.222222	7.777778
##	1337	1994-07-13	6.0764117	25.38875	7.6793059	20.181818	84.181818
##	1338	1994-07-14	6.9602342	25.38075	7.8403505	2.000000	2.055556
##	1339	1994-07-15	7.8440567	25.37276	8.0013951	2.222222	2.444444
##	1340	1994-07-16	8.7278792	25.36476	8.1624397	4.571429	44.095238
##	1341	1994-07-17	9.6117017	25.27592	8.6892836	2.785714	3.857143
##	1342	1994-07-18	10.4955242	25.27942	8.3872285	2.111111	2.111111
##	1343	1994-07-19	9.7544426	25.30849	8.0675436	2.055556	2.111111
##	1344	1994-07-20	9.0133609	25.33756	7.7478588	2.055556	4.055556
##	1345	1994-07-21	8.2722792	25.36664	7.4281739	8.666667	28.444444
##	1346	1994-07-22	7.5311975	25.39571	7.1084890	9.818182	7.636364
##	1347	1994-07-23	6.7901159	25.42478	6.7888042	17.473684	112.631579
##	1348	1994-07-24	6.0490342	25.20668	7.4731640	18.800000	407.371429
##	1349	1994-07-25	5.3079525	25.54452	6.1552293	52.952381	899.285714
##	1350	1994-07-26	4.5668708	24.84181	9.1078283	4.962963	15.703704
##	1351	1994-07-27	4.5041937	24.85003	9.0881759	2.000000	2.666667
##	1352	1994-07-28	4.4415165	24.85825	9.0685235	4.000000	5.818182
##	1353	1994-07-29	4.3788393	24.86648	9.0488711	2.000000	2.888889
##	1354	1994-07-30	4.3161622	24.87470	9.0292187	3.111111	34.166667
##	1355	1994-07-31	4.2534850	24.88292	9.0095663	3.500000	29.500000
##	1356	1994-08-01	4.1908078	24.95239	8.3855921	28.666667	69.644444
##	1357	1994-08-02	4.1281307	24.84656	8.7383145	15.481481	19.185185
##	1358	1994-08-03	4.0654535	24.88643	8.5452018	2.000000	12.000000
##	1359	1994-08-04	4.0027763	24.92630	8.3520890	3.444444	3.666667
##	1360	1994-08-05	3.9400992	24.96617	8.1589762	6.363636	6.909091
##	1361	1994-08-06	3.8774220	25.00605	7.9658634	2.166667	5.111111
##	1362	1994-08-07	3.8147448	25.04592	7.7727506	30.000000	12.444444
##	1363	1994-08-08	3.7520677	25.08579	7.5796378	4.000000	12.000000
##	1364	1994-08-09	3.6893905	25.12566	7.3865250	42.842105	495.157895
##	1365	1994-08-10	3.6267133	24.88090	9.0009307	4.846154	12.230769
##	1366	1994-08-11	3.6000820	25.31006	6.7392307	5.666667	420.761905

## 1367	1994-08-12	3.5734506	24.69775	10.3293479	3.777778	3.925926
## 1368	1994-08-13	3.5468192	24.75164	9.9479489	135.111111	3.555556
## 1369	1994-08-14	3.5201879	24.80553	9.5665500	60.909091	30.545455
## 1370	1994-08-15	3.4935565	24.85941	9.1851510	2.333333	6.444444
## 1371	1994-08-16	3.4669252	24.91330	8.8037520	13.777778	4.000000
## 1372	1994-08-17	3.4402938	24.96719	8.4223530	4.285714	2.000000
## 1373	1994-08-18	3.4136624	25.13634	8.8185031	17.357143	219.392857
## 1374	1994-08-19	3.3870311	25.05531	8.7829579	2.000000	2.000000
## 1375	1994-08-20	3.3603997	25.12335	8.1117525	5.111111	7.822222
## 1376	1994-08-21	3.3337683	25.19138	7.4405471	5.818182	13.090909
## 1377	1994-08-22	3.3071370	25.25942	6.7693417	2.888889	6.611111
## 1378	1994-08-23	3.2805056	25.32746	6.0981363	36.631579	234.526316
## 1379	1994-08-24	3.2538742	25.25613	6.8552433	3.485714	17.600000
## 1380	1994-08-25	3.2272429	25.54476	5.8030337	5.761905	375.142857
## 1381	1994-08-26	3.2006115	25.05747	8.6988871	2.000000	2.083333
## 1382	1994-08-27	3.1739802	25.07557	8.4931422	2.000000	11.636364
## 1383	1994-08-28	3.1473488	25.09366	8.2873972	5.288889	24.222222
## 1384	1994-08-29	3.1207174	25.11176	8.0816523	3.702128	51.191489
## 1385	1994-08-30	3.0940861	25.12985	7.8759074	7.777778	6.222222
## 1386	1994-08-31	3.0674547	25.14794	7.6701625	2.111111	4.000000
## 1387	1994-09-01	3.0408233	25.16604	7.4644176	3.724138	7.172414
## 1388	1994-09-02	3.0141920	25.30790	6.9037009	13.555556	66.044444
## 1389	1994-09-03	2.9875606	25.26102	7.0546188	3.142857	12.285714
## 1390	1994-09-04	3.2512415	25.27254	6.9346733	13.777778	203.555556
## 1391	1994-09-05	3.5149223	25.28407	6.8147279	16.000000	2.000000
## 1392	1994-09-06	3.7786032	25.29560	6.6947824	8.388889	68.944444
## 1393	1994-09-07	4.0422841	25.30713	6.5748369	2.363636	3.090909
## 1394	1994-09-08	4.3059649	25.31866	6.4548915	8.622222	15.688889
## 1395	1994-09-09	4.5696458	25.33018	6.3349460	7.263158	18.000000
## 1396	1994-09-10	4.8333267	25.26841	7.2740860	4.538462	5.769231
## 1397	1994-09-11	4.7652380	25.49129	5.6217510	35.619048	895.190476
## 1398	1994-09-12	4.6971494	25.00958	8.2793938	3.777778	3.333333
## 1399	1994-09-13	4.6290607	25.02334	8.2092189	10.222222	5.555556
## 1400	1994-09-14	4.5609721	25.03711	8.1390440	3.333333	3.944444
## 1401	1994-09-15	4.4928834	25.05087	8.0688691	5.454545	6.363636
## 1402	1994-09-16	4.4247948	25.06463	7.9986943	2.055556	2.166667
## 1403	1994-09-17	4.3567061	25.07840	7.9285194	2.466667	7.200000
## 1404	1994-09-18	4.2886175	25.04301	8.2033106	3.428571	21.857143
## 1405	1994-09-19	4.2205289	25.02492	8.1573321	2.111111	2.000000
## 1406	1994-09-20	4.1524402	25.11954	7.7652591	4.055556	11.055556
## 1407	1994-09-21	4.0843516	25.21416	7.3731861	5.500000	46.722222
## 1408	1994-09-22	4.0162629	25.30878	6.9811130	5.000000	44.000000
## 1409	1994-09-23	3.9481743	25.40340	6.5890400	2.526316	8.526316
## 1410	1994-09-24	3.8800856	25.09278	7.6944133	4.461538	8.461538
## 1411	1994-09-25	3.8119970	25.38562	6.4252195	19.725490	855.568627
## 1412	1994-09-26	3.7439083	24.79397	8.3278188	2.000000	6.296296
## 1413	1994-09-27	4.0580261	24.82322	8.2269196	2.333333	5.722222
## 1414	1994-09-28	4.3721439	24.85248	8.1260205	245.636364	83.272727
## 1415	1994-09-29	4.6862617	24.88174	8.0251213	20.888889	7.333333
## 1416	1994-09-30	5.0003795	24.91100	7.9242222	3.523810	17.619048
## 1417	1994-10-01	5.3144973	24.96085	7.8870855	14.755556	151.200000
## 1418	1994-10-02	5.6286152	24.98569	8.0191927	2.000000	5.555556
## 1419	1994-10-03	5.5502026	25.06322	7.6737220	10.000000	9.454545
## 1420	1994-10-04	5.4717901	25.14074	7.3282514	4.666667	12.133333

## 1421	1994-10-05	5.3933776	25.21827	6.9827807	2.611111	16.666667
## 1422	1994-10-06	5.3149651	25.29579	6.6373100	28.909091	22.363636
## 1423	1994-10-07	5.2365525	25.37332	6.2918393	2.210526	2.421053
## 1424	1994-10-08	5.1581400	25.22215	7.0163333	4.769231	21.384615
## 1425	1994-10-09	5.1023263	25.50194	5.7011177	87.190476	1746.047619
## 1426	1994-10-10	5.0465125	25.08632	7.5045404	3.259259	17.333333
## 1427	1994-10-11	5.1320441	25.09949	7.5892879	31.777778	35.777778
## 1428	1994-10-12	5.2175757	25.11266	7.6740355	3.837838	23.675676
## 1429	1994-10-13	5.3031073	25.12582	7.7587830	64.545455	15.272727
## 1430	1994-10-14	5.3886389	25.13899	7.8435305	22.468085	63.787234
## 1431	1994-10-15	5.4741705	25.15216	7.9282781	2.444444	13.333333
## 1432	1994-10-16	5.5597021	25.16532	8.0130256	21.555556	6.666667
## 1433	1994-10-17	5.6452338	25.17849	8.0977731	4.571429	26.571429
## 1434	1994-10-18	5.7307654	25.13632	8.0065853	35.107143	401.892857
## 1435	1994-10-19	5.8162970	25.14939	8.2927003	2.111111	7.777778
## 1436	1994-10-20	5.7920457	25.27642	7.5501117	2.333333	8.333333
## 1437	1994-10-21	5.7677945	25.40344	6.8075231	4.809524	9.095238
## 1438	1994-10-22	5.7435432	25.55306	6.0929051	55.733333	591.688889
## 1439	1994-10-23	5.7192920	25.22272	8.0506929	6.148148	19.259259
## 1440	1994-10-24	5.6950407	25.21392	8.0201634	3.866667	3.511111
## 1441	1994-10-25	5.6707895	25.20512	7.9896338	171.636364	33.090909
## 1442	1994-10-26	5.6465383	25.19633	7.9591043	5.272727	10.727273
## 1443	1994-10-27	5.6222870	25.18753	7.9285747	2.388889	5.611111
## 1444	1994-10-28	5.5980358	25.17873	7.8980452	2.222222	3.111111
## 1445	1994-10-29	5.5737845	25.16231	7.8496557	11.138462	128.184615
## 1446	1994-10-30	5.5495333	25.19443	7.7877918	7.142857	20.000000
## 1447	1994-10-31	5.5252820	25.49758	6.1724208	4.682540	12.250000
## 1448	1994-11-01	5.5010308	25.48309	6.2488133	2.222222	4.500000
## 1449	1994-11-02	5.4767795	25.46861	6.3252057	8.727273	19.272727
## 1450	1994-11-03	5.4525283	25.45412	6.4015982	9.555556	40.611111
## 1451	1994-11-04	5.4282771	25.43963	6.4779907	6.382979	13.106383
## 1452	1994-11-05	5.4040258	25.42514	6.5543831	40.888889	107.555556
## 1453	1994-11-06	5.3797746	25.41065	6.6307756	41.000000	79.000000
## 1454	1994-11-07	5.3555233	25.39616	6.7071681	7.952381	14.095238
## 1455	1994-11-08	5.3312721	25.48661	6.3581781	31.155556	167.733333
## 1456	1994-11-09	5.3070208	25.12791	7.8837308	10.666667	71.185185
## 1457	1994-11-10	5.2614525	25.19512	8.0487459	3.055556	3.722222
## 1458	1994-11-11	5.2158842	25.26233	8.2137609	5.241379	7.448276
## 1459	1994-11-12	5.1703158	25.37398	7.2248658	207.866667	380.311111
## 1460	1994-11-13	5.1247475	25.27871	7.9612955	15.600000	136.000000
## 1461	1994-11-14	5.0791792	25.41191	7.0180007	2.500000	5.444444
## 1462	1994-11-15	5.0336108	25.54511	6.0747060	6.292553	9.828605
## 1463	1994-11-16	4.9880425	25.43690	6.4638047	10.085106	14.212766
## 1464	1994-11-17	4.9424742	25.32869	6.8529033	4.967742	5.548387
## 1465	1994-11-18	4.8969058	25.60256	5.6404936	88.285714	1024.035714
## 1466	1994-11-19	4.8513375	25.02425	7.9340500	6.296296	45.481481
## 1467	1994-11-20	4.7597068	25.02590	7.9745114	40.000000	150.000000
## 1468	1994-11-21	4.6680760	25.02756	8.0149728	24.888889	8.666667
## 1469	1994-11-22	4.5764453	25.02922	8.0554341	5813.636364	4695.454545
## 1470	1994-11-23	4.4848145	25.03087	8.0958955	1006.250000	542.500000
## 1471	1994-11-24	4.3931838	25.03253	8.1363569	191.666667	76.388889
## 1472	1994-11-25	4.3015530	25.03419	8.1768183	516.833333	692.285354
## 1473	1994-11-26	4.2099223	25.03584	8.2172796	842.000000	1308.181818
## 1474	1994-11-27	4.1182915	25.03750	8.2577410	737.333333	1176.000000

##	1475	1994-11-28	4.0266608	25.03916	8.2982024	11.944444	40.777778
##	1476	1994-11-29	3.9350300	25.04081	8.3386638	142.222222	71.222222
##	1477	1994-11-30	3.8433993	25.04247	8.3791252	101.818182	78.363636
##	1478	1994-12-01	3.7517686	25.00182	8.5066838	130.424242	73.060606
##	1479	1994-12-02	3.6601378	25.18093	8.0179261	159.030303	67.757576
##	1480	1994-12-03	3.5685071	25.67289	5.7380022	85.570707	49.628788
##	1481	1994-12-04	3.4768763	25.63628	5.8483545	12.111111	31.500000
##	1482	1994-12-05	3.3852456	25.59967	5.9587069	967.090909	2833.272727
##	1483	1994-12-06	3.2936148	25.56306	6.0690593	614.333333	2885.000000
##	1484	1994-12-07	3.2019841	25.52645	6.1794116	5.777778	3.777778
##	1485	1994-12-08	3.1103533	25.48984	6.2897640	13.161290	37.161290
##	1486	1994-12-09	2.5972911	25.79730	5.0872251	22.977778	297.288889
##	1487	1994-12-10	3.3304072	25.05303	7.8484213	2.666667	6.000000
##	1488	1994-12-11	4.0635233	25.07531	7.8838370	6.000000	34.000000
##	1489	1994-12-12	4.7966394	25.09758	7.9192528	41.000000	67.000000
##	1490	1994-12-13	5.5297556	25.11986	7.9546686	13.388889	86.277778
##	1491	1994-12-14	6.2628717	25.14213	7.9900843	24.545455	25.454545
##	1492	1994-12-15	6.9959878	25.16441	8.0255001	200.000000	60.000000
##	1493	1994-12-16	7.7291039	25.18669	8.0609159	3.333333	5.500000
##	1494	1994-12-17	8.4622200	25.20896	8.0963317	22.444444	6.666667
##	1495	1994-12-18	8.9659770	25.26411	7.5525864	98.821429	169.535714
##	1496	1994-12-19	9.4697341	25.52614	6.3242642	3.142857	5.238095
##	1497	1994-12-20	9.9734911	25.83738	4.8689561	3.265873	19.007937
##	1498	1994-12-21	10.4772481	25.81200	5.1961877	3.388889	32.777778
##	1499	1994-12-22	10.9810052	25.78662	5.5234193	10.893617	26.723404
##	1500	1994-12-23	11.4847622	25.76124	5.8506508	40.000000	26.000000
##	1501	1994-12-24	11.9885193	25.73586	6.1778824	12.451613	279.483871
##	1502	1994-12-25	12.4922763	25.84801	4.9706430	9.165200	149.863148
##	1503	1994-12-26	12.9960333	25.19712	9.0058163	5.878788	20.242424
##	1504	1994-12-27	12.5614391	25.20482	8.5248482	2.000000	2.000000
##	1505	1994-12-28	12.1268448	25.21253	8.0438801	2.111111	10.388889
##	1506	1994-12-29	11.6922505	25.22023	7.5629121	2.000000	3.444444
##	1507	1994-12-30	11.2576562	25.22794	7.0819440	35.454545	26.000000
##	1508	1994-12-31	10.8230620	25.23564	6.6009759	40.000000	58.000000
##	1509	1995-01-01	10.3884677	25.24335	6.1200079	11.288889	320.844444
##	1510	1995-01-02	9.9538734	25.23142	6.4926585	4.068966	4.896552
##	1511	1995-01-03	9.5192791	25.25422	5.9333681	2.333333	2.266667
##	1512	1995-01-04	9.0846848	25.43613	6.7504618	6.888889	14.244444
##	1513	1995-01-05	9.0846848	25.61368	5.5881975	11.444444	26.222222
##	1514	1995-01-06	9.0846848	25.79123	4.4259332	7.090909	11.090909
##	1515	1995-01-07	9.0846848	25.77708	4.8348534	2.577778	21.688889
##	1516	1995-01-08	9.0846848	25.76293	5.2437735	2.645161	5.548387
##	1517	1995-01-09	9.0846848	25.84509	4.8149919	14.892857	207.714286
##	1518	1995-01-10	9.0846848	25.56779	7.0849279	2.518519	2.888889
##	1519	1995-01-11	9.0846848	25.55133	7.0431197	2.444444	5.333333
##	1520	1995-01-12	9.0846848	25.53487	7.0013114	30.340426	173.063830
##	1521	1995-01-13	9.0846848	25.51842	6.9595031	133.000000	312.000000
##	1522	1995-01-14	9.0846848	25.50196	6.9176949	8.222222	18.222222
##	1523	1995-01-15	9.0846848	25.48550	6.8758866	6.936170	11.404255
##	1524	1995-01-16	9.0846848	25.46904	6.8340783	2.500000	3.333333
##	1525	1995-01-17	9.0846848	25.45259	6.7922701	6.888889	7.777778
##	1526	1995-01-18	9.0846848	25.43613	6.7504618	2.000000	4.888889
##	1527	1995-01-19	8.9938543	25.35828	6.8991260	11.642857	98.785714
##	1528	1995-01-20	8.9030237	25.40862	6.7309025	2.476190	3.238095

##	1529	1995-01-21	8.8121931	25.83448	4.8334305	2.960317	2.896825
##	1530	1995-01-22	8.7213626	25.63364	5.5405133	3.444444	2.555556
##	1531	1995-01-23	8.6305320	25.43281	6.2475961	3.600000	16.050000
##	1532	1995-01-24	8.5397014	25.69458	5.2633891	28.607143	743.107143
##	1533	1995-01-25	8.4488708	25.04280	8.4871433	2.000000	2.740741
##	1534	1995-01-26	8.2423745	25.04751	8.3440204	69.100000	93.800000
##	1535	1995-01-27	8.0358781	25.05221	8.2008975	2.000000	3.055556
##	1536	1995-01-28	7.8293818	25.05692	8.0577746	7.636364	11.272727
##	1537	1995-01-29	7.6228854	25.06163	7.9146517	4.222222	9.111111
##	1538	1995-01-30	7.4163890	25.06633	7.7715288	2.000000	2.277778
##	1539	1995-01-31	7.2098927	25.07104	7.6284059	2.000000	8.000000
##	1540	1995-02-01	7.0033963	25.07575	7.4852830	35.172414	11.310345
##	1541	1995-02-02	6.7969000	24.85794	7.8787881	5.703704	29.925926
##	1542	1995-02-03	6.5904036	24.82943	7.5639400	2.000000	3.714286
##	1543	1995-02-04	6.3839072	25.08348	6.6077729	2.000000	2.666667
##	1544	1995-02-05	6.1774109	25.33753	5.6516058	78.321429	662.928571
##	1545	1995-02-06	5.9709145	24.95399	6.6140394	37.225806	339.096774
##	1546	1995-02-07	5.7644182	24.53445	6.4556348	2.000000	2.000000
##	1547	1995-02-08	5.5579218	24.73807	6.2972303	4.000000	5.777778
##	1548	1995-02-09	5.3514254	24.94169	6.1388257	13.090909	16.363636
##	1549	1995-02-10	5.1449291	25.14531	5.9804212	27.111111	319.111111
##	1550	1995-02-11	4.9384327	25.34892	5.8220166	2.000000	2.000000
##	1551	1995-02-12	4.7319364	25.29693	5.9430868	2.468085	4.680851
##	1552	1995-02-13	4.5254400	25.24494	6.0641570	4.166667	4.277778
##	1553	1995-02-14	5.5290285	25.10558	6.4566689	20.444444	9.111111
##	1554	1995-02-15	6.5326170	24.96622	6.8491808	2.055556	2.333333
##	1555	1995-02-16	7.5362055	24.82686	7.2416927	56.727273	535.454545
##	1556	1995-02-17	8.5397939	24.68750	7.6342045	3.185185	2.518519
##	1557	1995-02-18	6.6741269	24.51069	7.2319902	11.535714	48.428571
##	1558	1995-02-19	6.7382046	24.56035	6.9079387	2.000000	2.000000
##	1559	1995-02-20	6.8022822	24.48160	6.7865829	2.111111	5.777778
##	1560	1995-02-21	6.8663599	24.40284	6.6652271	18.500000	95.600000
##	1561	1995-02-22	6.9304375	24.32408	6.5438713	2.444444	6.000000
##	1562	1995-02-23	3.8501226	24.80383	6.4225155	3.225806	21.935484
##	1563	1995-02-24	3.9483123	25.28946	5.2191891	53.377778	765.200000
##	1564	1995-02-25	4.0465019	24.98819	5.2804075	2.055556	4.555556
##	1565	1995-02-26	4.1446916	24.68692	5.3416259	6.181818	3.818182
##	1566	1995-02-27	4.2428813	24.38564	5.4028444	2.000000	2.222222
##	1567	1995-02-28	4.3410710	24.08437	5.4640628	2.388889	4.972222
##	1568	1995-03-01	4.4392606	24.26161	5.7658371	2.777778	7.722222
##	1569	1995-03-02	4.5374503	24.43885	6.0676114	4.909091	6.727273
##	1570	1995-03-03	4.6356400	24.61609	6.3693857	12.177778	50.088889
##	1571	1995-03-04	4.7338297	24.79333	6.6711600	2.000000	6.000000
##	1572	1995-03-05	4.8320194	24.97057	6.9729344	39.875000	19.937500
##	1573	1995-03-06	4.9302090	24.77238	7.2747087	17.155556	318.133333
##	1574	1995-03-07	5.0283987	24.72854	7.1060683	14.000000	62.111111
##	1575	1995-03-08	5.1265884	24.84551	6.9374279	3.777778	2.222222
##	1576	1995-03-09	5.2247781	24.96248	6.7687875	2.000000	2.111111
##	1577	1995-03-10	5.3229677	25.07945	6.6001471	3.806452	52.451613
##	1578	1995-03-11	5.2611964	25.25367	7.4962856	13.714286	381.607143
##	1579	1995-03-12	5.1994250	24.51420	8.3924242	2.000000	2.888889
##	1580	1995-03-13	5.0515272	24.61446	8.2952468	2.333333	7.944444
##	1581	1995-03-14	4.9036293	24.71473	8.1980694	58.888889	6.888889
##	1582	1995-03-15	4.7557315	24.81500	8.1008920	7.243243	24.756757

##	1583	1995-03-16	4.6078336	24.91526	8.0037147	26.000000	177.636364
##	1584	1995-03-17	4.4599358	25.01553	7.9065373	5.111111	6.222222
##	1585	1995-03-18	4.3120380	25.11580	7.8093599	10.737374	5.383838
##	1586	1995-03-19	4.1641401	24.89987	7.7121825	16.363636	4.545455
##	1587	1995-03-20	4.0162423	24.68395	7.6150052	7.277778	11.833333
##	1588	1995-03-21	3.8683444	24.46802	7.5178278	1343.555556	33.111111
##	1589	1995-03-22	4.5243117	24.34115	8.1617003	39.396226	771.283019
##	1590	1995-03-23	5.9892718	24.28404	7.5580564	2.333333	3.066667
##	1591	1995-03-24	5.6533359	25.26590	7.7891915	2.474359	6.482051
##	1592	1995-03-25	5.3174000	24.23263	8.0203267	2.615385	9.897436
##	1593	1995-03-26	5.0342133	24.50442	7.5891609	14.700000	42.100000
##	1594	1995-03-27	4.7510267	24.77620	7.1579951	14.324324	74.891892
##	1595	1995-03-28	4.4678400	25.04798	6.7268294	4.516129	10.258065
##	1596	1995-03-29	4.1846533	25.33931	7.4348666	211.964286	1025.428571
##	1597	1995-03-30	3.9014667	24.65720	8.1429038	10.333333	32.055556
##	1598	1995-03-31	4.2820102	24.65933	8.0903151	6.297872	17.063830
##	1599	1995-04-01	4.6625538	24.66147	8.0377264	28.222222	41.333333
##	1600	1995-04-02	5.0430973	24.66360	7.9851378	2.722222	10.388889
##	1601	1995-04-03	5.4236409	24.66573	7.9325491	263.818182	508.545455
##	1602	1995-04-04	5.8041845	24.66787	7.8799605	10.000000	38.000000
##	1603	1995-04-05	6.1847280	24.67000	7.8273718	3.111111	6.222222
##	1604	1995-04-06	6.5652716	24.67213	7.7747832	5.500000	25.555556
##	1605	1995-04-07	6.9458152	24.67427	7.7221945	2.444444	13.333333
##	1606	1995-04-08	6.5038326	24.58614	7.5397556	8.642857	64.500000
##	1607	1995-04-09	6.0618500	24.89044	7.3573167	16.095238	193.047619
##	1608	1995-04-10	4.2479000	24.55363	7.1748778	3.277778	34.111111
##	1609	1995-04-11	2.4339500	24.21681	6.9924389	487.234043	54.425532
##	1610	1995-04-12	0.6200000	23.88000	6.8100000	244.839243	28.323877
##	1611	1995-04-13	1.5848250	24.56756	7.1375852	2.444444	2.222222
##	1612	1995-04-14	2.5496500	25.25512	7.4651704	3.419355	9.870968
##	1613	1995-04-15	3.5144750	25.44774	7.7927556	250.500000	334.928571
##	1614	1995-04-16	4.4793000	24.99288	8.1203408	2.000000	2.370370
##	1615	1995-04-17	3.9481265	25.21743	7.0190960	2.611111	7.944444
##	1616	1995-04-18	3.4169529	25.44197	5.9178512	31.454545	16.181818
##	1617	1995-04-19	3.9158149	25.37040	6.1994459	3.888889	30.388889
##	1618	1995-04-20	4.4146768	25.29883	6.4810407	10.444444	7.111111
##	1619	1995-04-21	4.9135387	25.22726	6.7626355	6.645161	23.870968
##	1620	1995-04-22	4.3572841	25.35443	6.1861349	79.928571	656.500000
##	1621	1995-04-23	4.5724083	25.02482	7.2912225	6.074074	6.888889
##	1622	1995-04-24	8.0498773	25.15172	7.3210066	4.500000	108.666667
##	1623	1995-04-25	7.9485500	25.11187	7.3441137	4.016667	101.533333
##	1624	1995-04-26	7.9466119	25.10275	7.4269525	3.533333	94.400000
##	1625	1995-04-27	7.9446737	25.19735	7.5097913	4.055556	18.944444
##	1626	1995-04-28	7.9427356	25.29194	7.5926301	4.500000	30.222222
##	1627	1995-04-29	7.9407975	25.38654	7.6754688	4.444444	6.222222
##	1628	1995-04-30	7.9388593	25.48113	7.7583076	32.000000	430.545455
##	1629	1995-05-01	7.9369212	25.57572	7.8411464	17.111111	217.467172
##	1630	1995-05-02	7.9349831	25.34067	7.9239852	2.222222	4.388889
##	1631	1995-05-03	7.9330449	25.10561	8.0068239	5.052632	4.052632
##	1632	1995-05-04	7.9311068	25.00813	7.9289693	3.388889	3.055556
##	1633	1995-05-05	7.1764512	24.90811	7.5982118	2.933333	3.933333
##	1634	1995-05-06	6.4217956	24.96817	7.2674543	3.388889	5.666667
##	1635	1995-05-07	5.6671400	25.02824	6.9366968	8.451613	14.451613
##	1636	1995-05-08	4.9124844	25.19683	6.6059393	13.077658	16.707288

##	1637	1995-05-09	3.7434375	24.94779	7.5647333	17.703704	18.962963
##	1638	1995-05-10	4.6333694	25.16390	7.6096273	347.090909	2507.090909
##	1639	1995-05-11	5.5233014	25.38000	7.6545212	28.808511	128.255319
##	1640	1995-05-12	6.4132333	25.59611	7.6994151	38.978723	164.680851
##	1641	1995-05-13	7.3031653	25.54920	7.7443091	49.148936	201.106383
##	1642	1995-05-14	8.1930972	25.50229	7.7892030	60.400000	1970.000000
##	1643	1995-05-15	9.0830291	25.45539	7.8340969	2.000000	6.000000
##	1644	1995-05-16	9.9729611	25.40848	7.8789909	81.611111	94.333333
##	1645	1995-05-17	10.8628930	25.36157	7.9238848	482.727273	1731.090909
##	1646	1995-05-18	11.7528249	25.31467	7.9687788	1922.000000	3100.800000
##	1647	1995-05-19	12.6427569	25.26776	8.0136727	2.000000	6.222222
##	1648	1995-05-20	13.5326888	25.22085	8.0585666	3.833333	5.166667
##	1649	1995-05-21	14.4226208	25.17395	8.1034606	16.044444	3.644444
##	1650	1995-05-22	9.5592333	25.09894	7.8971050	23.000000	7.384615
##	1651	1995-05-23	8.6907630	25.22652	7.8696809	4.857143	3.047619
##	1652	1995-05-24	7.8222927	25.60051	7.7488286	2.000000	2.000000
##	1653	1995-05-25	6.9538224	25.54960	7.6279763	4.222222	7.000000
##	1654	1995-05-26	6.0853522	25.49869	7.5071240	5404.545455	9363.636364
##	1655	1995-05-27	5.2168819	25.44779	7.3862717	4721.428571	4550.000000
##	1656	1995-05-28	4.3484116	25.39688	7.2654194	29.688889	17.022222
##	1657	1995-05-29	3.4799413	25.34597	7.1445671	39.000000	122.000000
##	1658	1995-05-30	2.6114710	25.29506	7.0237148	75.809524	383.761905
##	1659	1995-05-31	2.5100295	25.53357	6.0804077	30.166667	261.666667
##	1660	1995-06-01	4.2868125	25.20181	7.5002729	6.962963	10.296296
##	1661	1995-06-02	4.6057826	25.18431	7.5590076	2528.481481	1515.564815
##	1662	1995-06-03	4.9247527	25.16681	7.6177423	5050.000000	3020.833333
##	1663	1995-06-04	5.2437227	25.14931	7.6764770	210.000000	74.388889
##	1664	1995-06-05	5.5626928	25.13181	7.7352117	17.555556	5.555556
##	1665	1995-06-06	5.8816629	25.11431	7.7939464	190.000000	262.000000
##	1666	1995-06-07	6.2006330	25.09680	7.8526811	24.044444	349.466667
##	1667	1995-06-08	6.5196030	24.93507	7.9114158	2383.000000	2372.230769
##	1668	1995-06-09	6.5599455	24.97352	7.7232488	77.055556	101.111111
##	1669	1995-06-10	6.6002879	25.01198	7.5350818	20.086957	6.608696
##	1670	1995-06-11	5.4992226	25.23664	6.7099906	31.636364	32.909091
##	1671	1995-06-12	4.3981573	25.46131	5.8848994	2400.000000	9600.000000
##	1672	1995-06-13	3.2970921	25.68598	5.0598081	1202.833333	4806.000000
##	1673	1995-06-14	4.0988990	25.61543	5.2793937	5.666667	12.000000
##	1674	1995-06-15	4.9007060	25.54487	5.4989793	4.222222	3.111111
##	1675	1995-06-16	5.7025129	25.47432	5.7185648	11.612903	27.870968
##	1676	1995-06-17	7.4113815	25.68204	4.8683050	43.357143	565.250000
##	1677	1995-06-18	9.1202500	25.11575	7.2499179	14.733333	407.466667
##	1678	1995-06-19	9.3028821	25.24044	6.7713573	44.363636	613.818182
##	1679	1995-06-20	9.4855141	25.36514	6.2927966	4.166667	9.944444
##	1680	1995-06-21	9.6681462	25.48983	5.8142360	14.444444	46.000000
##	1681	1995-06-22	9.8507783	25.61453	5.3356753	47.224490	165.959184
##	1682	1995-06-23	10.0334104	25.73923	4.8571147	24.778912	84.035147
##	1683	1995-06-24	10.2160424	25.25963	7.0364597	2.333333	2.111111
##	1684	1995-06-25	10.2476617	25.41103	6.8163838	668.000000	694.062500
##	1685	1995-06-26	10.2792811	25.35718	6.5963079	167.125000	459.208333
##	1686	1995-06-27	10.3109004	25.55551	5.7709727	14.055556	36.944444
##	1687	1995-06-28	10.3425197	25.75383	4.9456374	34.967742	127.741935
##	1688	1995-06-29	10.3741390	26.03695	5.6532239	81.630769	667.169231
##	1689	1995-06-30	10.4057583	25.62177	6.3608104	6.962963	11.333333
##	1690	1995-07-01	10.2517791	25.57901	6.4286697	34.166667	14.666667

##	1691	1995-07-02	10.0977999	25.53624	6.4965290	2.000000	2.000000
##	1692	1995-07-03	9.9438206	25.49348	6.5643883	5.818182	107.454545
##	1693	1995-07-04	9.7898414	25.45071	6.6322476	20.000000	84.000000
##	1694	1995-07-05	9.6358622	25.40795	6.7001069	2.611111	10.944444
##	1695	1995-07-06	9.4818829	25.36518	6.7679662	7.454545	6.909091
##	1696	1995-07-07	9.3279037	25.32242	6.8358256	4.000000	4.222222
##	1697	1995-07-08	9.1739245	25.27965	6.9036849	5.277778	37.833333
##	1698	1995-07-09	9.0199452	25.23689	6.9715442	31.818182	16.545455
##	1699	1995-07-10	8.8659660	25.19412	7.0394035	4.888889	12.666667
##	1700	1995-07-11	8.7119868	25.15136	7.1072628	2.000000	7.944444
##	1701	1995-07-12	8.5580075	25.10859	7.1751221	8.488889	152.666667
##	1702	1995-07-13	8.7783545	25.18898	7.0167991	12.689655	7.310345
##	1703	1995-07-14	7.1903438	25.26353	6.8641203	2.095238	2.000000
##	1704	1995-07-15	6.5930152	25.27931	6.5886297	2.000000	2.444444
##	1705	1995-07-16	5.9956866	25.29508	6.3131390	2.444444	4.444444
##	1706	1995-07-17	5.3983581	25.31085	6.0376484	10.000000	36.258065
##	1707	1995-07-18	4.8684364	25.56157	5.4061150	25.785714	446.964286
##	1708	1995-07-19	4.6687542	25.05598	8.0041779	2.370370	4.296296
##	1709	1995-07-20	5.7096391	25.61416	5.4998008	9.518519	5.703704
##	1710	1995-07-21	6.7505240	25.53046	5.9004423	16.666667	7.111111
##	1711	1995-07-22	7.7914089	25.44676	6.3010838	4.000000	5.531915
##	1712	1995-07-23	8.8322938	25.36306	6.7017252	6.277778	372.888889
##	1713	1995-07-24	9.8731787	25.27936	7.1023667	3.000000	4.200000
##	1714	1995-07-25	10.9140636	25.19565	7.5030082	2.555556	3.888889
##	1715	1995-07-26	6.6314970	25.24094	7.0558076	5.312500	4.437500
##	1716	1995-07-27	6.2930518	25.14201	6.8712927	4.400000	22.977778
##	1717	1995-07-28	5.9546066	25.14671	6.6867778	12.611111	53.055556
##	1718	1995-07-29	5.6161614	25.15140	6.5022630	2.133333	3.688889
##	1719	1995-07-30	5.2777162	25.15610	6.3177481	4.545455	31.454545
##	1720	1995-07-31	4.9392710	25.16079	6.1332332	19.870968	104.516129
##	1721	1995-08-01	6.6386626	24.75680	7.0608416	7.000000	4.600000
##	1722	1995-08-02	8.3380542	24.35280	7.9884500	3.111111	6.370370
##	1723	1995-08-03	4.1667214	25.40696	5.6330283	23.511111	941.466667
##	1724	1995-08-04	3.4835485	25.48441	5.4598658	15.505556	472.011111
##	1725	1995-08-05	3.7655154	25.50210	5.4876805	7.500000	2.555556
##	1726	1995-08-06	4.0474823	25.51979	5.5154952	16.000000	48.363636
##	1727	1995-08-07	4.3294492	25.53747	5.5433098	2.000000	2.444444
##	1728	1995-08-08	4.6114161	25.55516	5.5711245	114.727273	199.818182
##	1729	1995-08-09	4.8933830	25.57285	5.5989392	2.666667	3.777778
##	1730	1995-08-10	5.1753499	25.59054	5.6267538	2.500000	5.277778
##	1731	1995-08-11	5.4573168	25.60822	5.6545685	10.696809	6.872931
##	1732	1995-08-12	6.3369962	25.51829	6.0332373	18.893617	8.468085
##	1733	1995-08-13	7.2166755	25.42836	6.4119061	4.444444	9.777778
##	1734	1995-08-14	8.0963548	25.33843	6.7905748	5.741935	27.354839
##	1735	1995-08-15	5.1422511	25.55815	5.6331520	11.071429	399.678571
##	1736	1995-08-16	26.7030333	24.76613	9.5748733	2.666667	7.037037
##	1737	1995-08-17	24.6262576	24.80026	9.1504701	34.000000	117.555556
##	1738	1995-08-18	22.5494818	24.83438	8.7260669	8.000000	2.000000
##	1739	1995-08-19	20.4727061	24.86851	8.3016636	2.111111	2.444444
##	1740	1995-08-20	14.3479195	24.75980	7.9122556	11.861111	169.888889
##	1741	1995-08-21	19.1238705	24.77453	7.8031059	21.611111	337.333333
##	1742	1995-08-22	17.0738092	24.81874	7.6650405	2.777778	2.277778
##	1743	1995-08-23	15.0237480	24.86295	7.5269751	6.444444	5.777778
##	1744	1995-08-24	12.9736867	24.90715	7.3889096	12.833333	90.277778

##	1745	1995-08-25	10.9236255	24.95136	7.2508442	18.545455	6.909091
##	1746	1995-08-26	8.8735643	24.99557	7.1127788	2.444444	5.611111
##	1747	1995-08-27	6.8235030	25.03977	6.9747133	3.777778	2.296296
##	1748	1995-08-28	6.4529364	25.08631	6.9702607	12.000000	31.659574
##	1749	1995-08-29	7.2780952	24.98649	7.1589810	4.800000	31.266667
##	1750	1995-08-30	6.8780233	25.07235	6.8387675	2.833333	6.166667
##	1751	1995-08-31	6.4779514	25.15820	6.5185540	3.722222	2.444444
##	1752	1995-09-01	6.0778795	25.24406	6.1983406	2.700000	3.800000
##	1753	1995-09-02	5.6778075	25.32991	5.8781271	3.350000	18.029032
##	1754	1995-09-03	5.5293459	24.92148	6.4258465	4.000000	32.258065
##	1755	1995-09-04	8.0329875	24.23176	7.1874279	28.157895	18.157895
##	1756	1995-09-05	5.0581244	25.34542	5.9733002	28.555556	336.555556
##	1757	1995-09-06	5.7126399	25.27754	6.2366591	2.000000	2.000000
##	1758	1995-09-07	6.3671554	25.20967	6.5000179	2.545455	4.727273
##	1759	1995-09-08	7.0216708	25.14180	6.7633767	11.444444	5.166667
##	1760	1995-09-09	7.6761863	25.07393	7.0267355	19.777778	17.555556
##	1761	1995-09-10	8.3307018	25.00606	7.2900944	2.000000	6.000000
##	1762	1995-09-11	8.9852172	24.93819	7.5534532	4.000000	3.636364
##	1763	1995-09-12	9.6397327	24.87032	7.8168120	11.555556	12.444444
##	1764	1995-09-13	10.2942482	24.80244	8.0801709	2.500000	4.611111
##	1765	1995-09-14	10.9487636	24.73457	8.3435297	2.888889	12.111111
##	1766	1995-09-15	10.5602381	25.01580	7.7040707	7.466667	44.200000
##	1767	1995-09-16	9.9513747	25.06376	7.5328589	4.500000	3.888889
##	1768	1995-09-17	9.3425114	25.11172	7.3616470	4.500000	66.666667
##	1769	1995-09-18	7.4225702	25.09162	6.8305156	11.777778	22.666667
##	1770	1995-09-19	5.5026290	25.07151	6.2993842	23.548387	268.064516
##	1771	1995-09-20	10.6365375	24.64760	7.7240521	12.052632	45.473684
##	1772	1995-09-21	4.8968200	25.35855	5.8611524	52.000000	771.911111
##	1773	1995-09-22	5.1802605	25.44145	5.6224550	2.666667	2.888889
##	1774	1995-09-23	5.4637010	25.52434	5.3837575	2.787879	2.717172
##	1775	1995-09-24	6.1733394	25.35363	6.0139714	2.909091	2.545455
##	1776	1995-09-25	6.8829778	25.18291	6.6441853	2.000000	2.333333
##	1777	1995-09-26	7.5926162	25.01219	7.2743992	3.333333	2.055556
##	1778	1995-09-27	8.3022545	24.84148	7.9046130	8.645833	4.486111
##	1779	1995-09-28	8.0128386	24.64807	8.0163166	13.958333	6.916667
##	1780	1995-09-29	7.2518000	24.66479	7.8346402	20.533333	59.533333
##	1781	1995-09-30	6.7231008	24.73861	7.5079305	9.111111	93.611111
##	1782	1995-10-01	6.1944016	24.81244	7.1812208	6.400000	28.600000
##	1783	1995-10-02	5.6657024	24.88626	6.8545110	2.944444	11.166667
##	1784	1995-10-03	5.1370032	24.96008	6.5278013	5.354839	39.290323
##	1785	1995-10-04	9.1804542	24.56856	7.2445917	15.052632	26.736842
##	1786	1995-10-05	8.6567762	24.72505	6.4755823	4.888889	15.555556
##	1787	1995-10-06	8.1330982	24.88153	5.7065729	25.466667	419.911111
##	1788	1995-10-07	7.6094203	25.03802	5.6474687	2.000000	2.000000
##	1789	1995-10-08	7.0857423	25.19451	5.5883644	5.636364	129.636364
##	1790	1995-10-09	6.5620644	25.35100	5.5292602	2.000000	2.444444
##	1791	1995-10-10	7.6497012	25.26249	5.9919335	8.545455	8.545455
##	1792	1995-10-11	8.7373380	25.17399	6.4546068	2.277778	11.055556
##	1793	1995-10-12	9.8249748	25.08548	6.9172801	3.388889	7.722222
##	1794	1995-10-13	10.9126117	24.99698	7.3799534	2.611111	5.333333
##	1795	1995-10-14	12.0002485	24.90848	7.8426267	81.724138	359.448276
##	1796	1995-10-15	10.1886727	24.90749	7.8490673	30.789474	613.105263
##	1797	1995-10-16	7.3018119	24.91360	7.7922048	2.266667	13.933333
##	1798	1995-10-17	7.3324141	25.37398	5.7781821	2.666667	11.555556

##	1799	1995-10-18	5.3034129	25.06903	6.8719584	27.619048	45.571429
##	1800	1995-10-19	6.7189708	24.83469	7.2020325	5.629630	6.518519
##	1801	1995-10-20	0.7200000	23.88100	6.7900000	19.348148	268.459259
##	1802	1995-10-21	4.9806956	25.34418	5.8001376	33.066667	530.400000
##	1803	1995-10-22	5.3204780	25.31808	5.9962685	6.833333	27.166667
##	1804	1995-10-23	5.6602605	25.29199	6.1923995	26.000000	31.272727
##	1805	1995-10-24	6.0000430	25.26590	6.3885305	11.555556	2.888889
##	1806	1995-10-25	6.3398255	25.23980	6.5846614	15.276596	128.893617
##	1807	1995-10-26	6.6796080	25.21371	6.7807924	36.000000	36.000000
##	1808	1995-10-27	7.0193905	25.18762	6.9769234	871.272727	84.000000
##	1809	1995-10-28	7.3591730	25.16152	7.1730544	3.055556	9.444444
##	1810	1995-10-29	7.6989555	25.13543	7.3691853	2.888889	6.444444
##	1811	1995-10-30	8.0387380	25.10934	7.5653163	9.957447	6.510638
##	1812	1995-10-31	8.3785205	25.08324	7.7614473	22.944444	148.444444
##	1813	1995-11-01	11.6486303	25.08554	7.7497815	2.111111	10.000000
##	1814	1995-11-02	8.4714667	25.07515	7.7971452	8.333333	7.733333
##	1815	1995-11-03	6.1791645	25.25078	6.7051381	48.193548	269.612903
##	1816	1995-11-04	5.7560614	25.38723	6.3294814	28.750000	543.500000
##	1817	1995-11-05	7.0688417	25.09216	7.6022063	3.777778	2.592593
##	1818	1995-11-06	4.9637980	25.49981	5.5610288	3.000000	2.962963
##	1819	1995-11-07	4.7792498	25.45023	5.8894517	2.222222	3.333333
##	1820	1995-11-08	4.5947016	25.40064	6.2178745	7.272727	11.090909
##	1821	1995-11-09	4.4101534	25.35106	6.5462974	211.111111	14.000000
##	1822	1995-11-10	4.2256052	25.30147	6.8747202	10.333333	12.500000
##	1823	1995-11-11	4.0410570	25.25188	7.2031431	8.085106	7.063830
##	1824	1995-11-12	3.8565088	25.20230	7.5315659	5.777778	19.444444
##	1825	1995-11-13	3.6719606	25.15271	7.8599888	2.666667	4.666667
##	1826	1995-11-14	3.5954517	25.14323	7.6857456	17.100000	9.500000
##	1827	1995-11-15	3.5189429	25.13375	7.5115024	2.733333	3.600000
##	1828	1995-11-16	3.5760250	25.14012	7.7129750	5.055556	203.055556
##	1829	1995-11-17	1.7246419	25.28593	6.7967187	22.193548	88.516129
##	1830	1995-11-18	1.5363743	25.33453	6.6288966	17.454545	104.000000
##	1831	1995-11-19	1.3481067	25.38312	6.4610744	70.800000	593.288889
##	1832	1995-11-20	6.4727458	25.06673	7.2018183	2.222222	6.518519
##	1833	1995-11-21	4.7838216	25.45663	5.8856703	60.020202	81.895623
##	1834	1995-11-22	4.5891738	25.45330	6.0146669	117.818182	157.272727
##	1835	1995-11-23	4.3945260	25.44997	6.1436636	2.444444	5.111111
##	1836	1995-11-24	4.1998783	25.44664	6.2726602	3.000000	9.055556
##	1837	1995-11-25	4.0052305	25.44331	6.4016568	2.611111	3.388889
##	1838	1995-11-26	3.8105827	25.43998	6.5306534	73.818182	182.727273
##	1839	1995-11-27	3.6159349	25.43665	6.6596501	775.000000	2425.000000
##	1840	1995-11-28	3.4212872	25.43332	6.7886467	6.500000	34.444444
##	1841	1995-11-29	3.2266394	25.42999	6.9176433	2.555556	4.444444
##	1842	1995-11-30	3.2617068	25.46185	6.8409927	66.444444	585.000000
##	1843	1995-12-01	4.2056786	25.31258	7.3360805	4.878049	4.487805
##	1844	1995-12-02	3.5739416	25.34235	7.2355177	2.444444	3.555556
##	1845	1995-12-03	2.9422047	25.37211	7.1349550	4.444444	16.333333
##	1846	1995-12-04	2.3104677	25.40187	7.0343923	4.709677	10.064516
##	1847	1995-12-05	3.1143333	25.20095	7.7791617	8.789474	28.315789
##	1848	1995-12-06	1.7916489	25.50995	6.0520818	101.777778	915.688889
##	1849	1995-12-07	1.2790500	25.64343	5.5810273	1114.909091	1226.545455
##	1850	1995-12-08	1.2824643	25.61923	5.6796633	5.052632	20.578947
##	1851	1995-12-09	1.2858786	25.59503	5.7782993	2.666667	3.555556
##	1852	1995-12-10	1.2892929	25.57084	5.8769353	3.555556	10.500000

##	1853	1995-12-11	1.2927073	25.54664	5.9755714	22.181818	13.818182
##	1854	1995-12-12	1.2961216	25.52244	6.0742074	6.944444	40.444444
##	1855	1995-12-13	1.2995359	25.49825	6.1728434	3.574468	6.042553
##	1856	1995-12-14	1.3029502	25.47405	6.2714795	3.555556	6.222222
##	1857	1995-12-15	1.3063645	25.44985	6.3701155	18.645161	53.870968
##	1858	1995-12-16	1.0657467	25.69097	5.3654713	10.507766	28.713262
##	1859	1995-12-17	3.1278167	25.14899	7.7300675	2.370370	3.555556
##	1860	1995-12-18	2.6215212	25.67150	6.2218348	2.000000	3.888889
##	1861	1995-12-19	1.9239488	25.71547	5.7180205	324.682927	571.121951
##	1862	1995-12-20	3.4126409	25.71515	5.7940066	25.794872	678.923077
##	1863	1995-12-21	2.9651677	25.74232	5.7688012	2.500000	4.111111
##	1864	1995-12-22	2.5176945	25.76948	5.7435959	3.822222	12.311111
##	1865	1995-12-23	2.0702212	25.79665	5.7183905	8.545455	4.000000
##	1866	1995-12-24	1.6227480	25.82382	5.6931852	6.376176	4.689655
##	1867	1995-12-25	5.5469515	25.47401	7.0189215	4.206897	5.379310
##	1868	1995-12-26	6.1911023	25.38974	7.4713058	2.888889	16.611111
##	1869	1995-12-27	4.5899643	25.36739	6.9578824	2.533333	43.266667
##	1870	1995-12-28	3.8833128	25.43867	6.6471883	2.055556	2.555556
##	1871	1995-12-29	3.1766612	25.50994	6.3364942	3.333333	16.222222
##	1872	1995-12-30	2.4700097	25.58122	6.0258002	13.833333	2.333333
##	1873	1995-12-31	1.7633582	25.65250	5.7151061	2.777778	5.111111
##	1874	1996-01-01	1.0567067	25.72378	5.4044120	49.071429	411.107143
##	1875	1996-01-02	2.4843167	24.89156	8.4580829	4.740741	10.888889
##	1876	1996-01-03	1.5195161	25.48392	6.1329374	5.354839	16.000000
##	1877	1996-01-04	1.3241161	25.63533	5.5732592	6.888889	28.000000
##	1878	1996-01-05	1.1287160	25.78674	5.0135809	3.200000	6.000000
##	1879	1996-01-06	1.7530088	25.76497	5.2456286	10.638298	89.872340
##	1880	1996-01-07	2.3773015	25.74321	5.4776763	6.545455	13.636364
##	1881	1996-01-08	3.0015943	25.72145	5.7097239	3.277778	4.111111
##	1882	1996-01-09	3.6258871	25.69968	5.9417716	5.419355	5.548387
##	1883	1996-01-10	1.4285644	25.88729	4.6927264	230.285714	1847.928571
##	1884	1996-01-11	7.9166500	25.15400	7.7259408	2.000000	2.000000
##	1885	1996-01-12	7.2152624	25.16677	7.6329183	4.666667	2.222222
##	1886	1996-01-13	6.5138749	25.17954	7.5398957	5.166667	22.777778
##	1887	1996-01-14	5.8124873	25.19231	7.4468732	10.545455	9.818182
##	1888	1996-01-15	5.1110998	25.20507	7.3538506	2.000000	4.222222
##	1889	1996-01-16	4.4097122	25.21784	7.2608280	35.066667	264.400000
##	1890	1996-01-17	5.0494606	25.47282	6.5712185	2.551724	2.551724
##	1891	1996-01-18	4.0834773	25.58643	5.0139050	2.055556	2.722222
##	1892	1996-01-19	3.3034105	25.63987	4.6462681	4.888889	6.833333
##	1893	1996-01-20	2.5233438	25.69331	4.2786313	5.777778	9.111111
##	1894	1996-01-21	1.7432771	25.74675	3.9109944	27.454545	18.181818
##	1895	1996-01-22	1.7943890	25.61614	4.7161845	2.055556	2.000000
##	1896	1996-01-23	1.8455010	25.48552	5.5213747	3.333333	2.000000
##	1897	1996-01-24	1.8966129	25.35490	6.3265648	11.096774	74.709677
##	1898	1996-01-25	0.8946227	25.66776	5.3938293	442.714286	2088.357143
##	1899	1996-01-26	4.8811500	25.02583	6.7894017	3.333333	6.148148
##	1900	1996-01-27	5.0955735	24.92591	7.1054633	2.444444	3.555556
##	1901	1996-01-28	5.3099970	24.82600	7.4215249	5.191489	6.553191
##	1902	1996-01-29	5.5244205	24.72608	7.7375866	485.555556	1011.500000
##	1903	1996-01-30	6.2826545	24.76301	7.7645036	2.333333	11.555556
##	1904	1996-01-31	3.9083119	25.19494	6.9350707	3.133333	11.933333
##	1905	1996-02-01	3.1381663	25.30211	6.4432093	3.900000	2.800000
##	1906	1996-02-02	2.3680207	25.40928	5.9513479	2.000000	2.888889

##	1907	1996-02-03	1.5978750	25.51645	5.4594865	7.944444	27.000000
##	1908	1996-02-04	0.8277294	25.62362	4.9676251	3.818182	4.909091
##	1909	1996-02-05	4.2451630	25.45298	5.9828578	4.666667	3.777778
##	1910	1996-02-06	7.6625967	25.28235	6.9980906	4.444444	11.500000
##	1911	1996-02-07	11.0800303	25.11171	8.0133233	3.000000	6.555556
##	1912	1996-02-08	5.5216341	25.05562	8.0644880	3.712121	4.459596
##	1913	1996-02-09	5.7474222	25.03123	8.0971022	4.424242	2.363636
##	1914	1996-02-10	4.6688022	25.05850	7.6430012	3.111111	2.000000
##	1915	1996-02-11	3.5901821	25.08577	7.1889001	2.277778	3.222222
##	1916	1996-02-12	2.5115620	25.11304	6.7347991	2.444444	4.000000
##	1917	1996-02-13	1.4329419	25.14031	6.2806981	12.064516	51.806452
##	1918	1996-02-14	3.6301875	24.48828	8.2288783	54.321147	423.903226
##	1919	1996-02-15	1.2695289	25.44432	5.5280916	96.577778	796.000000
##	1920	1996-02-16	1.4426317	25.45465	5.4607079	3.000000	16.333333
##	1921	1996-02-17	1.6157345	25.46497	5.3933242	4.444444	6.000000
##	1922	1996-02-18	1.7888373	25.47530	5.3259405	2.388889	3.055556
##	1923	1996-02-19	1.9619401	25.48563	5.2585568	4.222222	3.555556
##	1924	1996-02-20	2.1350429	25.49596	5.1911732	6.888889	17.388889
##	1925	1996-02-21	3.8376352	25.45052	5.9121773	9.555556	31.222222
##	1926	1996-02-22	5.5402275	25.40508	6.6331814	23.555556	11.000000
##	1927	1996-02-23	7.2428198	25.35964	7.3541856	4.000000	5.888889
##	1928	1996-02-24	8.9454121	25.31420	8.0751897	5.851852	15.407407
##	1929	1996-02-25	9.1820818	25.25016	8.4336055	3.992593	8.837037
##	1930	1996-02-26	5.6060488	25.22334	7.6419759	2.133333	2.266667
##	1931	1996-02-27	1.8960387	25.09677	5.9103542	4.709677	10.967742
##	1932	1996-02-28	4.6301042	24.75904	7.7266350	29.361702	73.319149
##	1933	1996-02-29	0.6109489	25.45027	5.0562411	204.311111	1773.244444
##	1934	1996-03-01	0.6622955	25.46259	4.9786535	14.181818	4.181818
##	1935	1996-03-02	0.7136421	25.47490	4.9010659	3.022222	3.022222
##	1936	1996-03-03	0.7649887	25.48721	4.8234783	6.722222	6.000000
##	1937	1996-03-04	0.8163353	25.49952	4.7458908	17.636364	12.727273
##	1938	1996-03-05	0.8676818	25.51183	4.6683032	2.222222	3.111111
##	1939	1996-03-06	0.9190284	25.52415	4.5907156	4.076628	2.727969
##	1940	1996-03-07	5.7122667	24.77158	7.7469752	5.931034	2.344828
##	1941	1996-03-08	4.2474684	24.65737	7.4699066	4.133333	9.266667
##	1942	1996-03-09	8.1299867	24.58123	7.6669324	257.444444	594.722222
##	1943	1996-03-10	4.8356272	24.78624	6.8519464	5.422222	5.733333
##	1944	1996-03-11	1.5412677	24.99124	6.0369603	13.666667	82.333333
##	1945	1996-03-12	1.3386907	25.27893	5.4178084	7.644444	225.111111
##	1946	1996-03-13	1.2845542	24.14867	7.2712246	2.000000	2.592593
##	1947	1996-03-14	1.2580894	24.34761	6.9079030	9.777778	2.888889
##	1948	1996-03-15	1.2316247	24.54655	6.5445813	4.222222	10.055556
##	1949	1996-03-16	1.2051599	24.74549	6.1812597	5.636364	4.363636
##	1950	1996-03-17	1.1786952	24.94443	5.8179381	10.888889	22.444444
##	1951	1996-03-18	1.1522304	25.14337	5.4546164	13.636364	10.363636
##	1952	1996-03-19	1.1257657	25.34231	5.0912948	7.818182	6.181818
##	1953	1996-03-20	2.9093118	25.14393	5.8653882	2.000000	2.000000
##	1954	1996-03-21	4.6928580	24.94555	6.6394816	2.000000	2.311111
##	1955	1996-03-22	6.4764042	24.74717	7.4135750	4.275862	4.827586
##	1956	1996-03-23	5.0710800	24.84936	7.5153638	147.722222	367.666667
##	1957	1996-03-24	3.1541905	24.88554	7.3477019	2.000000	2.000000
##	1958	1996-03-25	2.1643778	25.06797	6.5459922	2.444444	4.277778
##	1959	1996-03-26	2.1719534	25.06736	6.5437784	2.111111	2.055556
##	1960	1996-03-27	2.1795290	25.06676	6.5415645	5.225806	18.129032

##	1961	1996-03-28	1.4904791	25.29897	5.9745467	55.642857	958.071429
##	1962	1996-03-29	3.2715292	24.81784	6.8795725	3.611111	5.333333
##	1963	1996-03-30	2.6299184	24.94968	6.4364640	18.181818	8.909091
##	1964	1996-03-31	1.9883077	25.08153	5.9933555	4.800000	6.711111
##	1965	1996-04-01	1.3466969	25.21337	5.5502469	2.765957	20.893617
##	1966	1996-04-02	0.7050861	25.34521	5.1071384	5.160757	16.891253
##	1967	1996-04-03	1.2982479	25.21452	5.6170481	7.555556	12.888889
##	1968	1996-04-04	1.8914097	25.08383	6.1269578	2.000000	2.555556
##	1969	1996-04-05	2.4845715	24.95314	6.6368675	2.000000	5.277778
##	1970	1996-04-06	3.0777333	24.82245	7.1467771	103.317073	31.219512
##	1971	1996-04-07	3.6141133	24.83610	7.3292331	266.166667	672.777778
##	1972	1996-04-08	4.0425879	24.91302	7.2398809	2.222222	2.777778
##	1973	1996-04-09	1.6628613	25.07454	6.2107442	21.714286	145.714286
##	1974	1996-04-10	1.5182292	24.68932	6.5024054	3.407407	9.333333
##	1975	1996-04-11	1.2131727	25.24272	5.4875270	135.733333	1403.244444
##	1976	1996-04-12	0.8600000	23.88500	6.7500000	72.088889	707.733333
##	1977	1996-04-13	0.8539257	24.20299	6.4031708	8.444444	12.222222
##	1978	1996-04-14	0.8478515	24.52097	6.0563416	42.363636	22.545455
##	1979	1996-04-15	0.8417772	24.83896	5.7095124	2.000000	2.000000
##	1980	1996-04-16	0.8357029	25.15694	5.3626832	2.106383	2.425532
##	1981	1996-04-17	1.1952444	25.01048	5.7350608	2.212766	2.851064
##	1982	1996-04-18	1.5547859	24.86403	6.1074384	3.555556	6.666667
##	1983	1996-04-19	1.9143274	24.71757	6.4798160	2.777778	4.111111
##	1984	1996-04-20	2.2738689	24.57111	6.8521936	83.574468	342.893617
##	1985	1996-04-21	2.9156545	24.61064	6.9584142	2.000000	2.000000
##	1986	1996-04-22	1.9946929	24.61820	6.7620931	4.200000	7.333333
##	1987	1996-04-23	1.2444871	24.90545	5.9882945	9.225806	42.193548
##	1988	1996-04-24	3.0939208	24.55917	6.5750400	3.473684	5.315789
##	1989	1996-04-25	1.0343200	25.16714	5.2348420	46.311111	512.133333
##	1990	1996-04-26	1.0524251	25.17748	5.2305709	56.444444	12.222222
##	1991	1996-04-27	1.0705302	25.18783	5.2262998	280.181818	483.272727
##	1992	1996-04-28	1.0886353	25.19817	5.2220288	6000.000000	12000.000000
##	1993	1996-04-29	1.1067404	25.20852	5.2177577	3020.833333	6035.305556
##	1994	1996-04-30	1.4710573	25.16868	5.4456832	41.666667	70.611111
##	1995	1996-05-01	1.8353742	25.12885	5.6736086	50.000000	160.800000
##	1996	1996-05-02	2.1996912	25.08901	5.9015341	3016.500000	3069.500000
##	1997	1996-05-03	2.5640081	25.04918	6.1294596	2.444444	7.722222
##	1998	1996-05-04	2.9283250	25.00934	6.3573851	61.882353	351.647059
##	1999	1996-05-05	3.2926419	24.96951	6.5853106	270.000000	3100.000000
##	2000	1996-05-06	3.6569588	24.92967	6.8132360	3.666667	6.888889
##	2001	1996-05-07	4.0212758	24.88984	7.0411615	6.111111	49.666667
##	2002	1996-05-08	3.6786391	24.84925	7.0738331	58.545455	45.818182
##	2003	1996-05-09	3.3360024	24.80867	7.1065048	17.866667	58.066667
##	2004	1996-05-10	3.5297000	24.76806	7.2612862	23.944444	87.666667
##	2005	1996-05-11	2.4902323	24.90791	6.7571820	2.666667	4.500000
##	2006	1996-05-12	1.4507645	25.04775	6.2530777	9.047619	44.904762
##	2007	1996-05-13	1.1270659	25.22805	5.7042439	19.407407	561.000000
##	2008	1996-05-14	1.4415542	24.90697	6.8948179	8.074074	57.555556
##	2009	1996-05-15	1.3162890	24.97387	6.6178287	296.545455	66.727273
##	2010	1996-05-16	1.1910239	25.04076	6.3408395	2.944444	6.388889
##	2011	1996-05-17	1.0657587	25.10765	6.0638503	4.833333	13.777778
##	2012	1996-05-18	0.9404936	25.17454	5.7868612	6.545455	7.090909
##	2013	1996-05-19	0.8152284	25.24143	5.5098720	5.828283	4.878788
##	2014	1996-05-20	1.4800691	25.12079	6.0502717	5.111111	2.666667

##	2015	1996-05-21	2.1449097	25.00014	6.5906714	2.000000	2.000000
##	2016	1996-05-22	2.8097503	24.87950	7.1310712	13.702128	36.851064
##	2017	1996-05-23	3.4745909	24.75885	7.6714709	2.000000	2.000000
##	2018	1996-05-24	4.0393432	24.76099	7.8783402	79.000000	432.500000
##	2019	1996-05-25	2.3875500	24.76115	7.7204505	2.533333	3.400000
##	2020	1996-05-26	1.5748619	25.13593	6.3254143	648.424242	1146.000000
##	2021	1996-05-27	1.4558895	24.91192	6.9230316	296.695652	1219.217391
##	2022	1996-05-28	1.6094250	24.60423	7.6801128	4.615385	12.923077
##	2023	1996-05-29	1.6336955	24.80289	7.1106441	824.500000	735.812500
##	2024	1996-05-30	1.3817802	24.92678	6.7818457	230.500000	122.000000
##	2025	1996-05-31	1.1298649	25.05068	6.4530473	74.341463	346.731707
##	2026	1996-06-01	0.8779496	25.17458	6.1242490	36.000000	3.000000
##	2027	1996-06-02	0.6260343	25.29848	5.7954506	20.611111	4.444444
##	2028	1996-06-03	1.0428406	25.26973	5.9034182	5.222222	5.888889
##	2029	1996-06-04	1.4596468	25.24098	6.0113858	8400.000000	8520.000000
##	2030	1996-06-05	1.8764531	25.21222	6.1193534	50.133333	48.000000
##	2031	1996-06-06	2.2932594	25.18347	6.2273210	22.000000	14.000000
##	2032	1996-06-07	2.7100656	25.15472	6.3352886	107.090909	557.090909
##	2033	1996-06-08	3.1268719	25.12597	6.4432562	315.200000	2047.200000
##	2034	1996-06-09	3.5436782	25.09721	6.5512238	20.333333	31.833333
##	2035	1996-06-10	3.9604844	25.06846	6.6591915	500.000000	3000.000000
##	2036	1996-06-11	4.3772907	25.03971	6.7671591	5.277778	6.222222
##	2037	1996-06-12	4.7940970	25.01096	6.8751267	2.666667	2.222222
##	2038	1996-06-13	3.2872881	25.09920	6.5688729	298.243902	341.414634
##	2039	1996-06-14	5.0990273	24.97055	7.2934991	366.307692	1577.743590
##	2040	1996-06-15	0.6048882	25.59211	4.0651052	1034.376068	1766.316239
##	2041	1996-06-16	0.7395193	25.48902	4.2960522	1702.444444	1954.888889
##	2042	1996-06-17	0.8741504	25.38593	4.5269993	658.666667	550.000000
##	2043	1996-06-18	1.0087814	25.28284	4.7579463	439.272727	407.090909
##	2044	1996-06-19	1.1434125	25.17975	4.9888933	28.785714	96.071429
##	2045	1996-06-20	1.9112710	25.50793	5.1544826	13.096774	64.129032
##	2046	1996-06-21	1.6531187	25.78419	4.1924359	129.000000	805.625000
##	2047	1996-06-22	1.4125923	25.74264	3.6646469	47.866667	232.933333
##	2048	1996-06-23	3.1031653	25.57977	4.5734311	808.666667	4017.333333
##	2049	1996-06-24	4.7937384	25.41691	5.4822154	2.000000	2.222222
##	2050	1996-06-25	6.4843114	25.25405	6.3909996	3.872340	9.787234
##	2051	1996-06-26	8.1748844	25.09118	7.2997838	31.722222	99.166667
##	2052	1996-06-27	7.3612667	25.24249	7.2210206	7.111111	78.222222
##	2053	1996-06-28	4.8538571	25.35696	6.5550140	33.800000	165.666667
##	2054	1996-06-29	2.8080516	25.62383	5.0709365	25.419355	134.064516
##	2055	1996-06-30	1.8441488	25.80588	4.2682244	65.250000	601.214286
##	2056	1996-07-01	4.7600583	25.24538	6.0778967	5.703704	29.185185
##	2057	1996-07-02	4.3584197	25.31845	5.7577225	2241.300000	2762.500000
##	2058	1996-07-03	3.9567810	25.39151	5.4375484	619.000000	3050.000000
##	2059	1996-07-04	3.5551423	25.46458	5.1173743	16.944444	344.222222
##	2060	1996-07-05	3.1535036	25.53764	4.7972002	2.000000	2.500000
##	2061	1996-07-06	2.7518650	25.61070	4.4770260	383.636364	1593.454545
##	2062	1996-07-07	2.3502263	25.68377	4.1568519	414.666667	4002.666667
##	2063	1996-07-08	1.9485876	25.75683	3.8366778	8.500000	38.333333
##	2064	1996-07-09	1.5469489	25.82990	3.5165036	5.111111	15.166667
##	2065	1996-07-10	1.1453102	25.90296	3.1963295	12.000000	4.909091
##	2066	1996-07-11	0.7436716	25.97602	2.8761554	7.138889	6.204545
##	2067	1996-07-12	4.6440507	25.72643	4.5187476	2.277778	7.500000
##	2068	1996-07-13	8.5444299	25.47683	6.1613399	3.000000	15.722222

##	2069	1996-07-14	12.4448091	25.22723	7.8039321	5.000000	22.333333
##	2070	1996-07-15	8.3862841	25.15373	7.6324493	64.085106	648.000000
##	2071	1996-07-16	4.1722976	25.27272	6.7648986	345.111111	832.833333
##	2072	1996-07-17	2.6409488	25.82653	4.4502465	176.974910	439.287634
##	2073	1996-07-18	2.2674839	25.51925	4.7955177	8.838710	45.741935
##	2074	1996-07-19	3.3873375	25.58895	6.7818688	10.578947	39.105263
##	2075	1996-07-20	2.7812019	25.65865	6.1036013	2.000000	2.888889
##	2076	1996-07-21	2.1750663	25.72835	5.4253339	2.555556	8.888889
##	2077	1996-07-22	1.5689307	25.79804	4.7470665	11.090909	6.000000
##	2078	1996-07-23	0.9627951	25.86774	4.0687990	7.545455	4.111111
##	2079	1996-07-24	2.1656794	25.72548	4.5899338	4.000000	2.222222
##	2080	1996-07-25	3.3685637	25.58323	5.1110686	50.909091	103.272727
##	2081	1996-07-26	4.5714480	25.44097	5.6322035	3.611111	58.944444
##	2082	1996-07-27	5.7743324	25.29871	6.1533383	2.222222	2.000000
##	2083	1996-07-28	6.9772167	25.15645	6.6744731	5.000000	10.933333
##	2084	1996-07-29	8.5528311	24.87624	7.3234669	258.553191	616.170213
##	2085	1996-07-30	7.3449640	24.82280	7.3498230	2.444444	11.000000
##	2086	1996-07-31	6.1370970	24.76935	7.3761791	2.111111	3.222222
##	2087	1996-08-01	2.1166645	25.44336	5.1442284	60.950000	4.600000
##	2088	1996-08-02	3.6122458	24.93738	7.4237325	42.105263	32.473684
##	2089	1996-08-03	1.5580333	25.68291	4.4570267	85.466667	1257.288889
##	2090	1996-08-04	1.2638851	25.67552	4.5347787	80.400000	43.600000
##	2091	1996-08-05	0.9697370	25.66814	4.6125308	4.000000	8.944444
##	2092	1996-08-06	0.6755888	25.66075	4.6902829	3.363636	9.472222
##	2093	1996-08-07	1.2118279	25.59496	4.6642679	2.727273	10.000000
##	2094	1996-08-08	1.7480670	25.52916	4.6382530	2.355556	18.933333
##	2095	1996-08-09	2.2843061	25.46337	4.6122381	4.388889	7.500000
##	2096	1996-08-10	2.8205452	25.39757	4.5862232	9.904762	30.238095
##	2097	1996-08-11	6.2854042	24.86923	7.7266233	2.000000	2.000000
##	2098	1996-08-12	0.9103562	25.58816	4.4065175	12.080000	883.680000
##	2099	1996-08-13	2.8168088	25.18438	4.9878348	2.000000	5.611111
##	2100	1996-08-14	4.7232613	24.78061	5.5691521	73.568966	766.137931
##	2101	1996-08-15	4.3611956	24.42179	7.5181556	263.444444	338.000000
##	2102	1996-08-16	3.3692929	24.67388	7.5542133	2.533333	2.000000
##	2103	1996-08-17	3.4083866	24.67100	7.5450189	2.000000	13.111111
##	2104	1996-08-18	3.4474803	24.66813	7.5358245	12.545455	22.000000
##	2105	1996-08-19	3.4865741	24.66525	7.5266301	4.666667	25.777778
##	2106	1996-08-20	3.5256678	24.66237	7.5174356	9.555556	14.000000
##	2107	1996-08-21	3.5647616	24.65949	7.5082412	18.000000	37.454545
##	2108	1996-08-22	3.6038553	24.65662	7.4990468	2.000000	2.000000
##	2109	1996-08-23	3.6429491	24.65374	7.4898524	4.444444	6.444444
##	2110	1996-08-24	3.6820428	24.65086	7.4806579	26.727273	27.454545
##	2111	1996-08-25	3.7211366	24.64798	7.4714635	3.333333	5.333333
##	2112	1996-08-26	3.7602303	24.64511	7.4622691	2.611111	38.555556
##	2113	1996-08-27	7.0344182	25.00007	7.7085703	2.307692	6.538462
##	2114	1996-08-28	7.8448556	25.00405	8.0517880	11.021277	23.617021
##	2115	1996-08-29	5.1328976	25.12166	7.2432181	7.066667	12.200000
##	2116	1996-08-30	3.7885208	24.75364	7.0473158	2.962963	3.333333
##	2117	1996-08-31	5.9251879	24.91151	7.4813230	22.036364	11.018182
##	2118	1996-09-01	5.2535394	24.44853	8.5205909	2.000000	2.722222
##	2119	1996-09-02	4.7989341	24.51978	8.1169773	4.727273	2.909091
##	2120	1996-09-03	4.3443288	24.59102	7.7133638	2.250000	6.500000
##	2121	1996-09-04	3.8897235	24.66227	7.3097502	9.818182	11.454545
##	2122	1996-09-05	3.4351182	24.73351	6.9061367	2.000000	2.111111

## 2123	1996-09-06	6.2235455	24.71051	7.5154323	8.500000	5.500000
## 2124	1996-09-07	9.0119727	24.68750	8.1247279	75.862069	18.896552
## 2125	1996-09-08	7.7924956	24.70444	8.0891071	343.000000	376.500000
## 2126	1996-09-09	6.0004667	24.81793	7.5491124	2.600000	4.200000
## 2127	1996-09-10	3.6488848	24.68117	7.7089882	2.318182	4.818182
## 2128	1996-09-11	6.0608583	24.11300	8.2238979	2.962963	2.666667
## 2129	1996-09-12	7.0190470	24.09723	8.0095480	101.454545	127.272727
## 2130	1996-09-13	7.9772356	24.08146	7.7951981	3.500000	6.250000
## 2131	1996-09-14	8.9354242	24.06569	7.5808482	4.444444	43.722222
## 2132	1996-09-15	8.8416417	24.20649	7.3898294	27.818182	9.636364
## 2133	1996-09-16	8.7478591	24.34729	7.1988106	3.750000	9.750000
## 2134	1996-09-17	8.6540765	24.48809	7.0077918	5.636364	3.636364
## 2135	1996-09-18	8.5602939	24.62889	6.8167730	5.111111	11.111111
## 2136	1996-09-19	15.6675485	24.58576	7.2255682	5.750000	8.250000
## 2137	1996-09-20	22.7748030	24.54263	7.6343633	9.063830	5.191489
## 2138	1996-09-21	14.5271848	24.51010	8.4167048	2.222222	3.333333
## 2139	1996-09-22	18.2777644	24.58426	7.8853333	5.722222	10.611111
## 2140	1996-09-23	8.1641714	24.64903	8.3776643	19.333333	13.666667
## 2141	1996-09-24	17.9138909	24.31299	7.3098745	16.888889	6.722222
## 2142	1996-09-25	30.3534917	24.31519	7.0476246	44.347826	49.347826
## 2143	1996-09-26	4.8975778	24.84229	6.5085084	18.177778	102.444444
## 2144	1996-09-27	3.0618125	24.92251	6.7823737	72.166667	1213.875000
## 2145	1996-09-28	5.4746521	24.82331	7.0030279	11.000000	90.791667
## 2146	1996-09-29	8.2229408	24.52741	7.2765663	34.909091	67.636364
## 2147	1996-09-30	10.9712295	24.23150	7.5501047	59.000000	98.500000
## 2148	1996-10-01	13.7195182	23.93560	7.8236430	5.333333	3.500000
## 2149	1996-10-02	7.0386273	24.05128	6.6505967	5.787234	16.425532
## 2150	1996-10-03	4.5161348	24.13626	6.9275230	17.750000	80.250000
## 2151	1996-10-04	1.9936424	24.22124	7.2044494	4.055556	3.500000
## 2152	1996-10-05	2.6214924	24.18962	7.0247468	3.500000	4.250000
## 2153	1996-10-06	3.2493424	24.15801	6.8450442	2.055556	17.000000
## 2154	1996-10-07	3.2760956	24.23916	7.5666262	162.042553	518.170213
## 2155	1996-10-08	3.8908370	24.33590	7.6737485	3.466667	2.000000
## 2156	1996-10-09	2.1812042	24.44456	7.4730475	4.341463	14.341463
## 2157	1996-10-10	3.8448970	24.44308	7.2162639	2.666667	6.722222
## 2158	1996-10-11	3.8263758	24.41810	7.1950435	106.750000	61.500000
## 2159	1996-10-12	3.8078545	24.39312	7.1738230	12.510638	106.765957
## 2160	1996-10-13	0.9100000	23.88600	6.8700000	6.250000	8.250000
## 2161	1996-10-14	3.4217042	24.46771	6.7995437	4.842105	3.736842
## 2162	1996-10-15	3.5131309	24.53185	6.9247063	6.250000	12.250000
## 2163	1996-10-16	3.6045576	24.59599	7.0498688	4.500000	22.444444
## 2164	1996-10-17	3.5820140	24.57165	7.1336651	18.000000	18.210526
## 2165	1996-10-18	3.5594705	24.54731	7.2174615	4.500000	10.000000
## 2166	1996-10-19	3.5369269	24.52296	7.3012578	6.181818	4.181818
## 2167	1996-10-20	3.5143833	24.49862	7.3850542	5.111111	61.333333
## 2168	1996-10-21	3.6115326	24.51541	7.4652727	167.500000	87.750000
## 2169	1996-10-22	3.7086818	24.53220	7.5454912	3.222222	14.888889
## 2170	1996-10-23	4.4480311	24.49034	7.5890938	6.851064	11.659574
## 2171	1996-10-24	3.2166119	24.54483	7.7351238	4.866667	20.933333
## 2172	1996-10-25	3.2886167	24.50195	7.2294779	5.183333	11.966667
## 2173	1996-10-26	2.7443182	24.56357	7.2097832	5.500000	3.000000
## 2174	1996-10-27	2.2000197	24.62518	7.1900884	155.454545	50.727273
## 2175	1996-10-28	1.6557212	24.68679	7.1703936	2.444444	4.000000
## 2176	1996-10-29	2.4899379	24.71345	7.1102488	7.500000	10.500000

## 2177	1996-10-30	3.3241545	24.74011	7.0501039	14.127660	10.340426
## 2178	1996-10-31	2.9282621	24.79072	6.9988103	21.250000	23.750000
## 2179	1996-11-01	2.5323697	24.84134	6.9475167	4.000000	15.222222
## 2180	1996-11-02	2.8805333	24.86936	7.0156570	38.210526	135.052632
## 2181	1996-11-03	3.2286970	24.89738	7.0837974	19.000000	36.000000
## 2182	1996-11-04	3.5768606	24.92541	7.1519378	2.000000	2.611111
## 2183	1996-11-05	5.4084727	24.90402	8.1090355	3.153846	3.846154
## 2184	1996-11-06	5.6563644	24.92361	8.1509744	48.127660	339.957447
## 2185	1996-11-07	2.4293833	24.85360	7.5274212	2.074074	3.111111
## 2186	1996-11-08	4.4328881	24.88671	7.9189419	2.933333	5.866667
## 2187	1996-11-09	4.0410507	24.96338	7.4716986	17.750000	18.250000
## 2188	1996-11-10	3.6492133	25.04004	7.0244553	6.533333	24.444444
## 2189	1996-11-11	3.1576542	25.11218	6.7231142	98.576271	569.389831
## 2190	1996-11-12	3.0231875	25.09304	6.8002879	7.458333	18.625000
## 2191	1996-11-13	3.4856879	24.80141	7.5939003	2.000000	2.333333
## 2192	1996-11-14	2.7207682	24.76154	7.4628470	68.000000	14.000000
## 2193	1996-11-15	1.9558485	24.72168	7.3317936	18.510638	27.361702
## 2194	1996-11-16	1.8963232	24.72223	7.4101800	5.500000	4.000000
## 2195	1996-11-17	1.8367980	24.72278	7.4885664	10.545455	112.909091
## 2196	1996-11-18	1.7772727	24.72332	7.5669527	7.661616	62.037879
## 2197	1996-11-19	2.0879303	24.78187	7.3390200	4.777778	11.166667
## 2198	1996-11-20	2.8469808	24.81902	7.4460480	3.500000	18.500000
## 2199	1996-11-21	3.6060313	24.85616	7.5530760	2.000000	8.250000
## 2200	1996-11-22	4.3650818	24.89331	7.6601040	2.333333	3.888889
## 2201	1996-11-23	5.3231659	24.94141	7.7671320	8.000000	7.454545
## 2202	1996-11-24	6.2812500	24.98951	7.8741600	5.478261	9.304348
## 2203	1996-11-25	5.3818667	25.02815	7.6797206	2.666667	11.538462
## 2204	1996-11-26	5.6525810	25.03124	7.7896521	4.000000	19.866667
## 2205	1996-11-27	2.7703250	25.00773	7.2177700	5.185185	10.888889
## 2206	1996-11-28	3.0647049	24.86593	7.7763555	151.250000	68.750000
## 2207	1996-11-29	3.3590848	24.72413	8.3349409	404.829268	252.487805
## 2208	1996-11-30	5.2336909	24.87018	7.8292603	18.230769	4.692308
## 2209	1996-12-01	4.0059044	24.74693	7.9294182	197.115385	190.787330
## 2210	1996-12-02	4.4704439	24.88089	7.5755937	376.000000	376.882353
## 2211	1996-12-03	2.8765939	24.55967	8.1417067	7.272727	19.454545
## 2212	1996-12-04	3.0140960	24.56303	8.0580374	2.000000	2.000000
## 2213	1996-12-05	3.1515980	24.56640	7.9743681	21.272727	563.272727
## 2214	1996-12-06	3.2891000	24.56976	7.8906988	21.684211	434.947368
## 2215	1996-12-07	3.1010485	24.56459	7.9391817	2.000000	7.250000
## 2216	1996-12-08	2.9129970	24.55943	7.9876646	22.000000	79.090909
## 2217	1996-12-09	2.7249455	24.55426	8.0361476	2.222222	3.722222
## 2218	1996-12-10	2.8864530	24.76270	7.6447197	6.000000	13.000000
## 2219	1996-12-11	3.0479606	24.97114	7.2532918	6.765957	32.765957
## 2220	1996-12-12	2.6119532	24.95409	7.2386874	3.500000	9.000000
## 2221	1996-12-13	2.1759458	24.93703	7.2240829	2.740741	6.444444
## 2222	1996-12-14	3.9766153	24.94706	7.4295639	28.842105	20.105263
## 2223	1996-12-15	5.7772848	24.95708	7.6350448	2.888889	10.722222
## 2224	1996-12-16	3.2238583	24.64644	8.3221146	2.666667	9.629630
## 2225	1996-12-17	6.5055121	24.64977	7.5293785	6.461538	32.615385
## 2226	1996-12-18	6.6076533	24.62869	7.6114982	132.297872	1299.446809
## 2227	1996-12-19	4.7568905	24.75011	6.9999193	45.513514	788.702703
## 2228	1996-12-20	3.8940710	24.69831	7.3662316	4.250000	7.250000
## 2229	1996-12-21	3.0312515	24.64651	7.7325439	4.666667	18.055556
## 2230	1996-12-22	3.7412644	25.16794	5.6077409	26.214286	60.321429

##	2231	1996-12-23	3.2612979	25.24729	5.1667000	64.208333	608.708333
##	2232	1996-12-24	2.7533271	25.25132	5.0668602	38.125000	481.833333
##	2233	1996-12-25	3.4306932	25.23733	5.5786611	3.000000	4.750000
##	2234	1996-12-26	4.1080593	25.22335	6.0904621	2.000000	114.545455
##	2235	1996-12-27	4.7854254	25.20937	6.6022630	2.000000	65.000000
##	2236	1996-12-28	5.4627915	25.19538	7.1140639	4.250000	4.750000
##	2237	1996-12-29	6.1401576	25.18140	7.6258648	5.722222	58.222222
##	2238	1996-12-30	7.9135364	25.13146	7.1177615	3.404255	12.765957
##	2239	1996-12-31	5.2324273	24.49132	8.5264991	6.000000	56.222222
##	2240	1997-01-01	5.9199909	25.05869	6.1293470	2.000000	2.666667
##	2241	1997-01-02	5.7068667	25.02161	6.6497263	2.333333	8.370370
##	2242	1997-01-03	3.3167750	24.43206	8.2702896	2.666667	14.074074
##	2243	1997-01-04	4.6923762	24.90285	6.7099248	2.400000	2.666667
##	2244	1997-01-05	6.9290111	24.96976	7.6267089	29.733333	312.933333
##	2245	1997-01-06	5.4850182	24.43825	8.0478279	41.593939	161.648485
##	2246	1997-01-07	5.4241667	24.18031	8.0648212	53.454545	10.363636
##	2247	1997-01-08	5.3633152	23.92236	8.0818145	2.297872	3.234043
##	2248	1997-01-09	4.6706045	24.45541	7.4183435	603.818182	504.363636
##	2249	1997-01-10	3.9778939	24.98846	6.7548724	2.000000	2.611111
##	2250	1997-01-11	3.0725545	24.49912	7.2884127	2.425532	2.851064
##	2251	1997-01-12	4.1470208	24.00978	7.7715767	2.000000	2.074074
##	2252	1997-01-13	8.7789970	24.32787	7.1494585	3.241379	3.034483
##	2253	1997-01-14	8.4576667	24.54560	7.0762071	3.009404	4.204807
##	2254	1997-01-15	6.0011878	24.87402	6.6321959	2.777429	5.375131
##	2255	1997-01-16	7.2835151	24.44978	7.0212207	2.545455	6.545455
##	2256	1997-01-17	8.5658424	24.02554	7.4102455	2.277778	2.555556
##	2257	1997-01-18	9.3150818	24.61618	7.5698024	2.833333	2.888889
##	2258	1997-01-19	7.1364818	24.23315	7.7163800	2.555556	2.777778
##	2259	1997-01-20	6.1972106	24.24958	7.4277908	2.363636	3.818182
##	2260	1997-01-21	5.2579394	24.26601	7.1392015	7.277778	75.111111
##	2261	1997-01-22	2.9564625	24.46690	6.8785858	25.315789	88.947368
##	2262	1997-01-23	7.4374667	24.90146	6.6265521	228.713450	442.057018
##	2263	1997-01-24	5.5336114	24.93044	6.5981195	432.111111	795.166667
##	2264	1997-01-25	6.0557857	24.87888	6.9026702	2.000000	2.066667
##	2265	1997-01-26	2.9148222	25.13220	6.0446398	23.555556	160.311111
##	2266	1997-01-27	2.1929000	25.17774	5.8094069	60.881356	789.898305
##	2267	1997-01-28	2.6724636	24.59465	7.4182876	2.166667	2.166667
##	2268	1997-01-29	2.7490604	25.12528	5.9545402	2.291667	7.666667
##	2269	1997-01-30	3.0410681	24.73631	6.8861713	4.545455	4.545455
##	2270	1997-01-31	3.3330758	24.34734	7.8178024	3.272727	3.272727
##	2271	1997-02-01	2.3677364	24.16319	8.2375048	2.000000	2.000000
##	2272	1997-02-02	1.1417000	23.85611	8.3488300	2.448276	2.413793
##	2273	1997-02-03	4.1997848	24.38306	7.6706503	2.896552	2.827586
##	2274	1997-02-04	4.5257159	24.45988	7.7992386	29.777778	174.611111
##	2275	1997-02-05	3.6582929	24.54767	7.6581690	2.666667	10.666667
##	2276	1997-02-06	3.7414722	24.38485	8.0612619	3.454545	9.636364
##	2277	1997-02-07	3.8246515	24.22204	8.4643548	2.000000	2.000000
##	2278	1997-02-08	3.2951894	24.24495	8.2395556	8.363636	5.272727
##	2279	1997-02-09	2.7657273	24.26787	8.0147564	5.363636	4.090909
##	2280	1997-02-10	2.6809576	24.21145	8.0063139	2.363636	2.909091
##	2281	1997-02-11	2.5961879	24.15502	7.9978715	2.265152	2.537879
##	2282	1997-02-12	3.0330939	23.97054	7.6778485	2.166667	2.166667
##	2283	1997-02-13	2.1483667	24.39571	7.7837248	3.277778	12.055556
##	2284	1997-02-14	2.2335667	23.84814	7.6104529	2.315789	2.842105

##	2285	1997-02-15	4.4196030	23.83095	7.5607333	10.222222	24.111111
##	2286	1997-02-16	3.2661489	23.87305	7.6277649	6.144444	13.055556
##	2287	1997-02-17	3.2671738	24.09796	7.5005345	2.066667	2.000000
##	2288	1997-02-18	3.2708369	23.72776	7.5597783	23.272727	17.636364
##	2289	1997-02-19	3.2745000	23.35755	7.6190221	2.222222	7.777778
##	2290	1997-02-20	2.7151242	24.06223	7.8123782	13.000000	8.833333
##	2291	1997-02-21	2.6849015	24.26429	7.8484059	3.818182	3.090909
##	2292	1997-02-22	2.6546788	24.46635	7.8844336	3.333333	6.666667
##	2293	1997-02-23	2.6998980	24.45811	7.8493768	11.090909	6.000000
##	2294	1997-02-24	2.7451172	24.44986	7.8143199	4.000000	20.000000
##	2295	1997-02-25	2.7903364	24.44162	7.7792630	2.000000	2.888889
##	2296	1997-02-26	3.4688455	24.64004	7.9519161	2.000000	2.000000
##	2297	1997-02-27	2.8278292	24.52299	7.6160733	11.060606	7.757576
##	2298	1997-02-28	4.1443821	24.62049	8.0054877	20.121212	13.515152
##	2299	1997-03-01	3.0231250	24.62159	8.2079744	2.000000	2.000000
##	2300	1997-03-02	3.9727222	24.76392	7.1870393	14.322034	149.186441
##	2301	1997-03-03	1.9916604	24.76003	7.0399098	26.644068	296.372881
##	2302	1997-03-04	2.2714354	24.76425	7.3564612	3.583333	26.166667
##	2303	1997-03-05	3.9497939	24.02594	8.3484500	2.111111	3.555556
##	2304	1997-03-06	3.7764606	23.90572	8.1002046	767.750000	491.750000
##	2305	1997-03-07	3.6031273	23.78551	7.8519592	26.000000	180.000000
##	2306	1997-03-08	3.4297939	23.66530	7.6037139	12000.000000	12000.000000
##	2307	1997-03-09	3.2564606	23.54508	7.3554685	1532.444444	1909.111111
##	2308	1997-03-10	3.1643812	23.55396	7.3177461	3266.666667	2788.888889
##	2309	1997-03-11	3.0723018	23.56284	7.2800236	9.250000	27.750000
##	2310	1997-03-12	2.9802224	23.57171	7.2423012	241.454545	2950.727273
##	2311	1997-03-13	2.8881430	23.58059	7.2045788	12000.000000	12000.000000
##	2312	1997-03-14	2.7960636	23.58947	7.1668564	399.454545	441.954545
##	2313	1997-03-15	2.7698437	23.76767	7.4054579	985.000000	1160.000000
##	2314	1997-03-16	2.7436238	23.94588	7.6440595	3.777778	3.777778
##	2315	1997-03-17	3.0730807	23.86692	7.4543779	122.678571	191.071429
##	2316	1997-03-18	2.1702071	24.11497	7.5225212	46.000000	293.470588
##	2317	1997-03-19	2.7516786	24.08546	7.2799285	6.250000	10.500000
##	2318	1997-03-20	3.3331500	24.05595	7.0373358	2.740741	9.407407
##	2319	1997-03-21	2.7292061	24.08064	6.9953364	277.744681	447.021277
##	2320	1997-03-22	1.8346030	23.98482	6.9076682	86.545455	584.181818
##	2321	1997-03-23	0.9400000	23.88900	6.8200000	74.588517	658.880383
##	2322	1997-03-24	2.3928833	24.20304	7.0507133	62.631579	733.578947
##	2323	1997-03-25	3.8457667	24.51708	7.2814267	12.051282	132.000000
##	2324	1997-03-26	3.2009303	24.48223	7.2577848	7.750000	10.250000
##	2325	1997-03-27	2.5560939	24.44738	7.2341430	57.148936	607.021277
##	2326	1997-03-28	2.7308455	24.50189	7.2144848	61.666667	1273.666667
##	2327	1997-03-29	2.9055970	24.55639	7.1948267	27.681818	9.727273
##	2328	1997-03-30	2.9682091	24.60519	7.5085756	51.454545	430.363636
##	2329	1997-03-31	3.0308212	24.65400	7.8223244	4.000000	7.000000
##	2330	1997-04-01	3.0934333	24.70281	8.1360733	3.181818	4.818182
##	2331	1997-04-02	1.9971515	24.47747	7.8971561	237.888889	363.555556
##	2332	1997-04-03	1.3202542	24.41433	7.7640054	674.105263	650.263158
##	2333	1997-04-04	2.0449556	24.48784	8.0241504	241.641026	391.282051
##	2334	1997-04-05	2.0179098	24.53205	7.7308037	2.666667	2.000000
##	2335	1997-04-06	1.9715573	24.54520	7.6034849	330.250000	103.000000
##	2336	1997-04-07	1.9252049	24.55836	7.4761661	35.454545	169.818182
##	2337	1997-04-08	1.8788524	24.57151	7.3488473	18.000000	170.000000
##	2338	1997-04-09	1.8325000	24.58466	7.2215285	6.090909	34.818182

## 2339	1997-04-10	2.1351848	24.53775	7.5380582	2.722222	3.444444
## 2340	1997-04-11	2.0143263	24.50335	7.5594663	18.727273	44.363636
## 2341	1997-04-12	1.8934677	24.46894	7.5808743	12000.000000	12000.000000
## 2342	1997-04-13	1.7726091	24.43453	7.6022824	550.444444	248.500000
## 2343	1997-04-14	2.1880742	24.44761	7.6886636	1776.666667	1373.333333
## 2344	1997-04-15	2.6035394	24.46069	7.7750448	125.461538	51.076923
## 2345	1997-04-16	2.1030708	24.40733	7.2786375	1425.130769	809.713462
## 2346	1997-04-17	2.3252489	24.35579	7.7467149	2724.800000	1568.350000
## 2347	1997-04-18	1.9171833	24.48987	7.7694721	111.888889	27.111111
## 2348	1997-04-19	1.8540220	24.33873	7.6293920	140.250000	81.500000
## 2349	1997-04-20	1.7908606	24.18758	7.4893118	119.333333	47.538462
## 2350	1997-04-21	1.8268690	24.36407	7.3288736	220.000000	260.000000
## 2351	1997-04-22	1.8628773	24.54056	7.1684354	10.000000	13.250000
## 2352	1997-04-23	1.8988857	24.71705	7.0079971	282.304348	293.826087
## 2353	1997-04-24	1.9541879	24.83423	6.8136919	148.576271	844.779661
## 2354	1997-04-25	3.5617182	24.39076	7.7261676	11.555556	4.444444
## 2355	1997-04-26	1.8539042	24.78186	6.9850158	16.321429	15.642857
## 2356	1997-04-27	2.1152036	24.58443	7.2679275	426.000000	1219.636364
## 2357	1997-04-28	2.3765030	24.38701	7.5508391	119.350000	474.900000
## 2358	1997-04-29	2.1529515	24.44949	7.4812512	9.333333	32.666667
## 2359	1997-04-30	1.9294000	24.51198	7.4116633	13.666667	9.000000
## 2360	1997-05-01	2.0567167	24.63594	7.2149727	1123.636364	1159.454545
## 2361	1997-05-02	2.1840333	24.75991	7.0182821	8.666667	43.055556
## 2362	1997-05-03	2.2081071	24.67317	7.3713370	19.368421	59.684211
## 2363	1997-05-04	2.2321810	24.58644	7.7243919	2.357143	4.500000
## 2364	1997-05-05	2.3412789	24.54004	7.6605408	11.500000	9.000000
## 2365	1997-05-06	2.4503768	24.49364	7.5966897	1446.363636	1794.545455
## 2366	1997-05-07	2.5594748	24.44724	7.5328387	2440.000000	3920.000000
## 2367	1997-05-08	2.6685727	24.40084	7.4689876	6.722222	3.222222
## 2368	1997-05-09	2.4906038	24.34087	7.5336841	5.000000	11.750000
## 2369	1997-05-10	2.3126348	24.28089	7.5983806	6254.545455	4854.545455
## 2370	1997-05-11	2.1346659	24.22092	7.6630771	8956.666667	7896.666667
## 2371	1997-05-12	1.9566970	24.16094	7.7277736	380.000000	241.944444
## 2372	1997-05-13	2.3298323	24.20024	7.7525583	810.666667	421.000000
## 2373	1997-05-14	2.7029677	24.23953	7.7773429	76.750000	26.250000
## 2374	1997-05-15	3.0761030	24.27883	7.8021276	20.666667	26.111111
## 2375	1997-05-16	2.5404030	24.51998	7.5850273	479.931034	502.275862
## 2376	1997-05-17	3.2567244	24.51732	7.6403167	370.052632	435.578947
## 2377	1997-05-18	2.8695095	24.61778	7.5111857	11.466667	21.600000
## 2378	1997-05-19	3.3357942	24.43887	7.4459323	7.750000	22.000000
## 2379	1997-05-20	3.8020788	24.25996	7.3806788	50.277778	142.277778
## 2380	1997-05-21	3.5651848	24.34942	7.2568091	25.111111	50.333333
## 2381	1997-05-22	3.9276133	24.39373	7.2582739	1005.636364	310.727273
## 2382	1997-05-23	4.2900418	24.43805	7.2597388	3186.666667	613.333333
## 2383	1997-05-24	4.6524703	24.48237	7.2612036	112.250000	104.500000
## 2384	1997-05-25	5.0148988	24.52668	7.2626685	1817.272727	3729.272727
## 2385	1997-05-26	5.3773273	24.57100	7.2641333	309.166667	744.958333
## 2386	1997-05-27	4.3721486	24.62801	6.9953521	42.000000	320.000000
## 2387	1997-05-28	3.3669699	24.68501	6.7265708	658.526316	942.842105
## 2388	1997-05-29	2.3617912	24.74202	6.4577896	23.000000	880.000000
## 2389	1997-05-30	1.3566125	24.79903	6.1890083	14.962963	25.703704
## 2390	1997-05-31	1.8754047	24.96214	6.0504477	4.000000	6.500000
## 2391	1997-06-01	2.3941970	25.12525	5.9118870	28.127660	349.191489
## 2392	1997-06-02	3.3977576	25.11608	6.2098739	4076.000000	7733.333333

##	2393	1997-06-03	4.4013182	25.10690	6.5078609	7.333333	16.500000
##	2394	1997-06-04	8.0502058	25.25634	6.7631943	2.500000	2.750000
##	2395	1997-06-05	11.6990933	25.40579	7.0185277	11.692308	334.384615
##	2396	1997-06-06	16.1011854	25.41234	6.7745648	24.850000	441.200000
##	2397	1997-06-07	12.7855208	25.29370	7.1384650	3.214286	14.000000
##	2398	1997-06-08	10.3097571	25.46923	6.4521562	2.133333	26.266667
##	2399	1997-06-09	6.2036419	25.53219	5.9848072	7.750000	11.750000
##	2400	1997-06-10	2.0975267	25.59515	5.5174582	4.888889	9.111111
##	2401	1997-06-11	1.8027458	25.71352	5.1716854	50.067797	684.813559
##	2402	1997-06-12	11.4583091	25.33519	7.0980933	329.589744	856.871795
##	2403	1997-06-13	2.6979833	25.68427	5.4581798	44.312500	363.583333
##	2404	1997-06-14	4.2395977	25.24985	7.2295754	3.500000	7.000000
##	2405	1997-06-15	5.7812121	24.81544	9.0009709	260.723404	462.978723
##	2406	1997-06-16	5.2501303	24.91871	8.4547407	1105.000000	3539.000000
##	2407	1997-06-17	4.7190485	25.02197	7.9085105	3.750000	2.750000
##	2408	1997-06-18	4.1879667	25.12524	7.3622803	5.222222	51.888889
##	2409	1997-06-19	3.6870917	25.04488	7.3156055	2.000000	2.000000
##	2410	1997-06-20	3.1862167	24.96452	7.2689306	13.454545	742.363636
##	2411	1997-06-21	2.6853417	24.88415	7.2222558	1254.333333	3014.500000
##	2412	1997-06-22	2.1844667	24.80379	7.1755809	381.709091	628.145455
##	2413	1997-06-23	1.9400604	24.84099	6.7633240	450.000000	8666.666667
##	2414	1997-06-24	1.6956542	24.87818	6.3510671	3.142857	16.628571
##	2415	1997-06-25	2.3838939	25.45522	5.4064324	54.827586	1277.103448
##	2416	1997-06-26	2.6418111	25.59760	5.1618469	6.500000	28.600000
##	2417	1997-06-27	2.2325143	25.43990	5.7270586	23.000000	105.600000
##	2418	1997-06-28	3.6417499	25.18642	6.3001927	14.000000	43.000000
##	2419	1997-06-29	5.0509856	24.93295	6.8733268	24.363636	129.636364
##	2420	1997-06-30	6.4602212	24.67948	7.4464609	2.162162	2.702703
##	2421	1997-07-01	6.5873939	24.91899	6.9102061	9.250000	10.000000
##	2422	1997-07-02	6.7145667	25.15851	6.3739512	2.888889	5.500000
##	2423	1997-07-03	7.6187045	24.99871	7.0365130	9.272727	52.181818
##	2424	1997-07-04	8.5228424	24.83891	7.6990748	4.777778	39.888889
##	2425	1997-07-05	7.8657189	24.72207	7.6373241	4.750000	14.000000
##	2426	1997-07-06	7.2085955	24.60523	7.5755733	3.454545	5.272727
##	2427	1997-07-07	6.5514720	24.48840	7.5138226	4.250000	6.000000
##	2428	1997-07-08	5.8943485	24.37156	7.4520718	3.833333	8.388889
##	2429	1997-07-09	5.6538717	24.43687	7.0531065	12.545455	387.090909
##	2430	1997-07-10	5.4133949	24.50219	6.6541411	2.000000	7.000000
##	2431	1997-07-11	5.1729182	24.56751	6.2551758	34.444444	13.277778
##	2432	1997-07-12	6.0391439	24.60933	6.5910227	2.000000	2.000000
##	2433	1997-07-13	6.9053697	24.65115	6.9268697	18.555556	160.666667
##	2434	1997-07-14	6.1980778	24.70514	6.2989504	228.363636	661.272727
##	2435	1997-07-15	7.0496833	24.47049	6.1826321	2.148148	3.259259
##	2436	1997-07-16	6.4403286	24.83249	6.9998586	2.666667	9.666667
##	2437	1997-07-17	4.4026788	25.01971	5.3725300	4.272727	21.500000
##	2438	1997-07-18	7.6932838	25.04152	5.8950216	5.454545	4.545455
##	2439	1997-07-19	10.9838889	25.06332	6.4175132	3.250000	254.500000
##	2440	1997-07-20	14.2744939	25.08513	6.9400048	8.978723	9.361702
##	2441	1997-07-21	13.9654939	25.30114	5.8365473	3.777778	6.722222
##	2442	1997-07-22	9.6259059	25.33262	5.7574933	2.000000	2.750000
##	2443	1997-07-23	5.2863178	25.36411	5.6784393	32.750000	176.678571
##	2444	1997-07-24	3.1828190	25.17742	5.8165471	2.571429	6.666667
##	2445	1997-07-25	1.9778704	25.31069	5.9375378	102.962963	1409.481481
##	2446	1997-07-26	2.6914896	25.19744	6.2009662	41.250000	488.428571

## 2447	1997-07-27	7.2091576	24.62403	7.6253227	2.277778	3.666667
## 2448	1997-07-28	9.0520818	24.42865	8.7736009	19.379310	49.862069
## 2449	1997-07-29	13.1868911	24.45279	8.6357173	133.500000	405.944444
## 2450	1997-07-30	9.0502042	24.62430	6.8444654	10.000000	134.514286
## 2451	1997-07-31	5.7430976	24.86255	7.8432626	4.000000	9.400000
## 2452	1997-08-01	5.7952049	24.57373	8.2003919	22.727273	19.454545
## 2453	1997-08-02	5.8473121	24.28490	8.5575212	3.000000	3.136364
## 2454	1997-08-03	4.4460636	24.17550	8.4262509	5.781818	3.636364
## 2455	1997-08-04	5.3574214	24.53295	7.6838161	2.750000	3.250000
## 2456	1997-08-05	6.2687792	24.89040	6.9413813	15.842105	84.052632
## 2457	1997-08-06	5.3191424	25.19166	7.0718867	2.333333	3.000000
## 2458	1997-08-07	3.5921422	25.25927	7.1038840	7.555556	32.111111
## 2459	1997-08-08	4.6592476	25.04410	7.7626324	4.800000	24.400000
## 2460	1997-08-09	7.9781394	24.55815	8.4429970	7.500000	16.727273
## 2461	1997-08-10	8.6820020	24.53416	8.3878519	14.545455	64.000000
## 2462	1997-08-11	9.3858646	24.51017	8.3327069	3.250000	9.500000
## 2463	1997-08-12	10.0897273	24.48618	8.2775618	3.833333	5.500000
## 2464	1997-08-13	8.6920265	24.54470	7.9274757	112.181818	429.090909
## 2465	1997-08-14	7.2943258	24.60322	7.5773895	6.750000	21.500000
## 2466	1997-08-15	5.8966250	24.66173	7.2273034	4.000000	13.636364
## 2467	1997-08-16	4.4989242	24.72025	6.8772173	2.590909	7.136364
## 2468	1997-08-17	5.5318773	24.53907	7.3230697	4.000000	6.000000
## 2469	1997-08-18	6.5648303	24.35789	7.7689221	3.045455	9.954545
## 2470	1997-08-19	4.0498242	24.73025	6.9389400	4.072727	14.218182
## 2471	1997-08-20	4.8722625	24.68483	6.8523754	2.800000	6.971429
## 2472	1997-08-21	6.8881388	24.79433	7.0563486	4.727273	6.545455
## 2473	1997-08-22	8.9040152	24.90384	7.2603218	3.222222	3.555556
## 2474	1997-08-23	8.4939622	25.00743	6.8666929	76.944444	362.722222
## 2475	1997-08-24	5.3615286	25.06275	6.5088500	3.266667	9.133333
## 2476	1997-08-25	5.8131716	25.04115	6.3397517	9.000000	3.750000
## 2477	1997-08-26	6.2648146	25.01956	6.1706534	11.454545	46.000000
## 2478	1997-08-27	6.7164576	24.99797	6.0015552	2.055556	4.055556
## 2479	1997-08-28	8.0373121	24.94576	6.3599079	2.250000	2.000000
## 2480	1997-08-29	9.3581667	24.89355	6.7182606	4.111111	5.000000
## 2481	1997-08-30	7.9872424	24.87903	6.8003861	2.545455	2.181818
## 2482	1997-08-31	6.6163182	24.86451	6.8825115	2.444444	2.666667
## 2483	1997-09-01	6.9700652	24.84281	6.7776503	2.000000	4.500000
## 2484	1997-09-02	7.3238121	24.82112	6.6727891	14.000000	10.275862
## 2485	1997-09-03	3.8883156	24.93468	6.5230707	104.055556	455.888889
## 2486	1997-09-04	3.6175500	24.56323	6.3706558	40.800000	12.228571
## 2487	1997-09-05	8.0500286	24.66889	7.6358662	21.636364	84.545455
## 2488	1997-09-06	1.9666500	24.97634	5.9582135	21.850000	216.950000
## 2489	1997-09-07	2.5247981	25.07372	5.5804264	16.625000	419.609375
## 2490	1997-09-08	2.5877417	25.08275	5.8056652	4.785714	29.285714
## 2491	1997-09-09	5.6026000	24.49790	6.9813085	2.055556	2.000000
## 2492	1997-09-10	3.9246515	24.31152	7.0344274	111.894737	104.105263
## 2493	1997-09-11	2.2467030	24.12515	7.0875464	2.222222	4.722222
## 2494	1997-09-12	2.3165924	24.36103	6.8759005	62.500000	104.750000
## 2495	1997-09-13	2.3864818	24.59691	6.6642545	3.234043	6.425532
## 2496	1997-09-14	3.2088727	24.76234	6.4411611	22.750000	13.250000
## 2497	1997-09-15	4.0312636	24.92777	6.2180676	17.666667	228.666667
## 2498	1997-09-16	4.6734652	24.82235	6.6238183	4.181818	4.363636
## 2499	1997-09-17	5.3156667	24.71692	7.0295691	2.909091	8.545455
## 2500	1997-09-18	7.8655879	24.81508	8.0568676	5.555556	115.111111

##	2501	1997-09-19	5.1187467	24.65294	7.9074691	5.021277	15.191489
##	2502	1997-09-20	4.7619119	24.61353	8.1140038	2.266667	6.066667
##	2503	1997-09-21	3.6304333	24.47821	7.5810462	2.518519	5.629630
##	2504	1997-09-22	2.2802167	24.18410	7.1855231	16.750000	37.000000
##	2505	1997-09-23	0.9300000	23.89000	6.7900000	9.272727	95.818182
##	2506	1997-09-24	3.2943485	24.59814	6.0843227	2.222222	4.666667
##	2507	1997-09-25	3.3474273	24.58291	6.2504042	4.750000	4.500000
##	2508	1997-09-26	3.4005061	24.56767	6.4164858	2.638298	7.957447
##	2509	1997-09-27	2.9189924	24.56755	6.3414792	2.000000	4.750000
##	2510	1997-09-28	2.4374788	24.56744	6.2664727	3.888889	20.944444
##	2511	1997-09-29	2.6261561	24.61550	6.6229486	2.421053	3.157895
##	2512	1997-09-30	2.8148333	24.66357	6.9794245	5.444444	23.722222
##	2513	1997-10-01	2.3790083	24.81438	6.7625758	4.250000	37.000000
##	2514	1997-10-02	1.9431833	24.96519	6.5457271	3.105263	5.157895
##	2515	1997-10-03	6.4886606	25.06507	7.5342776	7.000000	45.111111
##	2516	1997-10-04	5.0391978	24.96041	7.4830218	6.444444	93.833333
##	2517	1997-10-05	4.7525381	25.06758	7.0897026	3.600000	15.000000
##	2518	1997-10-06	3.5349788	24.97699	7.3960400	4.772727	21.954545
##	2519	1997-10-07	3.2727303	24.95865	7.4859376	9.090909	2.545455
##	2520	1997-10-08	3.0104818	24.94030	7.5758352	13.777778	77.500000
##	2521	1997-10-09	3.2095295	24.94677	7.5382733	4.750000	6.500000
##	2522	1997-10-10	3.4085773	24.95324	7.5007114	5.454545	53.272727
##	2523	1997-10-11	3.6076250	24.95971	7.4631496	6.477273	28.261364
##	2524	1997-10-12	3.4693354	24.93534	7.3564349	7.500000	3.250000
##	2525	1997-10-13	3.3310458	24.91096	7.2497203	11.090909	15.818182
##	2526	1997-10-14	3.1927562	24.88659	7.1430056	5.500000	97.250000
##	2527	1997-10-15	3.0544667	24.86222	7.0362910	927.750000	1248.625000
##	2528	1997-10-16	3.8378955	24.89839	7.4250381	1850.000000	2400.000000
##	2529	1997-10-17	4.6213242	24.93456	7.8137852	3.000000	8.307692
##	2530	1997-10-18	4.7809933	24.91761	8.0733462	168.212766	576.127660
##	2531	1997-10-19	3.7422262	24.94919	7.7630931	32.266667	218.400000
##	2532	1997-10-20	2.1728917	24.79153	7.8582096	2.000000	2.370370
##	2533	1997-10-21	1.9307292	25.06626	6.9271078	2.500000	4.250000
##	2534	1997-10-22	1.6885667	25.34098	5.9960060	10.642857	27.285714
##	2535	1997-10-23	1.8026625	25.47761	5.6087904	11.000000	33.000000
##	2536	1997-10-24	2.7238667	25.28060	6.4811779	3.111111	7.666667
##	2537	1997-10-25	2.1693083	25.43300	5.9810144	9.373134	20.507463
##	2538	1997-10-26	6.3634667	25.17348	7.8566336	3.000000	11.833333
##	2539	1997-10-27	5.5491182	25.09490	7.9038548	4.181818	7.318182
##	2540	1997-10-28	6.3488242	25.08873	7.7806108	22.181818	9.272727
##	2541	1997-10-29	7.1485303	25.08256	7.6573668	3.250000	9.250000
##	2542	1997-10-30	7.9482364	25.07639	7.5341227	2.777778	6.555556
##	2543	1997-10-31	4.6430929	25.16923	7.6848514	2.600000	4.733333
##	2544	1997-11-01	8.5988687	25.12941	8.2525837	26.000000	349.090909
##	2545	1997-11-02	12.5546444	25.08958	8.8203160	5.388889	33.000000
##	2546	1997-11-03	11.4979939	25.08599	8.8906406	4.076923	29.538462
##	2547	1997-11-04	6.8144333	24.98919	8.6230221	2.222222	6.333333
##	2548	1997-11-05	4.0195576	24.89497	8.2341673	4.680851	12.340426
##	2549	1997-11-06	3.6062768	24.97094	7.9059223	381.894737	1513.684211
##	2550	1997-11-07	3.1929960	25.04691	7.5776774	1002.000000	4040.666667
##	2551	1997-11-08	2.7797152	25.12289	7.2494324	10.055556	91.722222
##	2552	1997-11-09	3.0094000	25.26583	6.5684967	9.300505	68.474747
##	2553	1997-11-10	3.9348455	25.30792	6.6944439	8.545455	45.227273
##	2554	1997-11-11	5.7537364	25.24920	6.9958742	12000.000000	12000.000000

##	2555	1997-11-12	7.5726273	25.19047	7.2973045	4.055556	7.388889
##	2556	1997-11-13	8.9188603	25.27343	7.2695787	5.750000	18.750000
##	2557	1997-11-14	10.2650933	25.35638	7.2418529	268.808511	457.106383
##	2558	1997-11-15	6.1314049	25.49307	6.4979749	368.303030	1050.181818
##	2559	1997-11-16	3.2054125	25.59682	5.6280796	49.333333	22.296296
##	2560	1997-11-17	7.5641250	25.58617	5.9831183	2.000000	2.000000
##	2561	1997-11-18	10.9832268	25.51465	6.9631173	10.500000	4.500000
##	2562	1997-11-19	14.4023286	25.44313	7.9431162	68.500000	79.833333
##	2563	1997-11-20	11.1006764	25.52261	7.6791640	20.000000	55.090909
##	2564	1997-11-21	7.7990242	25.60209	7.4152118	317.894737	321.578947
##	2565	1997-11-22	9.3490606	25.54007	7.7875245	2.250000	2.750000
##	2566	1997-11-23	10.8990970	25.47804	8.1598373	1141.818182	1299.272727
##	2567	1997-11-24	12.4491333	25.41602	8.5321500	318.526316	326.315789
##	2568	1997-11-25	7.4986015	25.41601	7.7727047	2.250000	5.000000
##	2569	1997-11-26	2.5480697	25.41600	7.0132594	5.055556	34.111111
##	2570	1997-11-27	2.3902812	25.38289	6.7811138	109.263158	340.526316
##	2571	1997-11-28	2.2324927	25.34978	6.5489681	70.000000	154.000000
##	2572	1997-11-29	2.0747042	25.31668	6.3168225	300.695652	745.130435
##	2573	1997-11-30	3.8688621	25.34489	6.3772196	12000.000000	12000.000000
##	2574	1997-12-01	5.6630200	25.37310	6.4376167	160.611111	623.166667
##	2575	1997-12-02	5.6119697	25.38913	6.1596006	2.333333	4.777778
##	2576	1997-12-03	2.3709143	25.64184	5.4933090	4.157895	19.052632
##	2577	1997-12-04	2.1222289	25.72283	5.4392476	5.250000	64.428571
##	2578	1997-12-05	1.2046396	25.81116	4.9834231	61.720000	526.080000
##	2579	1997-12-06	9.7156667	25.44282	6.2709545	10.444444	12.277778
##	2580	1997-12-07	1.8485333	25.82150	5.2416231	10.750000	31.000000
##	2581	1997-12-08	3.7303220	25.67179	5.7125089	6.250000	13.500000
##	2582	1997-12-09	5.6121106	25.52208	6.1833946	20.000000	1211.636364
##	2583	1997-12-10	7.4938992	25.37237	6.6542803	10.000000	750.000000
##	2584	1997-12-11	9.3756879	25.22266	7.1251661	3.000000	25.000000
##	2585	1997-12-12	9.2840384	25.27358	6.8874080	4.500000	15.750000
##	2586	1997-12-13	9.1923889	25.32450	6.6496499	11.454545	135.272727
##	2587	1997-12-14	9.1007394	25.37542	6.4118918	8.594595	101.027027
##	2588	1997-12-15	9.7035182	25.32249	6.2428652	2.750000	5.750000
##	2589	1997-12-16	10.3062970	25.26956	6.0738385	2.666667	8.611111
##	2590	1997-12-17	10.7469192	25.19782	6.5003171	1134.909091	1398.545455
##	2591	1997-12-18	11.1875414	25.12607	6.9267957	6170.000000	9600.000000
##	2592	1997-12-19	11.6281636	25.05432	7.3532742	5.636364	2.818182
##	2593	1997-12-20	6.8858222	25.35040	6.1606291	6.611111	18.055556
##	2594	1997-12-21	8.0198909	25.27124	5.9839155	4.758621	4.551724
##	2595	1997-12-22	4.4938833	25.28389	6.9708895	10.789474	102.315789
##	2596	1997-12-23	6.8676625	25.12649	5.7415233	3.407407	3.333333
##	2597	1997-12-24	8.8170873	24.90450	6.8350550	13.578947	11.263158
##	2598	1997-12-25	10.7665121	24.68250	7.9285867	12.277778	93.444444
##	2599	1997-12-26	9.5227616	24.72056	7.6107004	101.750000	61.250000
##	2600	1997-12-27	8.2790111	24.75862	7.2928141	1240.909091	4129.818182
##	2601	1997-12-28	7.0352606	24.79668	6.9749279	305.200000	311.650000
##	2602	1997-12-29	5.7572020	24.81672	6.8954980	260.000000	12000.000000
##	2603	1997-12-30	4.4791434	24.83677	6.8160681	12.250000	7.250000
##	2604	1997-12-31	3.2010848	24.85681	6.7366382	56.468085	278.468085
##	2605	1998-01-01	4.4350909	24.72410	6.8968061	18.000000	1000.000000
##	2606	1998-01-02	5.6690970	24.59139	7.0569739	7.111111	15.222222
##	2607	1998-01-03	8.8896218	24.65200	7.3785880	2.750000	4.750000
##	2608	1998-01-04	12.1101467	24.71261	7.7002020	6.255319	10.042553

##	2609	1998-01-05	6.1845500	24.38122	6.7997587	2.074074	4.592593
##	2610	1998-01-06	7.7332214	24.75496	7.9914900	18.466667	143.666667
##	2611	1998-01-07	12.9994727	24.45702	8.3715315	4.384615	13.307692
##	2612	1998-01-08	6.3419152	24.72031	6.0746982	4.765957	7.446809
##	2613	1998-01-09	6.1654742	24.44534	6.4735556	3.000000	8.500000
##	2614	1998-01-10	5.9890333	24.17038	6.8724130	4.111111	5.277778
##	2615	1998-01-11	5.1911990	24.46080	6.4930883	12.545455	37.818182
##	2616	1998-01-12	4.3933646	24.75121	6.1137635	24.500000	9.250000
##	2617	1998-01-13	3.5955303	25.04162	5.7344388	2.166667	2.388889
##	2618	1998-01-14	3.9613165	25.03371	5.8075734	12.421053	22.210526
##	2619	1998-01-15	4.3271027	25.02579	5.8807080	2.000000	4.500000
##	2620	1998-01-16	4.6928889	25.01787	5.9538427	5.000000	28.142857
##	2621	1998-01-17	3.7153813	25.06971	5.7214350	73.916667	917.000000
##	2622	1998-01-18	2.3675187	25.10061	5.5774690	6.083333	9.458333
##	2623	1998-01-19	4.2502442	24.86408	6.5409201	16.750000	7.750000
##	2624	1998-01-20	6.1329697	24.62754	7.5043712	19.689655	19.103448
##	2625	1998-01-21	4.7555689	24.63457	7.2707616	126.944444	421.444444
##	2626	1998-01-22	4.8818690	24.68193	7.1153876	2.000000	2.000000
##	2627	1998-01-23	3.4039500	24.50647	7.5554083	2.000000	2.000000
##	2628	1998-01-24	3.4297883	24.31560	7.5740128	5.750000	19.750000
##	2629	1998-01-25	3.4556265	24.12474	7.5926173	24.363636	4002.545455
##	2630	1998-01-26	3.4814648	23.93388	7.6112219	3.500000	91.500000
##	2631	1998-01-27	3.5073030	23.74302	7.6298264	6.500000	103.722222
##	2632	1998-01-28	2.9781227	24.03286	7.6442732	3.750000	5.750000
##	2633	1998-01-29	2.4489424	24.32271	7.6587200	2.000000	2.722222
##	2634	1998-01-30	2.6220970	24.02212	7.5128992	25.636364	247.272727
##	2635	1998-01-31	2.7952515	23.72152	7.3670785	2.055556	3.888889
##	2636	1998-02-01	2.5028061	23.79269	7.5787424	5.500000	32.000000
##	2637	1998-02-02	2.2103606	23.86386	7.7904064	2.500000	9.222222
##	2638	1998-02-03	2.1753717	23.83783	7.6400722	6.909091	56.545455
##	2639	1998-02-04	2.1403828	23.81179	7.4897381	21.000000	11.500000
##	2640	1998-02-05	2.1053939	23.78575	7.3394039	2.055556	2.722222
##	2641	1998-02-06	3.2891444	24.65491	7.3280604	18.611111	70.277778
##	2642	1998-02-07	2.9460544	24.74283	7.2752227	3.578947	3.684211
##	2643	1998-02-08	2.6029643	24.83075	7.2223850	7.333333	7.800000
##	2644	1998-02-09	2.5094042	24.45502	7.6506367	4.000000	7.333333
##	2645	1998-02-10	4.7629000	24.72298	7.4697127	2.777778	2.111111
##	2646	1998-02-11	4.5647152	24.67931	7.6874900	3.750000	5.250000
##	2647	1998-02-12	4.3665303	24.63563	7.9052673	23.636364	78.909091
##	2648	1998-02-13	4.1683455	24.59195	8.1230445	2.777778	6.833333
##	2649	1998-02-14	5.3269758	24.75973	8.2343815	2.545455	4.636364
##	2650	1998-02-15	6.6026566	24.79700	8.3072309	72.909091	33.454545
##	2651	1998-02-16	7.8783374	24.83427	8.3800803	2.000000	9.000000
##	2652	1998-02-17	9.1540182	24.87154	8.4529297	4.255319	28.765957
##	2653	1998-02-18	4.4720424	24.66487	8.4102618	2.090909	4.363636
##	2654	1998-02-19	4.1484455	24.56972	8.3223756	6.181818	16.000000
##	2655	1998-02-20	3.8248485	24.47457	8.2344894	3.363636	10.954545
##	2656	1998-02-21	6.1054378	24.36485	8.2420798	30.500000	134.222222
##	2657	1998-02-22	2.1473167	24.53807	7.3814146	2.894737	11.684211
##	2658	1998-02-23	5.2077788	24.72340	7.4320082	2.076923	3.000000
##	2659	1998-02-24	3.5560810	24.69821	7.4938336	3.800000	6.333333
##	2660	1998-02-25	2.7555152	24.52311	7.8129979	5.833333	85.333333
##	2661	1998-02-26	2.6440242	24.29412	7.8938395	7.473684	19.789474
##	2662	1998-02-27	2.5325333	24.06513	7.9746812	7.277778	2.000000

##	2663	1998-02-28	2.4726738	24.25088	7.6765633	3.250000	10.500000
##	2664	1998-03-01	2.4128142	24.43662	7.3784453	5.272727	7.818182
##	2665	1998-03-02	2.3529547	24.62236	7.0803274	2.750000	3.000000
##	2666	1998-03-03	2.2930951	24.80811	6.7822095	36.545455	43.090909
##	2667	1998-03-04	2.2332356	24.99385	6.4840916	16.177778	113.244444
##	2668	1998-03-05	2.1069937	24.99712	6.3899723	38.791667	467.833333
##	2669	1998-03-06	2.3285146	24.99635	6.6005008	2.000000	2.000000
##	2670	1998-03-07	1.9046121	24.57516	7.8449282	6.227273	9.863636
##	2671	1998-03-08	4.1737756	24.73661	7.8116320	28.833333	145.444444
##	2672	1998-03-09	3.4132091	24.70702	7.7066291	3.310345	2.689655
##	2673	1998-03-10	2.2769458	24.43829	7.8838175	2.000000	2.000000
##	2674	1998-03-11	2.5843429	24.53036	7.7861248	37.736842	67.947368
##	2675	1998-03-12	2.1410608	24.33199	7.7259339	462.363636	4840.909091
##	2676	1998-03-13	1.6977788	24.13362	7.6657430	233.951220	651.707317
##	2677	1998-03-14	1.5097773	24.08387	7.6363950	9.500000	5.750000
##	2678	1998-03-15	1.3217758	24.03412	7.6070470	4.553191	8.127660
##	2679	1998-03-16	2.2436727	24.17215	7.5364503	14.750000	17.500000
##	2680	1998-03-17	3.1655697	24.31018	7.4658536	2.472727	5.163636
##	2681	1998-03-18	2.8935000	24.35330	7.4304930	2.944444	15.500000
##	2682	1998-03-19	3.0164636	24.38883	7.5265742	11.750000	28.750000
##	2683	1998-03-20	3.1394273	24.42437	7.6226555	8.909091	3.636364
##	2684	1998-03-21	3.2623909	24.45991	7.7187367	2.055556	3.500000
##	2685	1998-03-22	2.6035330	24.38256	7.5740662	2.750000	15.250000
##	2686	1998-03-23	1.9446750	24.30521	7.4293958	17.473684	12.052632
##	2687	1998-03-24	3.5906283	24.32976	7.5284185	3.833333	15.555556
##	2688	1998-03-25	2.7906061	24.42388	7.4731452	2.000000	2.666667
##	2689	1998-03-26	1.8489714	24.48662	7.4284645	2.066667	2.666667
##	2690	1998-03-27	2.5005660	24.41144	7.5211736	41.250000	75.750000
##	2691	1998-03-28	3.1521606	24.33625	7.6138827	3.555556	12.277778
##	2692	1998-03-29	2.7848475	24.33378	7.6289764	6.909091	3.272727
##	2693	1998-03-30	2.4175343	24.33131	7.6440700	48.750000	23.000000
##	2694	1998-03-31	2.0502212	24.32883	7.6591636	29.404255	132.808511
##	2695	1998-04-01	2.1504636	24.45747	7.5516526	2.250000	8.000000
##	2696	1998-04-02	2.2507061	24.58611	7.4441415	5.555556	17.611111
##	2697	1998-04-03	2.2571717	24.61336	7.5011741	3.818182	5.454545
##	2698	1998-04-04	2.2636374	24.64062	7.5582068	32.750000	57.750000
##	2699	1998-04-05	2.2701030	24.66788	7.6152394	2.722222	5.888889
##	2700	1998-04-06	1.7853917	24.66308	7.6279554	3.703704	18.888889
##	2701	1998-04-07	3.9217333	24.70292	7.6028818	400.054054	981.351351
##	2702	1998-04-08	2.7927079	24.70798	7.4239055	5.030303	103.575758
##	2703	1998-04-09	2.5357133	24.79492	7.0412524	2.000000	10.444444
##	2704	1998-04-10	2.3530909	24.70007	7.2431797	3.055556	24.722222
##	2705	1998-04-11	2.4783778	24.74488	7.3501658	26.250000	17.750000
##	2706	1998-04-12	2.6036646	24.78969	7.4571518	22.000000	90.545455
##	2707	1998-04-13	2.7289515	24.83450	7.5641379	13.166667	3.277778
##	2708	1998-04-14	2.6686261	24.83929	7.4768041	168.250000	10.500000
##	2709	1998-04-15	2.6083008	24.84408	7.3894702	10.363636	24.909091
##	2710	1998-04-16	2.5479754	24.84887	7.3021364	3.000000	4.750000
##	2711	1998-04-17	2.4876500	24.85366	7.2148026	3.684211	2.947368
##	2712	1998-04-18	3.1767105	24.86380	7.3643311	11.416667	9.166667
##	2713	1998-04-19	3.1181053	24.97323	7.1126200	21.250000	7.000000
##	2714	1998-04-20	3.0595000	25.08267	6.8609089	8.722222	11.111111
##	2715	1998-04-21	1.5593854	25.27884	5.6953544	56.474576	357.593220
##	2716	1998-04-22	2.6197833	25.20260	6.1145423	25.458333	82.916667

## 2717	1998-04-23	5.2088424	24.97169	7.6708655	2.045455	2.500000
## 2718	1998-04-24	3.6228773	25.06844	7.7736441	2.181818	5.818182
## 2719	1998-04-25	2.0369121	25.16519	7.8764227	5.909091	5.954545
## 2720	1998-04-26	1.7768178	25.14403	6.7379980	18.177778	73.466667
## 2721	1998-04-27	1.9386576	25.05635	8.0293806	2.727273	4.036364
## 2722	1998-04-28	1.7835758	24.97559	7.7814282	2.333333	8.055556
## 2723	1998-04-29	1.7885141	24.97137	7.7470247	8.250000	5.000000
## 2724	1998-04-30	1.7934525	24.96716	7.7126213	719.454545	256.000000
## 2725	1998-05-01	1.7983909	24.96294	7.6782179	10.777778	17.111111
## 2726	1998-05-02	1.8917616	24.95489	7.6898499	17.600000	6.800000
## 2727	1998-05-03	1.9851323	24.94685	7.7014819	4.727273	47.636364
## 2728	1998-05-04	2.0785030	24.93881	7.7131139	3.363636	4.136364
## 2729	1998-05-05	1.8121078	25.01683	7.2498393	26.000000	35.272727
## 2730	1998-05-06	1.5457125	25.09485	6.7865646	4.962963	30.740741
## 2731	1998-05-07	2.2517190	25.05295	6.9970367	3.000000	3.400000
## 2732	1998-05-08	3.3055667	25.09985	6.8095655	12.153846	9.384615
## 2733	1998-05-09	3.1875333	25.04515	7.0670777	3275.272727	1771.636364
## 2734	1998-05-10	3.0695000	24.99046	7.3245900	254.350000	301.150000
## 2735	1998-05-11	2.5775333	24.91614	7.5972148	8.727273	12.954545
## 2736	1998-05-12	3.4228242	25.09766	6.8902755	9.090909	20.454545
## 2737	1998-05-13	2.9583889	25.23853	6.4360995	478.545455	2041.454545
## 2738	1998-05-14	2.4939535	25.37941	5.9819235	910.000000	2000.000000
## 2739	1998-05-15	2.0295182	25.52028	5.5277476	23.694444	1001.500000
## 2740	1998-05-16	4.7888576	25.58735	5.6623177	3.250000	3.000000
## 2741	1998-05-17	7.5481970	25.65442	5.7968879	2.111111	3.222222
## 2742	1998-05-18	13.1349711	25.60560	7.1388833	12.085106	87.234043
## 2743	1998-05-19	6.9200500	25.39445	7.0866254	3.210526	5.315789
## 2744	1998-05-20	9.3059500	25.47481	7.2949683	3.200000	4.200000
## 2745	1998-05-21	9.9807121	25.33779	7.8442558	5.890909	9.490909
## 2746	1998-05-22	3.8402545	25.26439	6.8637915	4.045455	4.863636
## 2747	1998-05-23	4.6696803	25.17002	7.1377079	2.909091	2.000000
## 2748	1998-05-24	5.4991061	25.07564	7.4116242	42.681818	2.909091
## 2749	1998-05-25	4.8525690	25.20013	6.9333318	84.545455	978.545455
## 2750	1998-05-26	4.2060319	25.32463	6.4550393	12.000000	565.000000
## 2751	1998-05-27	3.5594948	25.44913	5.9767469	2.750000	3.000000
## 2752	1998-05-28	2.9129578	25.57362	5.4984544	3.166667	4.695122
## 2753	1998-05-29	2.7099357	25.42484	6.1382436	3.707317	6.390244
## 2754	1998-05-30	7.5890485	25.43410	6.1651948	2.000000	2.222222
## 2755	1998-05-31	1.9957458	25.26308	6.6177363	2.148148	5.037037
## 2756	1998-06-01	1.7267685	25.36711	6.1221385	90.000000	13.000000
## 2757	1998-06-02	1.4577911	25.47114	5.6265407	20.088889	203.644444
## 2758	1998-06-03	1.3644351	25.51661	5.3953500	2.909091	5.818182
## 2759	1998-06-04	1.2710792	25.56208	5.1641594	50.041667	374.375000
## 2760	1998-06-05	4.8790944	25.48596	5.6525461	3.153846	2.307692
## 2761	1998-06-06	6.2720909	25.25476	6.2910721	9.444444	24.777778
## 2762	1998-06-07	2.5543733	25.80796	4.3564973	46.975610	216.878049
## 2763	1998-06-08	6.2774352	25.67549	5.2219667	6.250000	9.000000
## 2764	1998-06-09	10.0004970	25.54303	6.0874361	22.833333	388.000000
## 2765	1998-06-10	9.5010015	25.43659	6.4605264	5.473684	162.315789
## 2766	1998-06-11	9.0015061	25.33014	6.8336167	6.105263	165.157895
## 2767	1998-06-12	14.3518121	24.99975	7.8723930	2.454545	3.500000
## 2768	1998-06-13	10.2816773	25.08672	7.3313877	5.090909	30.000000
## 2769	1998-06-14	6.2115424	25.17369	6.7903824	2.388889	19.666667
## 2770	1998-06-15	4.5623581	25.34822	6.1387742	5.000000	6.250000

##	2771	1998-06-16	2.9131738	25.52276	5.4871660	5.170732	26.048780
##	2772	1998-06-17	6.1351758	25.46951	5.7453800	2.000000	2.666667
##	2773	1998-06-18	4.2551822	25.57848	5.3181033	6.277778	20.333333
##	2774	1998-06-19	12.4647208	25.46292	6.3751467	11.629630	73.925926
##	2775	1998-06-20	12.6516543	25.47836	6.3550739	3.250000	2.250000
##	2776	1998-06-21	12.8385878	25.49380	6.3350012	4.727273	49.454545
##	2777	1998-06-22	13.0255212	25.50924	6.3149285	2.888889	4.000000
##	2778	1998-06-23	10.9247828	25.28261	7.0258352	5.000000	8.250000
##	2779	1998-06-24	8.8240444	25.05599	7.7367418	6.727273	31.636364
##	2780	1998-06-25	6.7233061	24.82936	8.4476485	2.555556	7.055556
##	2781	1998-06-26	7.7075000	24.91352	7.9255334	4.000000	9.000000
##	2782	1998-06-27	8.6916939	24.99768	7.4034184	20.727273	9.454545
##	2783	1998-06-28	9.6758879	25.08185	6.8813033	2.909091	6.909091
##	2784	1998-06-29	10.8308818	25.17828	6.8933433	3.611111	12.055556
##	2785	1998-06-30	5.0339956	25.40156	5.7553518	22.000000	89.745455
##	2786	1998-07-01	3.9101857	25.35018	6.5073710	16.000000	48.333333
##	2787	1998-07-02	8.9114542	25.29326	6.1895350	6.148148	14.962963
##	2788	1998-07-03	7.5239121	25.32816	6.3439242	2.000000	2.888889
##	2789	1998-07-04	16.6182697	25.09308	7.2996406	2.166667	3.666667
##	2790	1998-07-05	16.3722470	25.03647	7.5417439	2.250000	4.250000
##	2791	1998-07-06	16.1262242	24.97986	7.7838471	41.636364	24.909091
##	2792	1998-07-07	15.8802015	24.92325	8.0259504	8.500000	28.500000
##	2793	1998-07-08	15.6341788	24.86664	8.2680536	2.277778	3.388889
##	2794	1998-07-09	13.5143960	24.79574	8.0580667	7.818182	8.909091
##	2795	1998-07-10	11.3946131	24.72484	7.8480797	1051.750000	124.000000
##	2796	1998-07-11	9.2748303	24.65393	7.6380927	2.510638	2.510638
##	2797	1998-07-12	7.9198152	24.91368	7.0529456	4.000000	25.750000
##	2798	1998-07-13	6.5648000	25.17342	6.4677984	32.533333	196.577778
##	2799	1998-07-14	4.5997604	25.26587	6.2367877	25.254237	155.016949
##	2800	1998-07-15	4.2139917	25.20036	6.5961715	4.035714	31.500000
##	2801	1998-07-16	4.7496606	24.42902	6.8602533	54.611111	40.944444
##	2802	1998-07-17	7.8056303	24.62689	7.0358109	2.000000	2.000000
##	2803	1998-07-18	6.6470640	24.72567	7.4106809	2.000000	2.181818
##	2804	1998-07-19	5.4884976	24.82444	7.7855510	4.105263	8.736842
##	2805	1998-07-20	5.7918956	24.92885	6.6390751	19.333333	20.000000
##	2806	1998-07-21	4.4917292	25.03327	7.3445763	2.148148	3.111111
##	2807	1998-07-22	4.9991828	24.84659	7.7369418	21.157895	6.526316
##	2808	1998-07-23	5.5066364	24.65992	8.1293073	2.777778	2.000000
##	2809	1998-07-24	5.3841859	24.52205	8.1450814	7.750000	5.500000
##	2810	1998-07-25	5.2617354	24.38419	8.1608556	10.545455	7.090909
##	2811	1998-07-26	5.1392848	24.24632	8.1766297	2.055556	2.555556
##	2812	1998-07-27	5.8491697	24.11864	8.2064886	6.250000	192.750000
##	2813	1998-07-28	6.5590545	23.99097	8.2363476	2.765957	3.489362
##	2814	1998-07-29	5.2191273	24.11605	8.1399685	2.000000	2.500000
##	2815	1998-07-30	5.6734803	24.09109	8.1881021	3.500000	16.750000
##	2816	1998-07-31	6.1278333	24.06613	8.2362358	2.000000	2.000000
##	2817	1998-08-01	5.0498292	23.97883	7.9573533	11.000000	29.736842
##	2818	1998-08-02	4.3753000	24.30283	8.2173238	59.611111	230.555556
##	2819	1998-08-03	2.6029643	24.83075	7.2223850	9.200000	14.600000
##	2820	1998-08-04	3.4315408	24.62922	7.4809262	4.750000	4.750000
##	2821	1998-08-05	4.2601174	24.42770	7.7394673	20.181818	3.818182
##	2822	1998-08-06	5.0886939	24.22617	7.9980085	2.555556	3.111111
##	2823	1998-08-07	4.5477030	24.01167	8.0170944	3.750000	8.500000
##	2824	1998-08-08	4.0067121	23.79717	8.0361803	2.611111	2.944444

## 2825	1998-08-09	3.3412485	24.13521	7.5733164	6.947368	4.421053
## 2826	1998-08-10	2.6757848	24.47326	7.1104524	2.111111	2.111111
## 2827	1998-08-11	3.1969455	24.39882	7.3044696	6.250000	7.250000
## 2828	1998-08-12	3.7181061	24.32438	7.4984869	7.272727	12.727273
## 2829	1998-08-13	4.2392667	24.24993	7.6925041	27.250000	7.750000
## 2830	1998-08-14	4.7604273	24.17549	7.8865213	24.545455	8.000000
## 2831	1998-08-15	5.2815879	24.10105	8.0805385	2.500000	5.500000
## 2832	1998-08-16	5.8027485	24.02661	8.2745558	2.000000	2.222222
## 2833	1998-08-17	5.5868076	24.47921	8.2059539	3.000000	4.250000
## 2834	1998-08-18	5.3708667	24.93181	8.1373521	2.000000	2.000000
## 2835	1998-08-19	4.4433133	25.04955	7.8339474	2.545455	4.363636
## 2836	1998-08-20	3.5157600	25.16729	7.5305427	2.277778	2.388889
## 2837	1998-08-21	5.0829000	25.00360	7.8599595	8.888889	42.148148
## 2838	1998-08-22	4.0000214	25.20685	7.5582521	10.789474	6.736842
## 2839	1998-08-23	3.4949531	24.95070	7.6076285	11.454545	5.090909
## 2840	1998-08-24	2.9898848	24.69455	7.6570048	2.444444	11.111111
## 2841	1998-08-25	3.0802742	24.67675	7.6259858	2.000000	4.000000
## 2842	1998-08-26	3.1706636	24.65895	7.5949667	4.893617	8.085106
## 2843	1998-08-27	3.1699455	24.77381	7.6945262	8.000000	4.250000
## 2844	1998-08-28	3.1692273	24.88868	7.7940858	2.500000	3.388889
## 2845	1998-08-29	3.9061394	24.88054	8.0831388	2.000000	2.000000
## 2846	1998-08-30	4.2043356	24.91799	7.9693689	102.218182	221.381818
## 2847	1998-08-31	2.3361708	24.68255	7.6695479	2.074074	9.481481
## 2848	1998-09-01	5.9818333	24.80885	7.7221521	3.000000	5.200000
## 2849	1998-09-02	1.9116711	25.09123	6.8233538	5.622642	4.528302
## 2850	1998-09-03	1.6175042	25.18379	6.3902200	7.050847	34.440678
## 2851	1998-09-04	1.6559333	25.22571	6.4082765	27.000000	259.125000
## 2852	1998-09-05	3.3168727	24.84138	7.2086315	2.388889	3.333333
## 2853	1998-09-06	3.5927828	24.84806	7.1612074	52.000000	93.250000
## 2854	1998-09-07	3.8686929	24.85475	7.1137832	2.000000	3.454545
## 2855	1998-09-08	4.1446030	24.86144	7.0663591	2.944444	10.888889
## 2856	1998-09-09	3.7246720	24.78861	7.2436023	2.500000	4.250000
## 2857	1998-09-10	3.3047409	24.71578	7.4208456	6.545455	2.727273
## 2858	1998-09-11	2.8848098	24.64295	7.5980889	30.250000	38.500000
## 2859	1998-09-12	2.4648788	24.57012	7.7753321	2.055556	2.777778
## 2860	1998-09-13	2.9694242	24.66269	7.6594212	3.148936	2.382979
## 2861	1998-09-14	3.1005106	24.73441	7.4462542	5.000000	4.750000
## 2862	1998-09-15	3.2315970	24.80613	7.2330873	7.111111	2.777778
## 2863	1998-09-16	4.3918689	25.15891	7.0441191	5.319149	5.191489
## 2864	1998-09-17	3.0721405	25.13366	7.0679381	5.789474	6.578947
## 2865	1998-09-18	2.8544750	25.10130	6.4232392	4.296296	3.777778
## 2866	1998-09-19	7.5216788	25.14190	7.2830936	2.111111	2.000000
## 2867	1998-09-20	6.1091621	25.09646	7.2139802	54.000000	17.578947
## 2868	1998-09-21	4.6966455	25.05102	7.1448667	2.722222	5.444444
## 2869	1998-09-22	0.8600000	23.89900	6.7600000	4.861111	6.222222
## 2870	1998-09-23	2.5301348	24.44724	6.9500906	7.000000	7.000000
## 2871	1998-09-24	4.2002697	24.99547	7.1401812	3.063830	3.063830
## 2872	1998-09-25	3.7805924	24.94556	7.3670689	21.250000	40.500000
## 2873	1998-09-26	3.3609152	24.89565	7.5939567	2.388889	7.555556
## 2874	1998-09-27	3.3702606	24.84700	7.6292008	2.727273	5.090909
## 2875	1998-09-28	3.3796061	24.79835	7.6644449	922.500000	1494.750000
## 2876	1998-09-29	3.3889515	24.74970	7.6996891	2.700000	7.800000
## 2877	1998-09-30	2.7840178	24.86574	7.5060556	84.936170	681.659574
## 2878	1998-10-01	3.5429283	24.80540	7.5847203	97.333333	220.000000

##	2879	1998-10-02	4.3018389	24.74506	7.6633850	49.666667	111.000000
##	2880	1998-10-03	3.6093683	24.84660	7.6451143	2.000000	2.000000
##	2881	1998-10-04	2.9168976	24.94814	7.6268436	23.170732	47.902439
##	2882	1998-10-05	1.9046394	24.92628	7.3436145	2.318182	6.000000
##	2883	1998-10-06	4.0121545	24.93948	7.7946897	2.888889	4.611111
##	2884	1998-10-07	3.6024182	24.95294	7.6563358	33.684211	18.947368
##	2885	1998-10-08	3.1926818	24.96641	7.5179818	3.555556	6.888889
##	2886	1998-10-09	3.3114242	25.04745	7.3880695	9.250000	11.500000
##	2887	1998-10-10	3.4301667	25.12849	7.2581571	13.090909	63.636364
##	2888	1998-10-11	3.5489091	25.20953	7.1282448	8.250000	5.250000
##	2889	1998-10-12	3.6676515	25.29057	6.9983324	3.055556	2.611111
##	2890	1998-10-13	3.3580345	25.26038	7.3871896	5.000000	4.000000
##	2891	1998-10-14	3.0484176	25.23019	7.7760468	11.818182	141.636364
##	2892	1998-10-15	2.7388006	25.20000	8.1649039	2.222222	7.666667
##	2893	1998-10-16	2.4291836	25.27048	7.1890289	196.000000	36.000000
##	2894	1998-10-17	2.1195667	25.34095	6.2131538	445.928571	328.857143
##	2895	1998-10-18	2.1972208	25.36324	6.2505500	87.423077	455.153846
##	2896	1998-10-19	2.0295979	25.44888	5.8806025	10.107143	39.964286
##	2897	1998-10-20	2.9304727	25.12073	7.3101742	7.055556	28.611111
##	2898	1998-10-21	4.9404061	25.25427	7.1231667	420.413793	440.482759
##	2899	1998-10-22	5.8471556	25.12772	8.0499484	328.526316	390.000000
##	2900	1998-10-23	3.4517667	25.25416	7.4155948	2.736842	3.157895
##	2901	1998-10-24	3.0215917	25.21184	7.1570733	4.000000	5.185185
##	2902	1998-10-25	4.9154091	25.17458	7.6968133	12.510638	9.106383
##	2903	1998-10-26	5.6737576	25.09144	7.8518314	3.750000	5.750000
##	2904	1998-10-27	6.4321061	25.00829	8.0068494	37.277778	17.500000
##	2905	1998-10-28	5.6601939	25.02531	7.9447778	1613.368421	1686.947368
##	2906	1998-10-29	4.8882818	25.04233	7.8827062	4233.333333	4140.000000
##	2907	1998-10-30	4.1163697	25.05935	7.8206345	5.166667	16.555556
##	2908	1998-10-31	4.0086191	25.12517	7.6219504	27.500000	39.750000
##	2909	1998-11-01	3.9008684	25.19100	7.4232663	1458.727273	1260.000000
##	2910	1998-11-02	3.7931178	25.25682	7.2245822	340.054054	342.216216
##	2911	1998-11-03	3.7926042	25.15263	7.6530971	171.993694	172.674775
##	2912	1998-11-04	4.7539476	25.26013	7.4988026	3.933333	3.133333
##	2913	1998-11-05	6.6376697	25.22964	7.4179527	3.263158	2.000000
##	2914	1998-11-06	6.9649606	25.15363	7.7275824	58.000000	1145.090909
##	2915	1998-11-07	7.2922515	25.07761	8.0372121	13.863636	127.500000
##	2916	1998-11-08	5.9919727	25.11677	7.8935674	40.500000	21.500000
##	2917	1998-11-09	4.6916939	25.15592	7.7499226	12.000000	12.000000
##	2918	1998-11-10	3.3914152	25.19508	7.6062779	32.566038	220.377358
##	2919	1998-11-11	4.7606121	25.15004	7.6487692	6558.000000	8120.000000
##	2920	1998-11-12	6.1298091	25.10500	7.6912605	144.750000	29.250000
##	2921	1998-11-13	7.4990061	25.05996	7.7337518	12.285714	26.857143
##	2922	1998-11-14	6.9817265	25.05659	7.7153198	1113.454545	1258.181818
##	2923	1998-11-15	6.4644470	25.05321	7.6968877	12000.000000	12000.000000
##	2924	1998-11-16	5.9471674	25.04984	7.6784557	2.000000	2.750000
##	2925	1998-11-17	5.4298879	25.04647	7.6600236	8.238095	30.380952
##	2926	1998-11-18	5.5518924	25.06279	7.7374012	2.000000	2.000000
##	2927	1998-11-19	5.6738970	25.07911	7.8147788	1466.545455	2358.909091
##	2928	1998-11-20	5.7959015	25.09543	7.8921564	89.454545	493.636364
##	2929	1998-11-21	5.9179061	25.11175	7.9695339	2.571429	3.476190
##	2930	1998-11-22	5.5343323	25.07303	7.8024926	95.894737	153.684211
##	2931	1998-11-23	5.1507586	25.03431	7.6354513	8.000000	2.000000
##	2932	1998-11-24	4.7671848	24.99559	7.4684100	2.095238	2.190476

## 2933	1998-11-25	4.7716485	25.38699	6.3664667	2.615385	2.769231
## 2934	1998-11-26	3.9942511	25.44135	6.1956604	30.042553	72.255319
## 2935	1998-11-27	3.5690667	25.38566	6.6867683	18.857143	33.028571
## 2936	1998-11-28	4.6577238	25.51064	5.8921102	3.133333	2.133333
## 2937	1998-11-29	8.8442271	25.54683	6.3144125	2.750000	9.000000
## 2938	1998-11-30	13.0307303	25.58302	6.7367148	2.339623	2.301887
## 2939	1998-12-01	12.6028652	25.55960	6.6921044	3.250000	6.500000
## 2940	1998-12-02	12.1750000	25.53618	6.6474939	3.724138	2.689655
## 2941	1998-12-03	8.2550022	25.66534	5.6881478	2.222222	2.666667
## 2942	1998-12-04	4.8647048	25.66268	5.7011683	2.000000	2.200000
## 2943	1998-12-05	4.9882125	25.47955	6.0080788	2.926829	2.487805
## 2944	1998-12-06	6.1742911	25.58219	5.7198626	34.363636	101.818182
## 2945	1998-12-07	7.3603697	25.68483	5.4316464	12.600000	36.480000
## 2946	1998-12-08	11.2073909	25.63742	6.2124715	9.698113	4.641509
## 2947	1998-12-09	3.1069800	25.79714	4.8850873	26.867925	72.566038
## 2948	1998-12-10	2.4995958	25.83034	4.5670294	77.250000	235.875000
## 2949	1998-12-11	2.7730000	25.75888	5.0132440	2.083333	2.000000
## 2950	1998-12-12	5.7893909	25.44665	6.2678200	2.000000	2.428571
## 2951	1998-12-13	7.3249000	25.48117	6.1260671	4.105263	3.157895
## 2952	1998-12-14	8.8604091	25.51569	5.9843142	2.880000	2.800000
## 2953	1998-12-15	10.3959182	25.33368	6.7798148	2.909091	3.636364
## 2954	1998-12-16	11.9314273	25.15168	7.5753155	2.000000	2.238095
## 2955	1998-12-17	10.1862727	25.20870	7.1215280	2.500000	2.250000
## 2956	1998-12-18	8.4411182	25.26572	6.6677405	50.181818	62.545455
## 2957	1998-12-19	6.6959636	25.32274	6.2139530	2.380952	5.714286
## 2958	1998-12-20	8.6934697	25.34615	6.3785742	3.750000	3.750000
## 2959	1998-12-21	10.6909758	25.36957	6.5431955	2.555556	5.666667
## 2960	1998-12-22	11.4919970	25.29918	7.0623703	5.818182	13.636364
## 2961	1998-12-23	12.2930182	25.22880	7.5815452	2.000000	2.444444
## 2962	1998-12-24	5.6870417	25.11083	6.8292250	2.000000	2.787879
## 2963	1998-12-25	7.9934048	25.24552	6.8459557	2.421053	2.052632
## 2964	1998-12-26	5.8362145	25.03382	6.7620224	5.272727	5.636364
## 2965	1998-12-27	3.6790242	24.82213	6.6780891	4.640000	5.040000
## 2966	1998-12-28	4.4674515	24.98200	6.3258573	13.924528	24.452830
## 2967	1998-12-29	7.0557258	25.32044	5.8590239	2.000000	3.750000
## 2968	1998-12-30	9.6440000	25.65887	5.3921906	2.444444	2.666667
## 2969	1998-12-31	13.0603111	25.54488	6.1063110	31.894737	55.789474
## 2970	1999-01-01	16.4766222	25.43089	6.8204313	2.388889	2.277778
## 2971	1999-01-02	7.5988143	25.53510	5.9417345	2.200000	3.133333
## 2972	1999-01-03	15.9182250	25.30776	6.8813433	2.181818	7.757576
## 2973	1999-01-04	12.9692460	25.11790	7.0579632	2.500000	4.500000
## 2974	1999-01-05	10.0202669	24.92804	7.2345831	6.181818	11.454545
## 2975	1999-01-06	7.0712879	24.73818	7.4112030	2.000000	2.333333
## 2976	1999-01-07	6.3807505	24.84534	7.1197218	2.000000	2.000000
## 2977	1999-01-08	5.6902131	24.95250	6.8282406	10.363636	20.909091
## 2978	1999-01-09	4.9996758	25.05965	6.5367594	2.000000	2.428571
## 2979	1999-01-10	7.4699773	24.63529	7.4934030	5.000000	5.750000
## 2980	1999-01-11	9.9402788	24.21092	8.4500467	2.142857	2.952381
## 2981	1999-01-12	9.5549384	24.31833	7.9600139	9.090909	36.545455
## 2982	1999-01-13	9.1695980	24.42574	7.4699812	2.000000	10.250000
## 2983	1999-01-14	8.7842576	24.53314	6.9799485	3.000000	4.380952
## 2984	1999-01-15	6.0321061	24.70213	6.2550918	2.909091	4.000000
## 2985	1999-01-16	3.2799545	24.87112	5.5302352	2.666667	4.523810
## 2986	1999-01-17	3.0575551	25.04010	5.9739572	9.250000	10.250000

##	2987	1999-01-18	2.8351556	25.20909	6.4176793	26.750000	212.321429
##	2988	1999-01-19	1.7776042	25.23973	6.3031917	93.178571	572.857143
##	2989	1999-01-20	1.9048250	25.25107	6.4280906	21.500000	106.875000
##	2990	1999-01-21	4.8314424	24.45518	7.6473897	2.142857	3.000000
##	2991	1999-01-22	5.9559939	24.81915	8.2286815	2.000000	2.111111
##	2992	1999-01-23	8.5819444	24.94814	7.0606033	11.636364	29.309091
##	2993	1999-01-24	4.5044119	25.06967	7.1625243	2.000000	2.266667
##	2994	1999-01-25	2.8121125	24.76048	6.8111250	2.000000	2.000000
##	2995	1999-01-26	3.9835033	24.65794	7.1481755	4.000000	13.750000
##	2996	1999-01-27	5.1548941	24.55540	7.4852259	2.000000	4.363636
##	2997	1999-01-28	6.3262848	24.45286	7.8222764	2.380952	6.714286
##	2998	1999-01-29	6.6972000	24.48822	7.4351432	5.250000	7.250000
##	2999	1999-01-30	7.0681152	24.52359	7.0480100	2.226415	2.981132
##	3000	1999-01-31	4.4689939	24.27497	7.7990042	4.560000	5.880000
##	3001	1999-02-01	4.8554357	24.59875	8.1081095	4.731707	3.804878
##	3002	1999-02-02	8.5573911	24.46105	8.6357696	2.000000	2.000000
##	3003	1999-02-03	3.7548333	24.23202	7.5886283	2.606061	3.636364
##	3004	1999-02-04	7.7677424	24.62415	8.5813288	3.384615	3.384615
##	3005	1999-02-05	6.7868152	24.59366	8.2159276	2.363636	3.090909
##	3006	1999-02-06	5.8058879	24.56316	7.8505264	2.809524	12.904762
##	3007	1999-02-07	5.3809591	24.55354	7.5816814	2.000000	2.000000
##	3008	1999-02-08	4.9560303	24.54392	7.3128364	4.188679	7.132075
##	3009	1999-02-09	4.4941152	24.48688	7.4155726	36.500000	64.000000
##	3010	1999-02-10	4.0322000	24.42983	7.5183088	2.476190	3.095238
##	3011	1999-02-11	4.3280939	24.37364	7.7892187	2.736842	11.789474
##	3012	1999-02-12	4.6239879	24.31746	8.0601286	6.000000	12.750000
##	3013	1999-02-13	4.9198818	24.26128	8.3310386	10.727273	5.090909
##	3014	1999-02-14	5.2157758	24.20509	8.6019485	2.190476	2.857143
##	3015	1999-02-15	5.9877545	24.36531	8.6392964	3.250000	3.250000
##	3016	1999-02-16	6.7597333	24.52552	8.6766442	6.127660	23.957447
##	3017	1999-02-17	4.4911250	24.25489	7.9888879	2.606061	2.484848
##	3018	1999-02-18	5.7798310	24.56898	8.5351667	39.066667	6.933333
##	3019	1999-02-19	11.6577545	24.48495	8.4584670	2.555556	2.111111
##	3020	1999-02-20	8.1039106	24.51530	8.1503973	8.750000	19.750000
##	3021	1999-02-21	4.5500667	24.54566	7.8423276	2.285714	5.238095
##	3022	1999-02-22	4.2316667	24.46139	7.6859728	68.000000	20.181818
##	3023	1999-02-23	3.9132667	24.37712	7.5296181	14.750000	19.000000
##	3024	1999-02-24	3.5948667	24.29286	7.3732633	2.190476	3.238095
##	3025	1999-02-25	3.7420222	24.36917	7.2354776	8.181818	5.636364
##	3026	1999-02-26	3.8891778	24.44548	7.0976918	3.000000	10.000000
##	3027	1999-02-27	4.0363333	24.52179	6.9599061	5.095238	9.047619
##	3028	1999-02-28	3.7211258	24.50595	7.1964088	10.000000	4.631579
##	3029	1999-03-01	3.4059182	24.49010	7.4329115	2.190476	2.095238
##	3030	1999-03-02	2.2346867	24.71136	7.5647764	17.155556	164.088889
##	3031	1999-03-03	2.1627208	24.79057	7.4697775	8.298507	106.567164
##	3032	1999-03-04	2.3237125	24.85481	7.2445417	2.000000	2.000000
##	3033	1999-03-05	2.2342909	23.94426	6.8044406	2.047619	2.190476
##	3034	1999-03-06	4.6454758	24.59134	7.8762533	4.538462	3.076923
##	3035	1999-03-07	5.0218089	24.72591	7.8272658	186.170213	290.425532
##	3036	1999-03-08	4.8209214	24.66895	8.4035588	16.733333	59.866667
##	3037	1999-03-09	2.8512333	24.57672	7.1423146	2.000000	2.181818
##	3038	1999-03-10	2.6730293	24.53651	7.1836704	47.000000	8.000000
##	3039	1999-03-11	2.4948253	24.49630	7.2250263	2.000000	2.000000
##	3040	1999-03-12	2.3166212	24.45608	7.2663821	2.000000	2.000000

## 3041	1999-03-13	2.3651985	24.50886	7.1871244	4.250000	7.250000
## 3042	1999-03-14	2.4137758	24.56163	7.1078667	3.849057	6.301887
## 3043	1999-03-15	2.8679530	24.42659	7.3084027	11.000000	19.250000
## 3044	1999-03-16	3.3221303	24.29155	7.5089388	2.000000	2.619048
## 3045	1999-03-17	4.7368600	24.29102	8.1988040	2.944444	7.555556
## 3046	1999-03-18	3.5643955	24.44155	7.9873213	152.909091	93.454545
## 3047	1999-03-19	2.3919310	24.59208	7.7758386	518.774194	75.483871
## 3048	1999-03-20	2.9885208	24.41137	7.0987042	2.146341	3.121951
## 3049	1999-03-21	3.7462576	24.66188	7.3814279	2.333333	2.000000
## 3050	1999-03-22	2.6455970	24.59381	6.4852518	11.147541	12.360656
## 3051	1999-03-23	0.7700000	23.91900	6.6400000	6.645199	7.466042
## 3052	1999-03-24	3.4989152	24.66768	6.5626379	2.142857	2.571429
## 3053	1999-03-25	3.0751409	24.58607	6.7124065	3.052632	2.421053
## 3054	1999-03-26	2.6513667	24.50445	6.8621752	2.680000	3.280000
## 3055	1999-03-27	3.3684566	24.50849	7.1314489	9.818182	15.636364
## 3056	1999-03-28	4.0855465	24.51254	7.4007226	36.750000	25.500000
## 3057	1999-03-29	4.8026364	24.51658	7.6699964	29.111111	15.111111
## 3058	1999-03-30	4.6700089	24.58846	7.6299062	78.425532	521.234043
## 3059	1999-03-31	3.3642956	24.66464	7.6307887	7.090909	52.666667
## 3060	1999-04-01	2.1221958	24.46667	6.5815658	2.060606	3.151515
## 3061	1999-04-02	2.3765376	24.50169	6.7194296	10.000000	10.000000
## 3062	1999-04-03	2.6308794	24.53670	6.8572935	10.909091	36.727273
## 3063	1999-04-04	2.8852212	24.57171	6.9951573	3.047619	2.285714
## 3064	1999-04-05	2.7654394	24.63176	6.9933647	26.000000	25.500000
## 3065	1999-04-06	2.6456576	24.69180	6.9915721	1137.471698	498.754717
## 3066	1999-04-07	2.5130505	24.65883	7.0198678	8266.666667	5186.666667
## 3067	1999-04-08	2.3804434	24.62585	7.0481634	750.500000	130.750000
## 3068	1999-04-09	2.2478364	24.59288	7.0764591	248.142857	159.809524
## 3069	1999-04-10	2.5048833	24.64645	6.8416573	290.000000	58.000000
## 3070	1999-04-11	2.7619303	24.70001	6.6068555	107.047619	24.571429
## 3071	1999-04-12	2.9810056	24.73754	6.7941951	5070.000000	4900.000000
## 3072	1999-04-13	3.2000810	24.77506	6.9815347	2722.181818	3294.181818
## 3073	1999-04-14	3.4191563	24.81259	7.1688743	19.750000	11.000000
## 3074	1999-04-15	3.6382316	24.85011	7.3562139	139.090909	434.727273
## 3075	1999-04-16	3.8573069	24.88764	7.5435535	370.000000	5600.000000
## 3076	1999-04-17	4.0763823	24.92517	7.7308931	3.750000	21.000000
## 3077	1999-04-18	4.2954576	24.96269	7.9182327	448.068966	610.413793
## 3078	1999-04-19	3.4610089	24.96529	7.7982338	84.550000	690.300000
## 3079	1999-04-20	2.9724500	25.02584	7.3823621	21.066667	53.200000
## 3080	1999-04-21	2.2499909	25.02087	6.7698748	5.523810	17.095238
## 3081	1999-04-22	3.3141172	25.00113	6.9376865	7.000000	2.750000
## 3082	1999-04-23	4.3782434	24.98140	7.1054981	69.090909	1064.545455
## 3083	1999-04-24	5.4423697	24.96166	7.2733097	26.511628	249.209302
## 3084	1999-04-25	4.8661583	24.93160	7.3090424	16.666667	303.333333
## 3085	1999-04-26	4.2899468	24.90154	7.3447752	8.500000	4.750000
## 3086	1999-04-27	3.7137354	24.87147	7.3805079	548.545455	1661.636364
## 3087	1999-04-28	3.1375239	24.84141	7.4162406	1211.000000	6013.000000
## 3088	1999-04-29	2.5613125	24.81135	7.4519733	2.363636	3.333333
## 3089	1999-04-30	2.4999381	24.78550	7.2688197	52.500000	26.000000
## 3090	1999-05-01	2.4385636	24.75965	7.0856661	2.285714	2.476190
## 3091	1999-05-02	2.6152384	24.83425	7.0639174	104.727273	750.181818
## 3092	1999-05-03	2.7919131	24.90884	7.0421687	8.000000	10.000000
## 3093	1999-05-04	2.9685879	24.98344	7.0204200	2.714286	4.761905
## 3094	1999-05-05	9.4389244	25.00475	7.5124624	109.888889	475.944444

##	3095	1999-05-06	5.8184810	25.06534	7.2096798	95.073171	296.000000
##	3096	1999-05-07	6.8338000	25.00222	7.4441807	37.500000	64.125000
##	3097	1999-05-08	4.9701917	24.92189	7.6530316	30.500000	7.750000
##	3098	1999-05-09	3.1065833	24.84155	7.8618825	8.242424	2.424242
##	3099	1999-05-10	1.6677208	25.20554	6.0918944	274.881356	238.237288
##	3100	1999-05-11	2.2692364	24.91271	6.9000455	244.078431	240.470588
##	3101	1999-05-12	1.7851583	25.28541	5.9592365	6.750000	56.500000
##	3102	1999-05-13	1.9980844	25.27846	5.8634913	2.622222	2.133333
##	3103	1999-05-14	3.7650697	24.92806	7.3982164	1074.918033	849.049180
##	3104	1999-05-15	3.5445167	24.94199	7.3526782	254.727273	1016.545455
##	3105	1999-05-16	3.3239636	24.95592	7.3071400	8.720000	26.400000
##	3106	1999-05-17	3.4270273	24.98417	7.1791968	1768.000000	1250.000000
##	3107	1999-05-18	3.5300909	25.01243	7.0512535	12000.000000	12000.000000
##	3108	1999-05-19	3.6331545	25.04068	6.9233103	3.428571	4.809524
##	3109	1999-05-20	4.4299039	25.16869	6.4333884	2.000000	8.750000
##	3110	1999-05-21	5.2266533	25.29669	5.9434664	34.388889	505.055556
##	3111	1999-05-22	5.1019481	25.32374	5.9125223	1138.363636	2624.363636
##	3112	1999-05-23	4.9772429	25.35079	5.8815781	248.727273	538.969697
##	3113	1999-05-24	3.5747667	25.17833	6.1149550	2.424242	2.303030
##	3114	1999-05-25	7.5056030	25.41339	5.7879912	6.000000	9.222222
##	3115	1999-05-26	7.1761674	25.36542	6.0573344	6.000000	5.250000
##	3116	1999-05-27	6.8467318	25.31744	6.3266776	22.727273	47.818182
##	3117	1999-05-28	6.5172962	25.26947	6.5960208	2.500000	4.250000
##	3118	1999-05-29	6.1878606	25.22149	6.8653639	2.761905	9.761905
##	3119	1999-05-30	5.6528788	25.27391	6.5843688	3.698113	5.018868
##	3120	1999-05-31	7.9246636	25.09554	7.2676195	7.250000	3.750000
##	3121	1999-06-01	10.1964485	24.91716	7.9508703	2.285714	2.047619
##	3122	1999-06-02	10.5489374	24.99008	7.7997749	21.636364	18.545455
##	3123	1999-06-03	10.9014263	25.06299	7.6486796	4.750000	3.500000
##	3124	1999-06-04	11.2539152	25.13591	7.4975842	2.190476	2.571429
##	3125	1999-06-05	8.5842576	25.02115	7.9289803	9.500000	28.500000
##	3126	1999-06-06	5.9146000	24.90640	8.3603764	3.358491	4.792453
##	3127	1999-06-07	5.9060788	25.03061	6.7217997	2.000000	3.076923
##	3128	1999-06-08	5.3525786	25.12154	6.4208505	4.780488	10.926829
##	3129	1999-06-09	5.6045956	25.03193	6.4250362	89.111111	285.722222
##	3130	1999-06-10	2.9519583	25.13137	6.5708279	2.666667	3.272727
##	3131	1999-06-11	2.8182998	25.19743	6.4449375	2.500000	4.500000
##	3132	1999-06-12	2.6846413	25.26350	6.3190470	1288.363636	2480.727273
##	3133	1999-06-13	2.5509828	25.32956	6.1931565	10.666667	41.333333
##	3134	1999-06-14	2.4173242	25.39563	6.0672661	2.761905	4.285714
##	3135	1999-06-15	5.7414924	25.37340	6.5567109	2.000000	2.000000
##	3136	1999-06-16	9.0656606	25.35118	7.0461558	2.226415	8.000000
##	3137	1999-06-17	8.2174758	25.15516	7.6483395	3.750000	5.000000
##	3138	1999-06-18	7.3692909	24.95914	8.2505233	2.047619	2.142857
##	3139	1999-06-19	6.2706646	25.06993	7.1589788	30.909091	46.181818
##	3140	1999-06-20	5.1720384	25.18073	6.0674342	4.750000	12.000000
##	3141	1999-06-21	4.0734121	25.29152	4.9758897	2.571429	2.619048
##	3142	1999-06-22	2.7591133	25.57372	4.7789031	2.088889	2.711111
##	3143	1999-06-23	2.2644083	25.66112	4.5325800	50.125000	672.041667
##	3144	1999-06-24	2.1869042	25.69094	4.2888258	9.552239	92.238806
##	3145	1999-06-25	11.7470182	25.28675	5.6097824	3.523810	4.190476
##	3146	1999-06-26	17.9609422	24.91884	7.6552380	2.055556	2.444444
##	3147	1999-06-27	13.6748842	24.99476	7.1186452	10.105263	6.315789
##	3148	1999-06-28	9.3888262	25.07067	6.5820524	2.266667	2.733333

## 3149	1999-06-29	9.9177722	24.71375	7.0511779	4.121212	33.090909
## 3150	1999-06-30	10.4467182	24.63418	7.5203033	2.000000	2.333333
## 3151	1999-07-01	8.5435162	24.75805	6.8194831	2.000000	2.750000
## 3152	1999-07-02	6.6403141	24.88192	6.1186629	2.909091	8.363636
## 3153	1999-07-03	4.7371121	25.00579	5.4178427	70.809524	7.380952
## 3154	1999-07-04	4.7242909	25.02148	5.3654815	4.000000	6.000000
## 3155	1999-07-05	4.7114697	25.03718	5.3131203	18.716981	4.566038
## 3156	1999-07-06	3.9821970	25.03138	5.5117431	2.000000	2.500000
## 3157	1999-07-07	3.2529242	25.02559	5.7103660	2.181818	4.545455
## 3158	1999-07-08	2.5236515	25.01979	5.9089888	2.095238	4.142857
## 3159	1999-07-09	6.2039846	25.08661	6.1334578	6.750000	9.250000
## 3160	1999-07-10	9.8843178	25.15343	6.3579269	17.333333	65.055556
## 3161	1999-07-11	6.9848881	24.98139	6.6383428	10.181818	7.272727
## 3162	1999-07-12	4.0854583	24.80935	6.9187588	12.545455	2.121212
## 3163	1999-07-13	5.5427429	25.06275	6.6828681	5.052632	19.789474
## 3164	1999-07-14	11.1702273	25.06460	6.6894206	2.000000	2.000000
## 3165	1999-07-15	3.8425182	24.60757	6.7412561	5.433962	10.301887
## 3166	1999-07-16	6.3456212	24.61830	6.6966356	2.250000	2.000000
## 3167	1999-07-17	8.8487242	24.62902	6.6520152	862.190476	5.000000
## 3168	1999-07-18	6.4938439	24.72553	6.2486130	42.526316	5.157895
## 3169	1999-07-19	4.1389636	24.82203	5.8452109	48.428571	5.095238
## 3170	1999-07-20	4.6145313	24.91699	5.7413545	2.500000	3.000000
## 3171	1999-07-21	5.0900990	25.01195	5.6374982	2.000000	2.181818
## 3172	1999-07-22	5.5656667	25.10690	5.5336418	17.571429	2.761905
## 3173	1999-07-23	8.8610356	25.18849	6.0222605	2.750000	2.750000
## 3174	1999-07-24	12.1564044	25.27007	6.5108791	28.222222	56.444444
## 3175	1999-07-25	12.1197367	25.15372	6.7551079	3.545455	2.500000
## 3176	1999-07-26	12.0830690	25.03736	6.9993367	2.000000	2.933333
## 3177	1999-07-27	14.3809939	24.88410	7.8139461	2.444444	5.666667
## 3178	1999-07-28	11.5623747	24.76936	7.7470507	8.500000	6.750000
## 3179	1999-07-29	8.7437556	24.65462	7.6801554	18.000000	76.727273
## 3180	1999-07-30	5.9251364	24.53988	7.6132600	2.857143	2.333333
## 3181	1999-07-31	4.9972197	24.47863	7.5651779	5.000000	2.000000
## 3182	1999-08-01	4.0693030	24.41738	7.5170958	2.000000	2.000000
## 3183	1999-08-02	4.9732048	24.32697	7.4509712	36.727273	16.545455
## 3184	1999-08-03	5.8771067	24.23656	7.3848465	9.250000	5.500000
## 3185	1999-08-04	6.7810085	24.14615	7.3187219	15.090909	4.363636
## 3186	1999-08-05	7.6849103	24.05574	7.2525973	177.250000	3.500000
## 3187	1999-08-06	8.5888121	23.96533	7.1864727	4.000000	9.190476
## 3188	1999-08-07	1.7749622	24.91661	6.0104562	6.755556	39.200000
## 3189	1999-08-08	1.7952051	25.02593	5.8486901	4.842105	9.368421
## 3190	1999-08-09	1.8154479	25.13526	5.6869240	11.333333	53.875000
## 3191	1999-08-10	2.2702604	25.11809	5.8274950	10.875000	121.000000
## 3192	1999-08-11	4.7365515	24.65564	6.4622567	13.761905	2.428571
## 3193	1999-08-12	9.3571978	24.70142	7.4099982	43.045455	180.272727
## 3194	1999-08-13	9.6707810	24.68170	7.5098417	4.390244	3.853659
## 3195	1999-08-14	9.0899000	24.63511	7.3910233	2.111111	2.000000
## 3196	1999-08-15	2.8612708	24.26395	6.2195162	12.787879	4.303030
## 3197	1999-08-16	2.8916775	24.28567	6.2338420	2.000000	2.750000
## 3198	1999-08-17	2.9220842	24.30740	6.2481678	9.090909	6.000000
## 3199	1999-08-18	2.9524909	24.32912	6.2624936	12.190476	3.190476
## 3200	1999-08-19	2.9242545	24.27066	6.3218753	14.000000	11.000000
## 3201	1999-08-20	2.8960182	24.21220	6.3812570	3.471698	2.716981
## 3202	1999-08-21	3.2805561	24.21182	6.5707177	8.000000	11.250000

##	3203	1999-08-22	3.6650939	24.21144	6.7601785	15.190476	7.095238
##	3204	1999-08-23	3.2691788	24.13615	6.9140298	2.727273	3.818182
##	3205	1999-08-24	2.8732636	24.06085	7.0678811	5.750000	13.750000
##	3206	1999-08-25	2.4773485	23.98556	7.2217324	2.333333	3.904762
##	3207	1999-08-26	3.0813561	23.88328	7.0316476	19.090909	8.727273
##	3208	1999-08-27	3.6853636	23.78099	6.8415627	33.160000	5.840000
##	3209	1999-08-28	3.7621583	24.50410	6.4785487	8.307692	3.384615
##	3210	1999-08-29	7.0484119	24.57002	7.5076786	132.722222	197.722222
##	3211	1999-08-30	7.6253667	24.43704	7.6109222	27.619048	7.619048
##	3212	1999-08-31	2.6708143	24.34993	7.2888545	2.000000	2.000000
##	3213	1999-09-01	3.9451636	24.29965	7.0370824	4.440000	4.200000
##	3214	1999-09-02	3.3681045	24.25166	7.0232305	11.636364	9.636364
##	3215	1999-09-03	2.7910455	24.20367	7.0093785	5.280000	2.280000
##	3216	1999-09-04	2.4747197	24.22078	6.9022850	4.909091	9.090909
##	3217	1999-09-05	2.1583939	24.23789	6.7951915	16.080000	7.160000
##	3218	1999-09-06	4.4540644	24.41706	7.5552547	3.666667	7.555556
##	3219	1999-09-07	3.1750714	24.47113	7.4468110	4.000000	2.536585
##	3220	1999-09-08	4.2594333	24.27836	7.3997130	10.777778	14.111111
##	3221	1999-09-09	2.6196833	24.20255	6.6471554	167.951220	17.707317
##	3222	1999-09-10	2.9856235	24.14553	6.5346579	2.000000	2.000000
##	3223	1999-09-11	3.3515636	24.08852	6.4221603	6.720000	5.000000
##	3224	1999-09-12	2.6681970	24.13518	6.3902398	13.090909	3.090909
##	3225	1999-09-13	1.9848303	24.18185	6.3583194	6.680000	4.440000
##	3226	1999-09-14	2.3135939	24.11965	6.3815767	4.327869	2.819672
##	3227	1999-09-15	2.4574870	24.50970	6.5771559	4.000000	14.000000
##	3228	1999-09-16	2.6013800	24.89976	6.7727351	5.018868	8.037736
##	3229	1999-09-17	2.4440265	24.93490	6.7066167	8.363636	3.454545
##	3230	1999-09-18	2.2866729	24.97004	6.6404983	23.875000	273.833333
##	3231	1999-09-19	2.3229458	24.86947	6.8460927	2.625000	2.458333
##	3232	1999-09-20	3.3075121	24.51421	8.3514239	2.904762	2.142857
##	3233	1999-09-21	7.2711222	24.58227	7.5247200	4.181818	11.954545
##	3234	1999-09-22	4.8642571	24.67565	7.4008819	4.341463	3.121951
##	3235	1999-09-23	6.5645091	24.73476	7.1449952	2.000000	2.222222
##	3236	1999-09-24	1.7669333	24.37823	7.9564950	3.212121	2.181818
##	3237	1999-09-25	0.7000000	23.93200	6.6600000	4.250000	7.500000
##	3238	1999-09-26	1.3778212	24.19970	7.3600700	38.545455	4.727273
##	3239	1999-09-27	2.0556424	24.46740	8.0601400	2.428571	3.619048
##	3240	1999-09-28	2.1505606	24.42898	8.1198752	8.000000	5.250000
##	3241	1999-09-29	2.2454788	24.39055	8.1796103	3.773585	11.207547
##	3242	1999-09-30	2.2495864	24.46346	7.9767085	3.250000	3.000000
##	3243	1999-10-01	2.2536939	24.53636	7.7738067	23.047619	11.571429
##	3244	1999-10-02	2.3008311	24.55392	7.8512193	52.363636	1327.090909
##	3245	1999-10-03	2.3479682	24.57148	7.9286320	26.000000	1200.000000
##	3246	1999-10-04	2.3951053	24.58904	8.0060446	7.500000	8.500000
##	3247	1999-10-05	2.4422424	24.60660	8.0834573	32.000000	3.904762
##	3248	1999-10-06	2.2383936	24.60983	8.0289548	4.000000	2.000000
##	3249	1999-10-07	2.0345447	24.61305	7.9744524	6515.090909	2584.545455
##	3250	1999-10-08	1.8306958	24.61628	7.9199500	600.083333	440.833333
##	3251	1999-10-09	0.6685095	24.66991	7.1042048	47.400000	18.666667
##	3252	1999-10-10	0.7062697	24.80313	7.0999706	27.111111	5.888889
##	3253	1999-10-11	2.6390818	24.59230	7.9973888	37.142857	6.333333
##	3254	1999-10-12	2.3993205	24.61144	7.9196114	2.000000	2.000000
##	3255	1999-10-13	2.1595591	24.63058	7.8418339	809.157895	565.263158
##	3256	1999-10-14	1.9197977	24.64971	7.7640565	50.666667	80.000000

## 3257	1999-10-15	1.6800364	24.66885	7.6862791	2.619048	3.095238
## 3258	1999-10-16	3.0646422	24.70389	7.0330869	59.888889	38.500000
## 3259	1999-10-17	3.0021841	24.72541	7.2435718	1754.000000	7.250000
## 3260	1999-10-18	2.9397259	24.74692	7.4540566	176.727273	215.090909
## 3261	1999-10-19	2.8772678	24.76843	7.6645415	3.000000	2.000000
## 3262	1999-10-20	2.8148097	24.78995	7.8750263	16.000000	5.500000
## 3263	1999-10-21	2.7523515	24.81146	8.0855112	2.000000	2.000000
## 3264	1999-10-22	2.3997174	24.80717	8.0602556	167.636364	268.363636
## 3265	1999-10-23	2.0470833	24.80288	8.0350000	2.121212	2.060606
## 3266	1999-10-24	6.9988889	24.80102	7.6097778	288.893617	350.723404
## 3267	1999-10-25	4.0692857	24.74950	7.4385714	4.580645	3.548387
## 3268	1999-10-26	7.1803030	24.80597	7.6936364	8.444444	4.555556
## 3269	1999-10-27	3.1360606	24.71891	8.3166667	11.698113	3.433962
## 3270	1999-10-28	2.3387879	24.67717	8.0803030	5457.454545	1874.000000
## 3271	1999-10-29	1.5415152	24.63542	7.8439394	97.904762	12.952381
## 3272	1999-10-30	1.7550000	24.64309	7.8348485	4336.666667	5340.000000
## 3273	1999-10-31	1.9684848	24.65076	7.8257576	15.857143	11.571429
## 3274	1999-11-01	2.8645455	24.67767	7.8839394	9.904762	5.238095
## 3275	1999-11-02	2.7789091	24.68412	7.9800606	379.090909	262.727273
## 3276	1999-11-03	2.6932727	24.69058	8.0761818	180.000000	260.000000
## 3277	1999-11-04	2.6076364	24.69703	8.1723030	1674.000000	2731.454545
## 3278	1999-11-05	2.5220000	24.70348	8.2684242	9666.666667	9266.666667
## 3279	1999-11-06	2.4363636	24.70994	8.3645455	28.952381	32.476190
## 3280	1999-11-07	2.4887879	24.74158	7.6433333	166.385281	203.965368
## 3281	1999-11-08	2.4542424	24.68220	7.8371212	303.818182	375.454545
## 3282	1999-11-09	2.4196970	24.62282	8.0309091	4.363636	19.363636
## 3283	1999-11-10	3.8462929	24.63973	7.8997879	4.000000	46.000000
## 3284	1999-11-11	5.2728889	24.65664	7.7686667	558.680851	629.872340
## 3285	1999-11-12	2.3233333	24.71579	7.4427273	86.888889	304.444444
## 3286	1999-11-13	3.6169048	24.80760	7.2550000	45.444444	153.611111
## 3287	1999-11-14	3.8578788	24.86733	7.0166667	4.000000	2.777778
## 3288	1999-11-15	1.8085714	24.85850	7.0000000	5.708333	14.680556
## 3289	1999-11-16	1.5770833	25.16996	6.1635417	7.416667	26.583333
## 3290	1999-11-17	2.1231111	25.04873	6.4988889	76.392857	215.285714
## 3291	1999-11-18	4.8781818	24.90003	6.8890909	10.190476	15.190476
## 3292	1999-11-19	10.0054545	24.77424	7.6863636	282.000000	327.888889
## 3293	1999-11-20	6.4912689	24.88550	7.2571402	230.000000	310.000000
## 3294	1999-11-21	2.9770833	24.99675	6.8279167	2.303030	4.181818
## 3295	1999-11-22	1.2783333	25.47779	5.3387500	10.227273	40.066919
## 3296	1999-11-23	3.0288095	25.50569	5.5550000	18.151515	75.952020
## 3297	1999-11-24	4.0651515	25.39991	6.0227273	26.075758	111.837121
## 3298	1999-11-25	3.5166667	25.41200	6.3002222	34.000000	147.722222
## 3299	1999-11-26	6.9524242	25.05485	7.8751515	107.619048	4.904762
## 3300	1999-11-27	5.5262121	25.02582	7.6398485	188.000000	1538.666667
## 3301	1999-11-28	4.1000000	24.99679	7.4045455	2.000000	2.476190
## 3302	1999-11-29	5.8736364	25.22942	6.4393939	7.476190	32.476190
## 3303	1999-11-30	6.8792424	25.17330	6.4250000	2.000000	140.000000
## 3304	1999-12-01	7.8848485	25.11718	6.4106061	2.142857	3.761905
## 3305	1999-12-02	7.5893939	25.00097	7.1278788	2.190476	3.380952
## 3306	1999-12-03	4.3163636	25.41394	6.0927273	2.047619	5.238095
## 3307	1999-12-04	6.2890909	25.32352	6.4245455	2.523810	30.119048
## 3308	1999-12-05	6.1746970	25.38000	6.3912121	3.000000	55.000000
## 3309	1999-12-06	6.0603030	25.43648	6.3578788	2.380952	5.523810
## 3310	1999-12-07	6.1054640	25.53270	5.7737311	2.500000	7.250000

## 3311	1999-12-08	6.1506250	25.62892	5.1895833	52.610169	126.000000
## 3312	1999-12-09	8.5944444	25.47831	5.8386667	2.042553	2.936170
## 3313	1999-12-10	4.5916667	25.54204	5.1883333	13.500000	188.333333
## 3314	1999-12-11	9.5566667	24.93067	8.1248485	33.476190	2.190476
## 3315	1999-12-12	14.3445238	25.10477	7.0111147	8.750000	5.000000
## 3316	1999-12-13	19.1323810	25.27888	5.8973810	2.133333	2.066667
## 3317	1999-12-14	15.9603030	25.29833	5.9872727	2.896552	5.724138
## 3318	1999-12-15	14.3995556	25.34467	5.3273333	2.222222	2.944444
## 3319	1999-12-16	6.4208333	25.25825	5.8891667	2.303030	2.848485
## 3320	1999-12-17	7.7223864	25.11229	6.6494318	4.250000	2.000000
## 3321	1999-12-18	9.0239394	24.96633	7.4096970	7.360000	17.040000
## 3322	1999-12-19	7.3033333	25.08477	6.9456566	88.000000	54.000000
## 3323	1999-12-20	5.5827273	25.20320	6.4816162	2.750000	2.750000
## 3324	1999-12-21	3.8621212	25.32164	6.0175758	5.952381	32.095238
## 3325	1999-12-22	5.3537157	25.30858	5.9427489	12.181818	14.545455
## 3326	1999-12-23	6.8453102	25.29553	5.8679221	3.750000	2.500000
## 3327	1999-12-24	8.3369048	25.28248	5.7930952	4.040816	39.714286
## 3328	1999-12-25	12.8128889	25.02876	6.8842222	82.055556	310.833333
## 3329	1999-12-26	16.8081818	24.82039	7.7690909	19.666667	48.222222
## 3330	1999-12-27	14.2308333	24.54512	9.0687500	3.151515	15.696970
## 3331	1999-12-28	13.1163131	24.46144	8.7362374	2.000000	3.500000
## 3332	1999-12-29	12.0017929	24.37775	8.4037247	102.363636	66.000000
## 3333	1999-12-30	10.8872727	24.29406	8.0712121	2.000000	2.190476
## 3334	1999-12-31	9.0808081	24.37185	7.7450505	3.250000	2.500000
## 3335	2000-01-01	7.2743434	24.44964	7.4188889	4.545455	9.272727
## 3336	2000-01-02	5.4678788	24.52742	7.0927273	2.000000	2.095238
## 3337	2000-01-03	5.5381818	24.61176	7.0369697	14.500000	2.750000
## 3338	2000-01-04	5.6084848	24.69609	6.9812121	2.490566	4.113208
## 3339	2000-01-05	8.3860606	24.83506	7.2675758	2.250000	3.000000
## 3340	2000-01-06	11.1636364	24.97403	7.5539394	2.142857	2.000000
## 3341	2000-01-07	9.5327273	24.83109	7.7446970	37.090909	9.636364
## 3342	2000-01-08	7.9018182	24.68815	7.9354545	2.160000	2.440000
## 3343	2000-01-09	8.1834343	24.81752	7.4360606	19.454545	16.545455
## 3344	2000-01-10	8.4650505	24.94688	6.9366667	3.500000	2.250000
## 3345	2000-01-11	8.7466667	25.07624	6.4372727	2.142857	2.000000
## 3346	2000-01-12	6.2803030	25.22015	6.3196970	2.000000	2.000000
## 3347	2000-01-13	2.2869048	25.35288	6.3930952	31.102041	61.632653
## 3348	2000-01-14	4.6591111	25.42604	6.1073333	290.944444	569.500000
## 3349	2000-01-15	5.1827407	25.11533	6.5819596	2.750000	2.500000
## 3350	2000-01-16	5.7063704	24.80462	7.0565859	28.181818	71.636364
## 3351	2000-01-17	6.2300000	24.49391	7.5312121	2.523810	2.571429
## 3352	2000-01-18	4.7733333	24.61608	7.1862500	2.000000	2.181818
## 3353	2000-01-19	4.6943939	24.78710	7.1564583	2.000000	2.000000
## 3354	2000-01-20	4.6154545	24.95812	7.1266667	4.452830	11.358491
## 3355	2000-01-21	12.6665152	25.12632	7.0475758	14.250000	5.500000
## 3356	2000-01-22	20.7175758	25.29452	6.9684848	7.444444	29.000000
## 3357	2000-01-23	10.2307143	25.37988	6.5528571	3.902439	5.756098
## 3358	2000-01-24	17.8160000	25.32364	7.3517778	2.055556	2.000000
## 3359	2000-01-25	11.2891667	24.80504	7.2266667	3.212121	5.515152
## 3360	2000-01-26	8.6665833	25.05311	6.3611111	2.000000	3.750000
## 3361	2000-01-27	6.0440000	25.30118	5.4955556	12.533333	4.056818
## 3362	2000-01-28	6.5945000	25.35711	5.5102778	3.636364	4.363636
## 3363	2000-01-29	7.1450000	25.41304	5.5250000	2.041667	5.431818
## 3364	2000-01-30	6.8508333	25.40015	5.3639583	27.428571	6.500000

## 3365	2000-01-31	11.5254545	24.99782	6.8957576	2.000000	2.363636
## 3366	2000-02-01	12.9153030	24.98150	7.3065152	3.272727	2.909091
## 3367	2000-02-02	14.3051515	24.96518	7.7172727	2.243902	2.292683
## 3368	2000-02-03	10.6793939	25.25909	6.9690909	9.090909	2.000000
## 3369	2000-02-04	8.9613131	25.16090	7.1081818	2.750000	3.250000
## 3370	2000-02-05	7.2432323	25.06271	7.2472727	38.000000	20.000000
## 3371	2000-02-06	5.5251515	24.96452	7.3863636	2.060606	2.000000
## 3372	2000-02-07	6.7917172	24.92243	7.3487879	3.000000	3.500000
## 3373	2000-02-08	8.0582828	24.88035	7.3112121	14.545455	34.727273
## 3374	2000-02-09	9.3248485	24.83827	7.2736364	2.000000	2.000000
## 3375	2000-02-10	8.3674242	24.87461	7.3654545	6.000000	2.500000
## 3376	2000-02-11	7.4100000	24.91094	7.4572727	23.172414	44.068966
## 3377	2000-02-12	13.6260000	24.90393	7.3933333	37.111111	136.888889
## 3378	2000-02-13	9.9919048	24.91993	7.5823810	2.000000	2.000000
## 3379	2000-02-14	7.0637500	24.80071	7.5541667	2.250000	3.416667
## 3380	2000-02-15	5.4592677	24.87757	6.9756061	5.750000	9.250000
## 3381	2000-02-16	3.8547854	24.95444	6.3970455	2.181818	2.000000
## 3382	2000-02-17	2.2503030	25.03130	5.8184848	2.000000	2.060606
## 3383	2000-02-18	4.5828788	25.10806	5.6400000	2.000000	3.500000
## 3384	2000-02-19	6.9154545	25.18482	5.4615152	2.060606	2.181818
## 3385	2000-02-20	7.6451515	25.08133	6.2841414	11.454545	8.363636
## 3386	2000-02-21	8.3748485	24.97785	7.1067677	2.000000	3.250000
## 3387	2000-02-22	9.1045455	24.87436	7.9293939	2.121212	2.121212
## 3388	2000-02-23	8.2595960	24.59787	7.8011111	18.500000	18.500000
## 3389	2000-02-24	7.4146465	24.32137	7.6728283	12.500000	4.000000
## 3390	2000-02-25	6.5696970	24.04488	7.5445455	25.818182	264.484848
## 3391	2000-02-26	6.6437374	24.06840	7.4553535	2.000000	2.000000
## 3392	2000-02-27	6.7177778	24.09193	7.3661616	7.875000	21.625000
## 3393	2000-02-28	6.7918182	24.11545	7.2769697	9.333333	5.818182
## 3394	2000-02-29	6.5604545	24.26821	7.4806061	23.750000	65.250000
## 3395	2000-03-01	6.3290909	24.42097	7.6842424	4.466667	5.400000
## 3396	2000-03-02	6.4359524	24.58660	7.4897619	3.000000	5.066667
## 3397	2000-03-03	6.2866667	24.48909	7.2555556	17.666667	70.222222
## 3398	2000-03-04	11.5987500	24.23846	7.1975000	2.000000	2.000000
## 3399	2000-03-05	10.2038352	24.24049	7.1125947	21.000000	6.500000
## 3400	2000-03-06	8.8089205	24.24252	7.0276894	50.000000	58.704545
## 3401	2000-03-07	7.4140057	24.24455	6.9427841	127.636364	110.909091
## 3402	2000-03-08	6.0190909	24.24658	6.8578788	464.352941	463.588235
## 3403	2000-03-09	6.1197980	24.28053	6.8636364	420.000000	880.000000
## 3404	2000-03-10	6.2205051	24.31448	6.8693939	80.000000	83.000000
## 3405	2000-03-11	6.3212121	24.34844	6.8751515	109.750000	61.000000
## 3406	2000-03-12	6.4219192	24.38239	6.8809091	2.000000	31.500000
## 3407	2000-03-13	6.5226263	24.41635	6.8866667	20.000000	2.000000
## 3408	2000-03-14	6.6233333	24.45030	6.8924242	60.090909	60.772727
## 3409	2000-03-15	5.1688889	24.69077	6.6248754	61.000000	390.000000
## 3410	2000-03-16	3.7144444	24.93124	6.3573266	4.500000	8.444444
## 3411	2000-03-17	2.2600000	25.17171	6.0897778	20.166667	7.546296
## 3412	2000-03-18	2.3485417	25.21140	6.0637500	35.833333	6.648148
## 3413	2000-03-19	2.9975000	25.16117	6.3197917	3.508772	5.750000
## 3414	2000-03-20	7.8666667	24.50961	7.6542424	8.181818	9.151515
## 3415	2000-03-21	8.3300000	24.54270	7.7210101	2.000000	14.030303
## 3416	2000-03-22	8.7933333	24.57579	7.7877778	64.363636	18.909091
## 3417	2000-03-23	9.2566667	24.60888	7.8545455	2.780488	2.634146
## 3418	2000-03-24	7.0784848	24.87521	7.5539394	2.000000	2.222222

## 3419	2000-03-25	8.1906667	24.81536	7.6184444	11.000000	141.461538
## 3420	2000-03-26	7.7295238	24.80688	7.6378571	3.515152	4.666667
## 3421	2000-03-27	4.0083333	24.68142	7.1533333	13.375000	9.125000
## 3422	2000-03-28	3.4793939	24.80373	6.9445455	14.711111	85.681818
## 3423	2000-03-29	3.3116162	25.00861	6.7564646	2.000000	18.666667
## 3424	2000-03-30	3.1438384	25.21348	6.5683838	2.500000	3.000000
## 3425	2000-03-31	2.9760606	25.41836	6.3803030	2.818182	6.500000
## 3426	2000-04-01	7.7660606	25.30282	7.0339394	2.000000	2.000000
## 3427	2000-04-02	13.3413636	25.24399	7.6857197	17.500000	6.500000
## 3428	2000-04-03	18.9166667	25.18517	8.3375000	6.250000	2.000000
## 3429	2000-04-04	8.0808889	25.23147	7.9222222	17.170213	7.574468
## 3430	2000-04-05	9.1804762	25.29155	7.4750000	2.000000	2.000000
## 3431	2000-04-06	12.0121212	25.23809	7.9706061	2.111111	2.222222
## 3432	2000-04-07	12.6995455	25.20445	7.7657576	2.250000	2.000000
## 3433	2000-04-08	13.3869697	25.17082	7.5609091	2.000000	2.000000
## 3434	2000-04-09	14.4102020	25.14190	7.7725253	4.909091	2.909091
## 3435	2000-04-10	15.4334343	25.11298	7.9841414	2.750000	5.750000
## 3436	2000-04-11	16.4566667	25.08406	8.1957576	2.242424	2.121212
## 3437	2000-04-12	14.2452020	25.00685	8.0174242	8577.777778	6031.111111
## 3438	2000-04-13	12.0337374	24.92965	7.8390909	320.000000	135.250000
## 3439	2000-04-14	9.8222727	24.85244	7.6607576	6219.846154	4410.000000
## 3440	2000-04-15	7.6108081	24.77523	7.4824242	133.555556	302.333333
## 3441	2000-04-16	5.3993434	24.69803	7.3040909	740.000000	40.000000
## 3442	2000-04-17	3.1878788	24.62082	7.1257576	157.307692	292.692308
## 3443	2000-04-18	3.9244697	24.67595	7.3196970	130.000000	44.000000
## 3444	2000-04-19	4.6610606	24.73109	7.5136364	4490.000000	12000.000000
## 3445	2000-04-20	5.3976515	24.78623	7.7075758	2881.777778	6200.000000
## 3446	2000-04-21	6.1342424	24.84136	7.9015152	657.677419	877.500000
## 3447	2000-04-22	5.4122222	24.80487	7.8933333	416.541667	528.680851
## 3448	2000-04-23	4.2500000	24.90890	7.6966667	5.866667	9.200000
## 3449	2000-04-24	4.0614583	24.84529	7.5614583	4029.333333	4283.333333
## 3450	2000-04-25	3.8729167	24.78167	7.4262500	482.000000	465.230769
## 3451	2000-04-26	3.7205303	24.81161	7.3473990	6.222222	6.222222
## 3452	2000-04-27	3.5681439	24.84155	7.2685480	17.272727	44.363636
## 3453	2000-04-28	3.4157576	24.87148	7.1896970	3.636364	2.000000
## 3454	2000-04-29	4.9400000	24.88733	7.4093939	5.000000	13.500000
## 3455	2000-04-30	6.4642424	24.90318	7.6290909	125.409091	318.363636
## 3456	2000-05-01	7.0493939	24.87677	7.8017172	3001.000000	142.500000
## 3457	2000-05-02	7.6345455	24.85035	7.9743434	27.111111	4.000000
## 3458	2000-05-03	8.2196970	24.82394	8.1469697	6.000000	13.515152
## 3459	2000-05-04	7.6428283	24.85386	7.9886869	26.727273	31.818182
## 3460	2000-05-05	7.0659596	24.88378	7.8304040	5.500000	6.750000
## 3461	2000-05-06	6.4890909	24.91370	7.6721212	9.393939	2.181818
## 3462	2000-05-07	9.7677778	24.99189	7.3124444	310.340426	721.829787
## 3463	2000-05-08	5.6871429	25.14740	6.8921429	4.631579	17.263158
## 3464	2000-05-09	8.5715152	25.10258	7.6712121	3.000000	24.800000
## 3465	2000-05-10	8.4513636	25.12333	7.5396970	2.924242	80.000000
## 3466	2000-05-11	8.3312121	25.14409	7.4081818	2.848485	2.121212
## 3467	2000-05-12	6.1340476	25.38724	6.5428571	62.983607	28.315789
## 3468	2000-05-13	2.5545455	25.50759	5.9627273	6.681818	19.543860
## 3469	2000-05-14	1.8303636	25.64529	5.5718182	23.200000	10.771930
## 3470	2000-05-15	5.8237500	24.95971	8.1229167	2.000000	2.000000
## 3471	2000-05-16	5.5775505	24.98448	7.8026515	3.500000	6.750000
## 3472	2000-05-17	5.3313510	25.00926	7.4823864	2.727273	2.545455

## 3473	2000-05-18	5.0851515	25.03403	7.1621212	2.181818	2.000000
## 3474	2000-05-19	4.8243939	25.00653	7.3725758	46.727273	32.181818
## 3475	2000-05-20	4.5636364	24.97903	7.5830303	3.818182	8.666667
## 3476	2000-05-21	4.3075000	25.01770	7.3985606	360.000000	22.944444
## 3477	2000-05-22	4.0513636	25.05636	7.2140909	29.000000	37.222222
## 3478	2000-05-23	3.7952273	25.09503	7.0296212	7.500000	51.500000
## 3479	2000-05-24	3.5390909	25.13370	6.8451515	2.000000	2.303030
## 3480	2000-05-25	4.2827273	25.50085	6.2496970	6.068966	441.517241
## 3481	2000-05-26	3.4808889	25.50313	5.8897778	3.833333	54.166667
## 3482	2000-05-27	3.6540476	25.51319	5.9347619	85.161290	162.387097
## 3483	2000-05-28	2.8133333	25.39392	5.7704167	8.303030	8.000000
## 3484	2000-05-29	7.4674242	25.38252	6.4849337	76.000000	401.090909
## 3485	2000-05-30	12.1215152	25.37112	7.1994508	128.545455	794.181818
## 3486	2000-05-31	16.7756061	25.35973	7.9139678	2.000000	3.200000
## 3487	2000-06-01	21.4296970	25.34833	8.6284848	13.515152	2.787879
## 3488	2000-06-02	19.0974747	25.35786	8.1720202	76.000000	182.121212
## 3489	2000-06-03	16.7652525	25.36738	7.7155556	35.818182	361.454545
## 3490	2000-06-04	14.4330303	25.37691	7.2590909	5.512195	3.804878
## 3491	2000-06-05	13.4338636	25.33074	7.3958333	360.000000	2003.000000
## 3492	2000-06-06	12.4346970	25.28458	7.5325758	84.000000	440.000000
## 3493	2000-06-07	11.4355303	25.23841	7.6693182	215.730769	10.000000
## 3494	2000-06-08	10.4363636	25.19224	7.8060606	347.461538	455.115385
## 3495	2000-06-09	10.2836364	25.19039	7.5372727	3610.600000	6010.000000
## 3496	2000-06-10	10.1309091	25.18855	7.2684848	1240.000000	5600.000000
## 3497	2000-06-11	9.9781818	25.18670	6.9996970	2.444444	3.222222
## 3498	2000-06-12	9.2273939	25.17712	7.0027273	2.000000	5.250000
## 3499	2000-06-13	8.4766061	25.16755	7.0057576	7.272727	7.636364
## 3500	2000-06-14	7.7258182	25.15797	7.0087879	2.606061	3.151515
## 3501	2000-06-15	6.9750303	25.12032	7.0118182	2.000000	4.250000
## 3502	2000-06-16	6.2242424	25.08267	7.0148485	6.111111	2.111111
## 3503	2000-06-17	4.7338095	25.11845	6.8776190	12.634146	12.634146
## 3504	2000-06-18	5.7051111	25.01138	7.0486667	5.555556	18.277778
## 3505	2000-06-19	4.8843165	25.02612	7.0677980	4.250000	24.000000
## 3506	2000-06-20	4.0635219	25.04086	7.0869293	1275.090909	1849.636364
## 3507	2000-06-21	3.2427273	25.05561	7.1060606	32.545455	2.424242
## 3508	2000-06-22	3.6128788	24.97701	7.1553788	4034.000000	4803.333333
## 3509	2000-06-23	3.9830303	24.89841	7.2046970	3.200000	149.600000
## 3510	2000-06-24	4.3531818	24.81981	7.2540152	2.630303	1200.000000
## 3511	2000-06-25	4.7233333	24.74121	7.3033333	2.060606	2.121212
## 3512	2000-06-26	3.8795833	24.85392	7.0187500	44.909091	143.454545
## 3513	2000-06-27	3.0358333	24.96663	6.7341667	7.875000	29.878788
## 3514	2000-06-28	4.0282197	24.97654	6.8279924	2.000000	2.000000
## 3515	2000-06-29	5.0206061	24.98645	6.9218182	25.772727	337.590909
## 3516	2000-06-30	5.3587229	25.08294	6.8355022	4.250000	2.000000
## 3517	2000-07-01	5.6968398	25.17942	6.7491861	40.000000	6550.000000
## 3518	2000-07-02	6.0349567	25.27590	6.6628701	25.684211	42.000000
## 3519	2000-07-03	6.3730736	25.37238	6.5765541	11.368421	7.263158
## 3520	2000-07-04	6.7111905	25.46886	6.4902381	2.000000	5.947368
## 3521	2000-07-05	4.6490698	25.64495	5.7302326	8.454545	4.631579
## 3522	2000-07-06	4.9978182	25.67269	5.3421818	13.018182	3.315789
## 3523	2000-07-07	16.0436364	25.01761	9.6627273	2.000000	2.000000
## 3524	2000-07-08	11.3711515	24.97881	8.8413636	2.250000	3.250000
## 3525	2000-07-09	6.6986667	24.94002	8.0200000	4.425532	24.170213
## 3526	2000-07-10	8.1203030	24.92858	8.3269697	2.111111	2.000000

## 3527	2000-07-11	4.0845238	25.16783	7.2950000	2.000000	2.000000
## 3528	2000-07-12	5.0575000	24.99329	7.4741667	2.000000	2.166667
## 3529	2000-07-13	5.4880303	25.04848	7.2678283	3.250000	4.500000
## 3530	2000-07-14	5.9185606	25.10366	7.0614899	7.636364	3.272727
## 3531	2000-07-15	6.3490909	25.15885	6.8551515	5.575758	51.515152
## 3532	2000-07-16	5.7734091	25.05155	7.0485606	4.537879	9.000000
## 3533	2000-07-17	5.1977273	24.94424	7.2419697	3.500000	7.000000
## 3534	2000-07-18	4.6220455	24.83694	7.4353788	76.363636	578.909091
## 3535	2000-07-19	4.0463636	24.72964	7.6287879	2.000000	2.060606
## 3536	2000-07-20	4.8743434	24.92420	7.1187879	12.000000	200.000000
## 3537	2000-07-21	5.7023232	25.11877	6.6087879	2.000000	2.000000
## 3538	2000-07-22	6.5303030	25.31333	6.0987879	13.409091	31.681818
## 3539	2000-07-23	7.4998485	25.38136	6.0542424	8.750000	66.888889
## 3540	2000-07-24	8.4693939	25.44939	6.0096970	2.000000	2.000000
## 3541	2000-07-25	15.8148485	25.31148	7.2642424	2.000000	2.000000
## 3542	2000-07-26	7.0721429	25.45710	6.3142857	2.341463	2.731707
## 3543	2000-07-27	11.9186667	25.40771	6.5077778	3.227273	3.000000
## 3544	2000-07-28	7.2783333	25.13304	6.9241667	2.000000	2.000000
## 3545	2000-07-29	7.9472727	25.04103	7.3348485	8.076923	11.000000
## 3546	2000-07-30	6.5439394	24.69806	8.2118182	3.024390	2.341463
## 3547	2000-07-31	7.1727273	24.72697	7.8580303	2.363636	2.545455
## 3548	2000-08-01	7.8015152	24.75588	7.5042424	3.121951	2.341463
## 3549	2000-08-02	7.7336291	24.74463	7.4671140	95.272727	80.363636
## 3550	2000-08-03	7.6657431	24.73337	7.4299856	11.500000	10.250000
## 3551	2000-08-04	7.5978571	24.72212	7.3928571	2.292683	2.341463
## 3552	2000-08-05	11.4277778	24.55727	7.5840000	6.444444	18.722222
## 3553	2000-08-06	14.3130303	24.64458	7.9063636	2.000000	2.666667
## 3554	2000-08-07	8.0429167	24.45404	8.6562500	2.187500	6.625000
## 3555	2000-08-08	6.5494886	24.42020	8.5199432	2.000000	2.545455
## 3556	2000-08-09	5.0560606	24.38636	8.3836364	2.000000	2.000000
## 3557	2000-08-10	4.6736364	24.57736	8.2157576	4.250000	9.500000
## 3558	2000-08-11	4.2912121	24.76836	8.0478788	2.409091	2.227273
## 3559	2000-08-12	3.5356061	24.59717	8.3395455	2.500000	6.000000
## 3560	2000-08-13	2.7800000	24.42597	8.6312121	2.000000	2.000000
## 3561	2000-08-14	3.4490909	24.58161	8.3227273	17.157895	9.157895
## 3562	2000-08-15	4.1181818	24.73724	8.0142424	2.363636	5.878788
## 3563	2000-08-16	4.6916162	24.70386	8.1949495	3.000000	5.500000
## 3564	2000-08-17	5.2650505	24.67047	8.3756566	2.181818	2.727273
## 3565	2000-08-18	5.8384848	24.63709	8.5563636	2.000000	2.000000
## 3566	2000-08-19	5.0932323	24.60371	8.5572727	2.000000	4.250000
## 3567	2000-08-20	4.3479798	24.57032	8.5581818	2.181818	3.090909
## 3568	2000-08-21	3.6027273	24.53694	8.5590909	2.000000	2.000000
## 3569	2000-08-22	3.1404545	24.71743	7.7988312	3.250000	30.250000
## 3570	2000-08-23	2.6781818	24.89793	7.0385714	3.622642	3.818182
## 3571	2000-08-24	2.2159091	25.11414	6.1622727	28.318182	3.358463
## 3572	2000-08-25	1.8709091	25.27191	5.8278182	7.309091	2.898744
## 3573	2000-08-26	4.9912121	24.47806	9.2178788	2.097561	2.439024
## 3574	2000-08-27	7.9312121	24.42355	8.7872727	2.000000	2.111111
## 3575	2000-08-28	6.6664444	24.70876	8.3006667	2.765957	6.468085
## 3576	2000-08-29	4.4183333	24.89545	7.4354762	2.133333	2.133333
## 3577	2000-08-30	5.4429167	24.90983	7.4983333	3.250000	3.437500
## 3578	2000-08-31	8.0239394	24.69079	8.0181818	2.500000	4.727273
## 3579	2000-09-01	9.1824242	24.81820	7.6081818	6.500000	6.500000
## 3580	2000-09-02	10.3409091	24.94561	7.1981818	2.807692	4.038462

##	3581	2000-09-03	10.8150000	24.54583	8.9441667	2.750000	2.875000
##	3582	2000-09-04	13.6047619	24.67590	8.5457143	2.000000	2.048780
##	3583	2000-09-05	13.6560000	24.55356	8.8291111	2.000000	2.000000
##	3584	2000-09-06	9.1618182	24.54885	8.5693939	2.222222	2.000000
##	3585	2000-09-07	7.5509091	24.57588	8.2518182	2.292683	2.536585
##	3586	2000-09-08	8.7557576	24.68748	8.0425758	2.545455	2.545455
##	3587	2000-09-09	9.9606061	24.79909	7.8333333	2.060606	2.000000
##	3588	2000-09-10	9.2902020	24.81542	7.7885859	3.250000	13.250000
##	3589	2000-09-11	8.6197980	24.83176	7.7438384	35.272727	20.181818
##	3590	2000-09-12	7.9493939	24.84809	7.6990909	2.060606	2.121212
##	3591	2000-09-13	5.7653030	24.86267	7.6109091	3.000000	7.750000
##	3592	2000-09-14	3.5812121	24.87724	7.5227273	2.000000	2.303030
##	3593	2000-09-15	5.7324242	24.82206	7.7460606	2.000000	2.000000
##	3594	2000-09-16	4.8464286	24.82214	7.6266667	4.487805	7.463415
##	3595	2000-09-17	4.5895556	24.83816	7.6811111	2.000000	2.000000
##	3596	2000-09-18	3.6570694	24.77077	7.5136806	32.000000	60.000000
##	3597	2000-09-19	2.7245833	24.70338	7.3462500	2.000000	2.000000
##	3598	2000-09-20	3.3307765	24.80431	7.0363068	7.818182	3.454545
##	3599	2000-09-21	3.9369697	24.90524	6.7263636	7.560976	6.195122
##	3600	2000-09-22	8.5448485	24.96391	6.2606061	2.192308	2.423077
##	3601	2000-09-23	1.8354545	24.82621	5.4496970	4.195122	5.219512
##	3602	2000-09-24	3.3511760	24.94176	5.6845599	33.272727	18.727273
##	3603	2000-09-25	4.8668975	25.05731	5.9194228	4.750000	4.750000
##	3604	2000-09-26	6.3826190	25.17286	6.1542857	2.264151	2.000000
##	3605	2000-09-27	2.1993182	25.27298	5.4127273	4.727273	2.000000
##	3606	2000-09-28	1.6301818	25.35900	5.0163636	4.872727	2.000000
##	3607	2000-09-29	23.6809091	24.73858	9.1027273	2.000000	2.000000
##	3608	2000-09-30	21.0001515	24.82053	8.6207576	16.250000	13.250000
##	3609	2000-10-01	18.3193939	24.90248	8.1387879	8.666667	27.111111
##	3610	2000-10-02	13.6631111	24.92293	7.9166667	5.400000	14.555556
##	3611	2000-10-03	10.2126190	25.03448	7.2716667	2.133333	2.000000
##	3612	2000-10-04	6.8041667	24.93792	7.4550000	17.307692	48.461538
##	3613	2000-10-05	5.8796405	24.82435	7.6834314	542.000000	590.444444
##	3614	2000-10-06	4.9551144	24.71078	7.9118627	12000.000000	12000.000000
##	3615	2000-10-07	4.0305882	24.59721	8.1402941	13.545455	48.090909
##	3616	2000-10-08	3.1716578	24.56582	7.9015107	4.222222	8.000000
##	3617	2000-10-09	2.3127273	24.53442	7.6627273	2.000000	2.000000
##	3618	2000-10-10	2.5134091	24.58622	7.2075000	971.454545	2750.000000
##	3619	2000-10-11	2.7140909	24.63802	6.7522727	120.909091	1017.333333
##	3620	2000-10-12	2.9147727	24.68981	6.2970455	73.333333	53.333333
##	3621	2000-10-13	3.1154545	24.74161	5.8418182	3.696970	2.424242
##	3622	2000-10-14	3.3024242	24.73315	6.6206061	12.421053	20.210526
##	3623	2000-10-15	3.4893939	24.72470	7.3993939	2.000000	2.000000
##	3624	2000-10-16	5.2157576	24.86085	7.8112121	2.307692	2.153846
##	3625	2000-10-17	3.3730952	24.83886	7.5607143	2.000000	2.000000
##	3626	2000-10-18	5.5771111	24.83656	7.7337778	2.500000	2.055556
##	3627	2000-10-19	2.9325000	24.87342	6.2887500	2.000000	2.000000
##	3628	2000-10-20	2.9089394	24.85544	6.3277525	5.750000	6.750000
##	3629	2000-10-21	2.8853788	24.83746	6.3667551	3543.272727	911.454545
##	3630	2000-10-22	2.8618182	24.81948	6.4057576	42.263158	52.571429
##	3631	2000-10-23	3.0733333	24.82410	6.3858586	55.500000	150.000000
##	3632	2000-10-24	3.2848485	24.82872	6.3659596	20.400000	5.250000
##	3633	2000-10-25	3.4963636	24.83333	6.3460606	7.090909	18.666667
##	3634	2000-10-26	3.3606061	24.86532	6.2434848	78.181818	127.666667

## 3635	2000-10-27	3.2248485	24.89730	6.1409091	2.909091	2.424242
## 3636	2000-10-28	4.3790909	24.90662	6.4327273	67.000000	8.000000
## 3637	2000-10-29	5.5333333	24.91595	6.7245455	2.000000	7.000000
## 3638	2000-10-30	6.6875758	24.92527	7.0163636	423.454545	910.909091
## 3639	2000-10-31	7.8418182	24.93459	7.3081818	2.500000	4.750000
## 3640	2000-11-01	8.9960606	24.94391	7.6000000	2.551724	3.931034
## 3641	2000-11-02	12.5002222	24.92538	7.7740000	4.727273	3.227273
## 3642	2000-11-03	8.5523810	24.94900	7.4838095	2.000000	2.000000
## 3643	2000-11-04	5.9133333	24.87003	6.5245455	3.454545	2.424242
## 3644	2000-11-05	4.5468750	24.90681	6.2949811	357.157895	449.894737
## 3645	2000-11-06	3.1804167	24.94358	6.0654167	2.166667	2.916667
## 3646	2000-11-07	2.4311869	24.95757	6.2790657	2.250000	2.500000
## 3647	2000-11-08	1.6819571	24.97156	6.4927146	34.181818	135.636364
## 3648	2000-11-09	0.9327273	24.98555	6.7063636	2.114286	2.457143
## 3649	2000-11-10	1.6538384	25.01614	6.6859596	5.500000	5.250000
## 3650	2000-11-11	2.3749495	25.04674	6.6655556	1937.272727	2156.545455
## 3651	2000-11-12	3.0960606	25.07733	6.6451515	2.242424	4.848485
## 3652	2000-11-13	3.0759596	25.06830	6.7671717	19.000000	171.000000
## 3653	2000-11-14	3.0558586	25.05927	6.8891919	2.250000	3.000000
## 3654	2000-11-15	3.0357576	25.05024	7.0112121	2.000000	2.303030
## 3655	2000-11-16	2.4854545	25.05120	7.2661616	56.181818	292.727273
## 3656	2000-11-17	1.9351515	25.05216	7.5211111	400.000000	560.000000
## 3657	2000-11-18	1.3848485	25.05312	7.7760606	5.380952	7.809524
## 3658	2000-11-19	3.8395455	25.04977	7.0560606	64.000000	5.293651
## 3659	2000-11-20	6.2942424	25.04642	6.3360606	2.000000	2.777778
## 3660	2000-11-21	6.1830952	25.01064	5.9242857	40.439024	55.658537
## 3661	2000-11-22	7.6844444	24.89944	7.1913095	27.388889	38.611111
## 3662	2000-11-23	0.9004167	24.93188	8.4583333	135.312500	71.187500
## 3663	2000-11-24	0.9631061	24.96262	8.2984848	2.000000	10.000000
## 3664	2000-11-25	1.0257955	24.99337	8.1386364	3246.363636	2637.090909
## 3665	2000-11-26	1.0884848	25.02412	7.9787879	23.365854	39.707317
## 3666	2000-11-27	1.2086364	25.06079	7.6931061	5006.666667	6660.000000
## 3667	2000-11-28	1.3287879	25.09745	7.4074242	448.400000	1328.800000
## 3668	2000-11-29	1.4489394	25.13412	7.1217424	20.000000	70.000000
## 3669	2000-11-30	1.5690909	25.17079	6.8360606	8.153846	3.153846
## 3670	2000-12-01	2.7642857	25.42750	5.4452381	2.428571	3.023921
## 3671	2000-12-02	1.8490909	25.63780	4.6677273	9.818182	2.893996
## 3672	2000-12-03	1.9858182	25.70242	4.4596364	12.727273	2.764071
## 3673	2000-12-04	1.4233333	25.02506	7.9533333	2.097561	2.634146
## 3674	2000-12-05	1.2688889	25.13458	7.4451515	14.000000	303.000000
## 3675	2000-12-06	1.1144444	25.24409	6.9369697	9.000000	220.000000
## 3676	2000-12-07	0.9600000	25.35361	6.4287879	4.000000	2.000000
## 3677	2000-12-08	4.5433333	25.37954	6.2909416	14.250000	11.000000
## 3678	2000-12-09	8.1266667	25.40548	6.1530952	6.341463	4.585366
## 3679	2000-12-10	11.2862222	25.30211	6.7373333	2.666667	5.500000
## 3680	2000-12-11	10.0121212	25.49652	5.8769697	2.000000	2.000000
## 3681	2000-12-12	3.0012500	25.48079	6.7287500	2.000000	2.000000
## 3682	2000-12-13	3.3962879	25.45326	6.5104798	2.000000	2.250000
## 3683	2000-12-14	3.7913258	25.42572	6.2922096	17.636364	4.000000
## 3684	2000-12-15	4.1863636	25.39818	6.0739394	6.058824	2.000000
## 3685	2000-12-16	3.0671717	25.43065	6.0133333	5.777778	5.750000
## 3686	2000-12-17	1.9479798	25.46311	5.9527273	1158.727273	1242.909091
## 3687	2000-12-18	0.8287879	25.49558	5.8921212	22.121212	210.545455
## 3688	2000-12-19	1.6539394	25.39613	6.6149495	6.400000	58.000000

## 3689	2000-12-20	2.4790909	25.29669	7.3377778	10.000000	16.000000
## 3690	2000-12-21	3.3042424	25.19724	8.0606061	121.954545	330.772727
## 3691	2000-12-22	3.2215909	25.28729	7.4836364	2.909091	10.200000
## 3692	2000-12-23	3.1389394	25.37733	6.9066667	24.349282	2.000000
## 3693	2000-12-24	3.0562879	25.46738	6.3296970	45.789474	97.157895
## 3694	2000-12-25	2.9736364	25.55742	5.7527273	2.000000	2.000000
## 3695	2000-12-26	4.6950505	25.50415	6.6778788	2.500000	17.750000
## 3696	2000-12-27	6.4164646	25.45088	7.6030303	1275.636364	2184.181818
## 3697	2000-12-28	8.1378788	25.39761	8.5281818	355.235294	357.705882
## 3698	2000-12-29	6.0813636	25.44371	7.6535101	280.000000	4600.000000
## 3699	2000-12-30	4.0248485	25.48981	6.7788384	2.666667	4.000000
## 3700	2000-12-31	1.9683333	25.53592	5.9041667	2.000000	2.833333
## 3701	2001-01-01	8.2460556	25.63070	5.2884167	16.363636	128.000000
## 3702	2001-01-02	14.5237778	25.72549	4.6726667	2.055556	2.944444
## 3703	2001-01-03	10.7385714	25.61879	5.3180952	2.193548	2.967742
## 3704	2001-01-04	28.8709091	25.44009	6.9154545	2.000000	2.111111
## 3705	2001-01-05	19.9891919	25.41405	6.8052525	2.250000	4.500000
## 3706	2001-01-06	11.1074747	25.38801	6.6950505	18.545455	36.545455
## 3707	2001-01-07	2.2257576	25.36197	6.5848485	2.000000	2.000000
## 3708	2001-01-08	2.0123232	25.18376	7.0330303	12000.000000	12000.000000
## 3709	2001-01-09	1.7988889	25.00555	7.4812121	1335.333333	1354.000000
## 3710	2001-01-10	1.5854545	24.82733	7.9293939	9.000000	49.176471
## 3711	2001-01-11	0.8125000	25.02829	7.6679167	6.375000	20.125000
## 3712	2001-01-12	7.5714286	25.11207	6.5621429	11.636364	11.333333
## 3713	2001-01-13	8.0748889	24.98431	6.9797778	2.000000	3.244444
## 3714	2001-01-14	7.4045455	24.97570	6.7648485	2.000000	2.222222
## 3715	2001-01-15	1.1263636	24.81121	7.2639394	2.000000	2.000000
## 3716	2001-01-16	2.3854762	25.26214	5.5092857	7.132075	7.636364
## 3717	2001-01-17	2.1436472	25.47450	4.8231818	5.137466	5.860140
## 3718	2001-01-18	1.9018182	25.61095	4.4794545	3.142857	4.083916
## 3719	2001-01-19	1.0657576	25.38609	5.3621212	2.000000	2.307692
## 3720	2001-01-20	5.2363636	25.19948	7.2563636	2.000000	2.181818
## 3721	2001-01-21	4.3525455	25.13492	7.2604242	2.000000	2.000000
## 3722	2001-01-22	3.4687273	25.07036	7.2644848	2.545455	3.090909
## 3723	2001-01-23	2.5849091	25.00579	7.2685455	2.500000	4.750000
## 3724	2001-01-24	1.7010909	24.94123	7.2726061	2.000000	2.000000
## 3725	2001-01-25	0.8172727	24.87667	7.2766667	2.000000	2.000000
## 3726	2001-01-26	1.2969697	24.95203	7.0100000	2.048780	2.195122
## 3727	2001-01-27	5.9676190	24.96019	7.3428571	2.048780	2.341463
## 3728	2001-01-28	10.3015556	25.07311	7.1415556	2.500000	4.722222
## 3729	2001-01-29	12.0109091	24.93067	7.2418182	2.000000	2.000000
## 3730	2001-01-30	1.5208333	24.47762	7.8495833	2.250000	5.187500
## 3731	2001-01-31	1.4749621	24.51719	7.7996402	2.000000	2.181818
## 3732	2001-02-01	1.4290909	24.55676	7.7496970	2.146341	2.243902
## 3733	2001-02-02	1.4289394	24.79141	7.6018182	11.818182	7.272727
## 3734	2001-02-03	1.4287879	25.02606	7.4539394	2.097561	2.292683
## 3735	2001-02-04	5.6190909	25.05727	8.8393939	3.038462	2.423077
## 3736	2001-02-05	4.2230303	24.98242	8.2245455	2.000000	2.000000
## 3737	2001-02-06	6.1135671	25.02883	8.0899697	3.750000	7.000000
## 3738	2001-02-07	8.0041039	25.07523	7.9553939	3.818182	3.272727
## 3739	2001-02-08	9.8946407	25.12163	7.8208182	3630.500000	835.750000
## 3740	2001-02-09	11.7851775	25.16803	7.6862424	2.000000	4.000000
## 3741	2001-02-10	13.6757143	25.21443	7.5516667	2.731707	3.853659
## 3742	2001-02-11	13.7024444	25.26229	7.4062222	2.000000	2.000000

## 3743	2001-02-12	14.3106061	25.10679	7.8272727	2.000000	2.888889
## 3744	2001-02-13	1.2495833	24.74513	8.0200000	2.000000	2.000000
## 3745	2001-02-14	1.5471970	24.70266	8.1748485	2.000000	2.750000
## 3746	2001-02-15	1.8448106	24.66019	8.3296970	11.454545	128.909091
## 3747	2001-02-16	2.1424242	24.61773	8.4845455	2.000000	2.000000
## 3748	2001-02-17	2.1226061	24.65498	8.3561212	12.750000	2.000000
## 3749	2001-02-18	2.1027879	24.69222	8.2276970	23.500000	15.750000
## 3750	2001-02-19	2.0829697	24.72947	8.0992727	2.000000	9.693182
## 3751	2001-02-20	2.0631515	24.76672	7.9708485	2.545455	3.636364
## 3752	2001-02-21	2.0433333	24.80397	7.8424242	2.097561	5.853659
## 3753	2001-02-22	4.3890909	24.91267	8.2845455	4.681818	3.000000
## 3754	2001-02-23	2.8248485	24.66158	8.2292424	5.500000	7.250000
## 3755	2001-02-24	1.2606061	24.41048	8.1739394	2.000000	2.000000
## 3756	2001-02-25	2.5294872	24.78646	7.1517949	2.379310	2.631579
## 3757	2001-02-26	2.4529787	25.03560	6.4397872	6.765957	2.421053
## 3758	2001-02-27	1.3523636	25.18296	6.0558182	10.909091	2.210526
## 3759	2001-02-28	1.0375758	24.12685	8.2675758	2.000000	2.000000
## 3760	2001-03-01	8.4077778	24.29602	8.4582222	2.181818	2.954545
## 3761	2001-03-02	5.1054545	24.48076	8.2178788	5.310345	4.758621
## 3762	2001-03-03	7.7200000	24.59381	8.0042857	2.000000	2.000000
## 3763	2001-03-04	0.9417391	24.57430	7.2126087	2.000000	2.000000
## 3764	2001-03-05	0.9983311	24.33002	7.4168906	7.500000	9.250000
## 3765	2001-03-06	1.0549231	24.08574	7.6211726	33.636364	27.090909
## 3766	2001-03-07	1.11115152	23.84145	7.8254545	2.121212	2.000000
## 3767	2001-03-08	1.0936364	23.99611	7.7509091	30.000000	6.272727
## 3768	2001-03-09	1.0757576	24.15076	7.6763636	13.863636	10.545455
## 3769	2001-03-10	2.0259596	24.26719	7.8589899	71.250000	39.500000
## 3770	2001-03-11	2.9761616	24.38363	8.0416162	26.000000	21.543103
## 3771	2001-03-12	3.9263636	24.50006	8.2242424	5.241379	3.586207
## 3772	2001-03-13	3.6591111	24.47940	8.1695556	2.111111	2.111111
## 3773	2001-03-14	3.8792857	24.38617	8.0152381	6.157895	12.052632
## 3774	2001-03-15	0.8645833	24.10129	8.1483333	2.166667	2.000000
## 3775	2001-03-16	0.9135606	24.18620	8.0519192	5.272727	3.818182
## 3776	2001-03-17	0.9625379	24.27112	7.9555051	2.250000	4.000000
## 3777	2001-03-18	1.01115152	24.35603	7.8590909	2.000000	2.000000
## 3778	2001-03-19	1.0484848	24.22012	7.8353030	54.052632	21.894737
## 3779	2001-03-20	1.0854545	24.08421	7.8115152	7.222222	2.060606
## 3780	2001-03-21	1.0843939	24.06939	7.7803788	8.000000	2.405303
## 3781	2001-03-22	1.0833333	24.05458	7.7492424	2.500000	2.750000
## 3782	2001-03-23	1.0822727	24.03976	7.7181061	3.272727	8.363636
## 3783	2001-03-24	1.0812121	24.02494	7.6869697	2.000000	2.121212
## 3784	2001-03-25	1.1190909	24.21009	8.1848485	3.268293	5.756098
## 3785	2001-03-26	4.9409091	24.30003	7.9703030	2.000000	2.000000
## 3786	2001-03-27	4.3304762	24.37783	7.9623810	8.243902	2.634146
## 3787	2001-03-28	1.1954167	24.11517	7.8454167	2.416667	2.000000
## 3788	2001-03-29	4.8913333	24.20351	8.1740000	2.000000	2.000000
## 3789	2001-03-30	3.6182626	24.14214	8.0100404	2.500000	8.500000
## 3790	2001-03-31	2.3451919	24.08077	7.8460808	2.363636	2.909091
## 3791	2001-04-01	1.0721212	24.01939	7.6821212	29.073171	48.975610
## 3792	2001-04-02	1.0697727	24.06749	7.6355303	17.000000	25.487805
## 3793	2001-04-03	1.0674242	24.11559	7.5889394	50.500000	2.000000
## 3794	2001-04-04	1.0650758	24.16369	7.5423485	84.000000	20.363636
## 3795	2001-04-05	1.0627273	24.21179	7.4957576	2.060606	2.000000
## 3796	2001-04-06	1.0648485	24.28057	7.4304040	14.222222	52.000000

## 3797	2001-04-07	1.0669697	24.34934	7.3650505	3.000000	13.250000
## 3798	2001-04-08	1.0690909	24.41812	7.2996970	2.000000	2.000000
## 3799	2001-04-09	1.2745455	24.45106	7.8669697	2.000000	2.000000
## 3800	2001-04-10	1.3550000	24.44718	7.7863636	10.421053	14.421053
## 3801	2001-04-11	1.4354545	24.44330	7.7057576	2.000000	3.636364
## 3802	2001-04-12	2.8306061	24.46758	7.6460606	5.750000	11.000000
## 3803	2001-04-13	4.2257576	24.49185	7.5863636	4.827586	4.482759
## 3804	2001-04-14	2.4073333	24.44700	7.6120000	2.000000	4.055556
## 3805	2001-04-15	2.0935714	24.57612	7.3100000	2.000000	2.000000
## 3806	2001-04-16	1.2704545	24.48573	7.2318182	2.000000	2.000000
## 3807	2001-04-17	1.3954654	24.69807	7.0724567	2.250000	7.750000
## 3808	2001-04-18	1.5204762	24.91040	6.9130952	6.188679	39.636364
## 3809	2001-04-19	1.9912121	24.83952	7.6824242	2.848485	4.363636
## 3810	2001-04-20	0.7933333	24.83796	6.5033333	3.363636	30.492424
## 3811	2001-04-21	0.5572727	24.96289	6.1869091	6.618182	56.621212
## 3812	2001-04-22	1.0503030	24.76525	7.1557273	9.750000	82.750000
## 3813	2001-04-23	1.5433333	24.56761	8.1245455	2.000000	2.060606
## 3814	2001-04-24	1.4350000	24.57505	7.9505303	7.090909	2.000000
## 3815	2001-04-25	1.3266667	24.58250	7.7765152	12.181818	10.363636
## 3816	2001-04-26	1.2183333	24.58995	7.6025000	6.000000	4.750000
## 3817	2001-04-27	1.1100000	24.59739	7.4284848	3.227273	2.727273
## 3818	2001-04-28	1.2122727	24.56247	7.5406061	18.500000	50.250000
## 3819	2001-04-29	1.3145455	24.52755	7.6527273	2.363636	2.424242
## 3820	2001-04-30	5.0380952	24.68910	7.1504762	2.266667	2.800000
## 3821	2001-05-01	3.6346667	24.81929	6.6611111	3.106383	4.680851
## 3822	2001-05-02	3.8196970	24.85018	6.4233333	3.000000	4.230769
## 3823	2001-05-03	1.2654167	24.71229	7.3033333	3.833333	2.000000
## 3824	2001-05-04	1.2678788	24.77385	7.1566667	2.060606	2.060606
## 3825	2001-05-05	1.2005303	24.74011	7.2807576	30.315789	17.789474
## 3826	2001-05-06	1.1331818	24.70638	7.4048485	2.000000	16.144737
## 3827	2001-05-07	1.0658333	24.67264	7.5289394	4.750000	14.500000
## 3828	2001-05-08	0.9984848	24.63891	7.6530303	10.363636	36.272727
## 3829	2001-05-09	0.9962121	24.79073	7.3430303	6.303030	10.000000
## 3830	2001-05-10	0.9939394	24.94255	7.0330303	2.242424	6.969697
## 3831	2001-05-11	1.0862338	24.96916	7.1837229	6.750000	12.000000
## 3832	2001-05-12	1.1785281	24.99577	7.3344156	4.363636	16.909091
## 3833	2001-05-13	1.2708225	25.02238	7.4851082	6.500000	9.000000
## 3834	2001-05-14	1.3631169	25.04899	7.6358009	53.818182	203.818182
## 3835	2001-05-15	1.4554113	25.07560	7.7864935	62.000000	66.000000
## 3836	2001-05-16	1.5477056	25.10221	7.9371861	2.000000	3.000000
## 3837	2001-05-17	1.6400000	25.12882	8.0878788	2.000000	2.060606
## 3838	2001-05-18	6.4136364	25.12521	7.6033333	601.724138	662.068966
## 3839	2001-05-19	5.1613333	25.12396	7.5648889	12.052632	31.684211
## 3840	2001-05-20	3.6592381	25.22406	7.2383968	9.000000	7.500000
## 3841	2001-05-21	2.1571429	25.32417	6.9119048	2.133333	2.133333
## 3842	2001-05-22	1.5106061	25.40209	7.7981818	26.227273	52.272727
## 3843	2001-05-23	1.5930429	25.38264	7.9508712	2.000000	3.250000
## 3844	2001-05-24	1.6754798	25.36320	8.1035606	8.000000	2.000000
## 3845	2001-05-25	1.7579167	25.34375	8.2562500	2.000000	2.000000
## 3846	2001-05-26	1.8042614	25.29560	8.4023674	6.947368	4.736842
## 3847	2001-05-27	1.8506061	25.24745	8.5484848	2.363636	2.000000
## 3848	2001-05-28	1.3922727	25.17524	8.2654545	5.750000	9.500000
## 3849	2001-05-29	0.9339394	25.10303	7.9824242	10.181818	61.090909
## 3850	2001-05-30	3.2275758	25.13708	7.5259091	3.750000	10.250000

##	3851	2001-05-31	5.5212121	25.17112	7.0693939	432.620690	469.448276
##	3852	2001-06-01	4.3055556	25.15073	7.2053333	6.722222	29.555556
##	3853	2001-06-02	3.8338095	25.14105	7.3709524	2.125000	6.242424
##	3854	2001-06-03	1.1824242	25.10221	7.5154545	2.000000	2.000000
##	3855	2001-06-04	1.2287879	25.15605	7.3162121	6.000000	5.250000
##	3856	2001-06-05	1.2751515	25.20988	7.1169697	4.848485	12.545455
##	3857	2001-06-06	2.1509091	25.54875	5.6501818	13.963636	40.090909
##	3858	2001-06-07	2.3327273	25.51323	5.7854545	16.909091	67.636364
##	3859	2001-06-08	2.3519048	25.41586	6.1602381	6.523810	38.141711
##	3860	2001-06-09	1.3872727	25.23848	7.1330303	2.121212	8.647059
##	3861	2001-06-10	1.3542929	25.25742	7.0953535	3.250000	2.750000
##	3862	2001-06-11	1.3213131	25.27636	7.0576768	9.454545	22.000000
##	3863	2001-06-12	1.2883333	25.29529	7.0200000	2.500000	4.562500
##	3864	2001-06-13	1.8493939	25.30891	7.0751515	2.000000	2.000000
##	3865	2001-06-14	1.9677778	25.30166	7.1465657	6.545455	32.727273
##	3866	2001-06-15	2.0861616	25.29440	7.2179798	2.000000	2.750000
##	3867	2001-06-16	2.2045455	25.28715	7.2893939	2.000000	2.000000
##	3868	2001-06-17	2.7770000	25.15327	7.9993333	3.135135	5.081081
##	3869	2001-06-18	2.2466667	25.21771	7.2628889	2.000000	2.000000
##	3870	2001-06-19	0.7883333	25.28946	6.2941667	27.562500	8.937500
##	3871	2001-06-20	1.3520000	25.43669	6.0462222	269.659574	301.234043
##	3872	2001-06-21	1.9791818	25.39075	6.3387172	2.000000	151.647324
##	3873	2001-06-22	2.6063636	25.34482	6.6312121	2.000000	2.060606
##	3874	2001-06-23	2.6557576	25.27090	7.1338384	2.000000	5.000000
##	3875	2001-06-24	2.7051515	25.19698	7.6364646	1121.272727	1730.909091
##	3876	2001-06-25	2.7545455	25.12306	8.1390909	2.000000	2.000000
##	3877	2001-06-26	2.4565152	25.12405	7.8790909	38.666667	622.666667
##	3878	2001-06-27	2.1584848	25.12505	7.6190909	62.000000	140.000000
##	3879	2001-06-28	1.8604545	25.12604	7.3590909	5.000000	5.750000
##	3880	2001-06-29	1.5624242	25.12703	7.0990909	2.121212	2.000000
##	3881	2001-06-30	1.4060606	25.15319	6.8807828	6.727273	4.181818
##	3882	2001-07-01	1.2496970	25.17934	6.6624747	3.500000	6.750000
##	3883	2001-07-02	1.0933333	25.20550	6.4441667	2.342857	3.200000
##	3884	2001-07-03	6.1660606	25.42761	6.4912121	2.000000	2.000000
##	3885	2001-07-04	4.9764444	25.43247	6.1662222	2.318182	7.363636
##	3886	2001-07-05	1.8688095	25.44650	5.9623810	2.000000	2.000000
##	3887	2001-07-06	2.4387879	25.33312	5.9278788	2.000000	2.030303
##	3888	2001-07-07	2.4538636	25.30111	6.0994697	12.909091	7.454545
##	3889	2001-07-08	2.4689394	25.26909	6.2710606	2.500000	4.250000
##	3890	2001-07-09	2.4840152	25.23708	6.4426515	192.736842	687.684211
##	3891	2001-07-10	2.4990909	25.20506	6.6142424	2.000000	2.000000
##	3892	2001-07-11	2.4888889	25.07758	7.1450505	4.000000	2.750000
##	3893	2001-07-12	2.4786869	24.95009	7.6758586	2.000000	3.454545
##	3894	2001-07-13	2.4684848	24.82261	8.2066667	2.060606	2.000000
##	3895	2001-07-14	2.1543939	24.84509	7.9510606	3.250000	5.500000
##	3896	2001-07-15	1.8403030	24.86758	7.6954545	2.954545	3.136364
##	3897	2001-07-16	1.9983333	24.73550	7.6489394	2.000000	6.750000
##	3898	2001-07-17	2.1563636	24.60342	7.6024242	147.103448	561.034483
##	3899	2001-07-18	1.4116667	24.75855	7.5923810	2.000000	4.466667
##	3900	2001-07-19	1.8473333	24.67633	7.7635556	2.054054	5.333333
##	3901	2001-07-20	1.3650000	24.75637	7.2620833	2.125000	2.625000
##	3902	2001-07-21	0.6827273	25.50267	5.0825455	2.545455	7.494318
##	3903	2001-07-22	0.8113636	25.42695	5.2063636	6.327273	12.363636
##	3904	2001-07-23	1.4830952	25.22910	5.6671429	2.904762	7.279379

## 3905	2001-07-24	1.5369697	24.98184	7.7157576	11.707317	2.195122
## 3906	2001-07-25	2.0484848	24.73459	7.8624242	2.000000	2.400591
## 3907	2001-07-26	2.5600000	24.48733	8.0090909	2.000000	2.606061
## 3908	2001-07-27	2.0350000	24.47097	7.7192424	2.363636	12.000000
## 3909	2001-07-28	1.5100000	24.45461	7.4293939	2.146341	3.073171
## 3910	2001-07-29	1.2590909	24.48194	7.2372727	3.615385	6.000000
## 3911	2001-07-30	1.6395455	24.39923	7.3295455	2.000000	2.500000
## 3912	2001-07-31	2.0200000	24.31652	7.4218182	2.206897	4.620690
## 3913	2001-08-01	3.1855556	24.63429	6.7093333	2.944444	7.166667
## 3914	2001-08-02	2.5680952	25.09205	6.2142857	3.000000	6.066667
## 3915	2001-08-03	1.3891667	25.08183	5.3845833	2.083333	2.000000
## 3916	2001-08-04	2.8019697	25.08179	6.0017424	2.750000	4.750000
## 3917	2001-08-05	4.2147727	25.08174	6.6189015	5.090909	3.636364
## 3918	2001-08-06	5.6275758	25.08170	7.2360606	2.000000	2.000000
## 3919	2001-08-07	3.9265152	24.95411	7.7148485	2.250000	4.000000
## 3920	2001-08-08	2.2254545	24.82652	8.1936364	2.000000	2.863636
## 3921	2001-08-09	1.8474242	24.63705	7.9375758	2.500000	7.750000
## 3922	2001-08-10	1.4693939	24.44758	7.6815152	2.303030	2.000000
## 3923	2001-08-11	1.6380808	24.48049	7.5152525	2.000000	2.363636
## 3924	2001-08-12	1.8067677	24.51341	7.3489899	6.750000	5.000000
## 3925	2001-08-13	1.9754545	24.54633	7.1827273	2.000000	2.303030
## 3926	2001-08-14	1.6140909	24.43856	7.3943939	4.000000	3.818182
## 3927	2001-08-15	1.2527273	24.33079	7.6060606	2.097561	2.829268
## 3928	2001-08-16	1.2241667	24.76008	7.0520833	2.790698	3.395349
## 3929	2001-08-17	1.7248889	24.92467	7.3666667	2.000000	2.000000
## 3930	2001-08-18	1.4685714	24.78188	7.1104762	2.000000	2.000000
## 3931	2001-08-19	2.0372727	24.87167	7.4060606	2.000000	2.000000
## 3932	2001-08-20	1.6660606	24.48185	8.0821212	2.731707	2.048780
## 3933	2001-08-21	1.7815152	24.73545	7.7969697	15.090909	18.181818
## 3934	2001-08-22	1.8969697	24.98906	7.5118182	3.317073	3.170732
## 3935	2001-08-23	2.1050909	24.97843	7.5012121	11.090909	12.727273
## 3936	2001-08-24	2.3132121	24.96781	7.4906061	904.000000	14.750000
## 3937	2001-08-25	2.5213333	24.95718	7.4800000	2.000000	8.647727
## 3938	2001-08-26	2.7294545	24.94656	7.4693939	4.000000	2.545455
## 3939	2001-08-27	2.9375758	24.93593	7.4587879	2.000000	2.000000
## 3940	2001-08-28	2.4976515	24.92530	7.2248485	2.250000	3.750000
## 3941	2001-08-29	2.0577273	24.91468	6.9909091	4.363636	13.636364
## 3942	2001-08-30	1.6178030	24.90405	6.7569697	2.250000	3.250000
## 3943	2001-08-31	1.1778788	24.89342	6.5230303	2.000000	2.303030
## 3944	2001-09-01	1.5543434	24.77599	6.9358586	17.636364	169.636364
## 3945	2001-09-02	1.9308081	24.65856	7.3486869	3.500000	4.500000
## 3946	2001-09-03	2.3072727	24.54112	7.7615152	2.000000	2.000000
## 3947	2001-09-04	2.8203030	25.03006	7.1696970	2.111111	2.111111
## 3948	2001-09-05	6.8778571	25.01545	7.4042857	8.448980	9.306122
## 3949	2001-09-06	2.5608889	25.10382	7.0971111	2.111111	2.555556
## 3950	2001-09-07	1.0500000	24.87679	7.1266667	2.000000	2.000000
## 3951	2001-09-08	1.5724242	24.81388	7.2809091	2.097561	3.268293
## 3952	2001-09-09	1.4828571	24.98433	7.0126190	2.264151	4.545455
## 3953	2001-09-10	1.0018182	25.21302	5.9897727	2.045455	3.696970
## 3954	2001-09-11	1.0703636	25.31815	5.7023636	2.436364	2.848485
## 3955	2001-09-12	3.8883333	24.83550	8.1679167	2.083333	2.000000
## 3956	2001-09-13	4.3567424	24.78660	8.4653220	12.000000	4.500000
## 3957	2001-09-14	4.8251515	24.73770	8.7627273	2.620690	4.275862
## 3958	2001-09-15	2.7619048	24.69112	8.6478571	2.000000	2.266667

## 3959	2001-09-16	3.5291111	24.73120	8.5060000	2.000000	2.111111
## 3960	2001-09-17	3.5541667	24.53692	8.1745833	2.000000	2.000000
## 3961	2001-09-18	2.8863131	24.53378	8.0573990	7.500000	16.250000
## 3962	2001-09-19	2.2184596	24.53065	7.9402146	8.727273	55.818182
## 3963	2001-09-20	1.5506061	24.52752	7.8230303	2.000000	2.000000
## 3964	2001-09-21	1.4727879	24.56056	7.6754545	3.500000	3.250000
## 3965	2001-09-22	1.3949697	24.59360	7.5278788	71.090909	104.545455
## 3966	2001-09-23	1.3171515	24.62664	7.3803030	2.121212	2.060606
## 3967	2001-09-24	1.2393333	24.62450	7.1827273	5.000000	5.000000
## 3968	2001-09-25	1.1615152	24.62236	6.9851515	2.000000	2.000000
## 3969	2001-09-26	1.1998990	24.48297	7.0490909	4.727273	8.727273
## 3970	2001-09-27	1.2382828	24.34358	7.1130303	2.750000	3.500000
## 3971	2001-09-28	1.2766667	24.20418	7.1769697	2.000000	2.060606
## 3972	2001-09-29	1.6277778	24.44349	7.9608889	2.727273	3.090909
## 3973	2001-09-30	1.7716667	24.48802	7.7085714	4.666667	3.600000
## 3974	2001-10-01	1.9406061	24.30688	7.6396970	2.000000	2.000000
## 3975	2001-10-02	1.2633333	24.15829	6.9095833	2.000000	2.000000
## 3976	2001-10-03	1.3712727	24.23286	6.9690000	9.750000	20.250000
## 3977	2001-10-04	1.4792121	24.30744	7.0284167	5.272727	6.727273
## 3978	2001-10-05	1.5871515	24.38201	7.0878333	2.000000	2.000000
## 3979	2001-10-06	1.6950909	24.45658	7.1472500	31.272727	107.636364
## 3980	2001-10-07	1.8030303	24.53115	7.2066667	2.000000	3.272727
## 3981	2001-10-08	1.7566667	24.56561	7.0832323	7.250000	10.750000
## 3982	2001-10-09	1.7103030	24.60006	6.9597980	16.545455	49.454545
## 3983	2001-10-10	1.6639394	24.63452	6.8363636	2.000000	2.121212
## 3984	2001-10-11	1.4978788	24.62824	6.9250000	2.000000	4.250000
## 3985	2001-10-12	1.3318182	24.62197	7.0136364	12.954545	31.000000
## 3986	2001-10-13	1.5327273	24.70239	6.8748485	8.829268	5.170732
## 3987	2001-10-14	1.4818182	24.75379	6.8219697	2.000000	15.312639
## 3988	2001-10-15	1.4309091	24.80518	6.7690909	2.000000	25.454545
## 3989	2001-10-16	1.1950379	24.75453	6.8866288	11.971429	2.000000
## 3990	2001-10-17	0.9591667	24.70388	7.0041667	21.942857	10.685714
## 3991	2001-10-18	1.6707143	24.77848	7.7526190	4.421053	20.473684
## 3992	2001-10-19	1.8422222	24.82589	7.5851111	2.368421	2.111111
## 3993	2001-10-20	1.9951515	24.77436	7.5306061	2.000000	2.111111
## 3994	2001-10-21	1.6554545	24.62458	7.3533333	6.653846	7.384615
## 3995	2001-10-22	1.4578571	24.80131	7.3883333	2.285714	6.343340
## 3996	2001-10-23	0.8018182	24.93948	6.8618182	8.409091	5.302064
## 3997	2001-10-24	0.8530357	25.00180	6.6708929	2.618182	4.260788
## 3998	2001-10-25	1.1742424	24.50048	7.1860606	7.365854	3.219512
## 3999	2001-10-26	1.1707071	24.51685	7.0663636	13.818182	111.090909
## 4000	2001-10-27	1.1671717	24.53321	6.9466667	2.000000	79.740576
## 4001	2001-10-28	1.1636364	24.54958	6.8269697	30.585366	48.390244
## 4002	2001-10-29	1.1706494	24.55354	6.8591775	25.000000	29.000000
## 4003	2001-10-30	1.1776623	24.55750	6.8913853	125.636364	1160.545455
## 4004	2001-10-31	1.1846753	24.56146	6.9235931	1100.000000	4870.000000
## 4005	2001-11-01	1.1916883	24.56542	6.9558009	1100.000000	1323.000000
## 4006	2001-11-02	1.1987013	24.56938	6.9880087	7.000000	16.250000
## 4007	2001-11-03	1.2057143	24.57334	7.0202165	1300.000000	5000.000000
## 4008	2001-11-04	1.2127273	24.57730	7.0524242	2.000000	2.000000
## 4009	2001-11-05	2.1357576	24.61809	7.5751515	14.413793	35.034483
## 4010	2001-11-06	2.7622222	24.62178	7.9651111	6.277778	15.500000
## 4011	2001-11-07	1.9004762	24.66505	7.8238095	157.736842	239.289474
## 4012	2001-11-08	1.7731548	24.72884	7.7889881	1096.727273	1106.363636

## 4013	2001-11-09	1.6458333	24.79263	7.7541667	2.000000	2.250000
## 4014	2001-11-10	1.7118561	24.79972	7.8042045	15.111111	65.111111
## 4015	2001-11-11	1.7778788	24.80682	7.8542424	2.121212	17.647059
## 4016	2001-11-12	1.7516162	24.81608	7.7735354	9.878788	82.000000
## 4017	2001-11-13	1.7253535	24.82534	7.6928283	17.636364	71.090909
## 4018	2001-11-14	1.6990909	24.83461	7.6121212	2.780488	5.756098
## 4019	2001-11-15	1.2542424	24.83648	7.6984848	11.454545	43.227273
## 4020	2001-11-16	1.1663636	24.84468	7.6784848	5.250000	16.750000
## 4021	2001-11-17	1.0784848	24.85287	7.6584848	104.105263	157.578947
## 4022	2001-11-18	0.9906061	24.86106	7.6384848	3.818182	2.545455
## 4023	2001-11-19	1.1853535	24.86074	7.7093939	11.000000	11.000000
## 4024	2001-11-20	1.3801010	24.86041	7.7803030	7.454545	22.000000
## 4025	2001-11-21	1.5748485	24.86009	7.8512121	2.181818	2.121212
## 4026	2001-11-22	1.4418182	24.84856	7.7315152	6.500000	4.750000
## 4027	2001-11-23	1.3087879	24.83703	7.6118182	2.060606	2.545455
## 4028	2001-11-24	1.2762121	24.81847	7.6886364	58.181818	94.181818
## 4029	2001-11-25	1.2436364	24.79991	7.7654545	2.000000	2.000000
## 4030	2001-11-26	1.2110606	24.78135	7.8422727	73.090909	204.181818
## 4031	2001-11-27	1.1784848	24.76279	7.9190909	2.048780	2.097561
## 4032	2001-11-28	1.0500000	24.71415	7.6169697	2.000000	2.000000
## 4033	2001-11-29	1.2862963	24.74484	7.5998316	15.090909	9.272727
## 4034	2001-11-30	1.5225926	24.77553	7.5826936	101.000000	13.000000
## 4035	2001-12-01	1.7588889	24.80622	7.5655556	2.888889	16.666667
## 4036	2001-12-02	1.3552778	24.81082	7.6315278	2.000000	42.193798
## 4037	2001-12-03	0.9516667	24.81542	7.6975000	20.837209	67.720930
## 4038	2001-12-04	1.6548485	24.84809	7.6954545	3.000000	2.444444
## 4039	2001-12-05	1.4266667	24.88740	7.5792857	2.666667	6.333333
## 4040	2001-12-06	1.4746667	24.85989	7.5344444	24.111111	180.944444
## 4041	2001-12-07	0.4965455	25.47305	5.7432727	7.523810	4.500000
## 4042	2001-12-08	0.5288636	25.50648	5.5725000	21.527273	387.636364
## 4043	2001-12-09	0.6300000	25.40171	5.8050000	6.952381	198.818182
## 4044	2001-12-10	1.6709091	25.28950	6.4250505	2.000000	10.000000
## 4045	2001-12-11	2.7118182	25.17728	7.0451010	12.500000	8.500000
## 4046	2001-12-12	3.7527273	25.06506	7.6651515	14.590909	8.045455
## 4047	2001-12-13	1.2990909	24.80209	8.3787879	2.926829	4.146341
## 4048	2001-12-14	0.7263636	24.76552	8.2538182	2.000000	2.060606
## 4049	2001-12-15	0.7112879	24.70546	8.1288485	5.636364	22.727273
## 4050	2001-12-16	0.6962121	24.64541	8.0038788	164.000000	116.750000
## 4051	2001-12-17	0.6811364	24.58536	7.8789091	23.000000	63.193182
## 4052	2001-12-18	0.6660606	24.52530	7.7539394	4.787879	9.636364
## 4053	2001-12-19	0.8253102	24.61366	7.5473882	58.181818	336.727273
## 4054	2001-12-20	0.9845599	24.70202	7.3408369	56.000000	1554.727273
## 4055	2001-12-21	1.1438095	24.79038	7.1342857	2.142857	2.714286
## 4056	2001-12-22	1.3127814	24.73741	7.3033658	2000.000000	9400.000000
## 4057	2001-12-23	1.4817532	24.68443	7.4724459	34.000000	5135.333333
## 4058	2001-12-24	1.6507251	24.63146	7.6415260	61.818182	773.090909
## 4059	2001-12-25	1.8196970	24.57848	7.8106061	4.195122	4.634146
## 4060	2001-12-26	1.5037879	24.65426	7.6380303	50.000000	29.000000
## 4061	2001-12-27	1.1878788	24.73003	7.4654545	8.461538	14.307692
## 4062	2001-12-28	1.1516162	24.80157	7.1842424	17.250000	22.750000
## 4063	2001-12-29	1.1153535	24.87310	6.9030303	67.090909	166.727273
## 4064	2001-12-30	1.0790909	24.94464	6.6218182	2.000000	2.000000
## 4065	2001-12-31	1.7494733	25.06833	6.6047042	4.250000	7.000000
## 4066	2002-01-01	2.4198557	25.19202	6.5875902	1100.545455	1099.090909

## 4067	2002-01-02	3.0902381	25.31571	6.5704762	7.714286	16.714286
## 4068	2002-01-03	3.8246753	25.29626	6.8049870	5.500000	10.000000
## 4069	2002-01-04	4.5591126	25.27680	7.0394978	11.818182	133.272727
## 4070	2002-01-05	5.2935498	25.25734	7.2740087	7.284091	12.000000
## 4071	2002-01-06	6.0279870	25.23788	7.5085195	2.750000	2.500000
## 4072	2002-01-07	6.7624242	25.21842	7.7430303	3.272727	2.000000
## 4073	2002-01-08	5.1592424	25.16248	7.7060606	3.272727	4.545455
## 4074	2002-01-09	3.5560606	25.10655	7.6690909	2.000000	2.060606
## 4075	2002-01-10	3.0778788	25.00214	7.6278788	6.750000	4.750000
## 4076	2002-01-11	2.5996970	24.89773	7.5866667	7.000000	27.863636
## 4077	2002-01-12	3.4852525	25.03143	7.4033333	5.500000	3.750000
## 4078	2002-01-13	4.3708081	25.16514	7.2200000	3.684211	22.736842
## 4079	2002-01-14	5.2563636	25.29885	7.0366667	3.515152	2.000000
## 4080	2002-01-15	7.2642424	25.27039	7.8406061	2.060606	2.000000
## 4081	2002-01-16	3.5936364	24.80736	9.2039394	2.097561	2.536585
## 4082	2002-01-17	4.0217172	24.94308	8.4807071	8.909091	19.272727
## 4083	2002-01-18	4.4497980	25.07880	7.7574747	2.000000	4.750000
## 4084	2002-01-19	4.8778788	25.21452	7.0342424	3.172414	2.137931
## 4085	2002-01-20	3.0664286	25.17843	6.7947619	8.600000	2.066667
## 4086	2002-01-21	4.3268889	25.17251	7.0635556	2.000000	2.333333
## 4087	2002-01-22	1.2925000	24.81362	7.8008333	2.083333	1.958333
## 4088	2002-01-23	1.0630682	24.52233	8.0089015	3.250000	5.000000
## 4089	2002-01-24	0.8336364	24.23103	8.2169697	8.000000	15.681818
## 4090	2002-01-25	0.9034545	25.31436	6.0301818	2.145455	1007.840909
## 4091	2002-01-26	1.0250000	25.14220	6.4693182	3.288889	2000.000000
## 4092	2002-01-27	1.0126190	24.88824	7.0057143	2.080000	22.222222
## 4093	2002-01-28	1.0167641	24.66263	7.6142208	3.090909	4.181818
## 4094	2002-01-29	1.0209091	24.43703	8.2227273	2.060606	2.000000
## 4095	2002-01-30	0.9941667	24.58425	7.9180303	3.500000	3.750000
## 4096	2002-01-31	0.9674242	24.73147	7.6133333	29.090909	10.727273
## 4097	2002-02-01	0.9406818	24.87869	7.3086364	4.000000	2.500000
## 4098	2002-02-02	0.9139394	25.02591	7.0039394	2.000000	2.000000
## 4099	2002-02-03	1.2904221	24.87118	7.5623268	95.368421	67.578947
## 4100	2002-02-04	1.6669048	24.71645	8.1207143	2.047619	2.238095
## 4101	2002-02-05	1.4705628	24.60885	8.2486580	11.250000	2.750000
## 4102	2002-02-06	1.2742208	24.50124	8.3766017	102.000000	24.000000
## 4103	2002-02-07	1.0778788	24.39364	8.5045455	2.000000	2.000000
## 4104	2002-02-08	1.2290909	24.24293	8.3474242	4.750000	4.000000
## 4105	2002-02-09	1.3803030	24.09223	8.1903030	3.090909	2.909091
## 4106	2002-02-10	1.5315152	23.94152	8.0331818	5.000000	3.500000
## 4107	2002-02-11	1.6827273	23.79082	7.8760606	2.000000	2.000000
## 4108	2002-02-12	2.2036364	23.73833	7.8472727	4.909091	2.000000
## 4109	2002-02-13	2.3189610	23.87385	7.9811364	2.545455	3.818182
## 4110	2002-02-14	2.4342857	24.00936	8.1150000	5.714286	2.095238
## 4111	2002-02-15	1.9925974	23.95721	7.9932576	5.250000	2.500000
## 4112	2002-02-16	1.5509091	23.90506	7.8715152	2.272727	2.045455
## 4113	2002-02-17	1.2042424	24.17974	7.7106061	2.500000	4.750000
## 4114	2002-02-18	0.8575758	24.45442	7.5496970	2.000000	2.545455
## 4115	2002-02-19	0.7990909	24.33666	7.6145455	316.545455	65.454545
## 4116	2002-02-20	0.7406061	24.21889	7.6793939	2.250000	2.500000
## 4117	2002-02-21	0.6821212	24.10112	7.7442424	4.181818	2.000000
## 4118	2002-02-22	0.7059394	24.05988	7.8426667	22.421053	17.684211
## 4119	2002-02-23	0.7297576	24.01864	7.9410909	64.250000	134.000000
## 4120	2002-02-24	0.7535758	23.97739	8.0395152	8.545455	7.272727

## 4121	2002-02-25	0.7773939	23.93615	8.1379394	39.000000	40.000000
## 4122	2002-02-26	0.8012121	23.89491	8.2363636	2.000000	2.000000
## 4123	2002-02-27	0.9563636	23.86791	8.0996970	5.515152	2.000000
## 4124	2002-02-28	0.8452652	23.84275	7.9000568	15.250000	7.500000
## 4125	2002-03-01	0.7341667	23.81758	7.7004167	7.250000	2.000000
## 4126	2002-03-02	0.7871429	24.26876	7.8830952	2.292683	2.536585
## 4127	2002-03-03	1.1322222	24.37618	8.0175556	2.111111	2.222222
## 4128	2002-03-04	1.7254545	24.48627	7.7572727	2.222222	2.111111
## 4129	2002-03-05	1.1132727	24.65860	7.1665455	23.000000	10.500000
## 4130	2002-03-06	0.5010909	24.83093	6.5758182	17.750000	11.340909
## 4131	2002-03-07	0.8652273	24.75032	6.7345455	6.109091	12.181818
## 4132	2002-03-08	1.2557143	24.49919	7.4138095	2.523810	7.090909
## 4133	2002-03-09	0.9978788	24.09439	8.1727273	2.000000	2.000000
## 4134	2002-03-10	0.9552525	24.07199	8.1597980	2.000000	8.750000
## 4135	2002-03-11	0.9126263	24.04959	8.1468687	73.090909	12.000000
## 4136	2002-03-12	0.8700000	24.02718	8.1339394	2.000000	2.000000
## 4137	2002-03-13	0.9481061	24.05124	8.0455303	2.250000	3.750000
## 4138	2002-03-14	1.0262121	24.07530	7.9571212	2.000000	2.181818
## 4139	2002-03-15	1.1043182	24.09936	7.8687121	45.500000	10.000000
## 4140	2002-03-16	1.1824242	24.12342	7.7803030	2.000000	2.727273
## 4141	2002-03-17	0.9703030	23.51488	7.5557576	4.961538	2.576923
## 4142	2002-03-18	1.3200000	23.94981	7.5761905	4.720000	4.640000
## 4143	2002-03-19	1.2307576	23.84557	7.5630952	46.363636	8.000000
## 4144	2002-03-20	1.1415152	23.74133	7.5500000	2.390244	2.146341
## 4145	2002-03-21	1.1720000	23.79865	7.5205455	2.666667	2.000000
## 4146	2002-03-22	1.2024848	23.85598	7.4910909	2.250000	6.750000
## 4147	2002-03-23	1.2329697	23.91330	7.4616364	5.000000	6.000000
## 4148	2002-03-24	1.2634545	23.97062	7.4321818	4.181818	2.181818
## 4149	2002-03-25	1.2939394	24.02794	7.4027273	2.926829	2.926829
## 4150	2002-03-26	1.2231313	23.97985	7.4093939	6.000000	9.272727
## 4151	2002-03-27	1.1523232	23.93176	7.4160606	6.750000	4.500000
## 4152	2002-03-28	1.0815152	23.88367	7.4227273	4.181818	2.000000
## 4153	2002-03-29	0.9831602	23.75368	7.3534740	463.090909	107.090909
## 4154	2002-03-30	0.8848052	23.62370	7.2842208	13.750000	15.000000
## 4155	2002-03-31	0.7864502	23.49372	7.2149675	60.333333	8.500000
## 4156	2002-04-01	0.6880952	23.36374	7.1457143	2.181818	2.000000
## 4157	2002-04-02	1.0257576	23.44000	6.8978788	6.606061	2.000000
## 4158	2002-04-03	1.0453535	23.46241	6.8330303	50.947368	739.263158
## 4159	2002-04-04	1.0649495	23.48483	6.7681818	4.000000	16.000000
## 4160	2002-04-05	1.0845455	23.50724	6.7033333	2.000000	2.000000
## 4161	2002-04-06	1.1009091	23.59818	6.8054545	3.250000	8.250000
## 4162	2002-04-07	1.1172727	23.68912	6.9075758	131.727273	25.227273
## 4163	2002-04-08	1.1233333	23.72155	6.9421212	4.000000	22.363636
## 4164	2002-04-09	1.1293939	23.75397	6.9766667	33.750000	19.500000
## 4165	2002-04-10	1.1354545	23.78639	7.0112121	37.000000	6.909091
## 4166	2002-04-11	1.1415152	23.81882	7.0457576	2.060606	2.606061
## 4167	2002-04-12	1.0056926	23.96130	7.1728860	65.000000	27.500000
## 4168	2002-04-13	0.8698701	24.10378	7.3000144	42.000000	52.204545
## 4169	2002-04-14	0.7340476	24.24626	7.4271429	20.377358	76.909091
## 4170	2002-04-15	0.4354545	24.61352	7.0688636	31.136364	55.045085
## 4171	2002-04-16	0.3812727	24.83418	6.6263636	46.363636	33.181079
## 4172	2002-04-17	1.0933333	24.06618	7.2072727	17.162791	11.317073
## 4173	2002-04-18	0.8396970	23.96383	7.3015152	51.000000	8.726718
## 4174	2002-04-19	0.5860606	23.86148	7.3957576	16.954545	6.136364

## 4175	2002-04-20	0.7654545	23.88952	7.2836364	3.250000	18.500000
## 4176	2002-04-21	0.9448485	23.91755	7.1715152	2.000000	2.060606
## 4177	2002-04-22	0.9333333	24.09479	7.4897619	2.000000	2.000000
## 4178	2002-04-23	1.0893333	24.13102	7.5757778	2.255319	2.340426
## 4179	2002-04-24	0.9939394	24.16509	7.4890909	2.307692	6.846154
## 4180	2002-04-25	1.0416667	24.04783	7.2062500	2.333333	2.250000
## 4181	2002-04-26	0.9664881	24.26176	7.1669697	9.230769	10.884615
## 4182	2002-04-27	0.8913095	24.20780	7.2021861	5.500000	9.000000
## 4183	2002-04-28	0.8161310	24.15384	7.2374026	68.181818	16.545455
## 4184	2002-04-29	0.7409524	24.09988	7.2726190	2.380952	2.047619
## 4185	2002-04-30	0.8616883	24.17799	7.2743398	5.500000	14.000000
## 4186	2002-05-01	0.9824242	24.25609	7.2760606	10.909091	27.090909
## 4187	2002-05-02	0.9762879	24.23766	7.2689394	29.636364	23.272727
## 4188	2002-05-03	0.9701515	24.21923	7.2618182	2.000000	2.000000
## 4189	2002-05-04	0.9640152	24.20080	7.2546970	24.000000	15.000000
## 4190	2002-05-05	0.9578788	24.18236	7.2475758	610.454545	940.090909
## 4191	2002-05-06	0.9187879	24.19012	7.2268182	1320.666667	1466.235294
## 4192	2002-05-07	0.8796970	24.19788	7.2060606	420.555556	422.000000
## 4193	2002-05-08	1.2463636	24.24848	7.2742424	78.277778	67.333333
## 4194	2002-05-09	1.2827348	24.29701	7.3587677	100.000000	88.181818
## 4195	2002-05-10	1.3191061	24.34554	7.4432929	81.000000	49.340909
## 4196	2002-05-11	1.3554773	24.39406	7.5278182	7.750000	10.500000
## 4197	2002-05-12	1.3918485	24.44259	7.6123434	72.000000	8.545455
## 4198	2002-05-13	1.4282197	24.49111	7.6968687	521.111111	10.000000
## 4199	2002-05-14	1.4645909	24.53964	7.7813939	18000.000000	14.444444
## 4200	2002-05-15	1.5009621	24.58816	7.8659192	12000.000000	18.888889
## 4201	2002-05-16	1.5373333	24.63669	7.9504444	20.800000	23.333333
## 4202	2002-05-17	1.5954667	24.61368	7.9526222	17.789474	34.631579
## 4203	2002-05-18	1.6536000	24.59068	7.9548000	2.000000	2.000000
## 4204	2002-05-19	1.7117333	24.56768	7.9569778	290.000000	840.000000
## 4205	2002-05-20	1.7698667	24.54467	7.9591556	66.000000	32.000000
## 4206	2002-05-21	1.8280000	24.52167	7.9613333	2.355556	3.422222
## 4207	2002-05-22	1.7316444	24.51168	7.9025333	16.000000	18.586111
## 4208	2002-05-23	1.6352889	24.50169	7.8437333	93.500000	33.750000
## 4209	2002-05-24	1.5389333	24.49171	7.7849333	1446.909091	2042.909091
## 4210	2002-05-25	1.4425778	24.48172	7.7261333	4.000000	1181.515770
## 4211	2002-05-26	1.3462222	24.47173	7.6673333	266.653061	320.122449
## 4212	2002-05-27	1.3865926	24.46349	7.6663704	790.000000	2840.000000
## 4213	2002-05-28	1.4269630	24.45524	7.6654074	13.400000	6.400000
## 4214	2002-05-29	1.4673333	24.44700	7.6644444	15.392857	10.357143
## 4215	2002-05-30	1.3577778	24.46690	7.5715556	6.250000	2.750000
## 4216	2002-05-31	1.2482222	24.48681	7.4786667	12.181818	4.909091
## 4217	2002-06-01	1.1386667	24.50671	7.3857778	2.000000	2.000000
## 4218	2002-06-02	1.0220417	24.48644	7.3335139	7.250000	4.250000
## 4219	2002-06-03	0.9054167	24.46617	7.2812500	2.166667	2.000000
## 4220	2002-06-04	1.1697083	24.52605	7.5057143	5.365854	23.268293
## 4221	2002-06-05	1.4340000	24.49122	7.6840000	50.777778	107.833333
## 4222	2002-06-06	1.5548485	24.54509	7.4690909	4.275862	5.862069
## 4223	2002-06-07	1.3430195	24.67495	7.2512121	2.000000	2.000000
## 4224	2002-06-08	1.1311905	24.80481	7.0333333	8.000000	3.181818
## 4225	2002-06-09	0.6175000	24.97811	6.6534091	10.690909	4.363636
## 4226	2002-06-10	0.3990909	25.11242	6.3778182	15.812500	2.250000
## 4227	2002-06-11	1.2006667	24.77653	7.0128889	2.044444	2.177778
## 4228	2002-06-12	1.0960741	24.67008	7.3130370	8.000000	3.220468

## 4229	2002-06-13	0.9914815	24.56363	7.6131852	8.000000	4.263158
## 4230	2002-06-14	0.8868889	24.45718	7.9133333	2.000000	2.000000
## 4231	2002-06-15	1.1968889	24.38936	7.8075556	2.000000	2.000000
## 4232	2002-06-16	1.1981111	24.39171	7.7802222	16.250000	15.750000
## 4233	2002-06-17	1.1993333	24.39406	7.7528889	1104.909091	1189.818182
## 4234	2002-06-18	1.2005556	24.39641	7.7255556	335.333333	1259.800000
## 4235	2002-06-19	1.2017778	24.39876	7.6982222	8.869565	70.212766
## 4236	2002-06-20	1.3035000	24.41640	7.6561111	2.000000	2.000000
## 4237	2002-06-21	1.4052222	24.43404	7.6140000	2276.000000	2805.454545
## 4238	2002-06-22	1.5069444	24.45169	7.5718889	71.666667	79.000000
## 4239	2002-06-23	1.6086667	24.46933	7.5297778	5.854545	45.396226
## 4240	2002-06-24	1.5539259	24.47073	7.5722963	7.927273	28.666667
## 4241	2002-06-25	1.4991852	24.47212	7.6148148	10.000000	57.454545
## 4242	2002-06-26	1.4444444	24.47351	7.6573333	3.688889	2.888889
## 4243	2002-06-27	1.2871852	24.45814	7.7140000	3.719444	360.000000
## 4244	2002-06-28	1.1299259	24.44277	7.7706667	3.750000	12.888889
## 4245	2002-06-29	0.9726667	24.42740	7.8273333	9.000000	3.607143
## 4246	2002-06-30	0.9977778	24.39064	7.8237778	52.750000	37.750000
## 4247	2002-07-01	1.0228889	24.35387	7.8202222	6.000000	19.875000
## 4248	2002-07-02	1.0480000	24.31711	7.8166667	2.355556	2.000000
## 4249	2002-07-03	1.2860000	24.43559	7.5960000	27.157895	10.421053
## 4250	2002-07-04	1.5240000	24.55407	7.3753333	3.200000	2.000000
## 4251	2002-07-05	1.5814444	24.49863	7.4133333	9.473684	12.947368
## 4252	2002-07-06	1.6388889	24.44320	7.4513333	2.000000	2.044444
## 4253	2002-07-07	1.7502222	24.63025	7.3264444	3.750000	6.250000
## 4254	2002-07-08	1.8615556	24.81730	7.2015556	27.454545	23.636364
## 4255	2002-07-09	1.9728889	25.00436	7.0766667	2.000000	2.000000
## 4256	2002-07-10	2.0881481	24.91405	7.3085185	3.500000	5.750000
## 4257	2002-07-11	2.2034074	24.82375	7.5403704	2.727273	2.363636
## 4258	2002-07-12	2.3186667	24.73344	7.7722222	2.000000	2.133333
## 4259	2002-07-13	2.4845556	24.72601	7.8858889	19.750000	18.500000
## 4260	2002-07-14	2.6504444	24.71858	7.9995556	2.928571	3.714286
## 4261	2002-07-15	2.3694444	24.73969	7.7091111	10.250000	8.750000
## 4262	2002-07-16	2.0884444	24.76080	7.4186667	2.571429	3.607143
## 4263	2002-07-17	1.8671389	24.69790	7.3993333	2.500000	2.000000
## 4264	2002-07-18	1.6458333	24.63500	7.3800000	2.000000	2.000000
## 4265	2002-07-19	2.8676944	24.82069	7.4015556	10.625000	3.125000
## 4266	2002-07-20	4.0895556	25.00638	7.4231111	2.512821	2.717949
## 4267	2002-07-21	2.9264286	25.10495	7.1269048	2.709677	2.333333
## 4268	2002-07-22	4.3409091	24.86748	7.7484848	2.333333	3.000000
## 4269	2002-07-23	2.8297403	25.07446	6.9472186	4.000000	2.000000
## 4270	2002-07-24	1.3185714	25.28143	6.1459524	10.264151	271.272727
## 4271	2002-07-25	0.9245455	25.47370	5.4284091	30.318182	145.636364
## 4272	2002-07-26	0.6887273	25.58082	4.9825455	23.678571	20.000000
## 4273	2002-07-27	2.6348889	24.63164	7.7106667	26.367347	9.688889
## 4274	2002-07-28	2.4567348	24.58419	7.6554432	22.666667	38.250000
## 4275	2002-07-29	2.2785808	24.53674	7.6002197	2.000000	319.034091
## 4276	2002-07-30	2.1004268	24.48929	7.5449962	131.090909	599.818182
## 4277	2002-07-31	1.9222727	24.44184	7.4897727	16.893617	117.333333
## 4278	2002-08-01	2.2304268	24.53953	7.3444407	60.000000	51.000000
## 4279	2002-08-02	2.5385808	24.63721	7.1991086	2.500000	5.250000
## 4280	2002-08-03	2.8467348	24.73489	7.0537765	17.090909	4.181818
## 4281	2002-08-04	3.1548889	24.83258	6.9084444	4.666667	2.755556
## 4282	2002-08-05	3.4744444	24.88767	6.9475556	3.000000	2.250000

##	4283	2002-08-06	3.7940000	24.94276	6.9866667	2.044444	2.088889
##	4284	2002-08-07	3.6784444	24.88093	7.2864444	13.454545	2.000000
##	4285	2002-08-08	3.5628889	24.81910	7.5862222	5.250000	9.000000
##	4286	2002-08-09	3.4473333	24.75727	7.8860000	2.177778	2.000000
##	4287	2002-08-10	3.2681111	24.79429	7.5900000	3.272727	2.545455
##	4288	2002-08-11	3.0888889	24.83131	7.2940000	2.264151	2.301887
##	4289	2002-08-12	3.0360000	24.58617	7.5412222	68.421053	24.421053
##	4290	2002-08-13	2.9831111	24.34102	7.7884444	2.044444	2.044444
##	4291	2002-08-14	1.7346667	23.89716	8.2320000	3.660377	2.339623
##	4292	2002-08-15	1.7407302	23.95421	8.1642857	4.363636	2.363636
##	4293	2002-08-16	1.7467937	24.01127	8.0965714	2.250000	4.250000
##	4294	2002-08-17	1.7528571	24.06833	8.0288571	5.090909	4.909091
##	4295	2002-08-18	1.7589206	24.12538	7.9611429	10.000000	6.500000
##	4296	2002-08-19	1.7649841	24.18244	7.8934286	12.000000	7.636364
##	4297	2002-08-20	1.7710476	24.23950	7.8257143	2.500000	2.250000
##	4298	2002-08-21	1.7771111	24.29656	7.7580000	2.000000	2.044444
##	4299	2002-08-22	1.3108889	24.10958	8.1113333	2.000000	2.000000
##	4300	2002-08-23	1.5529630	24.10519	8.0774815	5.090909	2.909091
##	4301	2002-08-24	1.7950370	24.10081	8.0436296	4.750000	4.000000
##	4302	2002-08-25	2.0371111	24.09642	8.0097778	2.044444	2.044444
##	4303	2002-08-26	1.9235556	23.82732	8.0085253	1239.636364	4129.636364
##	4304	2002-08-27	1.8100000	23.55823	8.0072727	10.000000	5.622642
##	4305	2002-08-28	1.7207111	23.56920	7.9557737	412.000000	2732.000000
##	4306	2002-08-29	1.6314222	23.58017	7.9042747	90.000000	820.000000
##	4307	2002-08-30	1.5421333	23.59114	7.8527758	49.000000	21.333333
##	4308	2002-08-31	1.4528444	23.60212	7.8012768	8.000000	6.526316
##	4309	2002-09-01	1.3635556	23.61309	7.7497778	2.577778	2.222222
##	4310	2002-09-02	1.1500000	24.01612	7.5516667	4.937500	3.375000
##	4311	2002-09-03	1.4235714	24.22383	7.6759524	3.219512	3.268293
##	4312	2002-09-04	1.6946667	24.28544	7.9060000	2.500000	2.000000
##	4313	2002-09-05	1.9900000	24.34961	7.7924242	2.000000	2.000000
##	4314	2002-09-06	1.5670238	24.29417	7.7050216	3.500000	2.750000
##	4315	2002-09-07	1.1440476	24.23874	7.6176190	2.333333	2.556818
##	4316	2002-09-08	0.6745455	24.58180	6.8490909	8.181818	2.363636
##	4317	2002-09-09	0.6441818	24.78618	6.4989091	23.236364	2.181818
##	4318	2002-09-10	0.9671111	23.78071	7.8486667	2.000000	2.000000
##	4319	2002-09-11	1.0184444	23.64644	7.8129630	2.500000	5.500000
##	4320	2002-09-12	1.0697778	23.51216	7.7772593	24.181818	6.545455
##	4321	2002-09-13	1.1211111	23.37789	7.7415556	2.000000	2.000000
##	4322	2002-09-14	1.6301111	23.31258	7.5612222	3.250000	5.750000
##	4323	2002-09-15	2.1391111	23.24727	7.3808889	7.035714	3.857143
##	4324	2002-09-16	1.5104530	23.27122	7.2980085	6.250000	2.500000
##	4325	2002-09-17	0.8817949	23.29518	7.2151282	2.000000	2.000000
##	4326	2002-09-18	0.8956410	23.30845	7.1403077	15.636364	3.090909
##	4327	2002-09-19	0.9094872	23.32171	7.0654872	4.000000	8.000000
##	4328	2002-09-20	0.9233333	23.33498	6.9906667	2.000000	2.000000
##	4329	2002-09-21	0.8737778	23.33643	7.0405556	3.052632	2.315789
##	4330	2002-09-22	0.8242222	23.33789	7.0904444	3.200000	2.000000
##	4331	2002-09-23	1.0493333	23.08723	6.9287778	6.250000	4.000000
##	4332	2002-09-24	1.2744444	22.83658	6.7671111	34.821429	3.214286
##	4333	2002-09-25	1.2240000	23.02837	6.7991111	3.250000	3.000000
##	4334	2002-09-26	1.1735556	23.22016	6.8311111	2.044444	3.155556
##	4335	2002-09-27	1.1920741	23.23003	6.9342222	5.454545	4.363636
##	4336	2002-09-28	1.2105926	23.23990	7.0373333	8.750000	7.000000

## 4337	2002-09-29	1.2291111	23.24978	7.1404444	2.000000	2.000000
## 4338	2002-09-30	1.0567778	23.40334	7.1465556	10.909091	3.272727
## 4339	2002-10-01	0.8844444	23.55691	7.1526667	2.000000	2.266667
## 4340	2002-10-02	0.9717037	23.49443	7.1015556	5.750000	7.500000
## 4341	2002-10-03	1.0589630	23.43195	7.0504444	2844.909091	3173.636364
## 4342	2002-10-04	1.1462222	23.36947	6.9993333	2.000000	3.022222
## 4343	2002-10-05	1.1101481	23.34852	6.9560741	252.833333	52.833333
## 4344	2002-10-06	1.0740741	23.32757	6.9128148	60.000000	28.291667
## 4345	2002-10-07	1.0380000	23.30662	6.8695556	9.035714	3.750000
## 4346	2002-10-08	1.0357222	23.33777	6.7810556	110.750000	340.750000
## 4347	2002-10-09	1.0334444	23.36892	6.6925556	18.666667	2.000000
## 4348	2002-10-10	1.0311667	23.40007	6.6040556	148.315789	4.631579
## 4349	2002-10-11	1.0288889	23.43122	6.5155556	2.800000	2.044444
## 4350	2002-10-12	1.2251111	23.45438	6.4608889	19.811321	5.283019
## 4351	2002-10-13	1.1902910	23.51391	6.6003042	20.363636	2.909091
## 4352	2002-10-14	1.1554709	23.57343	6.7397196	134.000000	10.431818
## 4353	2002-10-15	1.1206508	23.63296	6.8791349	820.000000	17.954545
## 4354	2002-10-16	1.0858307	23.69249	7.0185503	2.000000	25.477273
## 4355	2002-10-17	1.0510106	23.75202	7.1579656	2.750000	33.000000
## 4356	2002-10-18	1.0161905	23.81155	7.2973810	3.000000	22.227273
## 4357	2002-10-19	0.8345725	24.03377	7.0853950	50.909091	11.454545
## 4358	2002-10-20	0.6529545	24.25600	6.8734091	16.454545	9.736993
## 4359	2002-10-21	0.4554545	24.42291	6.6298182	22.145455	8.019440
## 4360	2002-10-22	1.2666667	23.85871	6.8915556	2.981132	6.301887
## 4361	2002-10-23	0.7657143	23.76098	7.1850000	2.733333	2.000000
## 4362	2002-10-24	0.9393484	23.87397	7.1612719	23.454545	12.363636
## 4363	2002-10-25	1.1129825	23.98696	7.1375439	2.047619	2.000000
## 4364	2002-10-26	1.2511111	24.00851	7.2968889	3.500000	5.954545
## 4365	2002-10-27	1.2586667	24.03583	7.2102222	24.727273	59.636364
## 4366	2002-10-28	1.2662222	24.06315	7.1235556	5.777778	12.000000
## 4367	2002-10-29	1.2737778	24.09047	7.0368889	2.133333	2.755556
## 4368	2002-10-30	0.8055556	23.96502	7.3573333	9.750000	3.285714
## 4369	2002-10-31	0.9774074	24.05221	7.3395556	315.333333	60.500000
## 4370	2002-11-01	1.1492593	24.13939	7.3217778	17.000000	16.000000
## 4371	2002-11-02	1.3211111	24.22658	7.3040000	7.200000	23.866667
## 4372	2002-11-03	1.2131111	24.22469	7.3062222	97.368421	12.736842
## 4373	2002-11-04	1.1051111	24.22280	7.3084444	2.044444	2.000000
## 4374	2002-11-05	1.0703704	24.19616	7.2400741	3.000000	2.500000
## 4375	2002-11-06	1.0356296	24.16953	7.1717037	11.818182	2.000000
## 4376	2002-11-07	1.0008889	24.14289	7.1033333	2.444444	2.000000
## 4377	2002-11-08	1.1223333	24.31564	6.9970000	16.500000	7.500000
## 4378	2002-11-09	1.2437778	24.48840	6.8906667	30.392857	15.785714
## 4379	2002-11-10	1.4182222	24.59718	6.9024444	5.666667	3.396226
## 4380	2002-11-11	1.0495556	24.57031	7.1960000	125.964286	50.250000
## 4381	2002-11-12	1.0556905	24.58857	7.1539524	3398.545455	425.125000
## 4382	2002-11-13	1.0618254	24.60683	7.1119048	120.000000	800.000000
## 4383	2002-11-14	1.0679603	24.62509	7.0698571	2.000000	2.000000
## 4384	2002-11-15	1.0740952	24.64336	7.0278095	1021.454545	287.272727
## 4385	2002-11-16	1.0802302	24.66162	6.9857619	20.250000	6.000000
## 4386	2002-11-17	1.0863651	24.67988	6.9437143	34.000000	1611.878788
## 4387	2002-11-18	1.0925000	24.69814	6.9016667	2239.727273	3217.757576
## 4388	2002-11-19	1.1668444	24.69011	6.9681333	4445.454545	4823.636364
## 4389	2002-11-20	1.2411889	24.68207	7.0346000	2900.750000	1390.250000
## 4390	2002-11-21	1.3155333	24.67404	7.1010667	3702.285714	3095.500000

## 4391	2002-11-22	1.3898778	24.66601	7.1675333	70.857143	71.200000
## 4392	2002-11-23	1.4642222	24.65798	7.2340000	6.844444	4.088889
## 4393	2002-11-24	1.7700000	24.66846	7.3594444	21.000000	4.750000
## 4394	2002-11-25	2.0757778	24.67893	7.4848889	11.821429	5.678571
## 4395	2002-11-26	1.9031111	24.70936	7.4611111	40.000000	4.589286
## 4396	2002-11-27	1.7304444	24.73978	7.4373333	3.750000	3.500000
## 4397	2002-11-28	1.5577778	24.77020	7.4135556	9.272727	5.636364
## 4398	2002-11-29	1.3851111	24.80062	7.3897778	134.452830	5.056604
## 4399	2002-11-30	1.0056237	24.96761	6.7456843	24.000000	649.619211
## 4400	2002-12-01	0.6261364	25.13459	6.1015909	664.763636	1294.181818
## 4401	2002-12-02	0.7852381	24.98952	6.5085714	5.280000	2.250000
## 4402	2002-12-03	1.5457778	24.91629	7.3188889	327.166667	323.833333
## 4403	2002-12-04	0.7849091	25.15315	5.9838182	280.206897	4310.000000
## 4404	2002-12-05	1.2986450	25.00235	6.6347662	473.333333	390.000000
## 4405	2002-12-06	1.8123810	24.85155	7.2857143	175.836735	40.571429
## 4406	2002-12-07	2.3960000	24.90607	7.4846667	50.222222	146.333333
## 4407	2002-12-08	2.5787879	24.84388	7.7869697	4.000000	3.555556
## 4408	2002-12-09	1.5683333	24.79433	7.6758333	2.166667	2.083333
## 4409	2002-12-10	1.5274074	24.74870	7.6069259	3.000000	2.250000
## 4410	2002-12-11	1.4864815	24.70307	7.5380185	6.727273	2.545455
## 4411	2002-12-12	1.4455556	24.65744	7.4691111	78.088889	2.844444
## 4412	2002-12-13	1.4465926	24.65966	7.4917037	5.000000	10.250000
## 4413	2002-12-14	1.4476296	24.66187	7.5142963	2.000000	9.910714
## 4414	2002-12-15	1.4486667	24.66409	7.5368889	6.321429	9.571429
## 4415	2002-12-16	1.3887778	24.61940	7.6091111	2.000000	5.750000
## 4416	2002-12-17	1.3288889	24.57471	7.6813333	2.000000	2.222222
## 4417	2002-12-18	1.2712963	24.59386	7.5710741	81.818182	42.000000
## 4418	2002-12-19	1.2137037	24.61301	7.4608148	2.750000	2.250000
## 4419	2002-12-20	1.1561111	24.63217	7.3505556	2.444444	3.222222
## 4420	2002-12-21	1.1959444	24.68507	7.1362778	122.000000	46.727273
## 4421	2002-12-22	1.2357778	24.73798	6.9220000	56.703704	8.905660
## 4422	2002-12-23	1.3285299	24.80909	6.7076667	68.800000	6.657958
## 4423	2002-12-24	1.4212821	24.88021	6.4933333	18.820513	4.410256
## 4424	2002-12-25	1.9813504	24.86768	6.7233333	130.181818	263.272727
## 4425	2002-12-26	2.5414188	24.85515	6.9533333	2.727273	2.000000
## 4426	2002-12-27	3.1014872	24.84262	7.1833333	24.000000	8.000000
## 4427	2002-12-28	3.6615556	24.83009	7.4133333	2.177778	2.000000
## 4428	2002-12-29	3.2084444	24.81458	7.4536111	12.210526	6.105263
## 4429	2002-12-30	2.7553333	24.79908	7.4938889	4.750000	21.750000
## 4430	2002-12-31	2.3022222	24.78357	7.5341667	29.818182	22.363636
## 4431	2003-01-01	1.8491111	24.76807	7.5744444	2.000000	2.044444
## 4432	2003-01-02	1.7442222	24.82437	7.0268889	64.250000	2.500000
## 4433	2003-01-03	1.6393333	24.88067	6.4793333	2.622222	2.088889
## 4434	2003-01-04	2.9730000	24.88229	6.7853333	19.166667	9.090909
## 4435	2003-01-05	4.3066667	24.88391	7.0913333	3.200000	2.355556
## 4436	2003-01-06	3.4687407	24.69864	7.3354074	5.500000	3.000000
## 4437	2003-01-07	2.6308148	24.51338	7.5794815	8.727273	12.909091
## 4438	2003-01-08	1.7928889	24.32811	7.8235556	3.955556	6.800000
## 4439	2003-01-09	2.2538889	24.51063	7.5737778	4.250000	5.000000
## 4440	2003-01-10	2.7148889	24.69316	7.3240000	2.500000	2.357143
## 4441	2003-01-11	2.4218333	24.67341	7.2389444	2.250000	2.000000
## 4442	2003-01-12	2.1287778	24.65366	7.1538889	132.909091	13.090909
## 4443	2003-01-13	1.8357222	24.63391	7.0688333	9.750000	5.250000
## 4444	2003-01-14	1.5426667	24.61416	6.9837778	2.000000	2.000000

## 4445	2003-01-15	0.3436364	25.40293	5.6454545	44.509091	2.263158
## 4446	2003-01-16	1.7266667	24.98540	6.2392857	22.524590	2.526316
## 4447	2003-01-17	0.8959091	25.28223	5.5461364	61.272727	2.263158
## 4448	2003-01-18	2.2493333	24.57382	6.9768889	2.044444	2.000000
## 4449	2003-01-19	2.1426190	24.83586	6.9333333	4.947368	2.000000
## 4450	2003-01-20	2.7246667	24.67511	7.0808889	494.680851	531.829787
## 4451	2003-01-21	2.7787879	24.82545	6.2551515	2.111111	2.000000
## 4452	2003-01-22	1.9387500	24.95829	6.0287500	329.333333	261.481481
## 4453	2003-01-23	1.8883519	24.82536	6.4751667	1800.000000	6400.000000
## 4454	2003-01-24	1.8379537	24.69242	6.9215833	9.555556	2.444444
## 4455	2003-01-25	1.7875556	24.55949	7.3680000	2.088889	2.044444
## 4456	2003-01-26	1.6220000	24.56328	7.1191111	58.727273	7.454545
## 4457	2003-01-27	1.4564444	24.56707	6.8702222	2.000000	2.044444
## 4458	2003-01-28	2.9248889	24.73346	6.6350000	65.454545	16.363636
## 4459	2003-01-29	4.3933333	24.89984	6.3997778	4.035714	3.321429
## 4460	2003-01-30	4.8224444	24.89660	6.7248889	9.911111	8.711111
## 4461	2003-01-31	4.2264444	24.57930	6.9085556	18.000000	7.636364
## 4462	2003-02-01	3.6304444	24.26200	7.0922222	2.000000	2.133333
## 4463	2003-02-02	2.6297778	24.94673	5.6117778	2.037736	2.113208
## 4464	2003-02-03	3.6621111	24.66159	6.3738889	25.818182	10.909091
## 4465	2003-02-04	4.6944444	24.37644	7.1360000	6.844444	3.288889
## 4466	2003-02-05	2.6122222	24.07111	6.9680000	2.150943	3.132075
## 4467	2003-02-06	2.7248889	24.10972	6.9960000	5.272727	10.363636
## 4468	2003-02-07	2.8375556	24.14833	7.0240000	3.750000	4.250000
## 4469	2003-02-08	2.9502222	24.18694	7.0520000	366.181818	220.181818
## 4470	2003-02-09	3.0628889	24.22556	7.0800000	2.000000	2.000000
## 4471	2003-02-10	2.9792889	24.16322	7.0560889	2.000000	2.500000
## 4472	2003-02-11	2.8956889	24.10088	7.0321778	2.000000	2.181818
## 4473	2003-02-12	2.8120889	24.03854	7.0082667	2.000000	2.000000
## 4474	2003-02-13	2.7284889	23.97620	6.9843556	2.000000	2.250000
## 4475	2003-02-14	2.6448889	23.91387	6.9604444	13.035714	2.535714
## 4476	2003-02-15	2.7956296	23.87078	7.0988889	3.250000	109.000000
## 4477	2003-02-16	2.9463704	23.82769	7.2373333	2.625000	2.000000
## 4478	2003-02-17	3.0971111	23.78460	7.3757778	2.000000	2.000000
## 4479	2003-02-18	3.0794815	23.75198	7.7113333	2.181818	3.636364
## 4480	2003-02-19	3.0618519	23.71936	8.0468889	2.500000	2.000000
## 4481	2003-02-20	3.0442222	23.68673	8.3824444	5.777778	2.133333
## 4482	2003-02-21	1.6866667	23.54029	8.5787500	2.333333	2.000000
## 4483	2003-02-22	2.0738095	23.98269	7.8776190	27.959184	13.673469
## 4484	2003-02-23	2.1942424	23.90261	7.3863636	2.000000	2.000000
## 4485	2003-02-24	2.3331111	23.85518	7.3702222	2.222222	2.000000
## 4486	2003-02-25	1.4569048	24.32264	6.9742857	4.400000	5.500000
## 4487	2003-02-26	0.8550000	24.63325	6.5993182	9.418182	5.272727
## 4488	2003-02-27	0.4721818	24.92951	5.9383636	31.927273	3.636364
## 4489	2003-02-28	2.3771111	23.53267	6.9217778	2.000000	2.000000
## 4490	2003-03-01	2.3771111	23.67355	7.0184444	4.000000	2.000000
## 4491	2003-03-02	2.3771111	23.81443	7.1151111	297.090909	9.818182
## 4492	2003-03-03	2.3771111	23.95531	7.2117778	3.000000	4.250000
## 4493	2003-03-04	2.3771111	24.09619	7.3084444	4.181818	6.181818
## 4494	2003-03-05	2.3771111	24.23707	7.4051111	2.000000	2.000000
## 4495	2003-03-06	2.7262222	24.22057	7.2906667	2.000000	6.750000
## 4496	2003-03-07	3.0753333	24.20407	7.1762222	2.000000	2.088889
## 4497	2003-03-08	1.6462222	24.20191	6.9620000	3.571429	3.214286
## 4498	2003-03-09	2.8060000	24.11702	6.8535556	2.113208	3.886792

## 4499	2003-03-10	2.4515556	24.09124	7.1755556	3.892857	2.428571
## 4500	2003-03-11	2.8667407	24.22002	7.1702222	2.250000	2.000000
## 4501	2003-03-12	3.2819259	24.34880	7.1648889	3.473684	3.473684
## 4502	2003-03-13	3.6971111	24.47758	7.1595556	2.000000	2.133333
## 4503	2003-03-14	2.7906667	24.41147	7.4126667	5.132075	7.433962
## 4504	2003-03-15	2.7013333	24.32728	7.5788889	1108.727273	538.909091
## 4505	2003-03-16	2.6120000	24.24309	7.7451111	2.075472	2.301887
## 4506	2003-03-17	2.5961778	24.24357	7.7482667	43.272727	14.363636
## 4507	2003-03-18	2.5803556	24.24406	7.7514222	17.500000	5.000000
## 4508	2003-03-19	2.5645333	24.24454	7.7545778	73.636364	22.727273
## 4509	2003-03-20	2.5487111	24.24503	7.7577333	4.000000	5.500000
## 4510	2003-03-21	2.5328889	24.24551	7.7608889	2.000000	2.177778
## 4511	2003-03-22	2.4700741	24.33770	7.5620000	46.545455	12.181818
## 4512	2003-03-23	2.4072593	24.42990	7.3631111	2.000000	2.500000
## 4513	2003-03-24	2.3444444	24.52209	7.1642222	2.088889	3.333333
## 4514	2003-03-25	2.5759259	24.54048	7.2535556	101.272727	43.090909
## 4515	2003-03-26	2.8074074	24.55887	7.3428889	7.750000	4.000000
## 4516	2003-03-27	3.0388889	24.57727	7.4322222	2.000000	2.044444
## 4517	2003-03-28	2.9642222	24.44844	7.7038889	13.894737	8.210526
## 4518	2003-03-29	2.8895556	24.31962	7.9755556	2.000000	2.088889
## 4519	2003-03-30	1.8702222	24.44796	7.2266667	2.679245	2.981132
## 4520	2003-03-31	2.3820000	24.57880	7.4880000	7.191489	5.276596
## 4521	2003-04-01	2.1097619	24.64507	7.4711905	2.000000	2.000000
## 4522	2003-04-02	2.5593939	24.63906	7.4842424	2.000000	2.000000
## 4523	2003-04-03	1.9650000	24.65042	7.2504167	2.583333	2.500000
## 4524	2003-04-04	1.3649545	24.92730	6.6158447	3.500000	2.750000
## 4525	2003-04-05	0.7649091	25.20418	5.9812727	25.054545	7.284091
## 4526	2003-04-06	1.0747619	24.80788	7.0919048	5.320755	11.818182
## 4527	2003-04-07	0.9381818	24.98482	6.6388636	4.500000	6.953535
## 4528	2003-04-08	2.1808889	24.40129	7.8684444	2.044444	2.088889
## 4529	2003-04-09	2.3640741	24.37799	7.9884444	17.750000	4.250000
## 4530	2003-04-10	2.5472593	24.35468	8.1084444	38.909091	13.818182
## 4531	2003-04-11	2.7304444	24.33138	8.2284444	2.355556	2.711111
## 4532	2003-04-12	2.4452222	24.41360	7.8056667	2.250000	3.750000
## 4533	2003-04-13	2.1600000	24.49582	7.3828889	2.000000	2.133333
## 4534	2003-04-14	2.2706222	24.51659	7.3464000	1434.363636	1577.272727
## 4535	2003-04-15	2.3812444	24.53735	7.3099111	2213.333333	6090.000000
## 4536	2003-04-16	2.4918667	24.55812	7.2734222	4.750000	6.500000
## 4537	2003-04-17	2.6024889	24.57888	7.2369333	70.000000	300.000000
## 4538	2003-04-18	2.7131111	24.59964	7.2004444	5.142857	4.178571
## 4539	2003-04-19	2.7524444	24.64959	7.0871111	4.500000	3.500000
## 4540	2003-04-20	2.7917778	24.69953	6.9737778	10.977778	49.600000
## 4541	2003-04-21	2.0633333	24.76862	7.1266667	2.577778	4.755556
## 4542	2003-04-22	1.9185333	24.75508	7.1174222	50.736842	155.684211
## 4543	2003-04-23	1.7737333	24.74154	7.1081778	30.000000	300.000000
## 4544	2003-04-24	1.6289333	24.72800	7.0989333	19.375000	24.000000
## 4545	2003-04-25	1.4841333	24.71445	7.0896889	8.750000	66.500000
## 4546	2003-04-26	1.3393333	24.70091	7.0804444	2.714286	3.214286
## 4547	2003-04-27	1.4532222	24.69931	7.2248889	7.357143	22.000000
## 4548	2003-04-28	1.5671111	24.69771	7.3693333	12.000000	17.733333
## 4549	2003-04-29	1.4450000	24.74250	7.4760000	4.250000	6.500000
## 4550	2003-04-30	1.3228889	24.78729	7.5826667	11.107143	25.321429
## 4551	2003-05-01	1.3123778	24.76825	7.5714889	12000.000000	12000.000000
## 4552	2003-05-02	1.3018667	24.74920	7.5603111	409.777778	122.666667

## 4553	2003-05-03	1.2913556	24.73016	7.5491333	3022.000000	8400.000000
## 4554	2003-05-04	1.2808444	24.71112	7.5379556	536.727273	418.909091
## 4555	2003-05-05	1.2703333	24.69208	7.5267778	68.000000	140.000000
## 4556	2003-05-06	1.2598222	24.67304	7.5156000	320.888889	11.250000
## 4557	2003-05-07	1.2493111	24.65399	7.5044222	600.000000	33.806818
## 4558	2003-05-08	1.2388000	24.63495	7.4932444	110.545455	56.363636
## 4559	2003-05-09	1.2282889	24.61591	7.4820667	1041.166667	6.250000
## 4560	2003-05-10	1.2177778	24.59687	7.4708889	364.255319	127.688889
## 4561	2003-05-11	1.3077333	24.59884	7.4902667	6020.000000	650.753535
## 4562	2003-05-12	1.3976889	24.60082	7.5096444	1141.454545	1173.818182
## 4563	2003-05-13	1.4876444	24.60280	7.5290222	48.250000	21.500000
## 4564	2003-05-14	1.5776000	24.60478	7.5484000	574.000000	1300.000000
## 4565	2003-05-15	1.6675556	24.60676	7.5677778	477.125000	164.808511
## 4566	2003-05-16	1.6378889	24.62288	7.4588889	511.000000	2100.000000
## 4567	2003-05-17	1.6082222	24.63900	7.3500000	56.656250	57.031250
## 4568	2003-05-18	1.4888889	24.63399	7.4045778	1650.000000	1200.000000
## 4569	2003-05-19	1.3695556	24.62897	7.4591556	12000.000000	2400.000000
## 4570	2003-05-20	1.2502222	24.62396	7.5137333	492.500000	152.500000
## 4571	2003-05-21	1.1308889	24.61895	7.5683111	4019.454545	2717.454545
## 4572	2003-05-22	1.0115556	24.61393	7.6228889	308.595745	285.869565
## 4573	2003-05-23	1.0380741	24.69418	7.3057778	1666.000000	2939.500000
## 4574	2003-05-24	1.0645926	24.77442	6.9886667	6280.000000	3355.000000
## 4575	2003-05-25	1.0911111	24.85467	6.6715556	311.890909	265.740741
## 4576	2003-05-26	1.4012698	24.89150	6.8132778	181.818182	176.181818
## 4577	2003-05-27	1.7114286	24.92833	6.9550000	6.952381	1148.090909
## 4578	2003-05-28	0.5645455	25.19868	6.1727273	229.125000	2120.000000
## 4579	2003-05-29	0.5967273	25.38320	5.7183636	14.290909	1256.821429
## 4580	2003-05-30	2.9313333	24.69311	7.9160000	494.561404	393.642857
## 4581	2003-05-31	1.2487500	24.76075	7.3916667	890.814815	925.000000
## 4582	2003-06-01	1.2997619	24.77062	7.5857143	349.317073	332.682927
## 4583	2003-06-02	1.5424444	24.70384	7.7253333	48.944444	42.888889
## 4584	2003-06-03	1.7681818	24.74655	7.5609091	512.166667	573.523810
## 4585	2003-06-04	1.8125657	24.75885	7.4850505	75.000000	53.111111
## 4586	2003-06-05	1.8569495	24.77114	7.4091919	38.000000	2.000000
## 4587	2003-06-06	1.9013333	24.78344	7.3333333	197.535714	28.500000
## 4588	2003-06-07	1.7988254	24.80560	7.2356190	268.444444	2.250000
## 4589	2003-06-08	1.6963175	24.82776	7.1379048	12000.000000	375.136364
## 4590	2003-06-09	1.5938095	24.84992	7.0401905	800.000000	748.022727
## 4591	2003-06-10	1.4913016	24.87208	6.9424762	1181.636364	1120.909091
## 4592	2003-06-11	1.3887937	24.89424	6.8447619	6.000000	4.500000
## 4593	2003-06-12	1.2862857	24.91640	6.7470476	323.000000	3000.000000
## 4594	2003-06-13	1.1837778	24.93856	6.6493333	26.800000	52.533333
## 4595	2003-06-14	1.1802222	24.89983	6.6598148	5600.000000	9800.000000
## 4596	2003-06-15	1.1766667	24.86110	6.6702963	12000.000000	12000.000000
## 4597	2003-06-16	1.1731111	24.82238	6.6807778	5684.842105	2617.263158
## 4598	2003-06-17	1.1695556	24.78365	6.6912593	557.714286	165.000000
## 4599	2003-06-18	1.1660000	24.74493	6.7017407	283.000000	89.428571
## 4600	2003-06-19	1.1624444	24.70620	6.7122222	118.192308	41.955556
## 4601	2003-06-20	1.3968000	24.74121	6.6269778	4063.333333	27.102778
## 4602	2003-06-21	1.6311556	24.77622	6.5417333	27.500000	12.250000
## 4603	2003-06-22	1.8655111	24.81123	6.4564889	300.727273	38.181818
## 4604	2003-06-23	2.0998667	24.84624	6.3712444	32.000000	22.246465
## 4605	2003-06-24	2.3342222	24.88124	6.2860000	41.040000	6.311111
## 4606	2003-06-25	2.3630556	24.82734	6.5733333	406.666667	5.280556

## 4607	2003-06-26	2.3918889	24.77344	6.8606667	15.400000	4.250000
## 4608	2003-06-27	2.4207222	24.71954	7.1480000	24.363636	12.727273
## 4609	2003-06-28	2.4495556	24.66564	7.4353333	5.509434	3.849057
## 4610	2003-06-29	3.6317778	24.53326	7.7273333	1019.272727	1097.636364
## 4611	2003-06-30	4.8140000	24.40087	8.0193333	5.555556	8.133333
## 4612	2003-07-01	4.3594074	24.53741	7.4396296	140.000000	20.000000
## 4613	2003-07-02	3.9048148	24.67396	6.8599259	12.222222	13.750000
## 4614	2003-07-03	3.4502222	24.81051	6.2802222	8.088889	7.288889
## 4615	2003-07-04	3.6505333	24.82143	6.3209333	161.090909	63.272727
## 4616	2003-07-05	3.8508444	24.83235	6.3616444	8.750000	2.250000
## 4617	2003-07-06	4.0511556	24.84327	6.4023556	1191.818182	1285.636364
## 4618	2003-07-07	4.2514667	24.85419	6.4430667	9.750000	2.500000
## 4619	2003-07-08	4.4517778	24.86511	6.4837778	20.638298	99.086957
## 4620	2003-07-09	3.2545556	25.04343	5.9446667	6.000000	12.000000
## 4621	2003-07-10	2.0573333	25.22176	5.4055556	4.133333	3.866667
## 4622	2003-07-11	2.1643333	25.22410	5.4373333	129.368421	14.421053
## 4623	2003-07-12	2.2713333	25.22644	5.4691111	3.911111	2.311111
## 4624	2003-07-13	2.3602222	25.18002	5.5660000	2.000000	2.000000
## 4625	2003-07-14	2.4491111	25.13360	5.6628889	42.363636	11.818182
## 4626	2003-07-15	2.5380000	25.08718	5.7597778	8.888889	29.733333
## 4627	2003-07-16	4.4975556	25.04076	6.2325926	2.000000	2.250000
## 4628	2003-07-17	6.4571111	24.99433	6.7054074	11.818182	7.090909
## 4629	2003-07-18	8.4166667	24.94791	7.1782222	5.111111	2.888889
## 4630	2003-07-19	5.5731250	24.99512	7.0372997	6.750000	2.750000
## 4631	2003-07-20	2.7295833	25.04233	6.8963771	2.083333	2.000000
## 4632	2003-07-21	3.2160606	25.03176	6.7554545	11.655172	5.586207
## 4633	2003-07-22	3.7595556	24.86791	7.6868889	2.055556	2.222222
## 4634	2003-07-23	4.0659524	24.96664	6.9007143	5.666667	3.333333
## 4635	2003-07-24	3.6835238	24.87490	6.9588466	4.000000	3.000000
## 4636	2003-07-25	3.3010952	24.78316	7.0169788	224.181818	1333.272727
## 4637	2003-07-26	2.9186667	24.69142	7.0751111	9.620690	6.068966
## 4638	2003-07-27	2.8039444	24.74947	6.7267778	18.545455	38.727273
## 4639	2003-07-28	2.6892222	24.80752	6.3784444	2.000000	2.250000
## 4640	2003-07-29	2.5745000	24.86557	6.0301111	6.000000	2.125000
## 4641	2003-07-30	2.4597778	24.92362	5.6817778	2.355556	2.000000
## 4642	2003-07-31	2.6070480	25.57045	4.6334545	22.690909	2.368421
## 4643	2003-08-01	2.7543182	25.50902	4.9738636	24.222222	2.736842
## 4644	2003-08-02	2.1859524	25.39529	5.3061905	5.571429	2.435088
## 4645	2003-08-03	5.9104444	25.28853	5.2826667	2.888889	2.133333
## 4646	2003-08-04	4.3270000	25.18329	5.3587778	8.857143	3.142857
## 4647	2003-08-05	2.7435556	25.07804	5.4348889	13.859649	8.631579
## 4648	2003-08-06	3.1928889	24.87618	5.9635556	2.488889	2.222222
## 4649	2003-08-07	3.2738519	24.74524	6.4746667	2.250000	2.500000
## 4650	2003-08-08	3.3548148	24.61431	6.9857778	15.454545	18.363636
## 4651	2003-08-09	3.4357778	24.48338	7.4968889	2.355556	2.533333
## 4652	2003-08-10	3.7855556	24.60544	6.9160000	3.000000	5.750000
## 4653	2003-08-11	4.1353333	24.72751	6.3351111	3.357143	3.821429
## 4654	2003-08-12	4.2975556	24.66422	5.9954444	2.000000	2.500000
## 4655	2003-08-13	4.4597778	24.60093	5.6557778	2.266667	2.000000
## 4656	2003-08-14	5.1744000	24.64037	6.0724444	9.272727	6.181818
## 4657	2003-08-15	5.8890222	24.67981	6.4891111	9.500000	6.750000
## 4658	2003-08-16	6.6036444	24.71925	6.9057778	146.545455	65.818182
## 4659	2003-08-17	7.3182667	24.75869	7.3224444	18.750000	4.250000
## 4660	2003-08-18	8.0328889	24.79813	7.7391111	2.000000	2.044444

## 4661	2003-08-19	7.2580000	24.73202	7.7267407	6.000000	9.500000
## 4662	2003-08-20	6.4831111	24.66591	7.7143704	12.545455	3.454545
## 4663	2003-08-21	5.7082222	24.59980	7.7020000	2.044444	2.000000
## 4664	2003-08-22	5.2460741	24.41533	8.1580741	2.000000	4.500000
## 4665	2003-08-23	4.7839259	24.23087	8.6141481	2.909091	2.000000
## 4666	2003-08-24	4.3217778	24.04640	9.0702222	2.044444	2.000000
## 4667	2003-08-25	3.5722222	23.82174	8.8311111	4.250000	4.250000
## 4668	2003-08-26	2.8226667	23.59709	8.5920000	2.035714	2.392857
## 4669	2003-08-27	2.2446667	23.83617	8.0007778	4.500000	6.750000
## 4670	2003-08-28	1.6666667	24.07524	7.4095556	99.785714	54.928571
## 4671	2003-08-29	1.7446667	24.09466	7.3631111	3.500000	3.000000
## 4672	2003-08-30	1.8226667	24.11407	7.3166667	2.000000	2.000000
## 4673	2003-08-31	1.7554762	24.51007	7.7511905	12.195122	7.073171
## 4674	2003-09-01	2.5071111	24.52460	7.7122222	2.055556	2.388889
## 4675	2003-09-02	3.3209091	24.52876	7.7472727	2.000000	2.461538
## 4676	2003-09-03	2.4108333	24.17679	7.7962500	2.000000	2.000000
## 4677	2003-09-04	2.0352381	24.48538	7.1180952	2.190476	4.090909
## 4678	2003-09-05	1.0765909	24.92532	5.9304545	12.181818	6.181818
## 4679	2003-09-06	0.8505455	25.11569	5.5876364	40.603175	2.500000
## 4680	2003-09-07	1.8980000	24.57900	7.2797778	2.044444	2.177778
## 4681	2003-09-08	1.6478889	24.42886	7.5094444	151.894737	18.315789
## 4682	2003-09-09	1.3977778	24.27871	7.7391111	2.044444	2.000000
## 4683	2003-09-10	1.4497778	24.31335	7.6252593	10.750000	8.000000
## 4684	2003-09-11	1.5017778	24.34799	7.5114074	6.545455	5.636364
## 4685	2003-09-12	1.5537778	24.38262	7.3975556	2.000000	2.444444
## 4686	2003-09-13	1.4836667	24.46354	7.4977778	280.000000	3.500000
## 4687	2003-09-14	1.4135556	24.54447	7.5980000	2.000000	2.177778
## 4688	2003-09-15	1.5810000	24.32067	7.7400556	6.000000	3.636364
## 4689	2003-09-16	1.7484444	24.09687	7.8821111	1504.750000	25.750000
## 4690	2003-09-17	1.9158889	23.87307	8.0241667	2.000000	14.232143
## 4691	2003-09-18	2.0833333	23.64927	8.1662222	12.714286	2.714286
## 4692	2003-09-19	1.8765185	23.93290	7.8905185	2.000000	2.482143
## 4693	2003-09-20	1.6697037	24.21654	7.6148148	2.000000	2.250000
## 4694	2003-09-21	1.4628889	24.50018	7.3391111	2.000000	2.000000
## 4695	2003-09-22	1.6421481	24.46122	7.4259259	2.727273	3.636364
## 4696	2003-09-23	1.8214074	24.42227	7.5127407	2.500000	27.250000
## 4697	2003-09-24	2.0006667	24.38331	7.5995556	2.000000	2.000000
## 4698	2003-09-25	1.9560000	24.24331	7.7390000	45.636364	9.636364
## 4699	2003-09-26	1.9113333	24.10331	7.8784444	3.584906	2.716981
## 4700	2003-09-27	1.7591111	24.13951	7.8947778	4.842105	3.052632
## 4701	2003-09-28	1.6068889	24.17571	7.9111111	2.044444	2.222222
## 4702	2003-09-29	1.3146667	23.81204	7.8646667	3.466667	2.000000
## 4703	2003-09-30	1.4526667	23.81802	7.7974444	45.636364	5.454545
## 4704	2003-10-01	1.5906667	23.82400	7.7302222	32.750000	18.000000
## 4705	2003-10-02	1.7286667	23.82998	7.6630000	54.000000	10.035714
## 4706	2003-10-03	1.8666667	23.83596	7.5957778	3.500000	2.071429
## 4707	2003-10-04	1.6008889	23.98318	7.5647778	9.250000	5.250000
## 4708	2003-10-05	1.3351111	24.13040	7.5337778	9.000000	3.857143
## 4709	2003-10-06	1.4247556	24.17758	7.5764444	13.000000	5.000000
## 4710	2003-10-07	1.5144000	24.22476	7.6191111	2.000000	3.590909
## 4711	2003-10-08	1.6040444	24.27193	7.6617778	2.181818	2.181818
## 4712	2003-10-09	1.6936889	24.31911	7.7044444	2.250000	4.250000
## 4713	2003-10-10	1.7833333	24.36629	7.7471111	129.288889	42.311111
## 4714	2003-10-11	1.5760000	24.05676	7.7200000	2.044444	2.000000

## 4715	2003-10-12	1.4415897	24.29265	7.4779487	46.000000	8.545455
## 4716	2003-10-13	1.3071795	24.52854	7.2358974	4.170213	3.500000
## 4717	2003-10-14	0.9702273	24.70700	6.8959091	4.727273	3.066667
## 4718	2003-10-15	0.7432759	24.83653	6.5337931	19.862069	2.633333
## 4719	2003-10-16	1.3138095	24.55900	7.4395238	2.066667	2.200000
## 4720	2003-10-17	1.4888889	24.62171	7.2180000	3.106383	2.765957
## 4721	2003-10-18	1.4818182	24.63142	6.9563636	5.384615	5.769231
## 4722	2003-10-19	1.3075000	24.52767	6.9491667	2.250000	2.000000
## 4723	2003-10-20	1.2833333	24.77367	6.8602222	3.178571	3.750000
## 4724	2003-10-21	1.2651111	24.82310	7.0015556	16.250000	10.250000
## 4725	2003-10-22	1.2468889	24.87253	7.1428889	2.452830	2.905660
## 4726	2003-10-23	1.3058519	24.76406	7.4132593	3.818182	2.181818
## 4727	2003-10-24	1.3648148	24.65559	7.6836296	476.363636	366.000000
## 4728	2003-10-25	1.4237778	24.54711	7.9540000	2.867925	2.226415
## 4729	2003-10-26	1.6071111	24.60364	7.6797778	23.833333	15.708333
## 4730	2003-10-27	1.4342667	24.59196	7.7157333	2.500000	2.000000
## 4731	2003-10-28	1.2614222	24.58028	7.7516889	2.250000	2.250000
## 4732	2003-10-29	1.0885778	24.56860	7.7876444	3.272727	3.636364
## 4733	2003-10-30	0.9157333	24.55692	7.8236000	2.250000	2.000000
## 4734	2003-10-31	0.7428889	24.54524	7.8595556	2.266667	2.000000
## 4735	2003-11-01	0.7929630	24.56761	7.8396296	9.636364	3.090909
## 4736	2003-11-02	0.8430370	24.58999	7.8197037	8.250000	8.750000
## 4737	2003-11-03	0.8931111	24.61236	7.7997778	2.044444	2.266667
## 4738	2003-11-04	1.2524444	24.73227	7.9464444	4.857143	2.428571
## 4739	2003-11-05	1.5431111	24.69293	7.8880000	4.250000	2.000000
## 4740	2003-11-06	1.8337778	24.65360	7.8295556	9.818182	3.818182
## 4741	2003-11-07	2.1244444	24.61427	7.7711111	15.471698	4.188679
## 4742	2003-11-08	1.8224444	24.59714	7.6650000	2.000000	979.457976
## 4743	2003-11-09	1.5204444	24.58002	7.5588889	5171.272727	1954.727273
## 4744	2003-11-10	1.2184444	24.56290	7.4527778	1720.750000	1676.250000
## 4745	2003-11-11	0.9164444	24.54578	7.3466667	876.230769	601.120000
## 4746	2003-11-12	1.1012593	24.57369	7.4217037	1612.500000	519.600000
## 4747	2003-11-13	1.2860741	24.60160	7.4967407	56.000000	71.000000
## 4748	2003-11-14	1.4708889	24.62951	7.5717778	23.285714	15.357143
## 4749	2003-11-15	1.3435556	24.69579	7.5240000	19.250000	4.250000
## 4750	2003-11-16	1.2162222	24.76207	7.4762222	10.000000	3.147222
## 4751	2003-11-17	1.0888889	24.82836	7.4284444	2.177778	2.044444
## 4752	2003-11-18	1.1540741	24.86736	7.4336296	42.909091	28.363636
## 4753	2003-11-19	1.2192593	24.90637	7.4388148	6.500000	3.750000
## 4754	2003-11-20	1.2844444	24.94538	7.4440000	2.000000	2.088889
## 4755	2003-11-21	1.2765556	24.88888	7.6808333	62.909091	45.090909
## 4756	2003-11-22	1.2686667	24.83238	7.9176667	42.500000	232.750000
## 4757	2003-11-23	1.2607778	24.77588	8.1545000	10.000000	24.000000
## 4758	2003-11-24	1.2528889	24.71938	8.3913333	2.000000	2.000000
## 4759	2003-11-25	1.7415152	24.79397	7.9554545	3.687500	2.437500
## 4760	2003-11-26	1.6900000	24.79119	8.0622222	2.843750	2.218750
## 4761	2003-11-27	1.3026667	24.79113	7.9776667	2.000000	2.000000
## 4762	2003-11-28	0.8797619	24.80657	7.5028571	9.735849	8.909091
## 4763	2003-11-29	0.5275000	24.99375	6.9413636	15.667925	9.198653
## 4764	2003-11-30	0.4636364	25.09036	6.5110909	21.600000	9.488215
## 4765	2003-12-01	1.3384444	24.62071	7.9768889	4.177778	9.777778
## 4766	2003-12-02	1.0197561	24.84659	7.3834146	5.500000	3.607143
## 4767	2003-12-03	1.0055556	25.04660	7.5348889	2.044444	2.000000
## 4768	2003-12-04	0.9751111	25.08041	7.3243704	1134.181818	1099.090909

## 4769	2003-12-05	0.9446667	25.11421	7.1138519	64.000000	550.745455
## 4770	2003-12-06	0.9142222	25.14802	6.9033333	2.044444	2.400000
## 4771	2003-12-07	2.5534444	24.97997	7.9067778	11.454545	20.545455
## 4772	2003-12-08	4.1926667	24.81191	8.9102222	5.377778	23.022222
## 4773	2003-12-09	3.2919259	24.95524	8.0945185	1093.454545	1157.454545
## 4774	2003-12-10	2.3911852	25.09858	7.2788148	44.000000	60.000000
## 4775	2003-12-11	1.4904444	25.24191	6.4631111	2.000000	2.444444
## 4776	2003-12-12	1.8754444	25.29944	6.5603333	132.000000	328.000000
## 4777	2003-12-13	2.2604444	25.35698	6.6575556	2.000000	2.000000
## 4778	2003-12-14	3.9895556	25.24622	7.6451111	42.727273	7.272727
## 4779	2003-12-15	5.7186667	25.13547	8.6326667	21.911111	36.311111
## 4780	2003-12-16	3.3664444	25.15598	7.5976667	6.727273	28.909091
## 4781	2003-12-17	1.0142222	25.17649	6.5626667	2.044444	2.933333
## 4782	2003-12-18	1.0673333	25.28788	6.2847778	9.090909	7.454545
## 4783	2003-12-19	1.1204444	25.39927	6.0068889	3.422222	3.422222
## 4784	2003-12-20	2.9770000	25.35022	6.9331111	12.727273	18.545455
## 4785	2003-12-21	4.8335556	25.30118	7.8593333	2.222222	2.222222
## 4786	2003-12-22	3.5547778	25.23832	7.7053333	3.090909	2.181818
## 4787	2003-12-23	2.2760000	25.17547	7.5513333	2.000000	2.000000
## 4788	2003-12-24	0.8666667	25.55133	5.5802381	3.520000	2.000000
## 4789	2003-12-25	0.3829091	25.80329	4.7616364	23.360000	2.000000
## 4790	2003-12-26	0.3681818	25.67586	5.1015909	43.200000	2.000000
## 4791	2003-12-27	1.1677778	25.32282	6.5817778	2.000000	2.000000
## 4792	2003-12-28	1.8463333	25.06258	7.7984444	9.454545	5.636364
## 4793	2003-12-29	2.5248889	24.80233	9.0151111	2.000000	2.000000
## 4794	2003-12-30	10.8154545	25.22885	7.9990909	2.187500	2.187500
## 4795	2003-12-31	9.1694444	25.30500	6.7152778	2.000000	2.000000
## 4796	2004-01-01	6.7723333	25.19227	7.6826667	2.000000	2.000000
## 4797	2004-01-02	3.2975556	24.82371	8.2357778	3.200000	2.444444
## 4798	2004-01-03	3.9260000	24.99691	7.2713333	2.909091	2.909091
## 4799	2004-01-04	4.5544444	25.17011	6.3068889	44.892857	30.750000
## 4800	2004-01-05	3.3242222	24.79240	8.0413333	2.444444	2.000000
## 4801	2004-01-06	7.8933333	24.60251	8.7548889	33.088889	3.090909
## 4802	2004-01-07	12.4624444	24.41262	9.4684444	63.733333	6.933333
## 4803	2004-01-08	9.5277778	24.36428	9.1315556	140.181818	22.000000
## 4804	2004-01-09	6.5931111	24.31594	8.7946667	3.000000	12.000000
## 4805	2004-01-10	3.6584444	24.26760	8.4577778	2.000000	2.000000
## 4806	2004-01-11	2.8432222	24.28716	8.2510000	21.636364	2.909091
## 4807	2004-01-12	2.0280000	24.30671	8.0442222	2.222222	2.000000
## 4808	2004-01-13	2.4957333	24.34399	7.9611111	115.454545	20.545455
## 4809	2004-01-14	2.9634667	24.38127	7.8780000	140.000000	15.909091
## 4810	2004-01-15	3.4312000	24.41855	7.7948889	320.000000	11.272727
## 4811	2004-01-16	3.8989333	24.45583	7.7117778	74.000000	6.636364
## 4812	2004-01-17	4.3666667	24.49311	7.6286667	2.000000	2.000000
## 4813	2004-01-18	4.0157778	24.32764	7.8996296	30.545455	16.000000
## 4814	2004-01-19	3.6648889	24.16216	8.1705926	4.000000	10.911111
## 4815	2004-01-20	3.3140000	23.99669	8.4415556	45.288889	5.822222
## 4816	2004-01-21	2.6123333	24.11887	8.3226667	9.272727	4.000000
## 4817	2004-01-22	1.9106667	24.24104	8.2037778	2.711111	2.000000
## 4818	2004-01-23	1.6518889	24.43316	7.8143333	10.363636	3.454545
## 4819	2004-01-24	1.3931111	24.62527	7.4248889	2.088889	2.044444
## 4820	2004-01-25	1.5676667	24.28262	7.6816667	5.272727	2.727273
## 4821	2004-01-26	1.7422222	23.93998	7.9384444	2.000000	2.000000
## 4822	2004-01-27	1.5137778	23.80947	8.0047111	34.909091	2.909091

##	4823	2004-01-28	1.2853333	23.67896	8.0709778	2.000000	2.454545
##	4824	2004-01-29	1.0568889	23.54844	8.1372444	2.000000	2.000000
##	4825	2004-01-30	1.5307778	23.66647	8.2035111	34.909091	8.909091
##	4826	2004-01-31	2.0046667	23.78449	8.2697778	2.000000	2.000000
##	4827	2004-02-01	1.8877778	23.70661	8.1695556	7.090909	2.000000
##	4828	2004-02-02	1.7708889	23.62873	8.0693333	2.000000	2.000000
##	4829	2004-02-03	1.2442424	23.99864	7.8336364	7.062500	4.500000
##	4830	2004-02-04	1.5752778	24.10456	7.8666667	4.531250	3.250000
##	4831	2004-02-05	1.8226667	24.02703	7.9320000	2.000000	2.000000
##	4832	2004-02-06	1.0542222	24.10007	7.9464444	2.000000	2.000000
##	4833	2004-02-07	0.8257143	24.41702	7.3423810	57.584906	27.272727
##	4834	2004-02-08	0.5422727	24.69520	6.7975000	34.428816	19.027056
##	4835	2004-02-09	0.2896364	24.87487	6.5447273	11.272727	10.781385
##	4836	2004-02-10	2.2697778	23.78173	7.8191111	4.357143	2.535714
##	4837	2004-02-11	0.7342222	24.21282	7.3440000	2.488889	2.000000
##	4838	2004-02-12	0.9668889	24.26046	7.4251852	40.363636	6.727273
##	4839	2004-02-13	1.1995556	24.30810	7.5063704	2.000000	31.074747
##	4840	2004-02-14	1.4322222	24.35573	7.5875556	5.955556	55.422222
##	4841	2004-02-15	1.2427778	24.33934	7.6550000	7.636364	5.636364
##	4842	2004-02-16	1.0533333	24.32296	7.7224444	2.044444	2.044444
##	4843	2004-02-17	1.2412222	24.44889	7.8091111	4.181818	5.090909
##	4844	2004-02-18	1.4291111	24.57482	7.8957778	2.000000	2.044444
##	4845	2004-02-19	1.2455556	24.35100	7.9064444	12.545455	2.727273
##	4846	2004-02-20	1.0620000	24.12718	7.9171111	2.000000	2.000000
##	4847	2004-02-21	1.3954444	24.18959	7.7705556	3.454545	2.727273
##	4848	2004-02-22	1.7288889	24.25200	7.6240000	2.088889	4.666667
##	4849	2004-02-23	1.5204444	24.27264	7.7308148	3.454545	49.090909
##	4850	2004-02-24	1.3120000	24.29327	7.8376296	2.727273	2.000000
##	4851	2004-02-25	1.1035556	24.31391	7.9444444	2.000000	2.000000
##	4852	2004-02-26	1.0191111	24.42243	7.6668889	24.181818	8.363636
##	4853	2004-02-27	0.9346667	24.53096	7.3893333	2.800000	2.000000
##	4854	2004-02-28	1.2973333	24.39072	7.7351111	231.818182	102.000000
##	4855	2004-02-29	1.6600000	24.25049	8.0808889	2.000000	2.000000
##	4856	2004-03-01	0.6739394	24.38018	7.8824242	11.562500	7.375000
##	4857	2004-03-02	0.7338889	24.31242	7.8672222	6.914583	4.820833
##	4858	2004-03-03	1.4633333	24.18487	7.9960000	2.266667	2.266667
##	4859	2004-03-04	1.1572222	24.25108	7.9044444	18.000000	4.909091
##	4860	2004-03-05	0.8511111	24.31729	7.8128889	11.863636	4.345051
##	4861	2004-03-06	0.3429545	24.75695	7.2188636	5.727273	3.781010
##	4862	2004-03-07	0.4442857	24.50517	7.5535714	2.619048	3.216970
##	4863	2004-03-08	0.3736364	24.81207	7.0960000	11.418182	2.652929
##	4864	2004-03-09	0.7808889	24.29162	7.6320000	2.000000	2.088889
##	4865	2004-03-10	0.8636667	24.32682	7.5672222	5.636364	2.727273
##	4866	2004-03-11	0.9464444	24.36202	7.5024444	2.000000	2.000000
##	4867	2004-03-12	0.9453333	24.52583	7.3093333	13.272727	21.636364
##	4868	2004-03-13	0.9442222	24.68964	7.1162222	11.377778	111.733333
##	4869	2004-03-14	1.0207111	24.64706	7.2253333	503.636364	1287.454545
##	4870	2004-03-15	1.0972000	24.60447	7.3344444	7400.000000	8466.666667
##	4871	2004-03-16	1.1736889	24.56188	7.4435556	7600.000000	6600.000000
##	4872	2004-03-17	1.2501778	24.51930	7.5526667	350.000000	760.000000
##	4873	2004-03-18	1.3266667	24.47671	7.6617778	54.711111	201.244444
##	4874	2004-03-19	1.2536667	24.48532	7.6330000	503.250000	1057.500000
##	4875	2004-03-20	1.1806667	24.49394	7.6042222	1537.200000	4505.000000
##	4876	2004-03-21	1.1076667	24.50255	7.5754444	162.500000	2633.333333

## 4877	2004-03-22	1.0346667	24.51117	7.5466667	2.666667	2.000000
## 4878	2004-03-23	1.5973333	24.52955	7.6506667	1545.250000	93.000000
## 4879	2004-03-24	2.1600000	24.54793	7.7546667	852.000000	82.400000
## 4880	2004-03-25	1.8788889	24.59461	7.7560000	30.000000	148.450000
## 4881	2004-03-26	1.5977778	24.64128	7.7573333	289.250000	214.500000
## 4882	2004-03-27	1.3166667	24.68796	7.7586667	1399.625000	4007.250000
## 4883	2004-03-28	1.1851852	24.76046	7.7938519	2510.000000	7800.000000
## 4884	2004-03-29	1.0537037	24.83296	7.8290370	71.000000	106.000000
## 4885	2004-03-30	0.9222222	24.90547	7.8642222	207.250000	235.821429
## 4886	2004-03-31	0.8971852	24.88378	7.8905185	136.000000	80.000000
## 4887	2004-04-01	0.8721481	24.86209	7.9168148	120.000000	60.355556
## 4888	2004-04-02	0.8471111	24.84040	7.9431111	41.866667	40.711111
## 4889	2004-04-03	0.9749778	24.83673	7.9306222	297.272727	570.545455
## 4890	2004-04-04	1.1028444	24.83307	7.9181333	69.333333	273.333333
## 4891	2004-04-05	1.2307111	24.82940	7.9056444	66.000000	480.000000
## 4892	2004-04-06	1.3585778	24.82573	7.8931556	70.200000	2400.000000
## 4893	2004-04-07	1.4864444	24.82207	7.8806667	74.400000	233.511111
## 4894	2004-04-08	1.3425000	24.85546	7.7542222	3011.500000	3145.000000
## 4895	2004-04-09	1.1985556	24.88884	7.6277778	160.000000	762.000000
## 4896	2004-04-10	1.0546111	24.92223	7.5013333	231.090909	289.636364
## 4897	2004-04-11	0.9106667	24.95562	7.3748889	116.545455	1344.818182
## 4898	2004-04-12	1.0482222	24.96043	7.5350556	2.000000	2400.000000
## 4899	2004-04-13	1.1857778	24.96524	7.6952222	9.822222	3600.000000
## 4900	2004-04-14	1.3233333	24.97006	7.8553889	17.644444	3200.000000
## 4901	2004-04-15	1.4608889	24.97487	8.0155556	25.466667	42.000000
## 4902	2004-04-16	1.3825714	24.94661	7.9822540	1147.090909	1221.090909
## 4903	2004-04-17	1.3042540	24.91836	7.9489524	139.000000	300.000000
## 4904	2004-04-18	1.2259365	24.89010	7.9156508	3400.000000	4133.333333
## 4905	2004-04-19	1.1476190	24.86185	7.8823492	9733.333333	7966.666667
## 4906	2004-04-20	1.0693016	24.83360	7.8490476	9000.000000	12000.000000
## 4907	2004-04-21	0.9909841	24.80534	7.8157460	780.909091	1110.833333
## 4908	2004-04-22	0.9126667	24.77709	7.7824444	44.755556	47.377778
## 4909	2004-04-23	1.0345926	24.81667	7.8495556	1680.000000	2433.333333
## 4910	2004-04-24	1.1565185	24.85624	7.9166667	2676.000000	5613.333333
## 4911	2004-04-25	1.2784444	24.89582	7.9837778	9.555556	29.955556
## 4912	2004-04-26	0.9793939	24.95533	7.6339394	427.937500	560.125000
## 4913	2004-04-27	0.8286111	25.00511	7.3963889	6213.968750	4320.062500
## 4914	2004-04-28	1.1366389	24.89702	7.6146944	12000.000000	8080.000000
## 4915	2004-04-29	1.4446667	24.78893	7.8330000	656.400000	482.400000
## 4916	2004-04-30	1.1858519	24.90513	7.5409630	7400.000000	6320.000000
## 4917	2004-05-01	0.9270370	25.02132	7.2489259	92.000000	72.400000
## 4918	2004-05-02	0.6682222	25.13751	6.9568889	204.285714	202.714286
## 4919	2004-05-03	0.9321111	25.15843	7.0551111	240.000000	64.000000
## 4920	2004-05-04	1.1960000	25.17936	7.1533333	9333.333333	48.207407
## 4921	2004-05-05	1.4598889	25.20028	7.2515556	4233.333333	32.414815
## 4922	2004-05-06	1.7237778	25.22120	7.3497778	9.600000	16.622222
## 4923	2004-05-07	1.6742222	25.18915	7.4667111	1512.545455	2194.727273
## 4924	2004-05-08	1.6246667	25.15710	7.5836444	6037.000000	6014.000000
## 4925	2004-05-09	1.5751111	25.12505	7.7005778	12000.000000	12000.000000
## 4926	2004-05-10	1.5255556	25.09300	7.8175111	12000.000000	12000.000000
## 4927	2004-05-11	1.4760000	25.06096	7.9344444	271.822222	375.022222
## 4928	2004-05-12	0.5356364	25.55731	6.0167273	191.696970	1456.363636
## 4929	2004-05-13	0.7061905	25.35119	6.5861905	18.720000	2.500000
## 4930	2004-05-14	0.4613636	25.51186	5.9350000	19.288889	1515.000000

## 4931	2004-05-15	1.1575758	25.37746	6.5682222	100.000000	2800.000000
## 4932	2004-05-16	1.8537879	25.24305	7.2014444	84.155556	6724.500000
## 4933	2004-05-17	2.5500000	25.10864	7.8346667	68.311111	355.555556
## 4934	2004-05-18	2.3240370	25.07409	7.8847407	3139.090909	3605.272727
## 4935	2004-05-19	2.0980741	25.03954	7.9348148	21.250000	29.750000
## 4936	2004-05-20	1.8721111	25.00499	7.9848889	5733.333333	12000.000000
## 4937	2004-05-21	1.6461481	24.97044	8.0349630	32.000000	8011.666667
## 4938	2004-05-22	1.4201852	24.93589	8.0850370	4006.000000	4023.333333
## 4939	2004-05-23	1.1942222	24.90133	8.1351111	14.434783	47.869565
## 4940	2004-05-24	1.2314074	24.91849	8.0096296	21.750000	9.500000
## 4941	2004-05-25	1.2685926	24.93564	7.8841481	93.090909	580.363636
## 4942	2004-05-26	1.3057778	24.95279	7.7586667	173.000000	330.666667
## 4943	2004-05-27	1.3429630	24.96994	7.6331852	36.000000	220.000000
## 4944	2004-05-28	1.3801481	24.98709	7.5077037	8.000000	28.000000
## 4945	2004-05-29	1.4173333	25.00424	7.3822222	67.422222	163.333333
## 4946	2004-05-30	1.7018095	24.98925	7.5543175	1682.181818	2363.090909
## 4947	2004-05-31	1.9862857	24.97425	7.7264127	2.500000	7.750000
## 4948	2004-06-01	2.2707619	24.95925	7.8985079	2560.333333	4244.400000
## 4949	2004-06-02	2.5552381	24.94426	8.0706032	4134.000000	4034.000000
## 4950	2004-06-03	2.8397143	24.92926	8.2426984	72.000000	180.000000
## 4951	2004-06-04	3.1241905	24.91426	8.4147937	40.727273	132.000000
## 4952	2004-06-05	3.4086667	24.89927	8.5868889	6.679245	23.773585
## 4953	2004-06-06	2.8785556	24.96844	7.9981111	12.000000	11.000000
## 4954	2004-06-07	2.3484444	25.03762	7.4093333	2.044444	2.755556
## 4955	2004-06-08	2.0831111	25.07128	7.3405926	52.181818	96.727273
## 4956	2004-06-09	1.8177778	25.10494	7.2718519	14.500000	9.750000
## 4957	2004-06-10	1.5524444	25.13860	7.2031111	2.000000	2.933333
## 4958	2004-06-11	1.3316296	25.03637	7.3716574	212.181818	355.272727
## 4959	2004-06-12	1.1108148	24.93414	7.5402037	2.500000	2.500000
## 4960	2004-06-13	0.8900000	24.83192	7.7087500	2.166667	2.666667
## 4961	2004-06-14	2.5785714	25.20652	7.0242857	10.312500	14.687500
## 4962	2004-06-15	2.0457440	25.05268	7.3640179	4.750000	4.750000
## 4963	2004-06-16	1.5129167	24.89883	7.7037500	2.500000	2.000000
## 4964	2004-06-17	2.2771429	24.63976	8.4704762	37.187500	23.812500
## 4965	2004-06-18	2.0752460	24.73138	8.1675238	64.000000	408.500000
## 4966	2004-06-19	1.8733492	24.82300	7.8645714	16.000000	580.000000
## 4967	2004-06-20	1.6714524	24.91462	7.5616190	9.000000	3.000000
## 4968	2004-06-21	1.4695556	25.00624	7.2586667	2.000000	2.400000
## 4969	2004-06-22	0.4749091	25.59416	5.1734545	19.666667	19.454545
## 4970	2004-06-23	1.0426190	25.38343	5.9390476	8.520000	3.750000
## 4971	2004-06-24	0.7084091	25.56270	5.3952273	13.045455	10.763889
## 4972	2004-06-25	1.9935556	24.68236	7.8726667	2.666667	17.777778
## 4973	2004-06-26	1.5321212	24.91194	7.7130303	42.312500	104.812500
## 4974	2004-06-27	2.8316667	24.93263	7.4826667	2.086957	2.173913
## 4975	2004-06-28	2.2047222	25.05997	7.4630556	2.000000	6.600000
## 4976	2004-06-29	2.2561111	25.12324	7.2320370	1194.909091	3245.272727
## 4977	2004-06-30	2.3075000	25.18651	7.0010185	4.500000	20.250000
## 4978	2004-07-01	2.3588889	25.24978	6.7700000	255.291667	285.333333
## 4979	2004-07-02	2.9141667	25.19672	7.0360000	12000.000000	6055.000000
## 4980	2004-07-03	3.4694444	25.14367	7.3020000	7200.000000	12000.000000
## 4981	2004-07-04	4.0247222	25.09061	7.5680000	330.727273	920.000000
## 4982	2004-07-05	4.5800000	25.03756	7.8340000	2.415094	19.773585
## 4983	2004-07-06	4.6180000	24.96463	7.7600000	28.000000	400.000000
## 4984	2004-07-07	4.6560000	24.89170	7.6860000	15.355556	80.000000

## 4985	2004-07-08	4.6940000	24.81878	7.6120000	2.711111	3.555556
## 4986	2004-07-09	4.6119259	24.77323	7.8688889	13.454545	160.545455
## 4987	2004-07-10	4.5298519	24.72768	8.1257778	11.000000	36.444444
## 4988	2004-07-11	4.4477778	24.68213	8.3826667	2.533333	4.400000
## 4989	2004-07-12	5.1387407	24.72296	7.9874815	7.818182	12.909091
## 4990	2004-07-13	5.8297037	24.76378	7.5922963	2.000000	6.500000
## 4991	2004-07-14	6.5206667	24.80460	7.1971111	2.177778	2.888889
## 4992	2004-07-15	6.4537222	24.83263	6.8927222	17.090909	11.454545
## 4993	2004-07-16	6.3867778	24.86067	6.5883333	4.250000	12.500000
## 4994	2004-07-17	6.3198333	24.88870	6.2839444	18.250000	50.000000
## 4995	2004-07-18	6.2528889	24.91673	5.9795556	20.958333	15.500000
## 4996	2004-07-19	4.4386667	24.94071	6.0621111	2.000000	4.750000
## 4997	2004-07-20	2.6244444	24.96469	6.1446667	3.094340	5.245283
## 4998	2004-07-21	2.4256667	24.57584	6.8482222	14.363636	25.090909
## 4999	2004-07-22	2.2268889	24.18700	7.5517778	7.866667	18.266667
## 5000	2004-07-23	1.9730370	24.39686	7.2147407	10.000000	12.545455
## 5001	2004-07-24	1.7191852	24.60672	6.8777037	2.000000	5.500000
## 5002	2004-07-25	1.4653333	24.81658	6.5406667	2.000000	2.044444
## 5003	2004-07-26	1.4102222	24.83270	6.5915111	5.750000	4.000000
## 5004	2004-07-27	1.3551111	24.84883	6.6423556	247.636364	4.000000
## 5005	2004-07-28	1.3000000	24.86495	6.6932000	2.000000	5.545455
## 5006	2004-07-29	1.2448889	24.88108	6.7440444	11.636364	7.090909
## 5007	2004-07-30	1.1897778	24.89720	6.7948889	3.018868	3.396226
## 5008	2004-07-31	3.4746667	24.44516	8.6862222	13.107143	18.964286
## 5009	2004-08-01	3.3912222	24.59752	8.2148889	7.250000	4.750000
## 5010	2004-08-02	3.3077778	24.74989	7.7435556	2.000000	2.044444
## 5011	2004-08-03	2.0806162	25.05618	6.7790505	23.818182	61.454545
## 5012	2004-08-04	0.8534545	25.36247	5.8145455	10.984127	12.500000
## 5013	2004-08-05	1.9723810	25.05419	7.0566667	4.285714	22.079365
## 5014	2004-08-06	0.8400000	25.25530	6.2972727	6.136364	31.658730
## 5015	2004-08-07	3.7390909	24.87885	7.2663636	24.190476	41.238095
## 5016	2004-08-08	3.1016667	24.82453	7.0141667	2.789474	2.631579
## 5017	2004-08-09	3.4926667	24.90203	7.0900000	6.000000	3.913043
## 5018	2004-08-10	2.8220000	24.91336	7.1688889	2.000000	2.088889
## 5019	2004-08-11	2.9786667	24.57936	7.9186667	2.088889	2.177778
## 5020	2004-08-12	3.0031667	24.47504	7.7963333	586.000000	93.454545
## 5021	2004-08-13	3.0276667	24.37072	7.6740000	8.750000	6.250000
## 5022	2004-08-14	3.0521667	24.26641	7.5516667	6.000000	3.090909
## 5023	2004-08-15	3.0766667	24.16209	7.4293333	2.188679	2.301887
## 5024	2004-08-16	3.2368889	24.16387	7.6673333	170.000000	92.250000
## 5025	2004-08-17	2.8059259	24.11193	7.5491111	59.000000	7.500000
## 5026	2004-08-18	2.3749630	24.06000	7.4308889	4.000000	15.660714
## 5027	2004-08-19	1.9440000	24.00807	7.3126667	67.571429	23.821429
## 5028	2004-08-20	2.6830000	24.17096	7.0323333	2.750000	8.500000
## 5029	2004-08-21	3.4220000	24.33384	6.7520000	6.250000	5.392857
## 5030	2004-08-22	2.9451111	24.28217	6.6928889	3.750000	2.750000
## 5031	2004-08-23	2.4682222	24.23049	6.6337778	3.178571	2.607143
## 5032	2004-08-24	2.0144444	24.25323	6.7475556	3.000000	3.750000
## 5033	2004-08-25	1.5606667	24.27596	6.8613333	2.266667	7.644444
## 5034	2004-08-26	1.7695556	24.29870	7.1163333	27.454545	28.363636
## 5035	2004-08-27	1.9784444	24.32144	7.3713333	2.000000	76.250000
## 5036	2004-08-28	2.1873333	24.34417	7.6263333	498.363636	293.818182
## 5037	2004-08-29	2.3962222	24.36691	7.8813333	2.188679	2.452830
## 5038	2004-08-30	1.8428889	24.56416	7.4464444	28.357143	21.285714

##	5039	2004-08-31	1.7477037	24.57455	7.4754074	121.750000	77.500000
##	5040	2004-09-01	1.6525185	24.58494	7.5043704	16.000000	32.000000
##	5041	2004-09-02	1.5573333	24.59533	7.5333333	2.571429	2.071429
##	5042	2004-09-03	1.7598889	24.47092	7.7801111	3.000000	3.000000
##	5043	2004-09-04	1.9624444	24.34651	8.0268889	6.142857	2.714286
##	5044	2004-09-05	1.9511111	24.40191	8.0854444	7.750000	3.250000
##	5045	2004-09-06	1.9397778	24.45731	8.1440000	19.777778	2.000000
##	5046	2004-09-07	0.7458182	25.06289	6.3932727	42.303030	14.545455
##	5047	2004-09-08	1.3264286	24.69286	7.4916667	4.080000	27.750000
##	5048	2004-09-09	1.0120455	24.90716	6.9497727	16.727273	15.250000
##	5049	2004-09-10	1.6995556	24.34656	7.7426667	4.321429	2.750000
##	5050	2004-09-11	1.7172727	24.51303	7.9157576	30.965517	13.448276
##	5051	2004-09-12	1.4922222	24.51064	7.8869444	2.000000	2.000000
##	5052	2004-09-13	1.7293333	24.61863	7.4526667	2.266667	4.266667
##	5053	2004-09-14	1.5046667	24.73178	7.0566667	2.000000	2.400000
##	5054	2004-09-15	1.6133333	24.66884	7.1931667	207.090909	221.454545
##	5055	2004-09-16	1.7220000	24.60590	7.3296667	65.750000	83.000000
##	5056	2004-09-17	1.8306667	24.54296	7.4661667	56.000000	660.388889
##	5057	2004-09-18	1.9393333	24.48002	7.6026667	247.846154	1237.777778
##	5058	2004-09-19	1.9067407	24.48059	7.6379259	439.692308	1815.166667
##	5059	2004-09-20	1.8741481	24.48115	7.6731852	364.000000	2950.000000
##	5060	2004-09-21	1.8415556	24.48171	7.7084444	6182.000000	640.000000
##	5061	2004-09-22	1.8089630	24.48227	7.7437037	12000.000000	12000.000000
##	5062	2004-09-23	1.7763704	24.48284	7.7789630	892.000000	2964.800000
##	5063	2004-09-24	1.7437778	24.48340	7.8142222	104.800000	251.466667
##	5064	2004-09-25	1.6755556	24.46770	7.7335556	1440.363636	2150.545455
##	5065	2004-09-26	1.6073333	24.45200	7.6528889	190.250000	63.250000
##	5066	2004-09-27	1.5391111	24.43629	7.5722222	6162.857143	3408.500000
##	5067	2004-09-28	1.4708889	24.42059	7.4915556	517.333333	493.333333
##	5068	2004-09-29	1.4026667	24.40489	7.4108889	762.754717	1114.943396
##	5069	2004-09-30	1.3300000	24.49872	7.3653778	219.333333	373.333333
##	5070	2004-10-01	1.2573333	24.59256	7.3198667	894.000000	1221.230769
##	5071	2004-10-02	1.1846667	24.68640	7.2743556	453.333333	273.333333
##	5072	2004-10-03	1.1120000	24.78023	7.2288444	180.000000	200.000000
##	5073	2004-10-04	1.0393333	24.87407	7.1833333	22.782609	59.866667
##	5074	2004-10-05	1.1614667	24.85966	7.3326667	966.909091	2359.090909
##	5075	2004-10-06	1.2836000	24.84525	7.4820000	2.000000	2.500000
##	5076	2004-10-07	1.4057333	24.83084	7.6313333	12000.000000	12000.000000
##	5077	2004-10-08	1.5278667	24.81643	7.7806667	9533.333333	12000.000000
##	5078	2004-10-09	1.6500000	24.80202	7.9300000	550.875000	594.750000
##	5079	2004-10-10	1.5878611	24.78734	7.8971389	7600.000000	7950.000000
##	5080	2004-10-11	1.5257222	24.77266	7.8642778	1490.000000	3215.000000
##	5081	2004-10-12	1.4635833	24.75797	7.8314167	916.400000	729.000000
##	5082	2004-10-13	1.4014444	24.74329	7.7985556	8277.250000	7280.000000
##	5083	2004-10-14	1.3393056	24.72861	7.7656944	1776.666667	4270.181818
##	5084	2004-10-15	1.2771667	24.71392	7.7328333	1212.181818	1260.363636
##	5085	2004-10-16	1.2150278	24.69924	7.6999722	210.000000	733.559177
##	5086	2004-10-17	1.1528889	24.68456	7.6671111	121.018868	206.754717
##	5087	2004-10-18	1.2451111	24.70299	7.6065926	6150.000000	12000.000000
##	5088	2004-10-19	1.3373333	24.72141	7.5460741	6060.000000	12000.000000
##	5089	2004-10-20	1.4295556	24.73984	7.4855556	91.963636	160.072727
##	5090	2004-10-21	1.4473333	24.75520	7.4781667	14.750000	14.500000
##	5091	2004-10-22	1.4651111	24.77056	7.4707778	510.000000	1190.000000
##	5092	2004-10-23	1.4828889	24.78591	7.4633889	620.000000	1870.000000

##	5093	2004-10-24	1.5006667	24.80127	7.4560000	56.723404	289.872340
##	5094	2004-10-25	1.4891852	24.79542	7.4964815	284.909091	1731.090909
##	5095	2004-10-26	1.4777037	24.78958	7.5369630	4.500000	3.500000
##	5096	2004-10-27	1.4662222	24.78373	7.5774444	8100.000000	12000.000000
##	5097	2004-10-28	1.4547407	24.77789	7.6179259	7300.000000	8400.000000
##	5098	2004-10-29	1.4432593	24.77204	7.6584074	640.000000	1200.000000
##	5099	2004-10-30	1.4317778	24.76620	7.6988889	232.830189	474.075472
##	5100	2004-10-31	1.4620556	24.76793	7.6784444	39.250000	25.000000
##	5101	2004-11-01	1.4923333	24.76967	7.6580000	2049.000000	2444.400000
##	5102	2004-11-02	1.5226111	24.77140	7.6375556	356.000000	200.000000
##	5103	2004-11-03	1.5528889	24.77313	7.6171111	53.433962	67.584906
##	5104	2004-11-04	1.5248333	24.81574	7.6156667	4.500000	2.500000
##	5105	2004-11-05	1.4967778	24.85836	7.6142222	26.000000	16.000000
##	5106	2004-11-06	1.4687222	24.90097	7.6127778	2969.818182	2880.909091
##	5107	2004-11-07	1.4406667	24.94358	7.6113333	544.357143	345.309091
##	5108	2004-11-08	1.4934074	24.90430	7.6683704	1126.666667	370.000000
##	5109	2004-11-09	1.5461481	24.86501	7.7254074	5666.666667	3300.000000
##	5110	2004-11-10	1.5988889	24.82573	7.7824444	99.511111	115.911111
##	5111	2004-11-11	1.3442424	24.90400	7.6315152	371.696970	378.363636
##	5112	2004-11-12	1.3538889	24.95567	7.4572222	3.703704	7.259259
##	5113	2004-11-13	1.2860000	24.93107	7.6390000	753.000000	753.000000
##	5114	2004-11-14	1.3923333	24.88213	7.7508333	12000.000000	12000.000000
##	5115	2004-11-15	1.4986667	24.83320	7.8626667	436.535714	574.392857
##	5116	2004-11-16	0.4558182	25.21316	6.2550909	30.476190	13.000000
##	5117	2004-11-17	0.9207143	24.95950	7.2942857	266.212766	3028.500000
##	5118	2004-11-18	0.6254545	25.09100	6.7184091	10.297872	62.000000
##	5119	2004-11-19	0.9315051	25.01174	7.1067601	2200.000000	84.428571
##	5120	2004-11-20	1.2375556	24.93249	7.4951111	46.464286	106.857143
##	5121	2004-11-21	1.2229206	24.89663	7.5416825	2.250000	3.750000
##	5122	2004-11-22	1.2082857	24.86078	7.5882540	1000.000000	6000.000000
##	5123	2004-11-23	1.1936508	24.82493	7.6348254	820.000000	980.000000
##	5124	2004-11-24	1.1790159	24.78907	7.6813968	10.000000	5.000000
##	5125	2004-11-25	1.1643810	24.75322	7.7279683	3347.636364	3792.363636
##	5126	2004-11-26	1.1497460	24.71737	7.7745397	3.750000	2.250000
##	5127	2004-11-27	1.1351111	24.68151	7.8211111	286.625000	592.666667
##	5128	2004-11-28	1.2004444	24.74169	7.6750000	9066.666667	12000.000000
##	5129	2004-11-29	1.2657778	24.80187	7.5288889	65.916667	225.041667
##	5130	2004-11-30	1.4436000	24.73470	7.6012889	2976.363636	3216.363636
##	5131	2004-12-01	1.6214222	24.66753	7.6736889	8.250000	9.750000
##	5132	2004-12-02	1.7992444	24.60036	7.7460889	4710.250000	7162.857143
##	5133	2004-12-03	1.9770667	24.53319	7.8184889	6336.666667	12000.000000
##	5134	2004-12-04	2.1548889	24.46602	7.8908889	512.269231	1254.600000
##	5135	2004-12-05	2.0345778	24.48749	7.8569778	4229.454545	4689.090909
##	5136	2004-12-06	1.9142667	24.50896	7.8230667	234.333333	64.333333
##	5137	2004-12-07	1.7939556	24.53042	7.7891556	4585.714286	5158.857143
##	5138	2004-12-08	1.6736444	24.55189	7.7552444	486.000000	850.000000
##	5139	2004-12-09	1.5533333	24.57336	7.7213333	90.678571	548.214286
##	5140	2004-12-10	2.3278889	24.73817	7.5398333	2.000000	11.250000
##	5141	2004-12-11	3.1024444	24.90298	7.3583333	32.000000	88.000000
##	5142	2004-12-12	3.8770000	25.06779	7.1768333	2856.000000	4449.818182
##	5143	2004-12-13	4.6515556	25.23260	6.9953333	267.642857	466.142857
##	5144	2004-12-14	4.9568000	25.07627	7.3480889	4313.333333	4240.000000
##	5145	2004-12-15	5.2620444	24.91993	7.7008444	4153.333333	6040.000000
##	5146	2004-12-16	5.5672889	24.76360	8.0536000	4352.727273	4890.909091

## 5147	2004-12-17	5.8725333	24.60727	8.4063556	10.250000	12.000000
## 5148	2004-12-18	6.1777778	24.45093	8.7591111	4055.125000	4863.142857
## 5149	2004-12-19	5.1451111	24.45679	8.5458519	8100.000000	9714.285714
## 5150	2004-12-20	4.1124444	24.46264	8.3325926	3613.250000	7972.285714
## 5151	2004-12-21	3.0797778	24.46849	8.1193333	445.821429	552.500000
## 5152	2004-12-22	3.8540444	24.62828	7.9197333	24.750000	30.750000
## 5153	2004-12-23	4.6283111	24.78808	7.7201333	6016.000000	6025.000000
## 5154	2004-12-24	5.4025778	24.94788	7.5205333	12000.000000	12000.000000
## 5155	2004-12-25	6.1768444	25.10767	7.3209333	833.333333	1990.000000
## 5156	2004-12-26	6.9511111	25.26747	7.1213333	344.642857	1347.500000
## 5157	2004-12-27	10.1193778	25.13742	7.4403556	4.500000	7.500000
## 5158	2004-12-28	13.2876444	25.00738	7.7593778	1596.000000	5416.000000
## 5159	2004-12-29	16.4559111	24.87733	8.0784000	2784.000000	11200.000000
## 5160	2004-12-30	19.6241778	24.74729	8.3974222	4085.000000	5126.666667
## 5161	2004-12-31	22.7924444	24.61724	8.7164444	667.500000	917.892857
## 5162	2005-01-01	22.0953778	24.65476	8.4858667	5.250000	6.500000
## 5163	2005-01-02	21.3983111	24.69227	8.2552889	4680.000000	4246.666667
## 5164	2005-01-03	20.7012444	24.72978	8.0247111	5858.400000	12000.000000
## 5165	2005-01-04	20.0041778	24.76729	7.7941333	6140.000000	12000.000000
## 5166	2005-01-05	19.3071111	24.80480	7.5635556	70.178571	200.321429
## 5167	2005-01-06	16.0908000	24.80648	7.4271556	11.750000	2.000000
## 5168	2005-01-07	12.8744889	24.80817	7.2907556	3800.000000	7040.000000
## 5169	2005-01-08	9.6581778	24.80985	7.1543556	20.000000	20.000000
## 5170	2005-01-09	6.4418667	24.81154	7.0179556	12000.000000	12000.000000
## 5171	2005-01-10	3.2255556	24.81322	6.8815556	6002.750000	6006.125000
## 5172	2005-01-11	3.2258222	24.78948	6.7380000	5.500000	12.250000
## 5173	2005-01-12	3.2260889	24.76574	6.5944444	2616.800000	3171.000000
## 5174	2005-01-13	3.2263556	24.74200	6.4508889	4004.000000	3601.000000
## 5175	2005-01-14	3.2266222	24.71825	6.3073333	30.000000	14.000000
## 5176	2005-01-15	3.2268889	24.69451	6.1637778	4.933333	4.044444
## 5177	2005-01-16	2.5882626	25.15728	5.3982525	84.909091	92.545455
## 5178	2005-01-17	1.9496364	25.62005	4.6327273	6.920635	7.000000
## 5179	2005-01-18	2.8181818	25.51007	4.9459091	15.733333	132.785714
## 5180	2005-01-19	2.8826190	25.32898	4.9795238	10.190476	258.571429
## 5181	2005-01-20	3.4722222	24.85829	5.6962222	356.035714	384.357143
## 5182	2005-01-21	1.5212121	25.01785	6.0675758	2.206897	2.758621
## 5183	2005-01-22	1.8919444	25.05964	6.0969444	661.800000	635.133333
## 5184	2005-01-23	2.6700000	25.03440	5.3593333	1257.222222	1390.555556
## 5185	2005-01-24	2.3973333	25.08162	5.7505556	2433.333333	2413.333333
## 5186	2005-01-25	2.1246667	25.12884	6.1417778	7.071429	7.107143
## 5187	2005-01-26	1.7987778	25.06720	6.2872222	2.500000	3.250000
## 5188	2005-01-27	1.4728889	25.00556	6.4326667	223.714286	231.000000
## 5189	2005-01-28	1.7310667	24.91248	6.6239111	3.000000	8.250000
## 5190	2005-01-29	1.9892444	24.81940	6.8151556	9200.000000	12000.000000
## 5191	2005-01-30	2.2474222	24.72632	7.0064000	7500.000000	12000.000000
## 5192	2005-01-31	2.5056000	24.63324	7.1976444	4501.000000	2800.000000
## 5193	2005-02-01	2.7637778	24.54016	7.3888889	8.071429	9.535714
## 5194	2005-02-02	2.7724444	24.67337	7.0468148	2.000000	11.250000
## 5195	2005-02-03	2.7811111	24.80659	6.7047407	10.000000	10.000000
## 5196	2005-02-04	2.7897778	24.93980	6.3626667	237.357143	369.892857
## 5197	2005-02-05	2.8773333	24.86385	6.6578667	4.000000	4.000000
## 5198	2005-02-06	2.9648889	24.78791	6.9530667	6866.666667	11000.000000
## 5199	2005-02-07	3.0524444	24.71196	7.2482667	6393.333333	12000.000000
## 5200	2005-02-08	3.1400000	24.63601	7.5434667	9800.000000	12000.000000

##	5201	2005-02-09	3.2275556	24.56007	7.8386667	504.178571	573.500000
##	5202	2005-02-10	3.0083889	24.60156	7.6838333	3.500000	5.500000
##	5203	2005-02-11	2.7892222	24.64306	7.5290000	77.500000	19.000000
##	5204	2005-02-12	2.5700556	24.68455	7.3741667	12000.000000	12.5666667
##	5205	2005-02-13	2.3508889	24.72604	7.2193333	68.304348	6.133333
##	5206	2005-02-14	2.5871111	24.66595	7.3344000	1447.090909	1420.909091
##	5207	2005-02-15	2.8233333	24.60586	7.4494667	2.500000	14.250000
##	5208	2005-02-16	3.0595556	24.54576	7.5645333	8200.000000	8866.666667
##	5209	2005-02-17	3.2957778	24.48567	7.6796000	7766.666667	8173.333333
##	5210	2005-02-18	3.5320000	24.42558	7.7946667	259.416667	257.666667
##	5211	2005-02-19	3.5711111	24.55944	7.5368889	1159.818182	1170.545455
##	5212	2005-02-20	3.6102222	24.69331	7.2791111	2.000000	2.250000
##	5213	2005-02-21	3.6493333	24.82718	7.0213333	540.000000	960.000000
##	5214	2005-02-22	3.6884444	24.96104	6.7635556	12000.000000	12000.000000
##	5215	2005-02-23	3.7275556	25.09491	6.5057778	12000.000000	12000.000000
##	5216	2005-02-24	3.7666667	25.22878	6.2480000	201.857143	115.857143
##	5217	2005-02-25	3.5532000	25.19973	6.4254667	5.000000	15.250000
##	5218	2005-02-26	3.3397333	25.17068	6.6029333	501.000000	301.000000
##	5219	2005-02-27	3.1262667	25.14163	6.7804000	12000.000000	12000.000000
##	5220	2005-02-28	2.9128000	25.11258	6.9578667	100.000000	220.000000
##	5221	2005-03-01	2.6993333	25.08353	7.1353333	228.821429	232.000000
##	5222	2005-03-02	3.0784444	24.98248	7.2444444	2.250000	3.250000
##	5223	2005-03-03	3.4575556	24.88142	7.3535556	171.000000	301.000000
##	5224	2005-03-04	3.8366667	24.78037	7.4626667	14.000000	4.000000
##	5225	2005-03-05	4.2157778	24.67931	7.5717778	334.928571	1133.392857
##	5226	2005-03-06	4.2342222	24.71048	7.4556296	4.500000	9.500000
##	5227	2005-03-07	4.2526667	24.74165	7.3394815	6.000000	41.200000
##	5228	2005-03-08	4.2711111	24.77282	7.2233333	4.285714	3.428571
##	5229	2005-03-09	3.1306667	24.87111	7.4506667	2.000000	2.000000
##	5230	2005-03-10	1.9902222	24.96940	7.6780000	2.000000	2.933333
##	5231	2005-03-11	0.6885455	25.06769	6.0690909	36.151515	162.000000
##	5232	2005-03-12	1.6223810	24.41833	7.2323810	8.600000	19.750000
##	5233	2005-03-13	0.7379545	24.79030	6.4093182	23.409091	300.000000
##	5234	2005-03-14	2.4375000	24.19239	7.8683333	2.000000	2.000000
##	5235	2005-03-15	3.0040000	24.12740	8.0486667	14.076923	13.615385
##	5236	2005-03-16	2.2751515	24.40579	7.7236364	2.000000	2.827586
##	5237	2005-03-17	2.2177778	24.44864	7.8020000	2.000000	4.222222
##	5238	2005-03-18	2.4280000	24.70769	7.6528889	2.177778	2.888889
##	5239	2005-03-19	2.2462222	24.45642	7.6980000	43.818182	63.818182
##	5240	2005-03-20	2.0644444	24.20516	7.7431111	7.750000	8.750000
##	5241	2005-03-21	1.8826667	23.95389	7.7882222	6.875000	7.000000
##	5242	2005-03-22	2.1178519	24.04459	7.7838519	6.000000	5.250000
##	5243	2005-03-23	2.3530370	24.13530	7.7794815	5.666667	10.666667
##	5244	2005-03-24	2.5882222	24.22600	7.7751111	2.000000	2.000000
##	5245	2005-03-25	2.4355556	24.28564	7.6751852	72.181818	56.909091
##	5246	2005-03-26	2.2828889	24.34529	7.5752593	5.750000	6.000000
##	5247	2005-03-27	2.1302222	24.40493	7.4753333	2.400000	2.000000
##	5248	2005-03-28	1.9334815	24.27907	7.4620741	81.090909	87.454545
##	5249	2005-03-29	1.7367407	24.15321	7.4488148	3.500000	3.250000
##	5250	2005-03-30	1.5400000	24.02736	7.4355556	2.088889	2.044444
##	5251	2005-03-31	1.8810370	24.02499	7.5029630	60.363636	159.454545
##	5252	2005-04-01	2.2220741	24.02263	7.5703704	5.250000	8.250000
##	5253	2005-04-02	2.5631111	24.02027	7.6377778	2.888889	3.111111
##	5254	2005-04-03	2.4945000	24.12034	7.4689444	10.909091	23.272727

##	5255	2005-04-04	2.4258889	24.22041	7.3001111	20.750000	12.750000
##	5256	2005-04-05	2.3572778	24.32048	7.1312778	6.000000	36.107143
##	5257	2005-04-06	2.2886667	24.42056	6.9624444	16.285714	59.464286
##	5258	2005-04-07	2.2401111	24.41943	6.9076667	8.000000	11.250000
##	5259	2005-04-08	2.1915556	24.41831	6.8528889	23.750000	127.714286
##	5260	2005-04-09	2.2665926	24.46699	6.6917778	2.000000	13.000000
##	5261	2005-04-10	2.3416296	24.51567	6.5306667	96.181818	160.000000
##	5262	2005-04-11	2.4166667	24.56436	6.3695556	2.679245	2.905660
##	5263	2005-04-12	2.4013333	24.33871	7.3844444	3.466667	2.133333
##	5264	2005-04-13	2.3212121	24.48833	7.4612121	199.437500	375.000000
##	5265	2005-04-14	2.1536111	24.52733	7.3055556	2.571429	4.400000
##	5266	2005-04-15	2.2730000	24.47840	7.1166667	2.000000	2.533333
##	5267	2005-04-16	0.4369091	25.31507	5.5134545	255.696970	3091.636364
##	5268	2005-04-17	1.3846667	24.93460	6.3291111	2.977778	75.866667
##	5269	2005-04-18	1.2192857	24.99979	6.4038095	13.102525	78.727273
##	5270	2005-04-19	0.8434091	25.13355	6.1245455	23.227273	44.363636
##	5271	2005-04-20	1.5941490	25.04926	6.5379394	14.274351	10.000000
##	5272	2005-04-21	2.3448889	24.96498	6.9513333	5.321429	5.928571
##	5273	2005-04-22	2.3018889	24.98251	6.8314444	4.000000	3.250000
##	5274	2005-04-23	2.2588889	25.00004	6.7115556	2.188679	2.264151
##	5275	2005-04-24	1.9267778	25.00590	6.6647778	1094.909091	1095.272727
##	5276	2005-04-25	1.5946667	25.01176	6.6180000	3.714286	4.321429
##	5277	2005-04-26	1.9276667	24.98227	7.0231111	14.500000	18.250000
##	5278	2005-04-27	2.2606667	24.95278	7.4282222	2.000000	2.133333
##	5279	2005-04-28	2.1171852	24.90598	7.4426667	1100.727273	1105.454545
##	5280	2005-04-29	1.9737037	24.85918	7.4571111	28.250000	20.000000
##	5281	2005-04-30	1.8302222	24.81238	7.4715556	119.535714	167.250000
##	5282	2005-05-01	1.9610000	24.92278	7.2574444	3.500000	4.750000
##	5283	2005-05-02	2.0917778	25.03318	7.0433333	2.044444	2.044444
##	5284	2005-05-03	2.1073333	25.02741	7.1841481	1114.909091	1312.363636
##	5285	2005-05-04	2.1228889	25.02164	7.3249630	2.250000	6.750000
##	5286	2005-05-05	2.1384444	25.01587	7.4657778	2.622222	4.800000
##	5287	2005-05-06	2.0129024	25.05568	7.2382458	420.363636	404.909091
##	5288	2005-05-07	1.8873603	25.09549	7.0107138	4.000000	11.500000
##	5289	2005-05-08	1.7618182	25.13530	6.7831818	424.428571	1080.357143
##	5290	2005-05-09	1.8669966	25.14114	6.8376515	3.750000	3.250000
##	5291	2005-05-10	1.9721751	25.14697	6.8921212	8933.333333	10933.333333
##	5292	2005-05-11	2.0773535	25.15281	6.9465909	8466.666667	10800.000000
##	5293	2005-05-12	2.1825320	25.15865	7.0010606	5033.333333	7733.333333
##	5294	2005-05-13	2.2877104	25.16449	7.0555303	457.090909	854.000000
##	5295	2005-05-14	2.3928889	25.17033	7.1100000	27.320755	159.245283
##	5296	2005-05-15	2.2572222	25.07266	7.3724444	78.000000	180.000000
##	5297	2005-05-16	2.1215556	24.97498	7.6348889	87.535714	204.250000
##	5298	2005-05-17	1.8431111	25.00107	7.5085185	2.250000	3.000000
##	5299	2005-05-18	1.5646667	25.02717	7.3821481	1431.272727	1423.636364
##	5300	2005-05-19	1.2862222	25.05327	7.2557778	67.169811	141.811321
##	5301	2005-05-20	1.8465185	25.00910	7.4121481	610.000000	2020.000000
##	5302	2005-05-21	2.4068148	24.96494	7.5685185	1650.000000	2470.000000
##	5303	2005-05-22	2.9671111	24.92078	7.7248889	338.042553	627.829787
##	5304	2005-05-23	2.8844444	24.93307	7.6785333	1904.181818	3080.181818
##	5305	2005-05-24	2.8017778	24.94536	7.6321778	4.000000	4.250000
##	5306	2005-05-25	2.7191111	24.95764	7.5858222	10600.000000	12000.000000
##	5307	2005-05-26	2.6364444	24.96993	7.5394667	600.000000	2100.000000
##	5308	2005-05-27	2.5537778	24.98222	7.4931111	335.404255	493.063830

##	5309	2005-05-28	2.2015152	25.06670	7.3787879	778.625000	825.187500
##	5310	2005-05-29	1.4397222	25.07061	7.2658333	17.885714	56.342857
##	5311	2005-05-30	2.8610000	25.03423	7.7486667	32.526316	143.473684
##	5312	2005-05-31	2.9914222	25.03609	7.6680889	446.000000	2120.000000
##	5313	2005-06-01	3.1218444	25.03795	7.5875111	3200.000000	10000.000000
##	5314	2005-06-02	3.2522667	25.03981	7.5069333	2855.272727	5629.818182
##	5315	2005-06-03	3.3826889	25.04167	7.4263556	2.250000	2.750000
##	5316	2005-06-04	3.5131111	25.04353	7.3457778	408.640000	840.200000
##	5317	2005-06-05	2.7317778	25.18136	6.7551111	5266.666667	12000.000000
##	5318	2005-06-06	1.9504444	25.31918	6.1644444	545.916667	580.666667
##	5319	2005-06-07	0.6318182	25.76440	5.0676364	318.363636	2761.454545
##	5320	2005-06-08	1.2340476	25.43707	6.1380952	12.840000	9.750000
##	5321	2005-06-09	0.8427273	25.60580	5.4495455	57.416667	1698.000000
##	5322	2005-06-10	1.1541145	25.43060	6.0999933	220.000000	60.000000
##	5323	2005-06-11	1.4655017	25.25541	6.7504411	9.000000	32.821429
##	5324	2005-06-12	1.7768889	25.08022	7.4008889	3.214286	5.642857
##	5325	2005-06-13	2.6173333	24.98057	7.8320000	2.500000	5.000000
##	5326	2005-06-14	3.4577778	24.88091	8.2631111	14.444444	319.022222
##	5327	2005-06-15	3.2765000	24.95883	7.9461667	1444.727273	2529.272727
##	5328	2005-06-16	3.0952222	25.03674	7.6292222	2.750000	9.500000
##	5329	2005-06-17	2.9139444	25.11465	7.3122778	12000.000000	8100.000000
##	5330	2005-06-18	2.7326667	25.19257	6.9953333	950.000000	6055.000000
##	5331	2005-06-19	2.5513889	25.27048	6.6783889	12000.000000	12000.000000
##	5332	2005-06-20	2.3701111	25.34839	6.3614444	3624.000000	3537.272727
##	5333	2005-06-21	2.1888333	25.42631	6.0445000	2.500000	2.250000
##	5334	2005-06-22	2.0075556	25.50422	5.7275556	507.333333	1028.750000
##	5335	2005-06-23	2.4940556	25.50934	5.9170000	11133.333333	12000.000000
##	5336	2005-06-24	2.9805556	25.51447	6.1064444	8800.000000	9333.333333
##	5337	2005-06-25	3.4670556	25.51959	6.2958889	3351.454545	3415.272727
##	5338	2005-06-26	3.9535556	25.52471	6.4853333	3.924528	4.867925
##	5339	2005-06-27	3.4544889	25.47149	6.5401333	4036.666667	4063.333333
##	5340	2005-06-28	2.9554222	25.41828	6.5949333	620.000000	2800.000000
##	5341	2005-06-29	2.4563556	25.36506	6.6497333	4400.000000	4200.000000
##	5342	2005-06-30	1.9572889	25.31184	6.7045333	1607.090909	2396.181818
##	5343	2005-07-01	1.4582222	25.25862	6.7593333	706.474576	691.118644
##	5344	2005-07-02	1.7529630	25.23615	6.7722963	7203.200000	7208.000000
##	5345	2005-07-03	2.0477037	25.21367	6.7852593	9800.000000	9266.666667
##	5346	2005-07-04	2.3424444	25.19120	6.7982222	260.142857	371.571429
##	5347	2005-07-05	2.5396889	25.15709	6.8743111	2.250000	2.000000
##	5348	2005-07-06	2.7369333	25.12299	6.9504000	4018.000000	4010.000000
##	5349	2005-07-07	2.9341778	25.08888	7.0264889	340.000000	1100.000000
##	5350	2005-07-08	3.1314222	25.05477	7.1025778	12000.000000	12000.000000
##	5351	2005-07-09	3.3286667	25.02067	7.1786667	1100.307692	1093.923077
##	5352	2005-07-10	3.7330000	25.01598	7.1710000	2.250000	2.750000
##	5353	2005-07-11	4.1373333	25.01130	7.1633333	743.176471	380.750000
##	5354	2005-07-12	3.6331852	25.07826	6.9723704	4001.333333	12000.000000
##	5355	2005-07-13	3.1290370	25.14522	6.7814074	12000.000000	6200.000000
##	5356	2005-07-14	2.6248889	25.21218	6.5904444	138.535714	92.750000
##	5357	2005-07-15	2.5791852	25.28227	6.4755556	2.250000	5.250000
##	5358	2005-07-16	2.5334815	25.35236	6.3606667	14.000000	49.107143
##	5359	2005-07-17	2.4877778	25.42244	6.2457778	31.892857	92.964286
##	5360	2005-07-18	3.9761111	25.13313	7.1451111	6.750000	4.000000
##	5361	2005-07-19	5.4644444	24.84382	8.0444444	43.777778	51.644444
##	5362	2005-07-20	4.2451515	25.15761	7.4924242	248.812500	197.625000

##	5363	2005-07-21	6.0086667	25.06167	8.1376667	2.608696	2.956522
##	5364	2005-07-22	4.0280556	25.16233	7.3477778	2.296296	2.148148
##	5365	2005-07-23	4.5104444	24.64018	8.6591111	3.866667	2.844444
##	5366	2005-07-24	0.9443636	25.52529	6.0703636	60.757576	120.909091
##	5367	2005-07-25	2.4723810	25.09933	7.4511905	2.520000	2.500000
##	5368	2005-07-26	1.1788636	25.34666	6.5170455	48.227273	34.696429
##	5369	2005-07-27	2.3026667	25.06709	6.8075556	81.285714	66.892857
##	5370	2005-07-28	2.2265000	25.05334	6.8456111	5.000000	5.250000
##	5371	2005-07-29	2.1503333	25.03959	6.8836667	16.181818	41.818182
##	5372	2005-07-30	2.0741667	25.02584	6.9217222	4.500000	15.000000
##	5373	2005-07-31	1.9980000	25.01209	6.9597778	3.066667	3.955556
##	5374	2005-08-01	2.8008889	24.69678	8.1275556	9.892857	12.500000
##	5375	2005-08-02	3.6085556	24.53961	8.7396667	2.000000	3.500000
##	5376	2005-08-03	4.4162222	24.38244	9.3517778	84.285714	72.678571
##	5377	2005-08-04	3.9209630	24.54143	8.6138519	2.250000	2.500000
##	5378	2005-08-05	3.4257037	24.70041	7.8759259	4.000000	13.785714
##	5379	2005-08-06	2.9304444	24.85940	7.1380000	23.178571	25.071429
##	5380	2005-08-07	3.0667778	24.59592	7.3383333	2.500000	3.750000
##	5381	2005-08-08	3.2031111	24.33244	7.5386667	17.821429	9.500000
##	5382	2005-08-09	2.8324444	24.36129	7.6621111	5.000000	6.500000
##	5383	2005-08-10	2.4617778	24.39013	7.7855556	4.857143	5.178571
##	5384	2005-08-11	2.2948889	24.41798	7.8504444	3.750000	4.250000
##	5385	2005-08-12	2.1280000	24.44582	7.9153333	2.000000	2.821429
##	5386	2005-08-13	1.6780000	24.28167	7.8190000	7.000000	3.750000
##	5387	2005-08-14	1.2280000	24.11751	7.7226667	2.000000	2.088889
##	5388	2005-08-15	1.4674815	24.25520	7.8465926	12.000000	6.750000
##	5389	2005-08-16	1.7069630	24.39289	7.9705185	65.636364	84.909091
##	5390	2005-08-17	1.9464444	24.53058	8.0944444	2.000000	2.113208
##	5391	2005-08-18	3.8311111	24.43164	7.9057778	2.000000	2.088889
##	5392	2005-08-19	3.5630370	24.65559	7.6960000	10.545455	131.454545
##	5393	2005-08-20	3.2949630	24.87953	7.4862222	3.500000	15.500000
##	5394	2005-08-21	3.0268889	25.10347	7.2764444	2.000000	2.000000
##	5395	2005-08-22	2.7260606	25.12761	7.0927273	11.562500	24.125000
##	5396	2005-08-23	4.0522222	25.20758	7.0911111	3.085714	3.314286
##	5397	2005-08-24	5.0553333	25.19903	7.2390000	2.000000	2.000000
##	5398	2005-08-25	2.8675556	24.46100	8.3913333	8.888889	4.622222
##	5399	2005-08-26	1.1496364	25.27269	5.8850909	53.909091	9.818182
##	5400	2005-08-27	1.8444186	24.86379	7.0762791	8.240000	38.750000
##	5401	2005-08-28	1.0445455	25.16955	6.0215909	74.454545	36.238095
##	5402	2005-08-29	1.7211616	24.64873	7.1031288	14.000000	33.726190
##	5403	2005-08-30	2.3977778	24.12791	8.1846667	4.535714	31.214286
##	5404	2005-08-31	2.6057778	24.39237	7.7740000	3.250000	3.250000
##	5405	2005-09-01	2.8137778	24.65682	7.3633333	18.714286	84.535714
##	5406	2005-09-02	2.9372222	24.72782	7.5260000	2.250000	3.000000
##	5407	2005-09-03	3.0606667	24.79882	7.6886667	10.785714	8.678571
##	5408	2005-09-04	2.5212222	24.60022	7.7406667	3.000000	2.750000
##	5409	2005-09-05	1.9817778	24.40162	7.7926667	366.071429	138.964286
##	5410	2005-09-06	1.6733333	24.55507	7.4675556	7.250000	4.500000
##	5411	2005-09-07	1.3648889	24.70851	7.1424444	2.044444	2.000000
##	5412	2005-09-08	1.4563889	24.69992	7.3608889	56.181818	37.090909
##	5413	2005-09-09	1.5478889	24.69132	7.5793333	2.250000	2.250000
##	5414	2005-09-10	1.6393889	24.68273	7.7977778	166.181818	111.090909
##	5415	2005-09-11	1.7308889	24.67413	8.0162222	2.226415	4.377358
##	5416	2005-09-12	3.6862222	24.50947	7.9128889	77.571429	79.285714

## 5417	2005-09-13	3.0314444	24.48493	7.8678889	2.000000	3.250000
## 5418	2005-09-14	2.3766667	24.46040	7.8228889	2.088889	2.066667
## 5419	2005-09-15	2.2282963	24.47993	7.7065926	940.363636	1140.545455
## 5420	2005-09-16	2.0799259	24.49947	7.5902963	15.250000	15.250000
## 5421	2005-09-17	1.9315556	24.51900	7.4740000	2.000000	2.488889
## 5422	2005-09-18	1.8128889	24.53472	7.4893333	37.090909	73.272727
## 5423	2005-09-19	1.6942222	24.55043	7.5046667	2.000000	3.500000
## 5424	2005-09-20	1.5755556	24.56615	7.5200000	15.818182	14.727273
## 5425	2005-09-21	1.4568889	24.58187	7.5353333	3.396226	2.339623
## 5426	2005-09-22	1.4320000	24.73480	7.1941111	103.818182	171.636364
## 5427	2005-09-23	1.4071111	24.88773	6.8528889	3.924528	10.679245
## 5428	2005-09-24	2.2462222	24.62031	7.4717778	6.490566	4.075472
## 5429	2005-09-25	1.5960000	24.84630	7.1513333	5.565217	4.347826
## 5430	2005-09-26	1.1083333	24.79314	7.1611111	2.222222	2.592593
## 5431	2005-09-27	1.2021212	24.72279	7.2769697	2.285714	2.857143
## 5432	2005-09-28	1.3906667	24.65613	7.3815556	3.245283	2.716981
## 5433	2005-09-29	0.6169091	25.15278	5.9663636	37.424242	63.636364
## 5434	2005-09-30	0.9950000	24.90671	6.8864286	4.523810	43.364719
## 5435	2005-10-01	0.6561364	25.12484	6.1713636	62.090909	23.093074
## 5436	2005-10-02	2.1324444	24.56878	7.9331111	3.535714	2.821429
## 5437	2005-10-03	1.9108889	24.67141	7.6784444	4.000000	4.500000
## 5438	2005-10-04	1.6893333	24.77404	7.4237778	2.113208	2.641509
## 5439	2005-10-05	1.9208889	24.69307	7.7282222	14.545455	13.272727
## 5440	2005-10-06	2.1524444	24.61209	8.0326667	19.000000	21.750000
## 5441	2005-10-07	1.7639259	24.61350	7.8335556	10.000000	5.500000
## 5442	2005-10-08	1.3754074	24.61492	7.6344444	1905.272727	2356.363636
## 5443	2005-10-09	0.9868889	24.61633	7.4353333	15.849057	12.641509
## 5444	2005-10-10	0.9043333	24.68802	7.3908889	173.000000	48.500000
## 5445	2005-10-11	0.8217778	24.75971	7.3464444	10.916667	42.222222
## 5446	2005-10-12	1.5595556	24.93376	7.0766667	92.250000	152.392857
## 5447	2005-10-13	1.5875556	24.83102	7.3957778	14.750000	5.750000
## 5448	2005-10-14	1.6155556	24.72829	7.7148889	125.644444	288.711111
## 5449	2005-10-15	1.6155556	24.72829	7.7148889	3616.363636	4477.818182
## 5450	2005-10-16	1.6155556	24.72829	7.7148889	4.500000	5.000000
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## 5458	2005-10-24	NA	NA	NA	NA	NA
## 5459	2005-10-25	NA	NA	NA	NA	NA
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## 6184	2007-10-20	NA	NA	NA	NA	NA
## 6185	2007-10-21	NA	NA	NA	NA	NA
## 6186	2007-10-22	NA	NA	NA	NA	NA
## 6187	2007-10-23	NA	NA	NA	NA	NA
## 6188	2007-10-24	NA	NA	NA	NA	NA
## 6189	2007-10-25	NA	NA	NA	NA	NA
## 6190	2007-10-26	NA	NA	NA	NA	NA
## 6191	2007-10-27	NA	NA	NA	NA	NA
## 6192	2007-10-28	NA	NA	NA	NA	NA
## 6193	2007-10-29	NA	NA	NA	NA	NA
## 6194	2007-10-30	NA	NA	NA	NA	NA
## 6195	2007-10-31	NA	NA	NA	NA	NA
## 6196	2007-11-01	NA	NA	NA	NA	NA
## 6197	2007-11-02	NA	NA	NA	NA	NA
## 6198	2007-11-03	NA	NA	NA	NA	NA
## 6199	2007-11-04	NA	NA	NA	NA	NA
## 6200	2007-11-05	NA	NA	NA	NA	NA
## 6201	2007-11-06	NA	NA	NA	NA	NA
## 6202	2007-11-07	NA	NA	NA	NA	NA
## 6203	2007-11-08	NA	NA	NA	NA	NA
## 6204	2007-11-09	NA	NA	NA	NA	NA
## 6205	2007-11-10	NA	NA	NA	NA	NA
## 6206	2007-11-11	NA	NA	NA	NA	NA
## 6207	2007-11-12	NA	NA	NA	NA	NA
## 6208	2007-11-13	NA	NA	NA	NA	NA
## 6209	2007-11-14	NA	NA	NA	NA	NA
## 6210	2007-11-15	NA	NA	NA	NA	NA
## 6211	2007-11-16	NA	NA	NA	NA	NA
## 6212	2007-11-17	NA	NA	NA	NA	NA
## 6213	2007-11-18	NA	NA	NA	NA	NA
## 6214	2007-11-19	NA	NA	NA	NA	NA
## 6215	2007-11-20	NA	NA	NA	NA	NA
## 6216	2007-11-21	NA	NA	NA	NA	NA
## 6217	2007-11-22	NA	NA	NA	NA	NA
## 6218	2007-11-23	NA	NA	NA	NA	NA
## 6219	2007-11-24	NA	NA	NA	NA	NA
## 6220	2007-11-25	NA	NA	NA	NA	NA
## 6221	2007-11-26	NA	NA	NA	NA	NA
## 6222	2007-11-27	NA	NA	NA	NA	NA
## 6223	2007-11-28	NA	NA	NA	NA	NA
## 6224	2007-11-29	NA	NA	NA	NA	NA
## 6225	2007-11-30	NA	NA	NA	NA	NA
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## 6228	2007-12-03	NA	NA	NA	NA	NA
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## 6231	2007-12-06	NA	NA	NA	NA	NA
## 6232	2007-12-07	NA	NA	NA	NA	NA
## 6233	2007-12-08	NA	NA	NA	NA	NA
## 6234	2007-12-09	NA	NA	NA	NA	NA
## 6235	2007-12-10	NA	NA	NA	NA	NA
## 6236	2007-12-11	NA	NA	NA	NA	NA
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## 6241	2007-12-16	NA	NA	NA	NA	NA
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## 6279	2008-01-23	NA	NA	NA	NA	NA
## 6280	2008-01-24	NA	NA	NA	NA	NA

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## 6334	2008-03-18	NA	NA	NA	NA	NA

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## 6339	2008-03-23	NA	NA	NA	NA	NA
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## 6387	2008-05-10	NA	NA	NA	NA	NA
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## 6393	2008-05-16	NA	NA	NA	NA	NA
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## 6417	2008-06-09	NA	NA	NA	NA	NA
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## 6438	2008-06-30	NA	NA	NA	NA	NA
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## 6547	2008-10-17	NA	NA	NA	NA	NA
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## 6555	2008-10-25	NA	NA	NA	NA	NA
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## 6560	2008-10-30	NA	NA	NA	NA	NA
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## 6570	2008-11-09	NA	NA	NA	NA	NA
## 6571	2008-11-10	NA	NA	NA	NA	NA
## 6572	2008-11-11	NA	NA	NA	NA	NA
## 6573	2008-11-12	NA	NA	NA	NA	NA
## 6574	2008-11-13	NA	NA	NA	NA	NA
## 6575	2008-11-14	NA	NA	NA	NA	NA
## 6576	2008-11-15	NA	NA	NA	NA	NA
## 6577	2008-11-16	NA	NA	NA	NA	NA
## 6578	2008-11-17	NA	NA	NA	NA	NA
## 6579	2008-11-18	NA	NA	NA	NA	NA
## 6580	2008-11-19	NA	NA	NA	NA	NA
## 6581	2008-11-20	NA	NA	NA	NA	NA
## 6582	2008-11-21	NA	NA	NA	NA	NA
## 6583	2008-11-22	NA	NA	NA	NA	NA
## 6584	2008-11-23	NA	NA	NA	NA	NA
## 6585	2008-11-24	NA	NA	NA	NA	NA
## 6586	2008-11-25	NA	NA	NA	NA	NA
## 6587	2008-11-26	NA	NA	NA	NA	NA
## 6588	2008-11-27	NA	NA	NA	NA	NA
## 6589	2008-11-28	NA	NA	NA	NA	NA
## 6590	2008-11-29	NA	NA	NA	NA	NA
## 6591	2008-11-30	NA	NA	NA	NA	NA
## 6592	2008-12-01	NA	NA	NA	NA	NA
## 6593	2008-12-02	NA	NA	NA	NA	NA
## 6594	2008-12-03	NA	NA	NA	NA	NA
## 6595	2008-12-04	NA	NA	NA	NA	NA
## 6596	2008-12-05	NA	NA	NA	NA	NA
## 6597	2008-12-06	NA	NA	NA	NA	NA
## 6598	2008-12-07	NA	NA	NA	NA	NA
## 6599	2008-12-08	NA	NA	NA	NA	NA
## 6600	2008-12-09	NA	NA	NA	NA	NA
## 6601	2008-12-10	NA	NA	NA	NA	NA
## 6602	2008-12-11	NA	NA	NA	NA	NA
## 6603	2008-12-12	NA	NA	NA	NA	NA
## 6604	2008-12-13	NA	NA	NA	NA	NA

## 6605	2008-12-14	NA	NA	NA	NA	NA
## 6606	2008-12-15	NA	NA	NA	NA	NA
## 6607	2008-12-16	NA	NA	NA	NA	NA
## 6608	2008-12-17	NA	NA	NA	NA	NA
## 6609	2008-12-18	NA	NA	NA	NA	NA
## 6610	2008-12-19	NA	NA	NA	NA	NA
## 6611	2008-12-20	NA	NA	NA	NA	NA
## 6612	2008-12-21	NA	NA	NA	NA	NA
## 6613	2008-12-22	NA	NA	NA	NA	NA
## 6614	2008-12-23	NA	NA	NA	NA	NA
## 6615	2008-12-24	NA	NA	NA	NA	NA
## 6616	2008-12-25	NA	NA	NA	NA	NA
## 6617	2008-12-26	NA	NA	NA	NA	NA
## 6618	2008-12-27	NA	NA	NA	NA	NA
## 6619	2008-12-28	NA	NA	NA	NA	NA
## 6620	2008-12-29	NA	NA	NA	NA	NA
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## 6624	2009-01-02	NA	NA	NA	NA	NA
## 6625	2009-01-03	NA	NA	NA	NA	NA
## 6626	2009-01-04	NA	NA	NA	NA	NA
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## 6628	2009-01-06	NA	NA	NA	NA	NA
## 6629	2009-01-07	NA	NA	NA	NA	NA
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## 6658	2009-02-05	NA	NA	NA	NA	NA

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## 6665	2009-02-12	NA	NA	NA	NA	NA
## 6666	2009-02-13	NA	NA	NA	NA	NA
## 6667	2009-02-14	NA	NA	NA	NA	NA
## 6668	2009-02-15	NA	NA	NA	NA	NA
## 6669	2009-02-16	NA	NA	NA	NA	NA
## 6670	2009-02-17	NA	NA	NA	NA	NA
## 6671	2009-02-18	NA	NA	NA	NA	NA
## 6672	2009-02-19	NA	NA	NA	NA	NA
## 6673	2009-02-20	NA	NA	NA	NA	NA
## 6674	2009-02-21	NA	NA	NA	NA	NA
## 6675	2009-02-22	NA	NA	NA	NA	NA
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## 6677	2009-02-24	NA	NA	NA	NA	NA
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## 6679	2009-02-26	NA	NA	NA	NA	NA
## 6680	2009-02-27	NA	NA	NA	NA	NA
## 6681	2009-02-28	NA	NA	NA	NA	NA
## 6682	2009-03-01	NA	NA	NA	NA	NA
## 6683	2009-03-02	NA	NA	NA	NA	NA
## 6684	2009-03-03	NA	NA	NA	NA	NA
## 6685	2009-03-04	NA	NA	NA	NA	NA
## 6686	2009-03-05	NA	NA	NA	NA	NA
## 6687	2009-03-06	NA	NA	NA	NA	NA
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## 6695	2009-03-14	NA	NA	NA	NA	NA
## 6696	2009-03-15	NA	NA	NA	NA	NA
## 6697	2009-03-16	NA	NA	NA	NA	NA
## 6698	2009-03-17	NA	NA	NA	NA	NA
## 6699	2009-03-18	NA	NA	NA	NA	NA
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## 6701	2009-03-20	NA	NA	NA	NA	NA
## 6702	2009-03-21	NA	NA	NA	NA	NA
## 6703	2009-03-22	NA	NA	NA	NA	NA
## 6704	2009-03-23	NA	NA	NA	NA	NA
## 6705	2009-03-24	NA	NA	NA	NA	NA
## 6706	2009-03-25	NA	NA	NA	NA	NA
## 6707	2009-03-26	NA	NA	NA	NA	NA
## 6708	2009-03-27	NA	NA	NA	NA	NA
## 6709	2009-03-28	NA	NA	NA	NA	NA
## 6710	2009-03-29	NA	NA	NA	NA	NA
## 6711	2009-03-30	NA	NA	NA	NA	NA
## 6712	2009-03-31	NA	NA	NA	NA	NA

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## 6714	2009-04-02	NA	NA	NA	NA	NA
## 6715	2009-04-03	NA	NA	NA	NA	NA
## 6716	2009-04-04	NA	NA	NA	NA	NA
## 6717	2009-04-05	NA	NA	NA	NA	NA
## 6718	2009-04-06	NA	NA	NA	NA	NA
## 6719	2009-04-07	NA	NA	NA	NA	NA
## 6720	2009-04-08	NA	NA	NA	NA	NA
## 6721	2009-04-09	NA	NA	NA	NA	NA
## 6722	2009-04-10	NA	NA	NA	NA	NA
## 6723	2009-04-11	NA	NA	NA	NA	NA
## 6724	2009-04-12	NA	NA	NA	NA	NA
## 6725	2009-04-13	NA	NA	NA	NA	NA
## 6726	2009-04-14	NA	NA	NA	NA	NA
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## 6728	2009-04-16	NA	NA	NA	NA	NA
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## 6730	2009-04-18	NA	NA	NA	NA	NA
## 6731	2009-04-19	NA	NA	NA	NA	NA
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## 6734	2009-04-22	NA	NA	NA	NA	NA
## 6735	2009-04-23	NA	NA	NA	NA	NA
## 6736	2009-04-24	NA	NA	NA	NA	NA
## 6737	2009-04-25	NA	NA	NA	NA	NA
## 6738	2009-04-26	NA	NA	NA	NA	NA
## 6739	2009-04-27	NA	NA	NA	NA	NA
## 6740	2009-04-28	NA	NA	NA	NA	NA
## 6741	2009-04-29	NA	NA	NA	NA	NA
## 6742	2009-04-30	NA	NA	NA	NA	NA
## 6743	2009-05-01	NA	NA	NA	NA	NA
## 6744	2009-05-02	NA	NA	NA	NA	NA
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## 6747	2009-05-05	NA	NA	NA	NA	NA
## 6748	2009-05-06	NA	NA	NA	NA	NA
## 6749	2009-05-07	NA	NA	NA	NA	NA
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## 6755	2009-05-13	NA	NA	NA	NA	NA
## 6756	2009-05-14	NA	NA	NA	NA	NA
## 6757	2009-05-15	NA	NA	NA	NA	NA
## 6758	2009-05-16	NA	NA	NA	NA	NA
## 6759	2009-05-17	NA	NA	NA	NA	NA
## 6760	2009-05-18	NA	NA	NA	NA	NA
## 6761	2009-05-19	NA	NA	NA	NA	NA
## 6762	2009-05-20	NA	NA	NA	NA	NA
## 6763	2009-05-21	NA	NA	NA	NA	NA
## 6764	2009-05-22	NA	NA	NA	NA	NA
## 6765	2009-05-23	NA	NA	NA	NA	NA
## 6766	2009-05-24	NA	NA	NA	NA	NA

## 6767	2009-05-25	NA	NA	NA	NA	NA
## 6768	2009-05-26	NA	NA	NA	NA	NA
## 6769	2009-05-27	NA	NA	NA	NA	NA
## 6770	2009-05-28	NA	NA	NA	NA	NA
## 6771	2009-05-29	NA	NA	NA	NA	NA
## 6772	2009-05-30	NA	NA	NA	NA	NA
## 6773	2009-05-31	NA	NA	NA	NA	NA
## 6774	2009-06-01	NA	NA	NA	NA	NA
## 6775	2009-06-02	NA	NA	NA	NA	NA
## 6776	2009-06-03	NA	NA	NA	NA	NA
## 6777	2009-06-04	NA	NA	NA	NA	NA
## 6778	2009-06-05	NA	NA	NA	NA	NA
## 6779	2009-06-06	NA	NA	NA	NA	NA
## 6780	2009-06-07	NA	NA	NA	NA	NA
## 6781	2009-06-08	NA	NA	NA	NA	NA
## 6782	2009-06-09	NA	NA	NA	NA	NA
## 6783	2009-06-10	NA	NA	NA	NA	NA
## 6784	2009-06-11	NA	NA	NA	NA	NA
## 6785	2009-06-12	NA	NA	NA	NA	NA
## 6786	2009-06-13	NA	NA	NA	NA	NA
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## 6788	2009-06-15	NA	NA	NA	NA	NA
## 6789	2009-06-16	NA	NA	NA	NA	NA
## 6790	2009-06-17	NA	NA	NA	NA	NA
## 6791	2009-06-18	NA	NA	NA	NA	NA
## 6792	2009-06-19	NA	NA	NA	NA	NA
## 6793	2009-06-20	NA	NA	NA	NA	NA
## 6794	2009-06-21	NA	NA	NA	NA	NA
## 6795	2009-06-22	NA	NA	NA	NA	NA
## 6796	2009-06-23	NA	NA	NA	NA	NA
## 6797	2009-06-24	NA	NA	NA	NA	NA
## 6798	2009-06-25	NA	NA	NA	NA	NA
## 6799	2009-06-26	NA	NA	NA	NA	NA
## 6800	2009-06-27	NA	NA	NA	NA	NA
## 6801	2009-06-28	NA	NA	NA	NA	NA
## 6802	2009-06-29	NA	NA	NA	NA	NA
## 6803	2009-06-30	NA	NA	NA	NA	NA
## 6804	2009-07-01	NA	NA	NA	NA	NA
## 6805	2009-07-02	NA	NA	NA	NA	NA
## 6806	2009-07-03	NA	NA	NA	NA	NA
## 6807	2009-07-04	NA	NA	NA	NA	NA
## 6808	2009-07-05	NA	NA	NA	NA	NA
## 6809	2009-07-06	NA	NA	NA	NA	NA
## 6810	2009-07-07	NA	NA	NA	NA	NA
## 6811	2009-07-08	NA	NA	NA	NA	NA
## 6812	2009-07-09	NA	NA	NA	NA	NA
## 6813	2009-07-10	NA	NA	NA	NA	NA
## 6814	2009-07-11	NA	NA	NA	NA	NA
## 6815	2009-07-12	NA	NA	NA	NA	NA
## 6816	2009-07-13	NA	NA	NA	NA	NA
## 6817	2009-07-14	NA	NA	NA	NA	NA
## 6818	2009-07-15	NA	NA	NA	NA	NA
## 6819	2009-07-16	NA	NA	NA	NA	NA
## 6820	2009-07-17	NA	NA	NA	NA	NA

## 6821	2009-07-18	NA	NA	NA	NA	NA
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## 6823	2009-07-20	NA	NA	NA	NA	NA
## 6824	2009-07-21	NA	NA	NA	NA	NA
## 6825	2009-07-22	NA	NA	NA	NA	NA
## 6826	2009-07-23	NA	NA	NA	NA	NA
## 6827	2009-07-24	NA	NA	NA	NA	NA
## 6828	2009-07-25	NA	NA	NA	NA	NA
## 6829	2009-07-26	NA	NA	NA	NA	NA
## 6830	2009-07-27	NA	NA	NA	NA	NA
## 6831	2009-07-28	NA	NA	NA	NA	NA
## 6832	2009-07-29	NA	NA	NA	NA	NA
## 6833	2009-07-30	NA	NA	NA	NA	NA
## 6834	2009-07-31	NA	NA	NA	NA	NA
## 6835	2009-08-01	NA	NA	NA	NA	NA
## 6836	2009-08-02	NA	NA	NA	NA	NA
## 6837	2009-08-03	NA	NA	NA	NA	NA
## 6838	2009-08-04	NA	NA	NA	NA	NA
## 6839	2009-08-05	NA	NA	NA	NA	NA
## 6840	2009-08-06	NA	NA	NA	NA	NA
## 6841	2009-08-07	NA	NA	NA	NA	NA
## 6842	2009-08-08	NA	NA	NA	NA	NA
## 6843	2009-08-09	NA	NA	NA	NA	NA
## 6844	2009-08-10	NA	NA	NA	NA	NA
## 6845	2009-08-11	NA	NA	NA	NA	NA
## 6846	2009-08-12	NA	NA	NA	NA	NA
## 6847	2009-08-13	NA	NA	NA	NA	NA
## 6848	2009-08-14	NA	NA	NA	NA	NA
## 6849	2009-08-15	NA	NA	NA	NA	NA
## 6850	2009-08-16	NA	NA	NA	NA	NA
## 6851	2009-08-17	NA	NA	NA	NA	NA
## 6852	2009-08-18	NA	NA	NA	NA	NA
## 6853	2009-08-19	NA	NA	NA	NA	NA
## 6854	2009-08-20	NA	NA	NA	NA	NA
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## 6856	2009-08-22	NA	NA	NA	NA	NA
## 6857	2009-08-23	NA	NA	NA	NA	NA
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## 6860	2009-08-26	NA	NA	NA	NA	NA
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## 6863	2009-08-29	NA	NA	NA	NA	NA
## 6864	2009-08-30	NA	NA	NA	NA	NA
## 6865	2009-08-31	NA	NA	NA	NA	NA
## 6866	2009-09-01	NA	NA	NA	NA	NA
## 6867	2009-09-02	NA	NA	NA	NA	NA
## 6868	2009-09-03	NA	NA	NA	NA	NA
## 6869	2009-09-04	NA	NA	NA	NA	NA
## 6870	2009-09-05	NA	NA	NA	NA	NA
## 6871	2009-09-06	NA	NA	NA	NA	NA
## 6872	2009-09-07	NA	NA	NA	NA	NA
## 6873	2009-09-08	NA	NA	NA	NA	NA
## 6874	2009-09-09	NA	NA	NA	NA	NA

## 6875	2009-09-10	NA	NA	NA	NA	NA
## 6876	2009-09-11	NA	NA	NA	NA	NA
## 6877	2009-09-12	NA	NA	NA	NA	NA
## 6878	2009-09-13	NA	NA	NA	NA	NA
## 6879	2009-09-14	NA	NA	NA	NA	NA
## 6880	2009-09-15	NA	NA	NA	NA	NA
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## 6883	2009-09-18	NA	NA	NA	NA	NA
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## 6885	2009-09-20	NA	NA	NA	NA	NA
## 6886	2009-09-21	NA	NA	NA	NA	NA
## 6887	2009-09-22	NA	NA	NA	NA	NA
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## 6895	2009-09-30	NA	NA	NA	NA	NA
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## 6897	2009-10-02	NA	NA	NA	NA	NA
## 6898	2009-10-03	NA	NA	NA	NA	NA
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## 6905	2009-10-10	NA	NA	NA	NA	NA
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## 6919	2009-10-24	NA	NA	NA	NA	NA
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## 6922	2009-10-27	NA	NA	NA	NA	NA
## 6923	2009-10-28	NA	NA	NA	NA	NA
## 6924	2009-10-29	NA	NA	NA	NA	NA
## 6925	2009-10-30	NA	NA	NA	NA	NA
## 6926	2009-10-31	NA	NA	NA	NA	NA
## 6927	2009-11-01	NA	NA	NA	NA	NA
## 6928	2009-11-02	NA	NA	NA	NA	NA

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## 6933	2009-11-07	NA	NA	NA	NA	NA
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## 6944	2009-11-18	NA	NA	NA	NA	NA
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## 6946	2009-11-20	NA	NA	NA	NA	NA
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## 6948	2009-11-22	NA	NA	NA	NA	NA
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## 6954	2009-11-28	NA	NA	NA	NA	NA
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## 6957	2009-12-01	NA	NA	NA	NA	NA
## 6958	2009-12-02	NA	NA	NA	NA	NA
## 6959	2009-12-03	NA	NA	NA	NA	NA
## 6960	2009-12-04	NA	NA	NA	NA	NA
## 6961	2009-12-05	NA	NA	NA	NA	NA
## 6962	2009-12-06	NA	NA	NA	NA	NA
## 6963	2009-12-07	NA	NA	NA	NA	NA
## 6964	2009-12-08	NA	NA	NA	NA	NA
## 6965	2009-12-09	NA	NA	NA	NA	NA
## 6966	2009-12-10	NA	NA	NA	NA	NA
## 6967	2009-12-11	NA	NA	NA	NA	NA
## 6968	2009-12-12	NA	NA	NA	NA	NA
## 6969	2009-12-13	NA	NA	NA	NA	NA
## 6970	2009-12-14	NA	NA	NA	NA	NA
## 6971	2009-12-15	NA	NA	NA	NA	NA
## 6972	2009-12-16	NA	NA	NA	NA	NA
## 6973	2009-12-17	NA	NA	NA	NA	NA
## 6974	2009-12-18	NA	NA	NA	NA	NA
## 6975	2009-12-19	NA	NA	NA	NA	NA
## 6976	2009-12-20	NA	NA	NA	NA	NA
## 6977	2009-12-21	NA	NA	NA	NA	NA
## 6978	2009-12-22	NA	NA	NA	NA	NA
## 6979	2009-12-23	NA	NA	NA	NA	NA
## 6980	2009-12-24	NA	NA	NA	NA	NA
## 6981	2009-12-25	NA	NA	NA	NA	NA
## 6982	2009-12-26	NA	NA	NA	NA	NA

## 6983	2009-12-27	NA	NA	NA	NA	NA
## 6984	2009-12-28	NA	NA	NA	NA	NA
## 6985	2009-12-29	NA	NA	NA	NA	NA
## 6986	2009-12-30	NA	NA	NA	NA	NA
## 6987	2009-12-31	NA	NA	NA	NA	NA
## 6988	2010-01-01	NA	NA	NA	NA	NA
## 6989	2010-01-02	NA	NA	NA	NA	NA
## 6990	2010-01-03	NA	NA	NA	NA	NA
## 6991	2010-01-04	NA	NA	NA	NA	NA
## 6992	2010-01-05	NA	NA	NA	NA	NA
## 6993	2010-01-06	NA	NA	NA	NA	NA
## 6994	2010-01-07	NA	NA	NA	NA	NA
## 6995	2010-01-08	NA	NA	NA	NA	NA
## 6996	2010-01-09	NA	NA	NA	NA	NA
## 6997	2010-01-10	NA	NA	NA	NA	NA
## 6998	2010-01-11	NA	NA	NA	NA	NA
## 6999	2010-01-12	NA	NA	NA	NA	NA
## 7000	2010-01-13	NA	NA	NA	NA	NA
## 7001	2010-01-14	NA	NA	NA	NA	NA
## 7002	2010-01-15	NA	NA	NA	NA	NA
## 7003	2010-01-16	NA	NA	NA	NA	NA
## 7004	2010-01-17	NA	NA	NA	NA	NA
## 7005	2010-01-18	NA	NA	NA	NA	NA
## 7006	2010-01-19	NA	NA	NA	NA	NA
## 7007	2010-01-20	NA	NA	NA	NA	NA
## 7008	2010-01-21	NA	NA	NA	NA	NA
## 7009	2010-01-22	NA	NA	NA	NA	NA
## 7010	2010-01-23	NA	NA	NA	NA	NA
## 7011	2010-01-24	NA	NA	NA	NA	NA
## 7012	2010-01-25	NA	NA	NA	NA	NA
## 7013	2010-01-26	NA	NA	NA	NA	NA
## 7014	2010-01-27	NA	NA	NA	NA	NA
## 7015	2010-01-28	NA	NA	NA	NA	NA
## 7016	2010-01-29	NA	NA	NA	NA	NA
## 7017	2010-01-30	NA	NA	NA	NA	NA
## 7018	2010-01-31	NA	NA	NA	NA	NA
## 7019	2010-02-01	NA	NA	NA	NA	NA
## 7020	2010-02-02	NA	NA	NA	NA	NA
## 7021	2010-02-03	NA	NA	NA	NA	NA
## 7022	2010-02-04	NA	NA	NA	NA	NA
## 7023	2010-02-05	NA	NA	NA	NA	NA
## 7024	2010-02-06	NA	NA	NA	NA	NA
## 7025	2010-02-07	NA	NA	NA	NA	NA
## 7026	2010-02-08	NA	NA	NA	NA	NA
## 7027	2010-02-09	NA	NA	NA	NA	NA
## 7028	2010-02-10	NA	NA	NA	NA	NA
## 7029	2010-02-11	NA	NA	NA	NA	NA
## 7030	2010-02-12	NA	NA	NA	NA	NA
## 7031	2010-02-13	NA	NA	NA	NA	NA
## 7032	2010-02-14	NA	NA	NA	NA	NA
## 7033	2010-02-15	NA	NA	NA	NA	NA
## 7034	2010-02-16	NA	NA	NA	NA	NA
## 7035	2010-02-17	NA	NA	NA	NA	NA
## 7036	2010-02-18	NA	NA	NA	NA	NA

##	7037	2010-02-19	NA	NA	NA	NA	NA
##	7038	2010-02-20	NA	NA	NA	NA	NA
##	7039	2010-02-21	NA	NA	NA	NA	NA
##	7040	2010-02-22	NA	NA	NA	NA	NA
##	7041	2010-02-23	NA	NA	NA	NA	NA
##	7042	2010-02-24	NA	NA	NA	NA	NA
##	7043	2010-02-25	NA	NA	NA	NA	NA
##	7044	2010-02-26	NA	NA	NA	NA	NA
##	7045	2010-02-27	NA	NA	NA	NA	NA
##	7046	2010-02-28	NA	NA	NA	NA	NA
##	7047	2010-03-01	NA	NA	NA	NA	NA
##	7048	2010-03-02	NA	NA	NA	NA	NA
##	7049	2010-03-03	NA	NA	NA	NA	NA
##	7050	2010-03-04	NA	NA	NA	NA	NA
##	7051	2010-03-05	NA	NA	NA	NA	NA
##	7052	2010-03-06	NA	NA	NA	NA	NA
##	7053	2010-03-07	NA	NA	NA	NA	NA
##	7054	2010-03-08	NA	NA	NA	NA	NA
##	7055	2010-03-09	NA	NA	NA	NA	NA
##	7056	2010-03-10	NA	NA	NA	NA	NA
##	7057	2010-03-11	NA	NA	NA	NA	NA
##	7058	2010-03-12	NA	NA	NA	NA	NA
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##	7060	2010-03-14	NA	NA	NA	NA	NA
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##	7062	2010-03-16	NA	NA	NA	NA	NA
##	7063	2010-03-17	NA	NA	NA	NA	NA
##	7064	2010-03-18	NA	NA	NA	NA	NA
##	7065	2010-03-19	NA	NA	NA	NA	NA
##	7066	2010-03-20	NA	NA	NA	NA	NA
##	7067	2010-03-21	NA	NA	NA	NA	NA
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##	7070	2010-03-24	NA	NA	NA	NA	NA
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##	7072	2010-03-26	NA	NA	NA	NA	NA
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##	7075	2010-03-29	NA	NA	NA	NA	NA
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##	7077	2010-03-31	NA	NA	NA	NA	NA
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##	7080	2010-04-03	NA	NA	NA	NA	NA
##	7081	2010-04-04	NA	NA	NA	NA	NA
##	7082	2010-04-05	NA	NA	NA	NA	NA
##	7083	2010-04-06	NA	NA	NA	NA	NA
##	7084	2010-04-07	NA	NA	NA	NA	NA
##	7085	2010-04-08	NA	NA	NA	NA	NA
##	7086	2010-04-09	NA	NA	NA	NA	NA
##	7087	2010-04-10	NA	NA	NA	NA	NA
##	7088	2010-04-11	NA	NA	NA	NA	NA
##	7089	2010-04-12	NA	NA	NA	NA	NA
##	7090	2010-04-13	NA	NA	NA	NA	NA

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##	7092	2010-04-15	NA	NA	NA	NA	NA
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##	7094	2010-04-17	NA	NA	NA	NA	NA
##	7095	2010-04-18	NA	NA	NA	NA	NA
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##	7097	2010-04-20	NA	NA	NA	NA	NA
##	7098	2010-04-21	NA	NA	NA	NA	NA
##	7099	2010-04-22	NA	NA	NA	NA	NA
##	7100	2010-04-23	NA	NA	NA	NA	NA
##	7101	2010-04-24	NA	NA	NA	NA	NA
##	7102	2010-04-25	NA	NA	NA	NA	NA
##	7103	2010-04-26	NA	NA	NA	NA	NA
##	7104	2010-04-27	NA	NA	NA	NA	NA
##	7105	2010-04-28	NA	NA	NA	NA	NA
##	7106	2010-04-29	NA	NA	NA	NA	NA
##	7107	2010-04-30	NA	NA	NA	NA	NA
##	7108	2010-05-01	NA	NA	NA	NA	NA
##	7109	2010-05-02	NA	NA	NA	NA	NA
##	7110	2010-05-03	NA	NA	NA	NA	NA
##	7111	2010-05-04	NA	NA	NA	NA	NA
##	7112	2010-05-05	NA	NA	NA	NA	NA
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##	7114	2010-05-07	NA	NA	NA	NA	NA
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##	7116	2010-05-09	NA	NA	NA	NA	NA
##	7117	2010-05-10	NA	NA	NA	NA	NA
##	7118	2010-05-11	NA	NA	NA	NA	NA
##	7119	2010-05-12	NA	NA	NA	NA	NA
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##	7121	2010-05-14	NA	NA	NA	NA	NA
##	7122	2010-05-15	NA	NA	NA	NA	NA
##	7123	2010-05-16	NA	NA	NA	NA	NA
##	7124	2010-05-17	NA	NA	NA	NA	NA
##	7125	2010-05-18	NA	NA	NA	NA	NA
##	7126	2010-05-19	NA	NA	NA	NA	NA
##	7127	2010-05-20	NA	NA	NA	NA	NA
##	7128	2010-05-21	NA	NA	NA	NA	NA
##	7129	2010-05-22	NA	NA	NA	NA	NA
##	7130	2010-05-23	NA	NA	NA	NA	NA
##	7131	2010-05-24	NA	NA	NA	NA	NA
##	7132	2010-05-25	NA	NA	NA	NA	NA
##	7133	2010-05-26	NA	NA	NA	NA	NA
##	7134	2010-05-27	NA	NA	NA	NA	NA
##	7135	2010-05-28	NA	NA	NA	NA	NA
##	7136	2010-05-29	NA	NA	NA	NA	NA
##	7137	2010-05-30	NA	NA	NA	NA	NA
##	7138	2010-05-31	NA	NA	NA	NA	NA
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##	7140	2010-06-02	NA	NA	NA	NA	NA
##	7141	2010-06-03	NA	NA	NA	NA	NA
##	7142	2010-06-04	NA	NA	NA	NA	NA
##	7143	2010-06-05	NA	NA	NA	NA	NA
##	7144	2010-06-06	NA	NA	NA	NA	NA

## 7145	2010-06-07	NA	NA	NA	NA	NA
## 7146	2010-06-08	NA	NA	NA	NA	NA
## 7147	2010-06-09	NA	NA	NA	NA	NA
## 7148	2010-06-10	NA	NA	NA	NA	NA
## 7149	2010-06-11	NA	NA	NA	NA	NA
## 7150	2010-06-12	NA	NA	NA	NA	NA
## 7151	2010-06-13	NA	NA	NA	NA	NA
## 7152	2010-06-14	NA	NA	NA	NA	NA
## 7153	2010-06-15	NA	NA	NA	NA	NA
## 7154	2010-06-16	NA	NA	NA	NA	NA
## 7155	2010-06-17	NA	NA	NA	NA	NA
## 7156	2010-06-18	NA	NA	NA	NA	NA
## 7157	2010-06-19	NA	NA	NA	NA	NA
## 7158	2010-06-20	NA	NA	NA	NA	NA
## 7159	2010-06-21	NA	NA	NA	NA	NA
## 7160	2010-06-22	NA	NA	NA	NA	NA
## 7161	2010-06-23	NA	NA	NA	NA	NA
## 7162	2010-06-24	NA	NA	NA	NA	NA
## 7163	2010-06-25	NA	NA	NA	NA	NA
## 7164	2010-06-26	NA	NA	NA	NA	NA
## 7165	2010-06-27	NA	NA	NA	NA	NA
## 7166	2010-06-28	NA	NA	NA	NA	NA
## 7167	2010-06-29	NA	NA	NA	NA	NA
## 7168	2010-06-30	NA	NA	NA	NA	NA
## 7169	2010-07-01	NA	NA	NA	NA	NA
## 7170	2010-07-02	NA	NA	NA	NA	NA
## 7171	2010-07-03	NA	NA	NA	NA	NA
## 7172	2010-07-04	NA	NA	NA	NA	NA
## 7173	2010-07-05	NA	NA	NA	NA	NA
## 7174	2010-07-06	NA	NA	NA	NA	NA
## 7175	2010-07-07	NA	NA	NA	NA	NA
## 7176	2010-07-08	NA	NA	NA	NA	NA
## 7177	2010-07-09	NA	NA	NA	NA	NA
## 7178	2010-07-10	NA	NA	NA	NA	NA
## 7179	2010-07-11	NA	NA	NA	NA	NA
## 7180	2010-07-12	NA	NA	NA	NA	NA
## 7181	2010-07-13	NA	NA	NA	NA	NA
## 7182	2010-07-14	NA	NA	NA	NA	NA
## 7183	2010-07-15	NA	NA	NA	NA	NA
## 7184	2010-07-16	NA	NA	NA	NA	NA
## 7185	2010-07-17	NA	NA	NA	NA	NA
## 7186	2010-07-18	NA	NA	NA	NA	NA
## 7187	2010-07-19	NA	NA	NA	NA	NA
## 7188	2010-07-20	NA	NA	NA	NA	NA
## 7189	2010-07-21	NA	NA	NA	NA	NA
## 7190	2010-07-22	NA	NA	NA	NA	NA
## 7191	2010-07-23	NA	NA	NA	NA	NA
## 7192	2010-07-24	NA	NA	NA	NA	NA
## 7193	2010-07-25	NA	NA	NA	NA	NA
## 7194	2010-07-26	NA	NA	NA	NA	NA
## 7195	2010-07-27	NA	NA	NA	NA	NA
## 7196	2010-07-28	NA	NA	NA	NA	NA
## 7197	2010-07-29	NA	NA	NA	NA	NA
## 7198	2010-07-30	NA	NA	NA	NA	NA

##	7199	2010-07-31	NA	NA	NA	NA	NA
##	7200	2010-08-01	NA	NA	NA	NA	NA
##	7201	2010-08-02	NA	NA	NA	NA	NA
##	7202	2010-08-03	NA	NA	NA	NA	NA
##	7203	2010-08-04	NA	NA	NA	NA	NA
##	7204	2010-08-05	NA	NA	NA	NA	NA
##	7205	2010-08-06	NA	NA	NA	NA	NA
##	7206	2010-08-07	NA	NA	NA	NA	NA
##	7207	2010-08-08	NA	NA	NA	NA	NA
##	7208	2010-08-09	NA	NA	NA	NA	NA
##	7209	2010-08-10	NA	NA	NA	NA	NA
##	7210	2010-08-11	NA	NA	NA	NA	NA
##	7211	2010-08-12	NA	NA	NA	NA	NA
##	7212	2010-08-13	NA	NA	NA	NA	NA
##	7213	2010-08-14	NA	NA	NA	NA	NA
##	7214	2010-08-15	NA	NA	NA	NA	NA
##	7215	2010-08-16	NA	NA	NA	NA	NA
##	7216	2010-08-17	NA	NA	NA	NA	NA
##	7217	2010-08-18	NA	NA	NA	NA	NA
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##	7219	2010-08-20	NA	NA	NA	NA	NA
##	7220	2010-08-21	NA	NA	NA	NA	NA
##	7221	2010-08-22	NA	NA	NA	NA	NA
##	7222	2010-08-23	NA	NA	NA	NA	NA
##	7223	2010-08-24	NA	NA	NA	NA	NA
##	7224	2010-08-25	NA	NA	NA	NA	NA
##	7225	2010-08-26	NA	NA	NA	NA	NA
##	7226	2010-08-27	NA	NA	NA	NA	NA
##	7227	2010-08-28	NA	NA	NA	NA	NA
##	7228	2010-08-29	NA	NA	NA	NA	NA
##	7229	2010-08-30	NA	NA	NA	NA	NA
##	7230	2010-08-31	NA	NA	NA	NA	NA
##	7231	2010-09-01	NA	NA	NA	NA	NA
##	7232	2010-09-02	NA	NA	NA	NA	NA
##	7233	2010-09-03	NA	NA	NA	NA	NA
##	7234	2010-09-04	NA	NA	NA	NA	NA
##	7235	2010-09-05	NA	NA	NA	NA	NA
##	7236	2010-09-06	NA	NA	NA	NA	NA
##	7237	2010-09-07	NA	NA	NA	NA	NA
##	7238	2010-09-08	NA	NA	NA	NA	NA
##	7239	2010-09-09	NA	NA	NA	NA	NA
##	7240	2010-09-10	NA	NA	NA	NA	NA
##	7241	2010-09-11	NA	NA	NA	NA	NA
##	7242	2010-09-12	NA	NA	NA	NA	NA
##	7243	2010-09-13	NA	NA	NA	NA	NA
##	7244	2010-09-14	NA	NA	NA	NA	NA
##	7245	2010-09-15	NA	NA	NA	NA	NA
##	7246	2010-09-16	NA	NA	NA	NA	NA
##	7247	2010-09-17	NA	NA	NA	NA	NA
##	7248	2010-09-18	NA	NA	NA	NA	NA
##	7249	2010-09-19	NA	NA	NA	NA	NA
##	7250	2010-09-20	NA	NA	NA	NA	NA
##	7251	2010-09-21	NA	NA	NA	NA	NA
##	7252	2010-09-22	NA	NA	NA	NA	NA

##	7253	2010-09-23	NA	NA	NA	NA	NA
##	7254	2010-09-24	NA	NA	NA	NA	NA
##	7255	2010-09-25	NA	NA	NA	NA	NA
##	7256	2010-09-26	NA	NA	NA	NA	NA
##	7257	2010-09-27	NA	NA	NA	NA	NA
##	7258	2010-09-28	NA	NA	NA	NA	NA
##	7259	2010-09-29	NA	NA	NA	NA	NA
##	7260	2010-09-30	NA	NA	NA	NA	NA
##	7261	2010-10-01	NA	NA	NA	NA	NA
##	7262	2010-10-02	NA	NA	NA	NA	NA
##	7263	2010-10-03	NA	NA	NA	NA	NA
##	7264	2010-10-04	NA	NA	NA	NA	NA
##	7265	2010-10-05	NA	NA	NA	NA	NA
##	7266	2010-10-06	NA	NA	NA	NA	NA
##	7267	2010-10-07	NA	NA	NA	NA	NA
##	7268	2010-10-08	NA	NA	NA	NA	NA
##	7269	2010-10-09	NA	NA	NA	NA	NA
##	7270	2010-10-10	NA	NA	NA	NA	NA
##	7271	2010-10-11	NA	NA	NA	NA	NA
##	7272	2010-10-12	NA	NA	NA	NA	NA
##	7273	2010-10-13	NA	NA	NA	NA	NA
##	7274	2010-10-14	NA	NA	NA	NA	NA
##	7275	2010-10-15	NA	NA	NA	NA	NA
##	7276	2010-10-16	NA	NA	NA	NA	NA
##	7277	2010-10-17	NA	NA	NA	NA	NA
##	7278	2010-10-18	NA	NA	NA	NA	NA
##	7279	2010-10-19	NA	NA	NA	NA	NA
##	7280	2010-10-20	NA	NA	NA	NA	NA
##	7281	2010-10-21	NA	NA	NA	NA	NA
##	7282	2010-10-22	NA	NA	NA	NA	NA
##	7283	2010-10-23	NA	NA	NA	NA	NA
##	7284	2010-10-24	NA	NA	NA	NA	NA
##	7285	2010-10-25	NA	NA	NA	NA	NA
##	7286	2010-10-26	NA	NA	NA	NA	NA
##	7287	2010-10-27	NA	NA	NA	NA	NA
##	7288	2010-10-28	NA	NA	NA	NA	NA
##	7289	2010-10-29	NA	NA	NA	NA	NA
##	7290	2010-10-30	NA	NA	NA	NA	NA
##	7291	2010-10-31	NA	NA	NA	NA	NA
##	7292	2010-11-01	NA	NA	NA	NA	NA
##	7293	2010-11-02	NA	NA	NA	NA	NA
##	7294	2010-11-03	NA	NA	NA	NA	NA
##	7295	2010-11-04	NA	NA	NA	NA	NA
##	7296	2010-11-05	NA	NA	NA	NA	NA
##	7297	2010-11-06	NA	NA	NA	NA	NA
##	7298	2010-11-07	NA	NA	NA	NA	NA
##	7299	2010-11-08	NA	NA	NA	NA	NA
##	7300	2010-11-09	NA	NA	NA	NA	NA
##	7301	2010-11-10	NA	NA	NA	NA	NA
##	7302	2010-11-11	NA	NA	NA	NA	NA
##	7303	2010-11-12	NA	NA	NA	NA	NA
##	7304	2010-11-13	NA	NA	NA	NA	NA
##	7305	2010-11-14	NA	NA	NA	NA	NA
##	7306	2010-11-15	NA	NA	NA	NA	NA

## 7307	2010-11-16	NA	NA	NA	NA	NA
## 7308	2010-11-17	NA	NA	NA	NA	NA
## 7309	2010-11-18	NA	NA	NA	NA	NA
## 7310	2010-11-19	NA	NA	NA	NA	NA
## 7311	2010-11-20	NA	NA	NA	NA	NA
## 7312	2010-11-21	NA	NA	NA	NA	NA
## 7313	2010-11-22	NA	NA	NA	NA	NA
## 7314	2010-11-23	NA	NA	NA	NA	NA
## 7315	2010-11-24	NA	NA	NA	NA	NA
## 7316	2010-11-25	NA	NA	NA	NA	NA
## 7317	2010-11-26	NA	NA	NA	NA	NA
## 7318	2010-11-27	NA	NA	NA	NA	NA
## 7319	2010-11-28	NA	NA	NA	NA	NA
## 7320	2010-11-29	NA	NA	NA	NA	NA
## 7321	2010-11-30	NA	NA	NA	NA	NA
## 7322	2010-12-01	NA	NA	NA	NA	NA
## 7323	2010-12-02	NA	NA	NA	NA	NA
## 7324	2010-12-03	NA	NA	NA	NA	NA
## 7325	2010-12-04	NA	NA	NA	NA	NA
## 7326	2010-12-05	NA	NA	NA	NA	NA
## 7327	2010-12-06	NA	NA	NA	NA	NA
## 7328	2010-12-07	NA	NA	NA	NA	NA
## 7329	2010-12-08	NA	NA	NA	NA	NA
## 7330	2010-12-09	NA	NA	NA	NA	NA
## 7331	2010-12-10	NA	NA	NA	NA	NA
## 7332	2010-12-11	NA	NA	NA	NA	NA
## 7333	2010-12-12	NA	NA	NA	NA	NA
## 7334	2010-12-13	NA	NA	NA	NA	NA
## 7335	2010-12-14	NA	NA	NA	NA	NA
## 7336	2010-12-15	NA	NA	NA	NA	NA
## 7337	2010-12-16	NA	NA	NA	NA	NA
## 7338	2010-12-17	NA	NA	NA	NA	NA
## 7339	2010-12-18	NA	NA	NA	NA	NA
## 7340	2010-12-19	NA	NA	NA	NA	NA
## 7341	2010-12-20	NA	NA	NA	NA	NA
## 7342	2010-12-21	NA	NA	NA	NA	NA
## 7343	2010-12-22	NA	NA	NA	NA	NA
## 7344	2010-12-23	NA	NA	NA	NA	NA
## 7345	2010-12-24	NA	NA	NA	NA	NA
## 7346	2010-12-25	NA	NA	NA	NA	NA
## 7347	2010-12-26	NA	NA	NA	NA	NA
## 7348	2010-12-27	NA	NA	NA	NA	NA
## 7349	2010-12-28	NA	NA	NA	NA	NA
## 7350	2010-12-29	NA	NA	NA	NA	NA
## 7351	2010-12-30	NA	NA	NA	NA	NA
## 7352	2010-12-31	NA	NA	NA	NA	NA
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## 7354	2011-01-02	NA	NA	NA	NA	NA
## 7355	2011-01-03	NA	NA	NA	NA	NA
## 7356	2011-01-04	NA	NA	NA	NA	NA
## 7357	2011-01-05	NA	NA	NA	NA	NA
## 7358	2011-01-06	NA	NA	NA	NA	NA
## 7359	2011-01-07	NA	NA	NA	NA	NA
## 7360	2011-01-08	NA	NA	NA	NA	NA

## 7361	2011-01-09	NA	NA	NA	NA	NA
## 7362	2011-01-10	NA	NA	NA	NA	NA
## 7363	2011-01-11	NA	NA	NA	NA	NA
## 7364	2011-01-12	NA	NA	NA	NA	NA
## 7365	2011-01-13	NA	NA	NA	NA	NA
## 7366	2011-01-14	NA	NA	NA	NA	NA
## 7367	2011-01-15	NA	NA	NA	NA	NA
## 7368	2011-01-16	NA	NA	NA	NA	NA
## 7369	2011-01-17	NA	NA	NA	NA	NA
## 7370	2011-01-18	NA	NA	NA	NA	NA
## 7371	2011-01-19	NA	NA	NA	NA	NA
## 7372	2011-01-20	NA	NA	NA	NA	NA
## 7373	2011-01-21	NA	NA	NA	NA	NA
## 7374	2011-01-22	NA	NA	NA	NA	NA
## 7375	2011-01-23	NA	NA	NA	NA	NA
## 7376	2011-01-24	NA	NA	NA	NA	NA
## 7377	2011-01-25	NA	NA	NA	NA	NA
## 7378	2011-01-26	NA	NA	NA	NA	NA
## 7379	2011-01-27	NA	NA	NA	NA	NA
## 7380	2011-01-28	NA	NA	NA	NA	NA
## 7381	2011-01-29	NA	NA	NA	NA	NA
## 7382	2011-01-30	NA	NA	NA	NA	NA
## 7383	2011-01-31	NA	NA	NA	NA	NA
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## 7385	2011-02-02	NA	NA	NA	NA	NA
## 7386	2011-02-03	NA	NA	NA	NA	NA
## 7387	2011-02-04	NA	NA	NA	NA	NA
## 7388	2011-02-05	NA	NA	NA	NA	NA
## 7389	2011-02-06	NA	NA	NA	NA	NA
## 7390	2011-02-07	NA	NA	NA	NA	NA
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## 7393	2011-02-10	NA	NA	NA	NA	NA
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## 7395	2011-02-12	NA	NA	NA	NA	NA
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## 7406	2011-02-23	NA	NA	NA	NA	NA
## 7407	2011-02-24	NA	NA	NA	NA	NA
## 7408	2011-02-25	NA	NA	NA	NA	NA
## 7409	2011-02-26	NA	NA	NA	NA	NA
## 7410	2011-02-27	NA	NA	NA	NA	NA
## 7411	2011-02-28	NA	NA	NA	NA	NA
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## 7413	2011-03-02	NA	NA	NA	NA	NA
## 7414	2011-03-03	NA	NA	NA	NA	NA

##	7415	2011-03-04	NA	NA	NA	NA	NA
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##	7417	2011-03-06	NA	NA	NA	NA	NA
##	7418	2011-03-07	NA	NA	NA	NA	NA
##	7419	2011-03-08	NA	NA	NA	NA	NA
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##	7423	2011-03-12	NA	NA	NA	NA	NA
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##	7426	2011-03-15	NA	NA	NA	NA	NA
##	7427	2011-03-16	NA	NA	NA	NA	NA
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##	7430	2011-03-19	NA	NA	NA	NA	NA
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##	7459	2011-04-17	NA	NA	NA	NA	NA
##	7460	2011-04-18	NA	NA	NA	NA	NA
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##	7465	2011-04-23	NA	NA	NA	NA	NA
##	7466	2011-04-24	NA	NA	NA	NA	NA
##	7467	2011-04-25	NA	NA	NA	NA	NA
##	7468	2011-04-26	NA	NA	NA	NA	NA

## 7469	2011-04-27	NA	NA	NA	NA	NA
## 7470	2011-04-28	NA	NA	NA	NA	NA
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## 7472	2011-04-30	NA	NA	NA	NA	NA
## 7473	2011-05-01	NA	NA	NA	NA	NA
## 7474	2011-05-02	NA	NA	NA	NA	NA
## 7475	2011-05-03	NA	NA	NA	NA	NA
## 7476	2011-05-04	NA	NA	NA	NA	NA
## 7477	2011-05-05	NA	NA	NA	NA	NA
## 7478	2011-05-06	NA	NA	NA	NA	NA
## 7479	2011-05-07	NA	NA	NA	NA	NA
## 7480	2011-05-08	NA	NA	NA	NA	NA
## 7481	2011-05-09	NA	NA	NA	NA	NA
## 7482	2011-05-10	NA	NA	NA	NA	NA
## 7483	2011-05-11	NA	NA	NA	NA	NA
## 7484	2011-05-12	NA	NA	NA	NA	NA
## 7485	2011-05-13	NA	NA	NA	NA	NA
## 7486	2011-05-14	NA	NA	NA	NA	NA
## 7487	2011-05-15	NA	NA	NA	NA	NA
## 7488	2011-05-16	NA	NA	NA	NA	NA
## 7489	2011-05-17	NA	NA	NA	NA	NA
## 7490	2011-05-18	NA	NA	NA	NA	NA
## 7491	2011-05-19	NA	NA	NA	NA	NA
## 7492	2011-05-20	NA	NA	NA	NA	NA
## 7493	2011-05-21	NA	NA	NA	NA	NA
## 7494	2011-05-22	NA	NA	NA	NA	NA
## 7495	2011-05-23	NA	NA	NA	NA	NA
## 7496	2011-05-24	NA	NA	NA	NA	NA
## 7497	2011-05-25	NA	NA	NA	NA	NA
## 7498	2011-05-26	NA	NA	NA	NA	NA
## 7499	2011-05-27	NA	NA	NA	NA	NA
## 7500	2011-05-28	NA	NA	NA	NA	NA
## 7501	2011-05-29	NA	NA	NA	NA	NA
## 7502	2011-05-30	NA	NA	NA	NA	NA
## 7503	2011-05-31	NA	NA	NA	NA	NA
## 7504	2011-06-01	NA	NA	NA	NA	NA
## 7505	2011-06-02	NA	NA	NA	NA	NA
## 7506	2011-06-03	NA	NA	NA	NA	NA
## 7507	2011-06-04	NA	NA	NA	NA	NA
## 7508	2011-06-05	NA	NA	NA	NA	NA
## 7509	2011-06-06	NA	NA	NA	NA	NA
## 7510	2011-06-07	NA	NA	NA	NA	NA
## 7511	2011-06-08	NA	NA	NA	NA	NA
## 7512	2011-06-09	NA	NA	NA	NA	NA
## 7513	2011-06-10	NA	NA	NA	NA	NA
## 7514	2011-06-11	NA	NA	NA	NA	NA
## 7515	2011-06-12	NA	NA	NA	NA	NA
## 7516	2011-06-13	NA	NA	NA	NA	NA
## 7517	2011-06-14	NA	NA	NA	NA	NA
## 7518	2011-06-15	NA	NA	NA	NA	NA
## 7519	2011-06-16	NA	NA	NA	NA	NA
## 7520	2011-06-17	NA	NA	NA	NA	NA
## 7521	2011-06-18	NA	NA	NA	NA	NA
## 7522	2011-06-19	NA	NA	NA	NA	NA

## 7523	2011-06-20	NA	NA	NA	NA	NA
## 7524	2011-06-21	NA	NA	NA	NA	NA
## 7525	2011-06-22	NA	NA	NA	NA	NA
## 7526	2011-06-23	NA	NA	NA	NA	NA
## 7527	2011-06-24	NA	NA	NA	NA	NA
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## 7532	2011-06-29	NA	NA	NA	NA	NA
## 7533	2011-06-30	NA	NA	NA	NA	NA
## 7534	2011-07-01	NA	NA	NA	NA	NA
## 7535	2011-07-02	NA	NA	NA	NA	NA
## 7536	2011-07-03	NA	NA	NA	NA	NA
## 7537	2011-07-04	NA	NA	NA	NA	NA
## 7538	2011-07-05	NA	NA	NA	NA	NA
## 7539	2011-07-06	NA	NA	NA	NA	NA
## 7540	2011-07-07	NA	NA	NA	NA	NA
## 7541	2011-07-08	NA	NA	NA	NA	NA
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## 7543	2011-07-10	NA	NA	NA	NA	NA
## 7544	2011-07-11	NA	NA	NA	NA	NA
## 7545	2011-07-12	NA	NA	NA	NA	NA
## 7546	2011-07-13	NA	NA	NA	NA	NA
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## 7548	2011-07-15	NA	NA	NA	NA	NA
## 7549	2011-07-16	NA	NA	NA	NA	NA
## 7550	2011-07-17	NA	NA	NA	NA	NA
## 7551	2011-07-18	NA	NA	NA	NA	NA
## 7552	2011-07-19	NA	NA	NA	NA	NA
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## 7554	2011-07-21	NA	NA	NA	NA	NA
## 7555	2011-07-22	NA	NA	NA	NA	NA
## 7556	2011-07-23	NA	NA	NA	NA	NA
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## 7559	2011-07-26	NA	NA	NA	NA	NA
## 7560	2011-07-27	NA	NA	NA	NA	NA
## 7561	2011-07-28	NA	NA	NA	NA	NA
## 7562	2011-07-29	NA	NA	NA	NA	NA
## 7563	2011-07-30	NA	NA	NA	NA	NA
## 7564	2011-07-31	NA	NA	NA	NA	NA
## 7565	2011-08-01	NA	NA	NA	NA	NA
## 7566	2011-08-02	NA	NA	NA	NA	NA
## 7567	2011-08-03	NA	NA	NA	NA	NA
## 7568	2011-08-04	NA	NA	NA	NA	NA
## 7569	2011-08-05	NA	NA	NA	NA	NA
## 7570	2011-08-06	NA	NA	NA	NA	NA
## 7571	2011-08-07	NA	NA	NA	NA	NA
## 7572	2011-08-08	NA	NA	NA	NA	NA
## 7573	2011-08-09	NA	NA	NA	NA	NA
## 7574	2011-08-10	NA	NA	NA	NA	NA
## 7575	2011-08-11	NA	NA	NA	NA	NA
## 7576	2011-08-12	NA	NA	NA	NA	NA

## 7577	2011-08-13	NA	NA	NA	NA	NA
## 7578	2011-08-14	NA	NA	NA	NA	NA
## 7579	2011-08-15	NA	NA	NA	NA	NA
## 7580	2011-08-16	NA	NA	NA	NA	NA
## 7581	2011-08-17	NA	NA	NA	NA	NA
## 7582	2011-08-18	NA	NA	NA	NA	NA
## 7583	2011-08-19	NA	NA	NA	NA	NA
## 7584	2011-08-20	NA	NA	NA	NA	NA
## 7585	2011-08-21	NA	NA	NA	NA	NA
## 7586	2011-08-22	NA	NA	NA	NA	NA
## 7587	2011-08-23	NA	NA	NA	NA	NA
## 7588	2011-08-24	NA	NA	NA	NA	NA
## 7589	2011-08-25	NA	NA	NA	NA	NA
## 7590	2011-08-26	NA	NA	NA	NA	NA
## 7591	2011-08-27	NA	NA	NA	NA	NA
## 7592	2011-08-28	NA	NA	NA	NA	NA
## 7593	2011-08-29	NA	NA	NA	NA	NA
## 7594	2011-08-30	NA	NA	NA	NA	NA
## 7595	2011-08-31	NA	NA	NA	NA	NA
## 7596	2011-09-01	NA	NA	NA	NA	NA
## 7597	2011-09-02	NA	NA	NA	NA	NA
## 7598	2011-09-03	NA	NA	NA	NA	NA
## 7599	2011-09-04	NA	NA	NA	NA	NA
## 7600	2011-09-05	NA	NA	NA	NA	NA
## 7601	2011-09-06	NA	NA	NA	NA	NA
## 7602	2011-09-07	NA	NA	NA	NA	NA
## 7603	2011-09-08	NA	NA	NA	NA	NA
## 7604	2011-09-09	NA	NA	NA	NA	NA
## 7605	2011-09-10	NA	NA	NA	NA	NA
## 7606	2011-09-11	NA	NA	NA	NA	NA
## 7607	2011-09-12	NA	NA	NA	NA	NA
## 7608	2011-09-13	NA	NA	NA	NA	NA
## 7609	2011-09-14	NA	NA	NA	NA	NA
## 7610	2011-09-15	NA	NA	NA	NA	NA
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## 7614	2011-09-19	NA	NA	NA	NA	NA
## 7615	2011-09-20	NA	NA	NA	NA	NA
## 7616	2011-09-21	NA	NA	NA	NA	NA
## 7617	2011-09-22	NA	NA	NA	NA	NA
## 7618	2011-09-23	NA	NA	NA	NA	NA
## 7619	2011-09-24	NA	NA	NA	NA	NA
## 7620	2011-09-25	NA	NA	NA	NA	NA
## 7621	2011-09-26	NA	NA	NA	NA	NA
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## 7623	2011-09-28	NA	NA	NA	NA	NA
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## 7625	2011-09-30	NA	NA	NA	NA	NA
## 7626	2011-10-01	NA	NA	NA	NA	NA
## 7627	2011-10-02	NA	NA	NA	NA	NA
## 7628	2011-10-03	NA	NA	NA	NA	NA
## 7629	2011-10-04	NA	NA	NA	NA	NA
## 7630	2011-10-05	NA	NA	NA	NA	NA

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##	7634	2011-10-09	NA	NA	NA	NA	NA
##	7635	2011-10-10	NA	NA	NA	NA	NA
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##	7637	2011-10-12	NA	NA	NA	NA	NA
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##	7651	2011-10-26	NA	NA	NA	NA	NA
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##	7656	2011-10-31	NA	NA	NA	NA	NA
##	7657	2011-11-01	NA	NA	NA	NA	NA
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##	7659	2011-11-03	NA	NA	NA	NA	NA
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##	7667	2011-11-11	NA	NA	NA	NA	NA
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##	7675	2011-11-19	NA	NA	NA	NA	NA
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##	7677	2011-11-21	NA	NA	NA	NA	NA
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##	7680	2011-11-24	NA	NA	NA	NA	NA
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##	7683	2011-11-27	NA	NA	NA	NA	NA
##	7684	2011-11-28	NA	NA	NA	NA	NA

##	7685	2011-11-29	NA	NA	NA	NA	NA
##	7686	2011-11-30	NA	NA	NA	NA	NA
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##	7688	2011-12-02	NA	NA	NA	NA	NA
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##	7696	2011-12-10	NA	NA	NA	NA	NA
##	7697	2011-12-11	NA	NA	NA	NA	NA
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##	7699	2011-12-13	NA	NA	NA	NA	NA
##	7700	2011-12-14	NA	NA	NA	NA	NA
##	7701	2011-12-15	NA	NA	NA	NA	NA
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##	7703	2011-12-17	NA	NA	NA	NA	NA
##	7704	2011-12-18	NA	NA	NA	NA	NA
##	7705	2011-12-19	NA	NA	NA	NA	NA
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##	7711	2011-12-25	NA	NA	NA	NA	NA
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##	7714	2011-12-28	NA	NA	NA	NA	NA
##	7715	2011-12-29	NA	NA	NA	NA	NA
##	7716	2011-12-30	NA	NA	NA	NA	NA
##	7717	2011-12-31	NA	NA	NA	NA	NA
##	7718	2012-01-01	NA	NA	NA	NA	NA
##	7719	2012-01-02	NA	NA	NA	NA	NA
##	7720	2012-01-03	NA	NA	NA	NA	NA
##	7721	2012-01-04	NA	NA	NA	NA	NA
##	7722	2012-01-05	NA	NA	NA	NA	NA
##	7723	2012-01-06	NA	NA	NA	NA	NA
##	7724	2012-01-07	NA	NA	NA	NA	NA
##	7725	2012-01-08	NA	NA	NA	NA	NA
##	7726	2012-01-09	NA	NA	NA	NA	NA
##	7727	2012-01-10	NA	NA	NA	NA	NA
##	7728	2012-01-11	NA	NA	NA	NA	NA
##	7729	2012-01-12	NA	NA	NA	NA	NA
##	7730	2012-01-13	NA	NA	NA	NA	NA
##	7731	2012-01-14	NA	NA	NA	NA	NA
##	7732	2012-01-15	NA	NA	NA	NA	NA
##	7733	2012-01-16	NA	NA	NA	NA	NA
##	7734	2012-01-17	NA	NA	NA	NA	NA
##	7735	2012-01-18	NA	NA	NA	NA	NA
##	7736	2012-01-19	NA	NA	NA	NA	NA
##	7737	2012-01-20	NA	NA	NA	NA	NA
##	7738	2012-01-21	NA	NA	NA	NA	NA

## 7739	2012-01-22	NA	NA	NA	NA	NA
## 7740	2012-01-23	NA	NA	NA	NA	NA
## 7741	2012-01-24	NA	NA	NA	NA	NA
## 7742	2012-01-25	NA	NA	NA	NA	NA
## 7743	2012-01-26	NA	NA	NA	NA	NA
## 7744	2012-01-27	NA	NA	NA	NA	NA
## 7745	2012-01-28	NA	NA	NA	NA	NA
## 7746	2012-01-29	NA	NA	NA	NA	NA
## 7747	2012-01-30	NA	NA	NA	NA	NA
## 7748	2012-01-31	NA	NA	NA	NA	NA
## 7749	2012-02-01	NA	NA	NA	NA	NA
## 7750	2012-02-02	NA	NA	NA	NA	NA
## 7751	2012-02-03	NA	NA	NA	NA	NA
## 7752	2012-02-04	NA	NA	NA	NA	NA
## 7753	2012-02-05	NA	NA	NA	NA	NA
## 7754	2012-02-06	NA	NA	NA	NA	NA
## 7755	2012-02-07	NA	NA	NA	NA	NA
## 7756	2012-02-08	NA	NA	NA	NA	NA
## 7757	2012-02-09	NA	NA	NA	NA	NA
## 7758	2012-02-10	NA	NA	NA	NA	NA
## 7759	2012-02-11	NA	NA	NA	NA	NA
## 7760	2012-02-12	NA	NA	NA	NA	NA
## 7761	2012-02-13	NA	NA	NA	NA	NA
## 7762	2012-02-14	NA	NA	NA	NA	NA
## 7763	2012-02-15	NA	NA	NA	NA	NA
## 7764	2012-02-16	NA	NA	NA	NA	NA
## 7765	2012-02-17	NA	NA	NA	NA	NA
## 7766	2012-02-18	NA	NA	NA	NA	NA
## 7767	2012-02-19	NA	NA	NA	NA	NA
## 7768	2012-02-20	NA	NA	NA	NA	NA
## 7769	2012-02-21	NA	NA	NA	NA	NA
## 7770	2012-02-22	NA	NA	NA	NA	NA
## 7771	2012-02-23	NA	NA	NA	NA	NA
## 7772	2012-02-24	NA	NA	NA	NA	NA
## 7773	2012-02-25	NA	NA	NA	NA	NA
## 7774	2012-02-26	NA	NA	NA	NA	NA
## 7775	2012-02-27	NA	NA	NA	NA	NA
## 7776	2012-02-28	NA	NA	NA	NA	NA
## 7777	2012-02-29	NA	NA	NA	NA	NA
## 7778	2012-03-01	NA	NA	NA	NA	NA
## 7779	2012-03-02	NA	NA	NA	NA	NA
## 7780	2012-03-03	NA	NA	NA	NA	NA
## 7781	2012-03-04	NA	NA	NA	NA	NA
## 7782	2012-03-05	NA	NA	NA	NA	NA
## 7783	2012-03-06	NA	NA	NA	NA	NA
## 7784	2012-03-07	NA	NA	NA	NA	NA
## 7785	2012-03-08	NA	NA	NA	NA	NA
## 7786	2012-03-09	NA	NA	NA	NA	NA
## 7787	2012-03-10	NA	NA	NA	NA	NA
## 7788	2012-03-11	NA	NA	NA	NA	NA
## 7789	2012-03-12	NA	NA	NA	NA	NA
## 7790	2012-03-13	NA	NA	NA	NA	NA
## 7791	2012-03-14	NA	NA	NA	NA	NA
## 7792	2012-03-15	NA	NA	NA	NA	NA

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##	7794	2012-03-17	NA	NA	NA	NA	NA
##	7795	2012-03-18	NA	NA	NA	NA	NA
##	7796	2012-03-19	NA	NA	NA	NA	NA
##	7797	2012-03-20	NA	NA	NA	NA	NA
##	7798	2012-03-21	NA	NA	NA	NA	NA
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##	7800	2012-03-23	NA	NA	NA	NA	NA
##	7801	2012-03-24	NA	NA	NA	NA	NA
##	7802	2012-03-25	NA	NA	NA	NA	NA
##	7803	2012-03-26	NA	NA	NA	NA	NA
##	7804	2012-03-27	NA	NA	NA	NA	NA
##	7805	2012-03-28	NA	NA	NA	NA	NA
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##	7811	2012-04-03	NA	NA	NA	NA	NA
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##	7815	2012-04-07	NA	NA	NA	NA	NA
##	7816	2012-04-08	NA	NA	NA	NA	NA
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##	7818	2012-04-10	NA	NA	NA	NA	NA
##	7819	2012-04-11	NA	NA	NA	NA	NA
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##	7840	2012-05-02	NA	NA	NA	NA	NA
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##	7843	2012-05-05	NA	NA	NA	NA	NA
##	7844	2012-05-06	NA	NA	NA	NA	NA
##	7845	2012-05-07	NA	NA	NA	NA	NA
##	7846	2012-05-08	NA	NA	NA	NA	NA

## 7847	2012-05-09	NA	NA	NA	NA	NA
## 7848	2012-05-10	NA	NA	NA	NA	NA
## 7849	2012-05-11	NA	NA	NA	NA	NA
## 7850	2012-05-12	NA	NA	NA	NA	NA
## 7851	2012-05-13	NA	NA	NA	NA	NA
## 7852	2012-05-14	NA	NA	NA	NA	NA
## 7853	2012-05-15	NA	NA	NA	NA	NA
## 7854	2012-05-16	NA	NA	NA	NA	NA
## 7855	2012-05-17	NA	NA	NA	NA	NA
## 7856	2012-05-18	NA	NA	NA	NA	NA
## 7857	2012-05-19	NA	NA	NA	NA	NA
## 7858	2012-05-20	NA	NA	NA	NA	NA
## 7859	2012-05-21	NA	NA	NA	NA	NA
## 7860	2012-05-22	NA	NA	NA	NA	NA
## 7861	2012-05-23	NA	NA	NA	NA	NA
## 7862	2012-05-24	NA	NA	NA	NA	NA
## 7863	2012-05-25	NA	NA	NA	NA	NA
## 7864	2012-05-26	NA	NA	NA	NA	NA
## 7865	2012-05-27	NA	NA	NA	NA	NA
## 7866	2012-05-28	NA	NA	NA	NA	NA
## 7867	2012-05-29	NA	NA	NA	NA	NA
## 7868	2012-05-30	NA	NA	NA	NA	NA
## 7869	2012-05-31	NA	NA	NA	NA	NA
## 7870	2012-06-01	NA	NA	NA	NA	NA
## 7871	2012-06-02	NA	NA	NA	NA	NA
## 7872	2012-06-03	NA	NA	NA	NA	NA
## 7873	2012-06-04	NA	NA	NA	NA	NA
## 7874	2012-06-05	NA	NA	NA	NA	NA
## 7875	2012-06-06	NA	NA	NA	NA	NA
## 7876	2012-06-07	NA	NA	NA	NA	NA
## 7877	2012-06-08	NA	NA	NA	NA	NA
## 7878	2012-06-09	NA	NA	NA	NA	NA
## 7879	2012-06-10	NA	NA	NA	NA	NA
## 7880	2012-06-11	NA	NA	NA	NA	NA
## 7881	2012-06-12	NA	NA	NA	NA	NA
## 7882	2012-06-13	NA	NA	NA	NA	NA
## 7883	2012-06-14	NA	NA	NA	NA	NA
## 7884	2012-06-15	NA	NA	NA	NA	NA
## 7885	2012-06-16	NA	NA	NA	NA	NA
## 7886	2012-06-17	NA	NA	NA	NA	NA
## 7887	2012-06-18	NA	NA	NA	NA	NA
## 7888	2012-06-19	NA	NA	NA	NA	NA
## 7889	2012-06-20	NA	NA	NA	NA	NA
## 7890	2012-06-21	NA	NA	NA	NA	NA
## 7891	2012-06-22	NA	NA	NA	NA	NA
## 7892	2012-06-23	NA	NA	NA	NA	NA
## 7893	2012-06-24	NA	NA	NA	NA	NA
## 7894	2012-06-25	NA	NA	NA	NA	NA
## 7895	2012-06-26	NA	NA	NA	NA	NA
## 7896	2012-06-27	NA	NA	NA	NA	NA
## 7897	2012-06-28	NA	NA	NA	NA	NA
## 7898	2012-06-29	NA	NA	NA	NA	NA
## 7899	2012-06-30	NA	NA	NA	NA	NA
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##	7908	2012-07-09	NA	NA	NA	NA	NA
##	7909	2012-07-10	NA	NA	NA	NA	NA
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##	7912	2012-07-13	NA	NA	NA	NA	NA
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##	7916	2012-07-17	NA	NA	NA	NA	NA
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##	7918	2012-07-19	NA	NA	NA	NA	NA
##	7919	2012-07-20	NA	NA	NA	NA	NA
##	7920	2012-07-21	NA	NA	NA	NA	NA
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##	7933	2012-08-03	NA	NA	NA	NA	NA
##	7934	2012-08-04	NA	NA	NA	NA	NA
##	7935	2012-08-05	NA	NA	NA	NA	NA
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##	7945	2012-08-15	NA	NA	NA	NA	NA
##	7946	2012-08-16	NA	NA	NA	NA	NA
##	7947	2012-08-17	NA	NA	NA	NA	NA
##	7948	2012-08-18	NA	NA	NA	NA	NA
##	7949	2012-08-19	NA	NA	NA	NA	NA
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##	7951	2012-08-21	NA	NA	NA	NA	NA
##	7952	2012-08-22	NA	NA	NA	NA	NA
##	7953	2012-08-23	NA	NA	NA	NA	NA
##	7954	2012-08-24	NA	NA	NA	NA	NA

## 7955	2012-08-25	NA	NA	NA	NA	NA
## 7956	2012-08-26	NA	NA	NA	NA	NA
## 7957	2012-08-27	NA	NA	NA	NA	NA
## 7958	2012-08-28	NA	NA	NA	NA	NA
## 7959	2012-08-29	NA	NA	NA	NA	NA
## 7960	2012-08-30	NA	NA	NA	NA	NA
## 7961	2012-08-31	NA	NA	NA	NA	NA
## 7962	2012-09-01	NA	NA	NA	NA	NA
## 7963	2012-09-02	NA	NA	NA	NA	NA
## 7964	2012-09-03	NA	NA	NA	NA	NA
## 7965	2012-09-04	NA	NA	NA	NA	NA
## 7966	2012-09-05	NA	NA	NA	NA	NA
## 7967	2012-09-06	NA	NA	NA	NA	NA
## 7968	2012-09-07	NA	NA	NA	NA	NA
## 7969	2012-09-08	NA	NA	NA	NA	NA
## 7970	2012-09-09	NA	NA	NA	NA	NA
## 7971	2012-09-10	NA	NA	NA	NA	NA
## 7972	2012-09-11	NA	NA	NA	NA	NA
## 7973	2012-09-12	NA	NA	NA	NA	NA
## 7974	2012-09-13	NA	NA	NA	NA	NA
## 7975	2012-09-14	NA	NA	NA	NA	NA
## 7976	2012-09-15	NA	NA	NA	NA	NA
## 7977	2012-09-16	NA	NA	NA	NA	NA
## 7978	2012-09-17	NA	NA	NA	NA	NA
## 7979	2012-09-18	NA	NA	NA	NA	NA
## 7980	2012-09-19	NA	NA	NA	NA	NA
## 7981	2012-09-20	NA	NA	NA	NA	NA
## 7982	2012-09-21	NA	NA	NA	NA	NA
## 7983	2012-09-22	NA	NA	NA	NA	NA
## 7984	2012-09-23	NA	NA	NA	NA	NA
## 7985	2012-09-24	NA	NA	NA	NA	NA
## 7986	2012-09-25	NA	NA	NA	NA	NA
## 7987	2012-09-26	NA	NA	NA	NA	NA
## 7988	2012-09-27	NA	NA	NA	NA	NA
## 7989	2012-09-28	NA	NA	NA	NA	NA
## 7990	2012-09-29	NA	NA	NA	NA	NA
## 7991	2012-09-30	NA	NA	NA	NA	NA
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## 7993	2012-10-02	NA	NA	NA	NA	NA
## 7994	2012-10-03	NA	NA	NA	NA	NA
## 7995	2012-10-04	NA	NA	NA	NA	NA
## 7996	2012-10-05	NA	NA	NA	NA	NA
## 7997	2012-10-06	NA	NA	NA	NA	NA
## 7998	2012-10-07	NA	NA	NA	NA	NA
## 7999	2012-10-08	NA	NA	NA	NA	NA
## 8000	2012-10-09	NA	NA	NA	NA	NA
## 8001	2012-10-10	NA	NA	NA	NA	NA
## 8002	2012-10-11	NA	NA	NA	NA	NA
## 8003	2012-10-12	NA	NA	NA	NA	NA
## 8004	2012-10-13	NA	NA	NA	NA	NA
## 8005	2012-10-14	NA	NA	NA	NA	NA
## 8006	2012-10-15	NA	NA	NA	NA	NA
## 8007	2012-10-16	NA	NA	NA	NA	NA
## 8008	2012-10-17	NA	NA	NA	NA	NA

## 8009	2012-10-18	NA	NA	NA	NA	NA
## 8010	2012-10-19	NA	NA	NA	NA	NA
## 8011	2012-10-20	NA	NA	NA	NA	NA
## 8012	2012-10-21	NA	NA	NA	NA	NA
## 8013	2012-10-22	NA	NA	NA	NA	NA
## 8014	2012-10-23	NA	NA	NA	NA	NA
## 8015	2012-10-24	NA	NA	NA	NA	NA
## 8016	2012-10-25	NA	NA	NA	NA	NA
## 8017	2012-10-26	NA	NA	NA	NA	NA
## 8018	2012-10-27	NA	NA	NA	NA	NA
## 8019	2012-10-28	NA	NA	NA	NA	NA
## 8020	2012-10-29	NA	NA	NA	NA	NA
## 8021	2012-10-30	NA	NA	NA	NA	NA
## 8022	2012-10-31	NA	NA	NA	NA	NA
## 8023	2012-11-01	NA	NA	NA	NA	NA
## 8024	2012-11-02	NA	NA	NA	NA	NA
## 8025	2012-11-03	NA	NA	NA	NA	NA
## 8026	2012-11-04	NA	NA	NA	NA	NA
## 8027	2012-11-05	NA	NA	NA	NA	NA
## 8028	2012-11-06	NA	NA	NA	NA	NA
## 8029	2012-11-07	NA	NA	NA	NA	NA
## 8030	2012-11-08	NA	NA	NA	NA	NA
## 8031	2012-11-09	NA	NA	NA	NA	NA
## 8032	2012-11-10	NA	NA	NA	NA	NA
## 8033	2012-11-11	NA	NA	NA	NA	NA
## 8034	2012-11-12	NA	NA	NA	NA	NA
## 8035	2012-11-13	NA	NA	NA	NA	NA
## 8036	2012-11-14	NA	NA	NA	NA	NA
## 8037	2012-11-15	NA	NA	NA	NA	NA
## 8038	2012-11-16	NA	NA	NA	NA	NA
## 8039	2012-11-17	NA	NA	NA	NA	NA
## 8040	2012-11-18	NA	NA	NA	NA	NA
## 8041	2012-11-19	NA	NA	NA	NA	NA
## 8042	2012-11-20	NA	NA	NA	NA	NA
## 8043	2012-11-21	NA	NA	NA	NA	NA
## 8044	2012-11-22	NA	NA	NA	NA	NA
## 8045	2012-11-23	NA	NA	NA	NA	NA
## 8046	2012-11-24	NA	NA	NA	NA	NA
## 8047	2012-11-25	NA	NA	NA	NA	NA
## 8048	2012-11-26	NA	NA	NA	NA	NA
## 8049	2012-11-27	NA	NA	NA	NA	NA
## 8050	2012-11-28	NA	NA	NA	NA	NA
## 8051	2012-11-29	NA	NA	NA	NA	NA
## 8052	2012-11-30	NA	NA	NA	NA	NA
## 8053	2012-12-01	NA	NA	NA	NA	NA
## 8054	2012-12-02	NA	NA	NA	NA	NA
## 8055	2012-12-03	NA	NA	NA	NA	NA
## 8056	2012-12-04	NA	NA	NA	NA	NA
## 8057	2012-12-05	NA	NA	NA	NA	NA
## 8058	2012-12-06	NA	NA	NA	NA	NA
## 8059	2012-12-07	NA	NA	NA	NA	NA
## 8060	2012-12-08	NA	NA	NA	NA	NA
## 8061	2012-12-09	NA	NA	NA	NA	NA
## 8062	2012-12-10	NA	NA	NA	NA	NA

## 8063	2012-12-11	NA	NA	NA	NA	NA
## 8064	2012-12-12	NA	NA	NA	NA	NA
## 8065	2012-12-13	NA	NA	NA	NA	NA
## 8066	2012-12-14	NA	NA	NA	NA	NA
## 8067	2012-12-15	NA	NA	NA	NA	NA
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## 8069	2012-12-17	NA	NA	NA	NA	NA
## 8070	2012-12-18	NA	NA	NA	NA	NA
## 8071	2012-12-19	NA	NA	NA	NA	NA
## 8072	2012-12-20	NA	NA	NA	NA	NA
## 8073	2012-12-21	NA	NA	NA	NA	NA
## 8074	2012-12-22	NA	NA	NA	NA	NA
## 8075	2012-12-23	NA	NA	NA	NA	NA
## 8076	2012-12-24	NA	NA	NA	NA	NA
## 8077	2012-12-25	NA	NA	NA	NA	NA
## 8078	2012-12-26	NA	NA	NA	NA	NA
## 8079	2012-12-27	NA	NA	NA	NA	NA
## 8080	2012-12-28	NA	NA	NA	NA	NA
## 8081	2012-12-29	NA	NA	NA	NA	NA
## 8082	2012-12-30	NA	NA	NA	NA	NA
## 8083	2012-12-31	NA	NA	NA	NA	NA
## 8084	2013-01-01	NA	NA	NA	NA	NA
## 8085	2013-01-02	NA	NA	NA	NA	NA
## 8086	2013-01-03	NA	NA	NA	NA	NA
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## 8089	2013-01-06	NA	NA	NA	NA	NA
## 8090	2013-01-07	NA	NA	NA	NA	NA
## 8091	2013-01-08	NA	NA	NA	NA	NA
## 8092	2013-01-09	NA	NA	NA	NA	NA
## 8093	2013-01-10	NA	NA	NA	NA	NA
## 8094	2013-01-11	NA	NA	NA	NA	NA
## 8095	2013-01-12	NA	NA	NA	NA	NA
## 8096	2013-01-13	NA	NA	NA	NA	NA
## 8097	2013-01-14	NA	NA	NA	NA	NA
## 8098	2013-01-15	NA	NA	NA	NA	NA
## 8099	2013-01-16	NA	NA	NA	NA	NA
## 8100	2013-01-17	NA	NA	NA	NA	NA
## 8101	2013-01-18	NA	NA	NA	NA	NA
## 8102	2013-01-19	NA	NA	NA	NA	NA
## 8103	2013-01-20	NA	NA	NA	NA	NA
## 8104	2013-01-21	NA	NA	NA	NA	NA
## 8105	2013-01-22	NA	NA	NA	NA	NA
## 8106	2013-01-23	NA	NA	NA	NA	NA
## 8107	2013-01-24	NA	NA	NA	NA	NA
## 8108	2013-01-25	NA	NA	NA	NA	NA
## 8109	2013-01-26	NA	NA	NA	NA	NA
## 8110	2013-01-27	NA	NA	NA	NA	NA
## 8111	2013-01-28	NA	NA	NA	NA	NA
## 8112	2013-01-29	NA	NA	NA	NA	NA
## 8113	2013-01-30	NA	NA	NA	NA	NA
## 8114	2013-01-31	NA	NA	NA	NA	NA
## 8115	2013-02-01	NA	NA	NA	NA	NA
## 8116	2013-02-02	NA	NA	NA	NA	NA

## 8117	2013-02-03	NA	NA	NA	NA	NA
## 8118	2013-02-04	NA	NA	NA	NA	NA
## 8119	2013-02-05	NA	NA	NA	NA	NA
## 8120	2013-02-06	NA	NA	NA	NA	NA
## 8121	2013-02-07	NA	NA	NA	NA	NA
## 8122	2013-02-08	NA	NA	NA	NA	NA
## 8123	2013-02-09	NA	NA	NA	NA	NA
## 8124	2013-02-10	NA	NA	NA	NA	NA
## 8125	2013-02-11	NA	NA	NA	NA	NA
## 8126	2013-02-12	NA	NA	NA	NA	NA
## 8127	2013-02-13	NA	NA	NA	NA	NA
## 8128	2013-02-14	NA	NA	NA	NA	NA
## 8129	2013-02-15	NA	NA	NA	NA	NA
## 8130	2013-02-16	NA	NA	NA	NA	NA
## 8131	2013-02-17	NA	NA	NA	NA	NA
## 8132	2013-02-18	NA	NA	NA	NA	NA
## 8133	2013-02-19	NA	NA	NA	NA	NA
## 8134	2013-02-20	NA	NA	NA	NA	NA
## 8135	2013-02-21	NA	NA	NA	NA	NA
## 8136	2013-02-22	NA	NA	NA	NA	NA
## 8137	2013-02-23	NA	NA	NA	NA	NA
## 8138	2013-02-24	NA	NA	NA	NA	NA
## 8139	2013-02-25	NA	NA	NA	NA	NA
## 8140	2013-02-26	NA	NA	NA	NA	NA
## 8141	2013-02-27	NA	NA	NA	NA	NA
## 8142	2013-02-28	NA	NA	NA	NA	NA
## 8143	2013-03-01	NA	NA	NA	NA	NA
## 8144	2013-03-02	NA	NA	NA	NA	NA
## 8145	2013-03-03	NA	NA	NA	NA	NA
## 8146	2013-03-04	NA	NA	NA	NA	NA
## 8147	2013-03-05	NA	NA	NA	NA	NA
## 8148	2013-03-06	NA	NA	NA	NA	NA
## 8149	2013-03-07	NA	NA	NA	NA	NA
## 8150	2013-03-08	NA	NA	NA	NA	NA
## 8151	2013-03-09	NA	NA	NA	NA	NA
## 8152	2013-03-10	NA	NA	NA	NA	NA
## 8153	2013-03-11	NA	NA	NA	NA	NA
## 8154	2013-03-12	NA	NA	NA	NA	NA
## 8155	2013-03-13	NA	NA	NA	NA	NA
## 8156	2013-03-14	NA	NA	NA	NA	NA
## 8157	2013-03-15	NA	NA	NA	NA	NA
## 8158	2013-03-16	NA	NA	NA	NA	NA
## 8159	2013-03-17	NA	NA	NA	NA	NA
## 8160	2013-03-18	NA	NA	NA	NA	NA
## 8161	2013-03-19	NA	NA	NA	NA	NA
## 8162	2013-03-20	NA	NA	NA	NA	NA
## 8163	2013-03-21	NA	NA	NA	NA	NA
## 8164	2013-03-22	NA	NA	NA	NA	NA
## 8165	2013-03-23	NA	NA	NA	NA	NA
## 8166	2013-03-24	NA	NA	NA	NA	NA
## 8167	2013-03-25	NA	NA	NA	NA	NA
## 8168	2013-03-26	NA	NA	NA	NA	NA
## 8169	2013-03-27	NA	NA	NA	NA	NA
## 8170	2013-03-28	NA	NA	NA	NA	NA

## 8171	2013-03-29	NA	NA	NA	NA	NA
## 8172	2013-03-30	NA	NA	NA	NA	NA
## 8173	2013-03-31	NA	NA	NA	NA	NA
## 8174	2013-04-01	NA	NA	NA	NA	NA
## 8175	2013-04-02	NA	NA	NA	NA	NA
## 8176	2013-04-03	NA	NA	NA	NA	NA
## 8177	2013-04-04	NA	NA	NA	NA	NA
## 8178	2013-04-05	NA	NA	NA	NA	NA
## 8179	2013-04-06	NA	NA	NA	NA	NA
## 8180	2013-04-07	NA	NA	NA	NA	NA
## 8181	2013-04-08	NA	NA	NA	NA	NA
## 8182	2013-04-09	NA	NA	NA	NA	NA
## 8183	2013-04-10	NA	NA	NA	NA	NA
## 8184	2013-04-11	NA	NA	NA	NA	NA
## 8185	2013-04-12	NA	NA	NA	NA	NA
## 8186	2013-04-13	NA	NA	NA	NA	NA
## 8187	2013-04-14	NA	NA	NA	NA	NA
## 8188	2013-04-15	NA	NA	NA	NA	NA
## 8189	2013-04-16	NA	NA	NA	NA	NA
## 8190	2013-04-17	NA	NA	NA	NA	NA
## 8191	2013-04-18	NA	NA	NA	NA	NA
## 8192	2013-04-19	NA	NA	NA	NA	NA
## 8193	2013-04-20	NA	NA	NA	NA	NA
## 8194	2013-04-21	NA	NA	NA	NA	NA
## 8195	2013-04-22	NA	NA	NA	NA	NA
## 8196	2013-04-23	NA	NA	NA	NA	NA
## 8197	2013-04-24	NA	NA	NA	NA	NA
## 8198	2013-04-25	NA	NA	NA	NA	NA
## 8199	2013-04-26	NA	NA	NA	NA	NA
## 8200	2013-04-27	NA	NA	NA	NA	NA
## 8201	2013-04-28	NA	NA	NA	NA	NA
## 8202	2013-04-29	NA	NA	NA	NA	NA
## 8203	2013-04-30	NA	NA	NA	NA	NA
## 8204	2013-05-01	NA	NA	NA	NA	NA
## 8205	2013-05-02	NA	NA	NA	NA	NA
## 8206	2013-05-03	NA	NA	NA	NA	NA
## 8207	2013-05-04	NA	NA	NA	NA	NA
## 8208	2013-05-05	NA	NA	NA	NA	NA
## 8209	2013-05-06	NA	NA	NA	NA	NA
## 8210	2013-05-07	NA	NA	NA	NA	NA
## 8211	2013-05-08	NA	NA	NA	NA	NA
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## 8213	2013-05-10	NA	NA	NA	NA	NA
## 8214	2013-05-11	NA	NA	NA	NA	NA
## 8215	2013-05-12	NA	NA	NA	NA	NA
## 8216	2013-05-13	NA	NA	NA	NA	NA
## 8217	2013-05-14	NA	NA	NA	NA	NA
## 8218	2013-05-15	NA	NA	NA	NA	NA
## 8219	2013-05-16	NA	NA	NA	NA	NA
## 8220	2013-05-17	NA	NA	NA	NA	NA
## 8221	2013-05-18	NA	NA	NA	NA	NA
## 8222	2013-05-19	NA	NA	NA	NA	NA
## 8223	2013-05-20	NA	NA	NA	NA	NA
## 8224	2013-05-21	NA	NA	NA	NA	NA

## 8225	2013-05-22	NA	NA	NA	NA	NA
## 8226	2013-05-23	NA	NA	NA	NA	NA
## 8227	2013-05-24	NA	NA	NA	NA	NA
## 8228	2013-05-25	NA	NA	NA	NA	NA
## 8229	2013-05-26	NA	NA	NA	NA	NA
## 8230	2013-05-27	NA	NA	NA	NA	NA
## 8231	2013-05-28	NA	NA	NA	NA	NA
## 8232	2013-05-29	NA	NA	NA	NA	NA
## 8233	2013-05-30	NA	NA	NA	NA	NA
## 8234	2013-05-31	NA	NA	NA	NA	NA
## 8235	2013-06-01	NA	NA	NA	NA	NA
## 8236	2013-06-02	NA	NA	NA	NA	NA
## 8237	2013-06-03	NA	NA	NA	NA	NA
## 8238	2013-06-04	NA	NA	NA	NA	NA
## 8239	2013-06-05	NA	NA	NA	NA	NA
## 8240	2013-06-06	NA	NA	NA	NA	NA
## 8241	2013-06-07	NA	NA	NA	NA	NA
## 8242	2013-06-08	NA	NA	NA	NA	NA
## 8243	2013-06-09	NA	NA	NA	NA	NA
## 8244	2013-06-10	NA	NA	NA	NA	NA
## 8245	2013-06-11	NA	NA	NA	NA	NA
## 8246	2013-06-12	NA	NA	NA	NA	NA
## 8247	2013-06-13	NA	NA	NA	NA	NA
## 8248	2013-06-14	NA	NA	NA	NA	NA
## 8249	2013-06-15	NA	NA	NA	NA	NA
## 8250	2013-06-16	NA	NA	NA	NA	NA
## 8251	2013-06-17	NA	NA	NA	NA	NA
## 8252	2013-06-18	NA	NA	NA	NA	NA
## 8253	2013-06-19	NA	NA	NA	NA	NA
## 8254	2013-06-20	NA	NA	NA	NA	NA
## 8255	2013-06-21	NA	NA	NA	NA	NA
## 8256	2013-06-22	NA	NA	NA	NA	NA
## 8257	2013-06-23	NA	NA	NA	NA	NA
## 8258	2013-06-24	NA	NA	NA	NA	NA
## 8259	2013-06-25	NA	NA	NA	NA	NA
## 8260	2013-06-26	NA	NA	NA	NA	NA
## 8261	2013-06-27	NA	NA	NA	NA	NA
## 8262	2013-06-28	NA	NA	NA	NA	NA
## 8263	2013-06-29	NA	NA	NA	NA	NA
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## 8265	2013-07-01	NA	NA	NA	NA	NA
## 8266	2013-07-02	NA	NA	NA	NA	NA
## 8267	2013-07-03	NA	NA	NA	NA	NA
## 8268	2013-07-04	NA	NA	NA	NA	NA
## 8269	2013-07-05	NA	NA	NA	NA	NA
## 8270	2013-07-06	NA	NA	NA	NA	NA
## 8271	2013-07-07	NA	NA	NA	NA	NA
## 8272	2013-07-08	NA	NA	NA	NA	NA
## 8273	2013-07-09	NA	NA	NA	NA	NA
## 8274	2013-07-10	NA	NA	NA	NA	NA
## 8275	2013-07-11	NA	NA	NA	NA	NA
## 8276	2013-07-12	NA	NA	NA	NA	NA
## 8277	2013-07-13	NA	NA	NA	NA	NA
## 8278	2013-07-14	NA	NA	NA	NA	NA

## 8279	2013-07-15	NA	NA	NA	NA	NA
## 8280	2013-07-16	NA	NA	NA	NA	NA
## 8281	2013-07-17	NA	NA	NA	NA	NA
## 8282	2013-07-18	NA	NA	NA	NA	NA
## 8283	2013-07-19	NA	NA	NA	NA	NA
## 8284	2013-07-20	NA	NA	NA	NA	NA
## 8285	2013-07-21	NA	NA	NA	NA	NA
## 8286	2013-07-22	NA	NA	NA	NA	NA
## 8287	2013-07-23	NA	NA	NA	NA	NA
## 8288	2013-07-24	NA	NA	NA	NA	NA
## 8289	2013-07-25	NA	NA	NA	NA	NA
## 8290	2013-07-26	NA	NA	NA	NA	NA
## 8291	2013-07-27	NA	NA	NA	NA	NA
## 8292	2013-07-28	NA	NA	NA	NA	NA
## 8293	2013-07-29	NA	NA	NA	NA	NA
## 8294	2013-07-30	NA	NA	NA	NA	NA
## 8295	2013-07-31	NA	NA	NA	NA	NA
## 8296	2013-08-01	NA	NA	NA	NA	NA
## 8297	2013-08-02	NA	NA	NA	NA	NA
## 8298	2013-08-03	NA	NA	NA	NA	NA
## 8299	2013-08-04	NA	NA	NA	NA	NA
## 8300	2013-08-05	NA	NA	NA	NA	NA
## 8301	2013-08-06	NA	NA	NA	NA	NA
## 8302	2013-08-07	NA	NA	NA	NA	NA
## 8303	2013-08-08	NA	NA	NA	NA	NA
## 8304	2013-08-09	NA	NA	NA	NA	NA
## 8305	2013-08-10	NA	NA	NA	NA	NA
## 8306	2013-08-11	NA	NA	NA	NA	NA
## 8307	2013-08-12	NA	NA	NA	NA	NA
## 8308	2013-08-13	NA	NA	NA	NA	NA
## 8309	2013-08-14	NA	NA	NA	NA	NA
## 8310	2013-08-15	NA	NA	NA	NA	NA
## 8311	2013-08-16	NA	NA	NA	NA	NA
## 8312	2013-08-17	NA	NA	NA	NA	NA
## 8313	2013-08-18	NA	NA	NA	NA	NA
## 8314	2013-08-19	NA	NA	NA	NA	NA
## 8315	2013-08-20	NA	NA	NA	NA	NA
## 8316	2013-08-21	NA	NA	NA	NA	NA
## 8317	2013-08-22	NA	NA	NA	NA	NA
## 8318	2013-08-23	NA	NA	NA	NA	NA
## 8319	2013-08-24	NA	NA	NA	NA	NA
## 8320	2013-08-25	NA	NA	NA	NA	NA
## 8321	2013-08-26	NA	NA	NA	NA	NA
## 8322	2013-08-27	NA	NA	NA	NA	NA
## 8323	2013-08-28	NA	NA	NA	NA	NA
## 8324	2013-08-29	NA	NA	NA	NA	NA
## 8325	2013-08-30	NA	NA	NA	NA	NA
## 8326	2013-08-31	NA	NA	NA	NA	NA
## 8327	2013-09-01	NA	NA	NA	NA	NA
## 8328	2013-09-02	NA	NA	NA	NA	NA
## 8329	2013-09-03	NA	NA	NA	NA	NA
## 8330	2013-09-04	NA	NA	NA	NA	NA
## 8331	2013-09-05	NA	NA	NA	NA	NA
## 8332	2013-09-06	NA	NA	NA	NA	NA

##	8333	2013-09-07	NA	NA	NA	NA	NA
##		OG	PH	SALINITY	SUSO	TEMP	XMS
## 1		0.2000000	8.130000	33.595500	3.9964286	19.370000	60.22500
## 2		0.2000000	8.143000	33.580275	3.9964286	14.507692	80.02564
## 3		0.2000000	8.156000	33.565050	3.9964286	14.392308	83.89744
## 4		0.2000000	8.169000	33.549825	3.9964286	14.541026	78.97436
## 5		0.2000000	8.182000	33.534600	3.9964286	13.430000	80.20000
## 6		0.2000000	8.195000	33.519375	3.9964286	14.268889	86.21111
## 7		0.2000000	8.193333	33.493000	3.9964286	13.750000	80.45833
## 8		0.2000000	8.191667	33.491000	3.9964286	14.384000	84.40000
## 9		0.2000000	8.190000	33.495318	3.9964286	14.512821	72.02564
## 10		0.2000000	8.188333	33.499636	3.9964286	14.576923	68.35897
## 11		0.2000000	8.186667	33.503955	3.9964286	14.507692	76.51282
## 12		0.2000000	8.185000	33.508273	3.9964286	14.069231	78.71053
## 13		0.2000000	8.183333	33.512591	3.9964286	14.294872	82.43590
## 14		0.2000000	8.181667	33.516909	3.9964286	14.174359	81.23077
## 15		0.2000000	8.180000	33.521227	3.9964286	14.461538	72.12821
## 16		0.2000000	8.178333	33.525545	3.9964286	14.461538	69.53846
## 17		0.2000000	8.176667	33.529864	3.9964286	13.825641	79.23077
## 18		0.2000000	8.175000	33.534182	3.9964286	13.790000	80.70000
## 19		0.2000000	8.173333	33.538500	3.9964286	13.698824	77.36471
## 20		0.2000000	8.176481	33.504000	3.9964286	14.387500	77.25000
## 21		0.2000000	8.179630	33.509000	3.9964286	14.330000	81.96667
## 22		0.2000000	8.182778	33.509411	3.9964286	13.738462	78.89189
## 23		0.2000000	8.185926	33.509821	3.9964286	14.376923	80.53846
## 24		0.2000000	8.189074	33.510232	3.9964286	14.053846	82.25641
## 25		0.2000000	8.192222	33.510643	3.9964286	14.430769	82.64103
## 26		0.2000000	8.195370	33.511054	3.9964286	14.415385	63.07692
## 27		0.2000000	8.198519	33.511464	3.9964286	14.720000	64.80000
## 28		0.2000000	8.201667	33.511875	3.9964286	13.148889	80.35556
## 29		0.2000000	8.198148	33.491000	3.9964286	13.694737	66.68421
## 30		0.2000000	8.194630	33.459000	3.9964286	13.693333	77.56667
## 31		0.2000000	8.191111	33.466867	3.9964286	13.297436	75.61538
## 32		0.2000000	8.187593	33.474734	3.9964286	12.942424	72.90909
## 33		0.2000000	8.184074	33.482602	3.9964286	12.700000	58.33333
## 34		0.2000000	8.180556	33.490469	3.9964286	12.784615	73.00000
## 35		0.2000000	8.177037	33.498336	3.9964286	12.947436	71.46154
## 36		0.2000000	8.173519	33.506203	3.9964286	13.110256	69.92308
## 37		0.2000000	8.170000	33.514070	3.9964286	13.273077	68.38462
## 38		0.2000000	8.166481	33.521937	3.9964286	13.435897	66.84615
## 39		0.2000000	8.162963	33.529805	3.9964286	13.433333	75.92105
## 40		0.2000000	8.159444	33.537672	3.9964286	13.500000	74.33333
## 41		0.2000000	8.155926	33.545539	3.9964286	13.125641	82.65789
## 42		0.2000000	8.152407	33.553406	3.9964286	13.194872	81.09818
## 43		0.2000000	8.148889	33.561273	3.9964286	13.264103	79.53846
## 44		0.2000000	8.145370	33.569141	3.9964286	14.248718	73.56410
## 45		0.2000000	8.141852	33.577008	3.9964286	13.130000	72.90000
## 46		0.2000000	8.138333	33.584875	3.9964286	12.688889	79.80000
## 47		0.2000000	8.133333	33.528000	3.9964286	13.463158	64.52632
## 48		0.2000000	8.128333	33.548500	3.9964286	13.126667	68.93333
## 49		0.2000000	8.123333	33.557292	3.9964286	13.192308	74.42105
## 50		0.2000000	8.118333	33.566083	3.9964286	12.979487	74.71053
## 51		0.2000000	8.113333	33.574875	3.9964286	12.766667	75.00000
## 52		0.2000000	8.108333	33.583667	3.9964286	12.956410	76.56410

```

## 53 0.2000000 8.103333 33.592458 3.9964286 11.987179 78.68421
## 54 0.2000000 8.098333 33.601250 3.9964286 13.515385 78.25641
## 55 0.2000000 8.093333 33.610042 3.9964286 13.957692 76.98718
## 56 0.2000000 8.088333 33.618833 3.9964286 14.400000 75.71795
## 57 0.2000000 8.083333 33.627625 3.9964286 11.715385 77.64103
## 58 0.2000000 8.078333 33.636417 3.9964286 13.279487 66.82051
## 59 0.2000000 8.073333 33.645208 3.9964286 13.169231 71.84211
## 60 0.2000000 8.068333 33.654000 3.9964286 12.750000 73.10000
## 61 0.2000000 8.063333 33.227857 3.9964286 11.525000 78.65000
## 62 0.2000000 8.083194 33.653000 3.9964286 13.347368 78.15789
## 63 0.2000000 8.103056 33.648500 3.9964286 12.600000 79.41379
## 64 0.2000000 8.122917 33.640075 3.9964286 12.305128 74.56410
## 65 0.2000000 8.142778 33.631650 3.9964286 12.520513 76.51282
## 66 0.2000000 8.162639 33.623225 3.9964286 13.802564 68.28205
## 67 0.2000000 8.182500 33.614800 3.9964286 13.169231 70.34211
## 68 0.2000000 8.202361 33.606375 3.9964286 15.138462 66.94872
## 69 0.2000000 8.222222 33.597950 3.9964286 15.103846 66.15385
## 70 0.2000000 8.242083 33.589525 3.9964286 15.069231 65.35897
## 71 0.2000000 8.261944 33.581100 3.9964286 13.658974 70.64103
## 72 0.2000000 8.281806 33.572675 3.9964286 14.500000 77.50000
## 73 0.2000000 8.301667 33.564250 3.9964286 12.565556 71.36667
## 74 0.2000000 8.294679 33.579000 3.9964286 14.705263 66.57895
## 75 0.2000000 8.287692 33.591000 3.9964286 13.720000 70.89655
## 76 0.2000000 8.280705 33.581391 3.9964286 15.787179 74.25641
## 77 0.2000000 8.273718 33.571782 3.9964286 15.988462 74.60256
## 78 0.2000000 8.266731 33.562174 3.9964286 16.189744 74.94872
## 79 0.2000000 8.259744 33.552565 3.9964286 14.502564 73.61538
## 80 0.2000000 8.252756 33.542956 3.9964286 14.271795 74.79487
## 81 0.2000000 8.245769 33.533347 3.9964286 14.041026 75.97436
## 82 0.2000000 8.238782 33.523738 3.9964286 13.674359 68.76316
## 83 0.2000000 8.231795 33.514130 3.9964286 13.674359 68.76316
## 84 0.2000000 8.224808 33.504521 3.9964286 13.674359 68.76316
## 85 0.2000000 8.217821 33.494912 3.9964286 13.674359 68.76316
## 86 0.2000000 8.210833 33.485303 3.9964286 13.500000 75.70000
## 87 0.2000000 8.203846 33.475694 3.9964286 13.209756 81.04878
## 88 0.2000000 8.211340 33.470000 3.9964286 14.884211 76.94737
## 89 0.2000000 8.218835 33.482000 3.9964286 14.320000 78.53333
## 90 0.2000000 8.226329 33.485425 3.9964286 15.346154 75.60526
## 91 0.2000000 8.233824 33.488851 3.9964286 16.057692 78.61032
## 92 0.2000000 8.241318 33.492276 3.9964286 16.769231 81.61538
## 93 0.2000000 8.248812 33.495702 3.9964286 13.538462 81.78947
## 94 0.2000000 8.256307 33.499127 3.9964286 15.502564 80.15385
## 95 0.2000000 8.263801 33.502553 3.9964286 15.502564 80.15385
## 96 0.2000000 8.271295 33.505978 3.9964286 15.502564 80.15385
## 97 0.2000000 8.278790 33.509404 3.9964286 15.502564 80.15385
## 98 0.2000000 8.286284 33.512829 3.9964286 16.251282 80.23077
## 99 0.2000000 8.293778 33.516255 3.9964286 15.256410 70.25641
## 100 0.2000000 8.301273 33.519680 3.9964286 14.419231 73.06410
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## 102 0.2000000 8.316261 33.526531 3.9964286 14.461538 75.30769
## 103 0.2000000 8.323756 33.529957 3.9964286 15.080000 48.30000
## 104 0.2000000 8.331250 33.533382 3.9964286 13.774359 80.73077
## 105 0.2000000 8.329167 33.509000 3.9964286 16.552632 84.52632
## 106 0.2000000 8.327083 33.483500 3.9964286 14.916667 86.73333

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## 618 0.2175556 7.942454 33.645081 3.5050000 12.856410 74.38462
## 619 0.2208000 7.960954 33.644587 3.2900000 12.412821 73.94872
## 620 0.2240444 7.979455 33.644093 3.0750000 11.781818 80.47727
## 621 0.2272889 7.926744 33.697294 3.5625000 11.171951 80.08537
## 622 0.2305333 8.035897 33.625047 3.9875000 12.505172 79.29310
## 623 0.2337778 8.023410 33.616500 3.9901389 14.500000 80.51282
## 624 0.2370222 8.010924 33.607953 3.9927778 14.882051 79.92308
## 625 0.2402667 7.998437 33.599407 3.9954167 14.988034 80.49573
## 626 0.2435111 7.985951 33.590860 3.9980556 15.094017 81.06838
## 627 0.2467556 7.973465 33.582314 4.0006944 15.200000 81.64103
## 628 0.2500000 7.960978 33.573767 4.0033333 11.657609 88.84239
## 629 0.2491667 7.971934 33.580090 4.1376190 15.684615 83.20513
## 630 0.2483333 7.982890 33.586413 4.2719048 11.614972 88.87288
## 631 0.2475000 7.992664 33.585038 4.4061905 13.321588 87.02618
## 632 0.2466667 8.002438 33.583662 4.5404762 15.028205 85.17949
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## 634 0.2450000 8.021987 33.580910 4.8090476 13.976923 81.51282
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## 638 0.2416667 8.061084 33.575407 5.3461905 13.791026 76.76923
## 639 0.2408333 8.070859 33.574032 5.4804762 14.292308 75.25641
## 640 0.2400000 8.080633 33.572656 5.6147619 14.535897 73.56410
## 641 0.2391667 8.090407 33.571280 5.7490476 15.481579 86.71053
## 642 0.2383333 8.100182 33.569905 5.8833333 14.888636 85.04545
## 643 0.2200000 8.079524 33.569521 3.9458333 13.623171 87.48780
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## 645 0.2010417 8.042396 33.561981 3.3295833 16.882051 86.10256
## 646 0.2020833 7.958050 33.612187 3.0300000 11.999441 87.72626

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## 647 0.2030324 7.959402 33.629502 3.4104167 15.382051 84.17949
## 648 0.2039815 7.960754 33.646817 3.7908333 12.038418 88.18644
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## 674 0.2000000 8.187741 33.476132 4.4815385 19.153846 83.29487
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## 704 0.2444444 8.159611 33.448050 6.7083333 15.355556 77.61111
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## 724 0.2172759 7.958220 33.537704 5.5541667 12.940563 84.78592
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## 851 0.2000000 8.100000 33.587000 3.2595853 19.190000 50.05000
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## 857 0.2000000 8.132020 33.454767 2.7733474 15.454167 81.58333
## 858 0.2000000 8.137357 33.432729 2.6923077 14.507143 83.78571
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## 863	0.2000000	7.935538	33.587140	2.9437500	12.180769	82.76923
## 864	0.2000000	7.964859	33.550155	3.7727564	14.608696	68.73913
## 865	0.2000000	7.994179	33.513171	4.6017628	14.641667	65.20833
## 866	0.2000000	8.023500	33.476186	5.4307692	13.671429	73.42857
## 867	0.2000000	8.087250	33.444104	4.7307692	14.604167	79.62500
## 868	0.2000000	8.092500	33.444650	6.7500000	13.960000	81.00000
## 869	0.2000000	8.064201	33.513605	5.2468750	14.733333	81.79167
## 870	0.2000000	8.035902	33.582561	3.7437500	12.241176	85.88235
## 871	0.2000000	8.006387	33.590096	3.8118007	13.303922	80.35784
## 872	0.2000000	7.976872	33.597630	3.8798514	14.366667	74.83333
## 873	0.2000000	7.947356	33.605165	3.9479021	12.019802	86.31683
## 874	0.2000000	7.886412	33.561820	4.0159528	12.513725	89.80392
## 875	0.2000000	7.914720	33.551549	4.0840035	13.595833	78.08333
## 876	0.2000000	7.943029	33.541279	4.1520542	13.050000	78.83333
## 877	0.2000000	7.971337	33.531009	4.2201049	13.326389	77.81944
## 878	0.2000000	7.999646	33.520739	4.2881556	13.602778	76.80556
## 879	0.2000000	8.027954	33.510469	4.3562063	13.879167	75.79167
## 880	0.2000000	8.056263	33.500199	4.4242570	13.587500	74.25000
## 881	0.2000000	8.084571	33.489929	4.4923077	13.550000	79.35714
## 882	0.2000000	8.085400	33.507600	8.2416667	13.780000	82.70000
## 883	0.2000000	8.109875	33.424896	4.2153846	14.900000	81.87500
## 884	0.2000000	7.946983	33.540955	4.0081731	13.442000	84.01750
## 885	0.2000000	7.784090	33.657015	3.8009615	11.984000	86.16000
## 886	0.2000000	7.760118	33.675924	3.5937500	11.676471	85.92157
## 887	0.2000000	7.809027	33.649643	3.5088942	13.591304	79.91304
## 888	0.2000000	7.857936	33.623363	3.4240385	13.560870	79.56522
## 889	0.2000000	7.906845	33.597083	3.3391827	13.732518	78.94928
## 890	0.2000000	7.955754	33.570803	3.2543269	13.904167	78.33333
## 891	0.2000000	8.004662	33.544523	3.1694712	13.762500	81.25000
## 892	0.2000000	8.053571	33.518243	3.0846154	13.028571	79.14286
## 893	0.2000000	8.145391	33.510235	3.9000000	14.000000	75.56522
## 894	0.2000000	8.080333	33.505989	3.9392045	13.122222	78.55556
## 895	0.2000000	7.886442	33.641079	3.9784091	11.715385	82.71154
## 896	0.2000000	7.901216	33.639680	4.0176136	11.774510	82.26471
## 897	0.2000000	7.897267	33.658066	4.0568182	12.837255	78.73652
## 898	0.2000000	7.893319	33.676452	4.0960227	13.900000	75.20833
## 899	0.2000000	7.889370	33.694838	4.1352273	14.762500	76.16667
## 900	0.2000000	7.885422	33.713224	4.1744318	14.683333	76.33333
## 901	0.2000000	7.881473	33.731609	4.2136364	14.370833	76.10417
## 902	0.2000000	7.877525	33.749995	4.2528409	14.058333	75.87500
## 903	0.2000000	7.873576	33.768381	4.2920455	13.362500	75.70833
## 904	0.2000000	7.869627	33.786767	4.3312500	11.349020	81.96078
## 905	0.2000000	7.908824	33.818272	5.1208333	11.137255	85.93137
## 906	0.2000000	7.961224	33.768105	5.9104167	12.372794	76.96569
## 907	0.2000000	8.013625	33.717937	6.7000000	13.608333	68.00000
## 908	0.2000000	7.957375	33.748917	4.8120000	12.512500	75.91667
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## 910	0.2000000	7.957083	33.735668	4.5941111	15.416667	80.66667
## 911	0.2000000	7.956938	33.729043	4.4851667	16.508333	77.37500
## 912	0.2000000	7.956792	33.722419	4.3762222	17.600000	74.08333
## 913	0.2000000	7.956646	33.715794	4.2672778	18.429167	76.12500
## 914	0.2000000	7.956500	33.709170	4.1583333	14.390000	77.30000
## 915	0.2000000	7.982714	33.692150	3.8538462	14.692857	81.71429
## 916	0.2000000	8.130292	33.820004	3.3576923	16.958333	80.00000

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## 917 0.2000000 7.875922 33.900595 3.9725962 12.007843 86.02941
## 918 0.2000000 7.880269 33.917013 4.5875000 12.023077 85.36538
## 919 0.2000000 7.913144 33.895802 4.4500000 15.400000 70.91667
## 920 0.2000000 7.946019 33.874591 4.3125000 16.035417 73.87500
## 921 0.2000000 7.978893 33.853380 4.1750000 16.670833 76.83333
## 922 0.2000000 8.011768 33.832168 4.0375000 15.385417 78.20238
## 923 0.2000000 8.044643 33.810957 3.9000000 14.100000 79.57143
## 924 0.2000000 8.195609 33.978657 4.3115385 16.373913 80.39130
## 925 0.2000000 7.984500 33.805310 6.7583333 14.380000 80.70000
## 926 0.2143167 7.951360 33.829782 6.0168403 15.821250 80.01667
## 927 0.2286333 7.918221 33.854254 5.2753472 17.262500 79.33333
## 928 0.2429500 7.885081 33.878726 4.5338542 16.716667 81.41667
## 929 0.2572667 7.851942 33.903198 3.7923611 14.394967 84.13903
## 930 0.2715833 7.818802 33.927670 3.0508681 12.073267 86.86139
## 931 0.2859000 7.652173 33.903065 2.3093750 12.036538 85.65385
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## 971 0.2000000 7.986901 33.618708 3.6800347 15.700000 83.33333
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## 1025 0.2000000 7.823458 33.643071 3.2240000 12.370833 82.87500
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## 1109 0.2000000 8.088182 33.501299 3.2256410 19.739583 81.16667
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## 1111 0.2000000 8.107167 33.584679 3.6000000 19.250000 84.66667
## 1112 0.2000000 8.123824 33.470569 2.7562500 17.235294 90.94118
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## 1115 0.2000000 8.064685 33.559407 4.5543761 18.882083 59.96500
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## 1117 0.2000000 8.014055 33.518221 4.8279829 18.766667 86.33333
## 1118 0.2000000 7.988741 33.497629 4.9647863 18.920833 86.20833
## 1119 0.2000000 7.963426 33.477036 5.1015897 16.242574 89.95050
## 1120 0.2000000 7.915506 33.504563 5.2383932 17.212954 86.85025
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## 1124 0.2000000 8.076533 33.552787 2.5666667 16.826667 88.60000
## 1125 0.2000000 8.101552 33.555179 3.1586207 16.862069 86.79310
## 1126 0.2000000 8.073250 33.631347 3.1633892 16.856034 77.18822
## 1127 0.2000000 8.044947 33.707514 3.1681576 16.850000 67.58333
## 1128 0.2000000 8.016645 33.783682 3.1729261 16.845833 79.50000
## 1129 0.2000000 7.988343 33.859849 3.1776946 17.266667 89.16667
## 1130 0.2000000 8.009316 33.883530 3.1824631 17.537500 85.91667
## 1131 0.2000000 8.030288 33.907211 3.1872315 17.433333 89.45833
## 1132 0.2000000 8.051261 33.930891 3.1920000 17.378261 85.08696

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## 1133 0.2000000 8.086440 33.972188 4.7000000 17.328000 86.66000
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## 1136 0.2000000 7.971218 33.945940 5.3017802 16.439604 88.00000
## 1137 0.2000000 7.986216 33.924404 5.3238242 17.508333 73.37500
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## 1139 0.2000000 8.016212 33.881333 5.3679121 17.500000 73.35714
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## 1240 0.2000000 8.037750 33.548492 5.0120000 14.812500 84.54167

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## 1376 0.2000000 7.912567 33.649748 4.0660714 14.901515 83.65152
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## 1378 0.2000000 7.865133 33.702190 3.8071429 13.003333 84.41515
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## 1382 0.2000000 8.006470 33.630925 5.1989744 14.382386 83.68750
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## 1393 0.2000000 7.918772 33.678670 4.3805556 13.463636 81.07576
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## 1401 0.2000000 7.852141 33.577062 2.8825000 15.634848 84.68182
## 1402 0.2000000 7.877010 33.558034 2.0933333 16.136364 85.75758

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## 1877 0.2000000 7.915837 33.776109 7.9303571 14.281818 81.36364
## 1878 0.2000000 7.920770 33.843444 7.6571429 11.330000 89.99000
## 1879 0.2000000 7.905408 33.830184 7.3839286 12.745455 82.33333
## 1880 0.2000000 7.890046 33.816924 7.1107143 12.772727 80.90909
## 1881 0.2000000 7.874684 33.803663 6.8375000 12.800000 79.48485
## 1882 0.2000000 7.859323 33.790403 6.5642857 11.629032 85.22581
## 1883 0.2000000 7.769000 33.858371 6.5689655 10.868889 82.44624
## 1884 0.2000000 8.222417 33.698954 4.1423077 14.100000 79.66667
## 1885 0.2000000 8.184846 33.701104 4.3397285 13.960606 80.19697
## 1886 0.2000000 8.147274 33.703253 4.5371493 13.821212 80.72727
## 1887 0.2000000 8.109703 33.705403 4.7345701 13.779182 81.91574
## 1888 0.2000000 8.072132 33.707553 4.9319910 13.737152 83.10421

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## 1889 0.2000000 8.034561 33.709702 5.1294118 13.695122 84.29268
## 1890 0.2000000 7.953939 33.734685 8.2050000 12.569697 77.96970
## 1891 0.2000000 7.967182 33.761627 7.5578947 12.122727 78.47727
## 1892 0.2000000 7.926448 33.787135 7.4655075 13.590909 78.84848
## 1893 0.2000000 7.885713 33.812642 7.3731203 12.509517 84.14299
## 1894 0.2000000 7.844979 33.838149 7.2807331 11.428125 89.43750
## 1895 0.2000000 7.874255 33.809015 7.1883459 14.836364 81.21212
## 1896 0.2000000 7.903531 33.779882 7.0959586 13.932698 82.54154
## 1897 0.2000000 7.932806 33.750748 7.0035714 13.029032 83.87097
## 1898 0.2000000 7.680273 33.764355 6.5965517 11.538636 90.13636
## 1899 0.2000000 8.102333 33.996704 5.6269231 15.541667 80.50000
## 1900 0.2000000 8.081806 33.905211 5.6284750 16.572348 82.53788
## 1901 0.2000000 8.061278 33.813718 5.6300270 17.603030 84.57576
## 1902 0.2000000 8.040750 33.722225 5.6315789 16.031818 82.95455
## 1903 0.2000000 7.936818 33.762697 6.7100000 16.018182 81.42424
## 1904 0.2000000 7.840262 33.720810 5.5735294 13.797619 85.97619
## 1905 0.2000000 7.824192 33.733369 5.9087395 15.800325 84.57900
## 1906 0.2000000 7.808121 33.745929 6.2439496 17.803030 83.18182
## 1907 0.2000000 7.792051 33.758488 6.5791597 15.690909 83.21212
## 1908 0.2000000 7.775980 33.771048 6.9143697 11.750000 91.11765
## 1909 0.2000000 7.843138 33.743174 7.2495798 13.655303 87.18004
## 1910 0.2000000 7.910296 33.715301 7.5847899 15.560606 83.24242
## 1911 0.2000000 7.977455 33.687427 7.9200000 14.021212 76.39394
## 1912 0.2000000 7.923439 33.666120 6.1764706 14.234146 83.00000
## 1913 0.2000000 8.063422 33.649727 4.7447368 14.304444 83.88889
## 1914 0.2011000 8.017518 33.659990 4.6514098 15.335556 83.48990
## 1915 0.2022000 7.971614 33.670254 4.5580827 16.366667 83.09091
## 1916 0.2033000 7.925710 33.680517 4.4647556 15.075269 85.28739
## 1917 0.2044000 7.879806 33.690781 4.3714286 13.783871 87.48387
## 1918 0.2055000 8.115917 33.700012 4.9461538 16.937500 85.04167
## 1919 0.2066000 7.797578 33.708033 6.0206897 12.362222 90.00000
## 1920 0.2077000 7.816407 33.717180 6.2161686 17.939394 84.75758
## 1921 0.2088000 7.835236 33.726327 6.4116475 16.777273 83.95455
## 1922 0.2099000 7.854066 33.735474 6.6071264 15.615152 83.15152
## 1923 0.2110000 7.872895 33.744621 6.8026054 13.910127 86.94310
## 1924 0.2121000 7.891724 33.753767 6.9980843 12.205102 90.73469
## 1925 0.2132000 7.903627 33.710488 7.1935632 15.712121 83.03030
## 1926 0.2143000 7.915529 33.667208 7.3890421 15.739394 82.81818
## 1927 0.2154000 7.927431 33.623928 7.5845211 15.587879 81.93939
## 1928 0.2165000 7.939333 33.580648 7.7800000 12.784848 79.30303
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## 1935 0.2000000 7.831258 33.715587 10.1988670 17.072727 81.42424
## 1936 0.2000000 7.820742 33.717393 9.6120936 14.175758 78.21212
## 1937 0.2000000 7.810227 33.719198 9.0253202 13.480570 81.44534
## 1938 0.2000000 7.799712 33.721004 8.4385468 12.785383 84.67855
## 1939 0.2000000 7.789196 33.722810 7.8517734 12.090196 87.91176
## 1940 0.2000000 8.026939 33.576506 7.2650000 15.242424 81.72727
## 1941 0.2000000 8.037026 33.559892 8.4029412 15.639474 85.34211
## 1942 0.2000000 8.058911 33.547271 10.1131579 16.002222 73.93333

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## 1943 0.2000000 7.991730 33.571742 8.4565789 18.100000 82.03030
## 1944 0.2000000 7.924548 33.596213 6.8000000 14.106452 89.29032
## 1945 0.2000000 7.742744 33.611360 8.4758621 12.809302 91.32558
## 1946 0.2000000 8.059958 33.573975 6.3307692 17.995833 86.12500
## 1947 0.2000000 8.025313 33.577797 6.4612393 16.641856 84.62311
## 1948 0.2000000 7.990668 33.581619 6.5917094 15.287879 83.12121
## 1949 0.2000000 7.956023 33.585441 6.7221795 14.612968 84.60071
## 1950 0.2000000 7.921378 33.589264 6.8526496 13.938057 86.08021
## 1951 0.2000000 7.886733 33.593086 6.9831197 13.263146 87.55971
## 1952 0.2000000 7.852088 33.596908 7.1135897 12.588235 89.03922
## 1953 0.2000000 7.920003 33.552979 7.2440598 15.103030 82.03030
## 1954 0.2000000 7.987918 33.509050 7.3745299 16.172727 81.60606
## 1955 0.2000000 8.055833 33.465121 7.5050000 15.108333 74.25000
## 1956 0.2000000 7.934156 33.385787 8.0315789 14.342222 82.51111
## 1957 0.2367000 7.917381 33.371012 2.8941176 14.080952 87.30952
## 1958 0.2348154 7.946333 33.413456 3.0270308 14.971429 83.90476
## 1959 0.2329308 7.957651 33.408476 3.1599440 15.606061 83.57576
## 1960 0.2310462 7.968968 33.403497 3.2928571 13.290323 88.93548
## 1961 0.2291615 7.912256 33.485895 2.4103448 12.400000 90.23256
## 1962 0.2272769 7.962208 33.375087 2.7038462 14.454167 84.37500
## 1963 0.2253923 7.938166 33.418960 2.8802036 15.042235 83.94508
## 1964 0.2235077 7.914124 33.462832 3.0565611 15.630303 83.51515
## 1965 0.2216231 7.890082 33.506705 3.2329186 15.430303 85.00000
## 1966 0.2197385 7.866040 33.550577 3.4092760 12.450495 89.47525
## 1967 0.2178538 7.904571 33.493638 3.5856335 14.072217 86.14671
## 1968 0.2159692 7.943103 33.436698 3.7619910 15.693939 82.81818
## 1969 0.2140846 7.981635 33.379759 3.9383484 15.475758 83.24242
## 1970 0.2122000 8.020167 33.322819 4.1147059 14.261905 86.04762
## 1971 0.2001667 8.024756 33.310847 4.5131579 14.188889 84.37778
## 1972 0.2191667 8.004152 33.336312 2.4600000 13.903030 83.48485
## 1973 0.2175694 7.942097 33.415845 2.6321429 13.351613 84.16129
## 1974 0.2159722 8.048833 33.392458 4.8923077 15.170833 78.62500
## 1975 0.2143750 7.892795 33.508641 2.8793103 12.870455 89.68182
## 1976 0.2127778 8.120000 33.588000 3.0073402 19.230000 71.80000
## 1977 0.2111806 8.074684 33.556717 3.1353700 17.668485 74.75556
## 1978 0.2095833 8.029368 33.525433 3.2633999 16.106970 77.71111
## 1979 0.2079861 7.984051 33.494150 3.3914297 14.545455 80.66667
## 1980 0.2063889 7.938735 33.462867 3.5194596 13.132353 89.42157
## 1981 0.2047917 7.951485 33.445948 3.6474894 14.793939 78.42424
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## 1983 0.2015972 7.976984 33.412112 3.9035491 15.418182 77.90909
## 1984 0.2000000 7.989733 33.395193 4.0315789 15.733333 82.51111
## 1985 0.2000000 7.993212 33.382530 3.1450000 15.509091 85.15152
## 1986 0.2127000 7.887429 33.382598 3.1382353 15.476190 87.04762
## 1987 0.2118533 7.983677 33.385184 3.0285714 14.103226 86.25806
## 1988 0.2110067 8.063250 33.373321 4.1884615 15.725000 77.37500
## 1989 0.2101600 7.929867 33.461573 3.3827586 13.108889 87.60000
## 1990 0.2093133 7.931072 33.458876 3.4004454 13.051616 87.52323
## 1991 0.2084667 7.932277 33.456179 3.4181322 12.994343 87.44646
## 1992 0.2076200 7.933482 33.453481 3.4358190 12.937071 87.36970
## 1993 0.2067733 7.934687 33.450784 3.4535057 12.879798 87.29293
## 1994 0.2059267 7.944612 33.435880 3.4711925 14.927273 75.18182
## 1995 0.2050800 7.954538 33.420976 3.4888793 14.642424 73.63636
## 1996 0.2042333 7.964463 33.406072 3.5065661 14.357576 72.09091

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## 1997 0.2033867 7.974389 33.391168 3.5242529 14.072727 70.54545
## 1998 0.2025400 7.984314 33.376264 3.5419397 14.108081 71.71717
## 1999 0.2016933 7.994240 33.361360 3.5596264 14.143434 72.88889
## 2000 0.2008467 8.004165 33.346456 3.5773132 14.178788 74.06061
## 2001 0.2000000 8.014091 33.331552 3.5950000 14.036364 75.54545
## 2002 0.2000000 8.021165 33.339878 4.6063235 14.256277 74.17749
## 2003 0.2000000 8.028238 33.348205 5.6176471 14.476190 72.80952
## 2004 0.2000000 8.041311 33.338380 5.2684211 14.642222 73.42222
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## 2006 0.2000000 7.963065 33.401684 1.9035714 13.506452 85.22581
## 2007 0.2000000 7.916000 33.483973 1.3000000 12.922727 89.97727
## 2008 0.2000000 7.935958 33.366483 3.6000000 14.079167 79.04167
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## 2010 0.2000000 7.917567 33.426746 3.5155556 14.996970 82.30303
## 2011 0.2000000 7.908372 33.456877 3.4733333 14.681818 75.27273
## 2012 0.2000000 7.899176 33.487009 3.4311111 13.809046 81.62166
## 2013 0.2000000 7.889980 33.517140 3.3888889 12.936275 87.97059
## 2014 0.2000000 7.935750 33.484376 3.3466667 14.039349 87.15196
## 2015 0.2000000 7.981520 33.451611 3.3044444 15.142424 86.33333
## 2016 0.2000000 8.027291 33.418846 3.2622222 15.239394 86.78788
## 2017 0.2000000 8.073061 33.386082 3.2200000 14.854545 83.09091
## 2018 0.2000000 8.072159 33.381552 3.2368421 14.838636 81.63636
## 2019 0.2000000 8.070595 33.397433 2.4558824 14.883333 87.85714
## 2020 0.2000000 7.968524 33.424071 5.7153846 13.142857 90.00000
## 2021 0.2000000 7.969526 33.409932 2.9142857 14.178947 89.00000
## 2022 0.2000000 7.964694 33.302100 3.4550000 15.269444 85.08333
## 2023 0.2000000 8.045000 33.352609 2.1187500 14.513636 90.27273
## 2024 0.2000000 8.014684 33.395558 2.2381250 14.894697 81.92424
## 2025 0.2000000 7.984368 33.438507 2.3575000 15.275758 73.57576
## 2026 0.2000000 7.954051 33.481455 2.4768750 13.979545 82.40553
## 2027 0.2000000 7.923735 33.524404 2.5962500 12.683333 91.23529
## 2028 0.2000000 7.925804 33.511827 2.7156250 15.157576 80.00000
## 2029 0.2000000 7.927873 33.499250 2.8350000 15.068182 79.10606
## 2030 0.2000000 7.929942 33.486674 2.9543750 14.978788 78.21212
## 2031 0.2000000 7.932011 33.474097 3.0737500 14.849242 78.55303
## 2032 0.2000000 7.934080 33.461520 3.1931250 14.719697 78.89394
## 2033 0.2000000 7.936149 33.448943 3.3125000 14.590152 79.23485
## 2034 0.2000000 7.938218 33.436367 3.4318750 14.460606 79.57576
## 2035 0.2000000 7.940286 33.423790 3.5512500 14.543939 79.60606
## 2036 0.2000000 7.942355 33.411213 3.6706250 14.627273 79.63636
## 2037 0.2000000 7.944424 33.398636 3.7900000 13.654545 80.57576
## 2038 0.2000000 7.927167 33.444195 3.1764706 13.380952 83.35714
## 2039 0.2000000 7.962386 33.402793 5.1342105 13.852273 76.52273
## 2040 0.2083333 7.798461 33.713014 4.9327530 11.872549 89.85294
## 2041 0.2166667 7.817179 33.636586 4.7312955 12.117953 86.34804
## 2042 0.2250000 7.835897 33.560159 4.5298381 12.363358 82.84314
## 2043 0.2333333 7.854615 33.483732 4.3283806 12.608762 79.33824
## 2044 0.2416667 7.873333 33.407304 4.1269231 12.854167 75.83333
## 2045 0.2500000 7.819581 33.617658 3.8357143 11.964516 84.09677
## 2046 0.2583333 7.702375 33.804778 2.5421053 11.246875 86.65625
## 2047 0.2666667 7.776308 33.791015 4.1700000 13.106522 77.32609
## 2048 0.2750000 7.837703 33.726484 4.6288158 13.452833 76.88406
## 2049 0.2833333 7.899098 33.661952 5.0876316 13.799144 76.44203
## 2050 0.2916667 7.960494 33.597421 5.5464474 14.145455 76.00000

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## 2051 0.3000000 8.021889 33.532889 6.0052632 13.746667 75.13333
## 2052 0.6166667 7.999576 33.554518 6.3150000 13.096970 74.63636
## 2053 0.3400000 7.942595 33.567255 5.3970588 12.557143 79.78571
## 2054 0.3489583 7.866032 33.734461 3.9821429 11.812903 84.25806
## 2055 0.3579167 7.799907 33.828679 4.2931034 11.223256 88.11628
## 2056 0.3668750 8.055667 33.633696 4.1923077 13.366667 79.95833
## 2057 0.3758333 8.024558 33.662380 4.3928994 13.478788 78.64899
## 2058 0.3847917 7.993449 33.691065 4.5934911 13.590909 77.33965
## 2059 0.3937500 7.962340 33.719749 4.7940828 13.703030 76.03030
## 2060 0.4027083 7.931231 33.748434 4.9946746 13.548485 76.43182
## 2061 0.4116667 7.900123 33.777119 5.1952663 13.393939 76.83333
## 2062 0.4206250 7.869014 33.805803 5.3958580 13.239394 77.23485
## 2063 0.4295833 7.837905 33.834488 5.5964497 13.084848 77.63636
## 2064 0.4385417 7.806796 33.863172 5.7970414 12.384848 77.39394
## 2065 0.4475000 7.775687 33.891857 5.9976331 11.538503 82.37834
## 2066 0.4564583 7.744578 33.920541 6.1982249 10.692157 87.36275
## 2067 0.4654167 7.833729 33.816820 6.3988166 12.233333 73.75758
## 2068 0.4743750 7.922880 33.713100 6.5994083 13.769697 64.63636
## 2069 0.4833333 8.012030 33.609379 6.8000000 13.403030 66.00000
## 2070 0.2000000 8.011273 33.573095 5.0552632 13.586364 74.79545
## 2071 0.2000000 7.951643 33.573974 3.6294118 12.978571 85.00000
## 2072 0.2125000 7.784140 33.818279 2.9172414 11.062791 88.11628
## 2073 0.2250000 7.838806 33.763332 3.2285714 12.306452 84.87097
## 2074 0.2375000 7.970792 33.790669 4.0653846 13.400000 81.75000
## 2075 0.2500000 7.885028 33.818005 4.0061589 13.484848 80.34470
## 2076 0.2625000 7.799263 33.845342 3.9469331 13.569697 78.93939
## 2077 0.2750000 7.713499 33.872678 3.8877074 12.340241 83.31283
## 2078 0.2875000 7.627735 33.900015 3.8284816 11.110784 87.68627
## 2079 0.3000000 7.704531 33.841543 3.7692559 12.242543 85.32620
## 2080 0.3125000 7.781327 33.783071 3.7100302 13.374302 82.96613
## 2081 0.3250000 7.858123 33.724599 3.6508044 14.506061 80.60606
## 2082 0.3375000 7.934918 33.666127 3.5915787 14.056602 80.91017
## 2083 0.3500000 8.011714 33.607655 3.5323529 13.607143 81.21429
## 2084 0.4833333 8.045089 33.584516 4.3973684 14.917778 76.53333
## 2085 0.3416667 8.042166 33.601558 4.1386842 16.345455 82.15152
## 2086 0.2000000 8.039242 33.618600 3.8800000 15.493939 79.06061
## 2087 0.2000000 7.849355 33.657642 3.4392857 12.322581 85.32258
## 2088 0.2000000 8.028542 33.607996 4.8615385 14.733333 80.12500
## 2089 0.2000000 7.778978 33.759096 2.8000000 11.504444 80.40657
## 2090 0.2000000 7.767128 33.763232 2.8428571 14.093131 80.68813
## 2091 0.2000000 7.755278 33.767369 2.8857143 16.681818 80.96970
## 2092 0.2000000 7.743429 33.771506 2.9285714 11.630612 87.82653
## 2093 0.2000000 7.769200 33.751122 2.9714286 14.009246 84.35266
## 2094 0.2000000 7.794972 33.730737 3.0142857 16.387879 80.87879
## 2095 0.2000000 7.820744 33.710352 3.0571429 13.842424 81.48485
## 2096 0.2000000 7.846516 33.689968 3.1000000 12.600000 85.51613
## 2097 0.2000000 8.074500 33.564875 5.5769231 14.875000 78.37500
## 2098 0.2000000 7.761500 33.781550 3.4500000 11.975000 80.12500
## 2099 0.2000000 7.897702 33.694465 4.2275641 18.012121 79.48485
## 2100 0.2000000 8.033903 33.607381 5.0051282 15.154839 82.37097
## 2101 0.2000000 8.045644 33.542496 4.3973684 16.722222 80.40000
## 2102 0.2000000 8.099833 33.498974 2.7294118 15.457143 84.80952
## 2103 0.2000000 8.094589 33.493562 2.9117380 16.597691 83.02453
## 2104 0.2000000 8.089345 33.488151 3.0940642 17.738240 81.23954

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## 2105 0.2000000 8.084102 33.482740 3.2763904 18.878788 79.45455
## 2106 0.2000000 8.078858 33.477329 3.4587166 18.308081 80.52525
## 2107 0.2000000 8.073614 33.471917 3.6410428 17.737374 81.59596
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## 2109 0.2000000 8.063126 33.461095 4.0056952 16.649495 82.51515
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## 2111 0.2000000 8.052638 33.450272 4.3703476 15.615152 82.21212
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## 2113 0.2000000 7.999939 33.366182 4.7350000 13.512121 77.27273
## 2114 1.5083333 8.025044 33.391604 4.4473684 13.546667 80.11111
## 2115 0.2000000 7.988690 33.445660 3.3264706 13.154762 83.66667
## 2116 0.2722222 8.007500 33.436183 3.4757516 14.804167 77.33333
## 2117 0.3444444 8.023333 33.440618 3.6250327 14.145455 77.78788
## 2118 0.41666667 8.110848 33.426124 3.7743137 16.196970 76.69697
## 2119 0.4888889 8.074629 33.426685 3.9235948 15.872727 77.14394
## 2120 0.5611111 8.038409 33.427245 4.0728758 15.548485 77.59091
## 2121 0.6333333 8.002189 33.427806 4.2221569 15.224242 78.03788
## 2122 0.7055556 7.965970 33.428367 4.3714379 14.900000 78.48485
## 2123 0.7777778 8.015803 33.406527 4.5207190 14.950000 76.71212
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## 2125 0.46666667 8.053756 33.350104 7.6526316 14.848889 75.08889
## 2126 0.2000000 8.000381 33.353031 6.7333333 14.288095 78.57143
## 2127 0.3222222 7.978273 33.365145 6.8618056 15.021212 77.45455
## 2128 0.4444444 8.057250 33.382513 6.9902778 17.500000 73.12500
## 2129 0.56666667 8.071419 33.377374 7.1187500 17.543434 73.09343
## 2130 0.6888889 8.085588 33.372235 7.2472222 17.586869 73.06187
## 2131 0.8111111 8.099758 33.367097 7.3756944 17.630303 73.03030
## 2132 0.9333333 8.073205 33.351057 7.5041667 16.988636 74.20455
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## 2134 1.1777778 8.020098 33.318977 7.7611111 15.705303 76.55303
## 2135 1.3000000 7.993545 33.302936 7.8895833 15.063636 77.72727
## 2136 1.4222222 8.032364 33.280633 8.0180556 15.203030 71.89394
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## 2153 0.2000000 8.078121 33.147555 6.3308381 16.709091 80.21212
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## 2155 0.2000000 8.028222 33.144107 8.4764706 15.907407 83.92593
## 2156 0.3363636 8.012396 33.138125 4.5485714 15.389583 86.22917
## 2157 0.3258741 8.070970 33.176755 4.5209890 15.530303 82.39394
## 2158 0.3153846 8.040167 33.166885 4.4934066 15.615152 80.54545

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## 2159 0.3048951 8.009364 33.157015 4.4658242 15.700000 78.69697
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## 2161 0.2839161 8.038792 33.197404 4.4106593 15.508333 73.83333
## 2162 0.2734266 8.045214 33.181826 4.3830769 15.164773 77.43182
## 2163 0.2629371 8.051636 33.166248 4.3554945 14.821212 81.03030
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## 2265 0.2000000 7.974889 33.551016 3.8974837 13.286667 86.55556
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## 2643 0.2000000 8.073643 33.455219 10.4500000 14.623810 87.42857
## 2644 0.2000000 8.141083 33.441954 10.9900000 16.208333 85.62500

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## 2648 0.2000000 8.165667 33.442509 10.6124880 15.693939 83.33333
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## 2697 0.2000000 8.147303 33.496956 8.4591765 15.895960 84.07071
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## 2703 0.2000000 8.078244 33.489978 6.1421053 15.048889 73.84444
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## 2903 0.2000000 8.162712 33.422085 4.4785697 13.390909 68.63636
## 2904 0.2000000 8.172515 33.371000 4.6945635 13.603030 58.63636
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## 2909 0.2000000 8.083825 33.454007 5.7745325 13.017441 71.03232
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## 2913 0.2000000 8.068515 33.493391 5.4275000 12.966667 73.09091
## 2914 0.2400000 8.032030 33.478644 5.4932500 13.293939 75.06061

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## 3916 0.2000000 7.976162 33.640932 2.8936120 14.096237 77.35366
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## 3936 0.2000000 8.120101 33.545875 3.0553125 14.412000 80.25230
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## 3939 0.2000000 8.127071 33.546461 2.9775000 14.623636 80.15394
## 3940 0.2000000 8.129394 33.546657 2.9515625 14.611288 81.06447

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## 4423 0.2000000 8.035128 33.455410 3.4446359 14.499487 59.38385
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## 4425 0.2000000 8.053897 33.456850 3.4708403 14.627299 65.50615
## 4426 0.2000000 8.063282 33.457569 3.4839426 14.691205 68.56729

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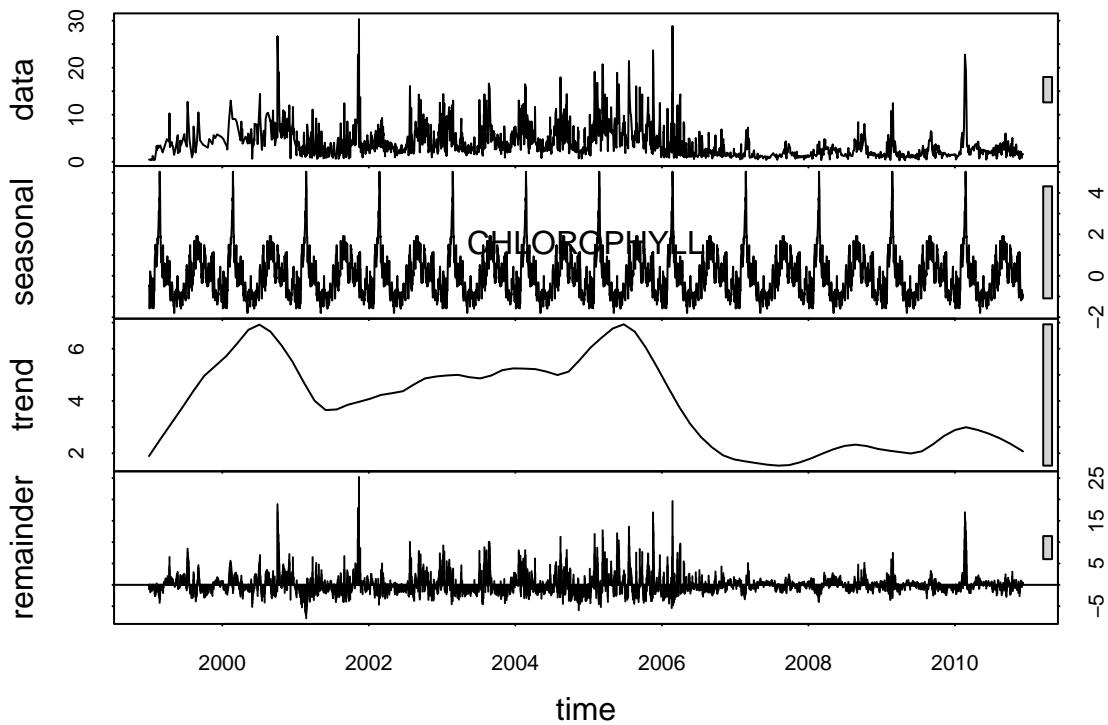
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## [ reached 'max' / getOption("max.print") -- omitted 3035 rows ]

##### 5 YEAR - 1996 - 2001 #####
ts_chlorophyll <- ts(owt_df02_gb04_mrgd$CHLOROPHYLL, start = c(1996, 1), freq = 365)
ts_1996_2001_chl <- window(ts_chlorophyll, start=c(1999, 1))
stl_chl <- stl(ts_1996_2001_chl, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_chl)
mtext("CHLOROPHYLL", side=3, line = -5)

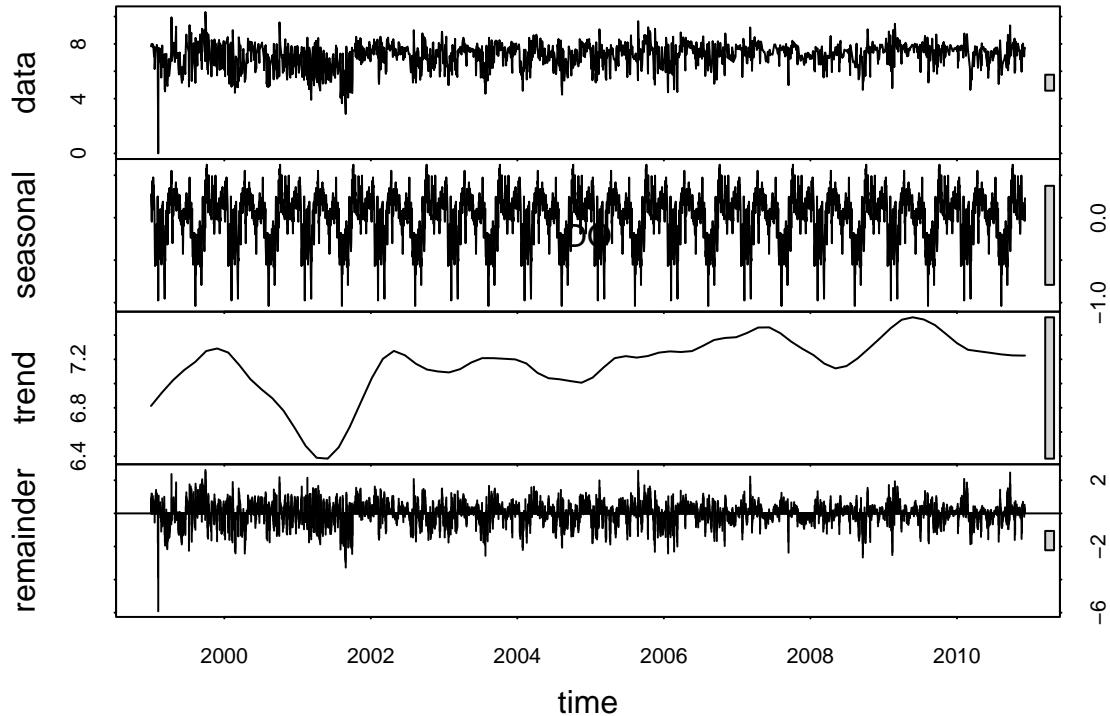
```



```

ts_do <- ts(owt_df02_gb04_mrgd$D0, start = c(1996, 1), freq = 365)
ts_1996_2001_do <- window(ts_do, start=c(1999, 1))
stl_do <- stl(ts_1996_2001_do, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_do)
mtext("D0", side=3, line = -5)

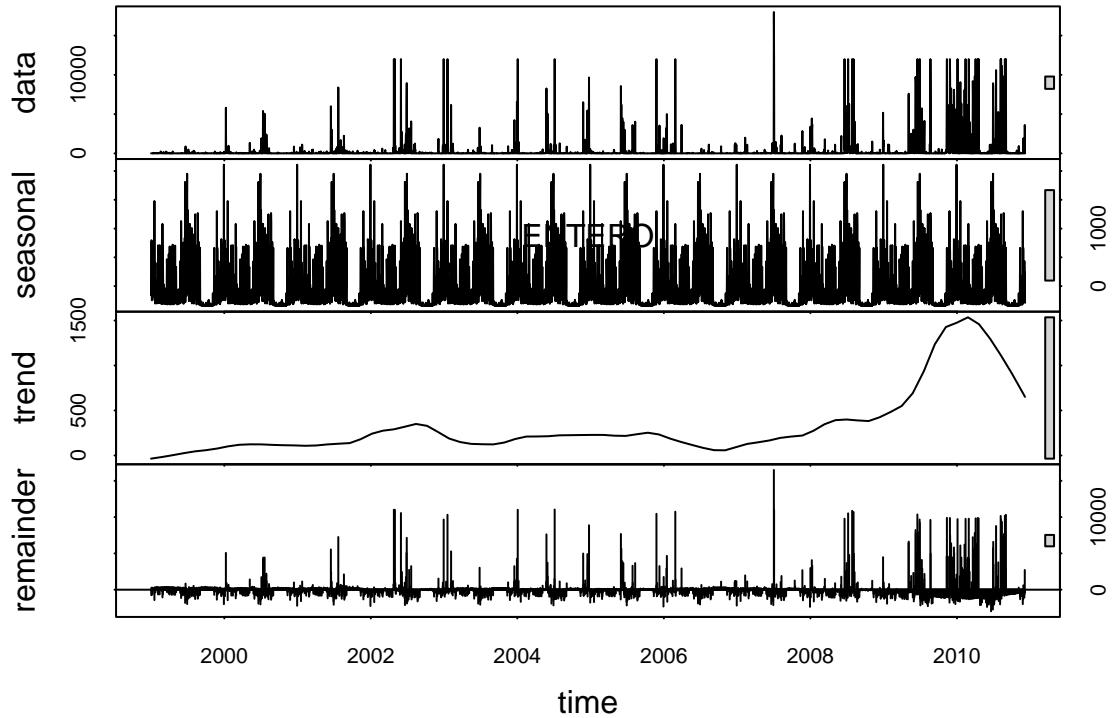
```



```

ts_ent <- ts(owt_df02_gb04_mrgd$ENTERO, start = c(1996, 1), freq = 365)
ts_1996_2001_ent <- window(ts_ent, start=c(1999, 1))
stl_ent <- stl(ts_1996_2001_ent, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_ent)
mtext("ENTERO", side=3, line = -5)

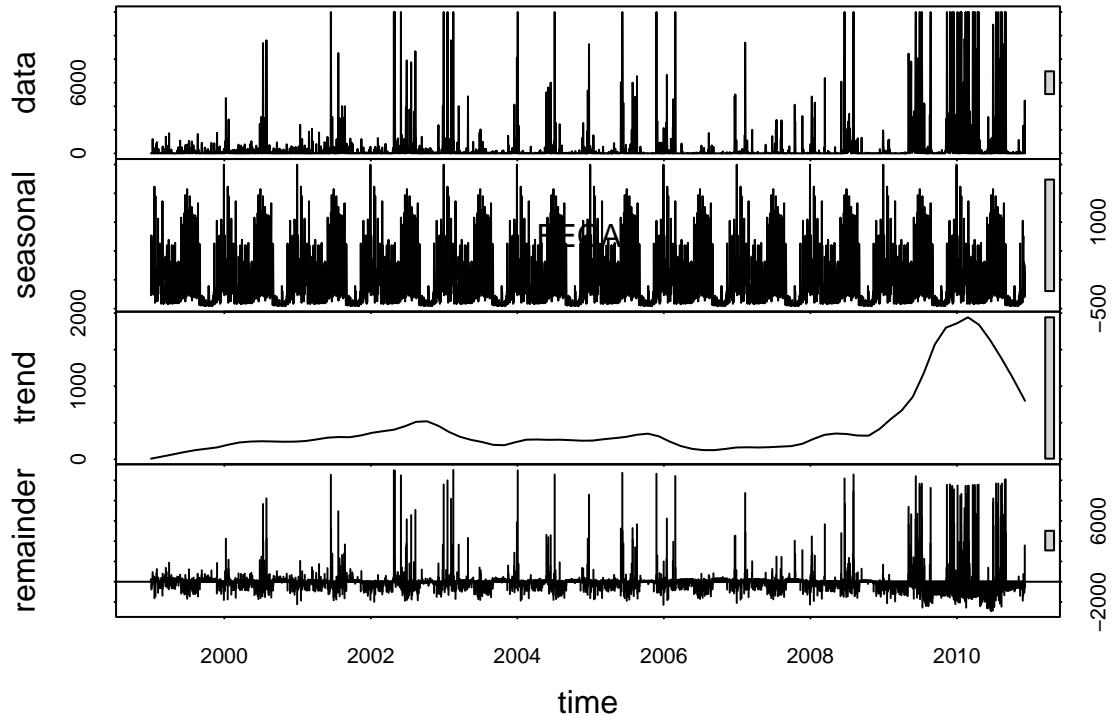
```



```

ts_fecal <- ts(owt_df02_gb04_mrgd$FECAL, start = c(1996, 1), freq = 365)
ts_1996_2001_fecal <- window(ts_fecal, start=c(1999, 1))
stl_fecal <- stl(ts_1996_2001_fecal, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_fecal)
mtext("FECAL", side=3, line = -5)

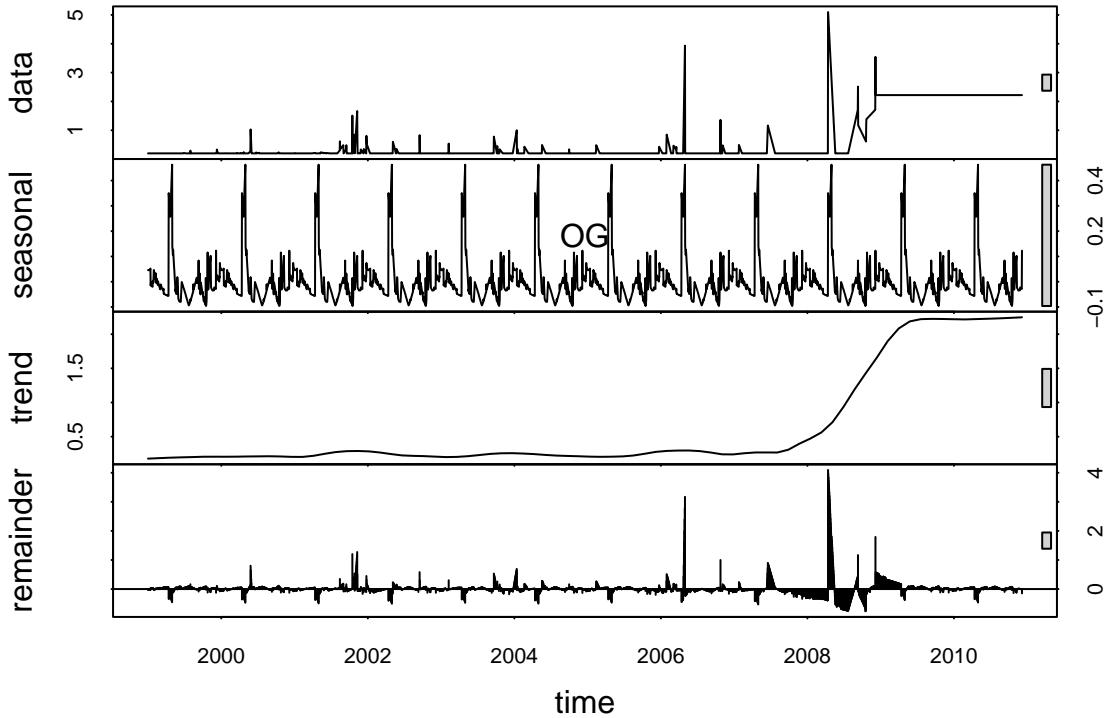
```



```

ts_og <- ts(owt_df02_gb04_mrgd$OG, start = c(1996, 1), freq = 365)
ts_1996_2001_og <- window(ts_og, start=c(1999, 1))
stl_og <- stl(ts_1996_2001_og, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_og)
mtext("OG", side=3, line = -5)

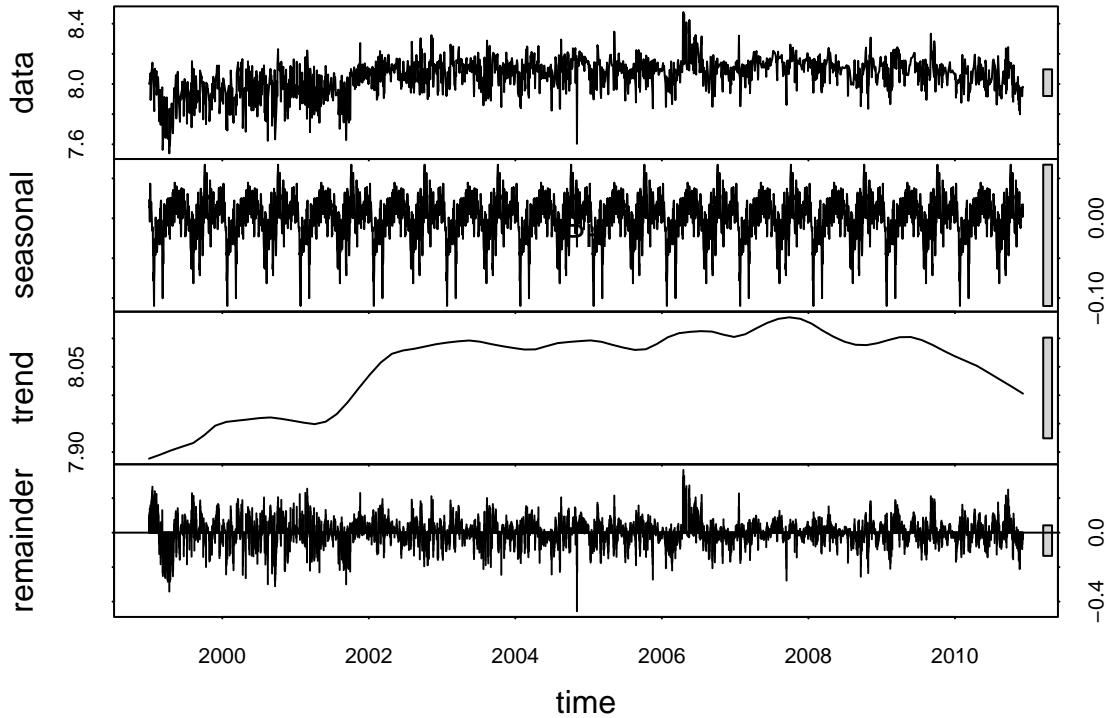
```



```

ts_ph <- ts(owt_df02_gb04_mrgd$PH, start = c(1996, 1), freq = 365)
ts_1996_2001_ph <- window(ts_ph, start=c(1999, 1))
stl_ph <- stl(ts_1996_2001_ph, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_ph)
mtext("PH", side=3, line = -5)

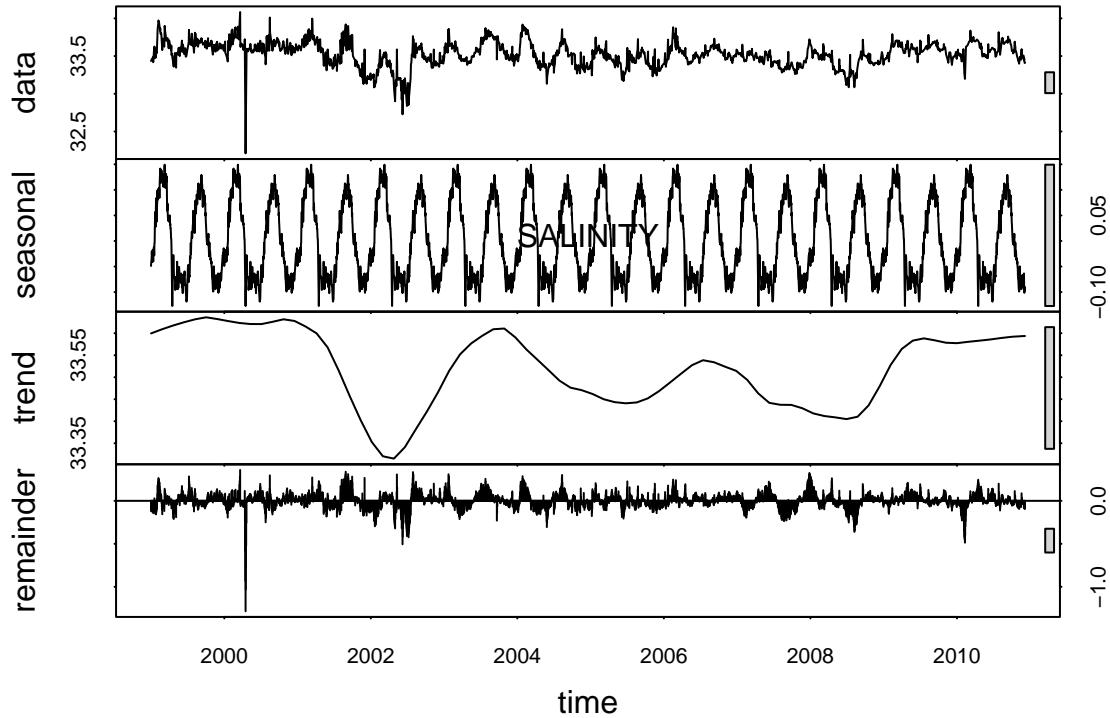
```



```

ts_salinity <- ts(owt_df02_gb04_mrgd$SALINITY, start = c(1996, 1), freq = 365)
ts_1996_2001_salinity <- window(ts_salinity, start=c(1999, 1))
stl_salinity <- stl(ts_1996_2001_salinity, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_salinity)
mtext("SALINITY", side=3, line = -5)

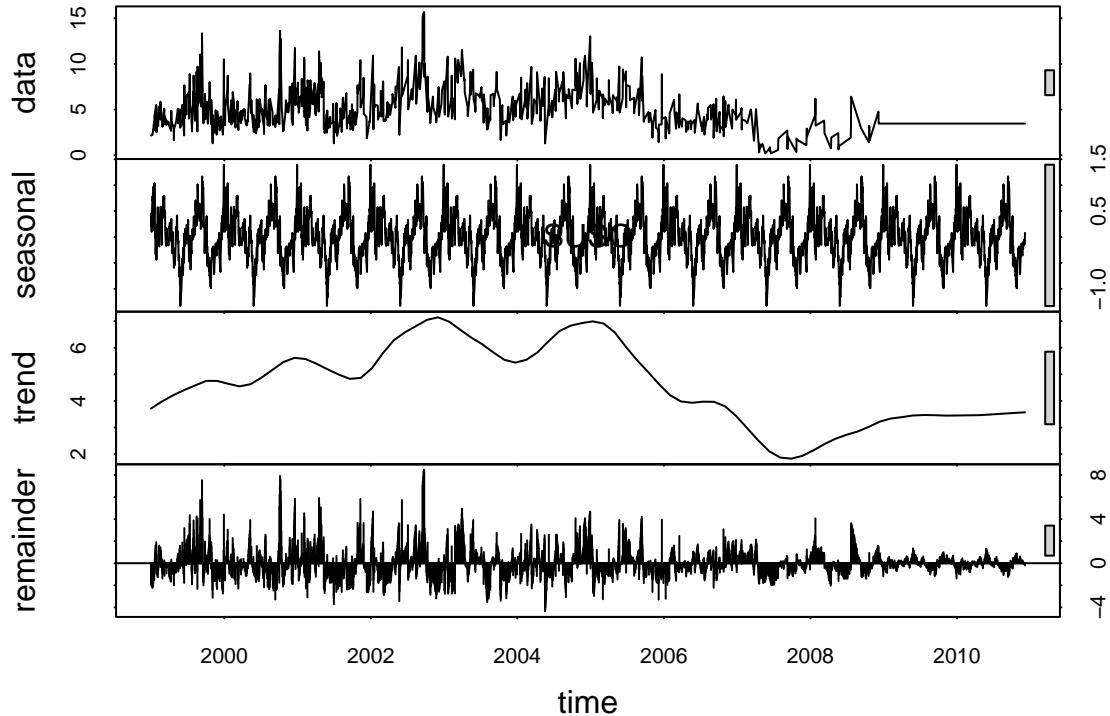
```



```

ts_suso <- ts(owt_df02_gb04_mrgd$SUSO, start = c(1996, 1), freq = 365)
ts_1996_2001_suso <- window(ts_suso, start=c(1999, 1))
stl_suso <- stl(ts_1996_2001_suso, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_suso)
mtext("SUSO", side=3, line = -5)

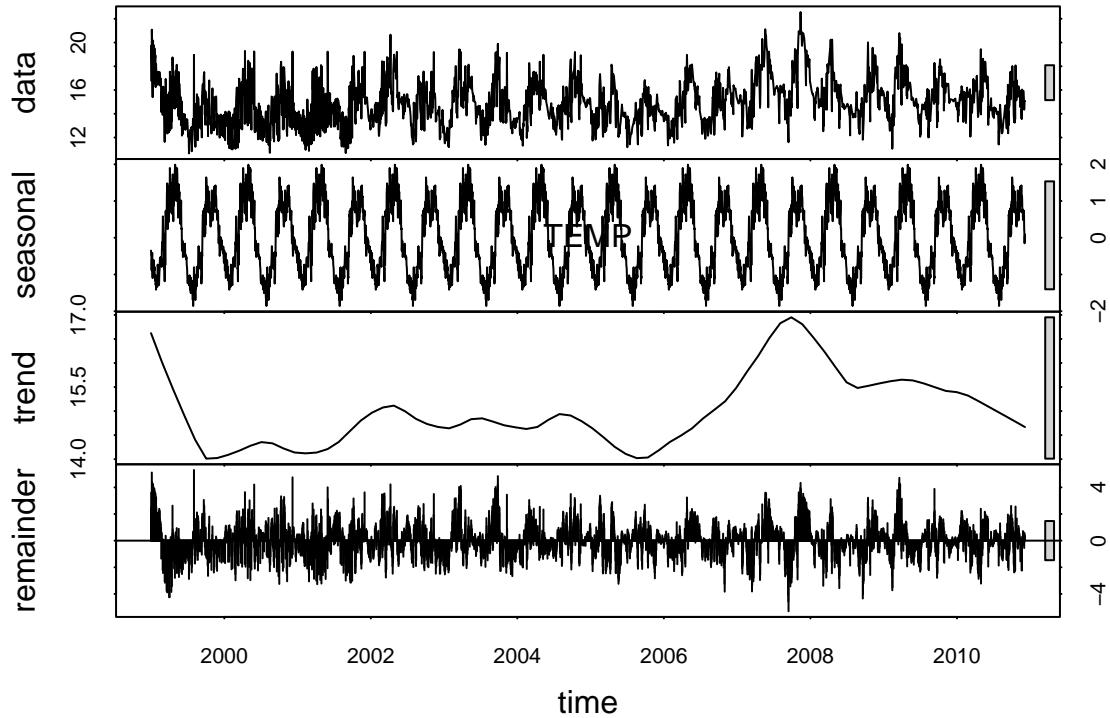
```



```

ts_temp <- ts(owt_df02_gb04_mrgd$TEMP, start = c(1996, 1), freq = 365)
ts_1996_2001_temp <- window(ts_temp, start=c(1999, 1))
stl_temp <- stl(ts_1996_2001_temp, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_temp)
mtext("TEMP", side=3, line = -5)

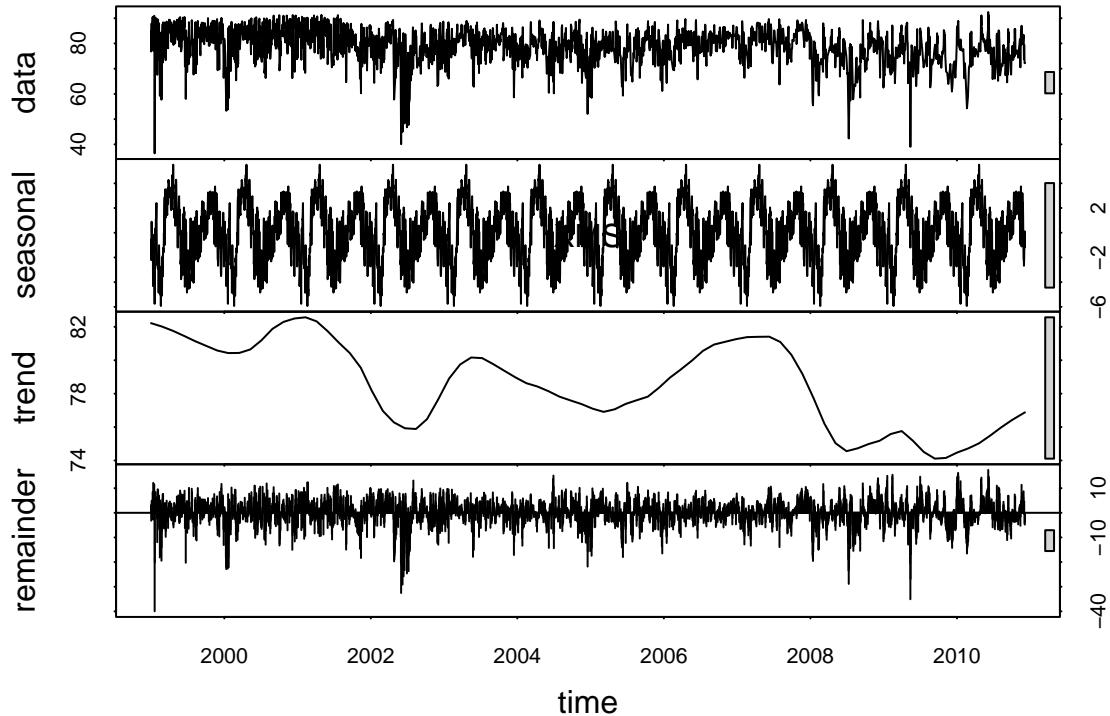
```



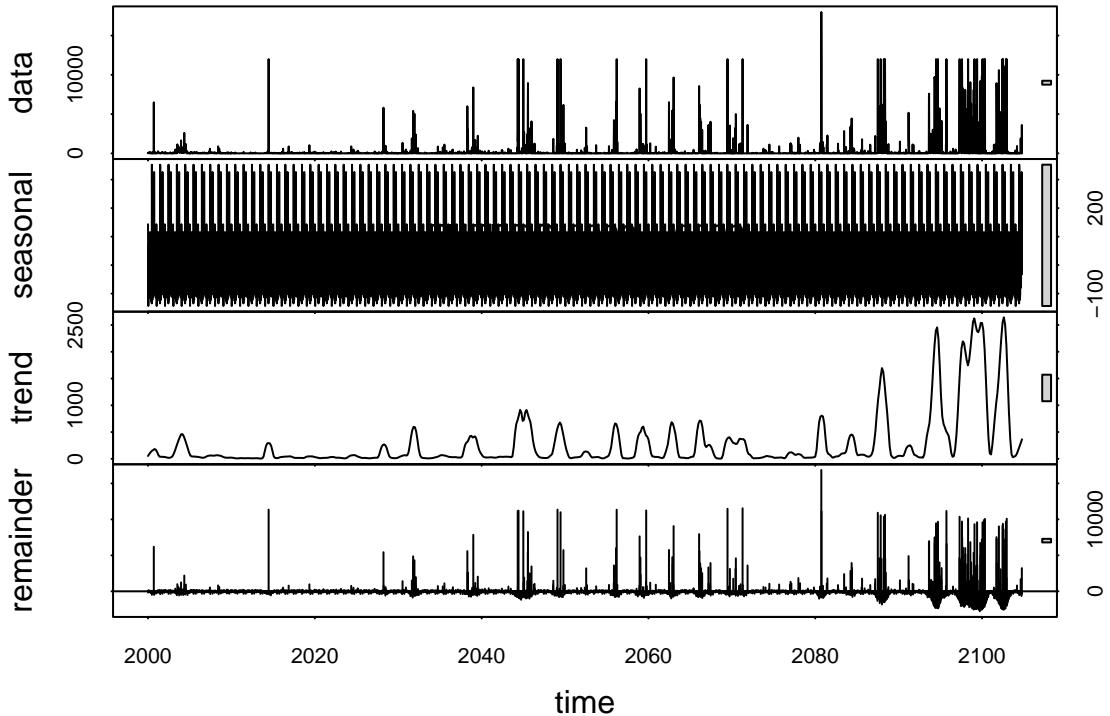
```

ts_xms <- ts(owt_df02_gb04_mrgd$XMS, start = c(1996, 1), freq = 365)
ts_1996_2001_xms <- window(ts_xms, start=c(1999, 1))
stl_xms <- stl(ts_1996_2001_xms, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_xms)
mtext("XMS", side=3, line = -5)

```



```
# 2000 - 2022 #####
ts_ent <- ts(owt_df02_gb04_mrgd$ENTERO, start = c(2000, 1), freq = 52)
ts_2000_2022_ent <- window(ts_ent, start=c(2000, 1))
stl_ent <- stl(ts_2000_2022_ent, s.window="periodic")
#labels.chart = seq(as.Date("1990-11-15"), as.Date("2021-12-29"), by = "weeks")
plot(stl_ent)
mtext("ENTERO 2000 - 2022", side=3, line = -5)
```



```
{r CC-EDA-STL-1YEARPERIOD}
```

1 YEAR - 2001

```
ts_chlorophyll <- ts(owt_df02_gb04_mrgd$CHLOROPHYLL, start = c(2001, 1), freq = 365)
ts_1996_2001_chl <- window(ts_chlorophyll, start=c(2001, 1), end=c(2001, 2)) plot(ts_1996_2001_chl)
stl_chl <- stl(ts_1996_2001_chl, s.window="periodic") #labels.chart = seq(as.Date("1990-11-15"),
as.Date("2021-12-29"), by = "weeks") plot(stl_chl) mtext("CHLOROPHYLL", side=3, line = -5)
```

```
#library(forecast)
```

```
# All parameters exhibited seasonal cycles within a year range, so
# it would make sense to have several years worth of datapoints for the training period.
# This set below can be used for all parameters.
train <- head(owt_df02_gb04_mrgd, round(NROW(owt_df02_gb04_mrgd) * 0.6))
h <- length(owt_df02_gb04_mrgd) - NROW(train)
test <- tail(owt_df02_gb04_mrgd, h)
```

Define custom function to produce scatterplots comparing multiple predictors to one target

```
param_lst03 <- c("CHLOROPHYLL",
                  "DENSITY",
                  "DO",
                  "FECAL",
                  "OG",
```

```

    "PH",
    "SALINITY",
    "SUSO",
    "TEMP",
    "XMS")

scatr <- function(df = NA,
                  y = NA,
                  x_lst = c()) {
  for (p in x_lst) {
    plot <- ggplot(df, aes(df[, p], df[, y])) +
      geom_point() +
      stat_smooth(method = "lm",
                  formula = y ~ x,
                  geom = "smooth") +
      labs(x = p,
            y = y,
            title = "Figure",
            subtitle = paste0("Scatterplot of ", p, " and ", y, " Series"))
    print(plot)
  }
}

```

Run custom function on data aggregated by date_sample and parameter

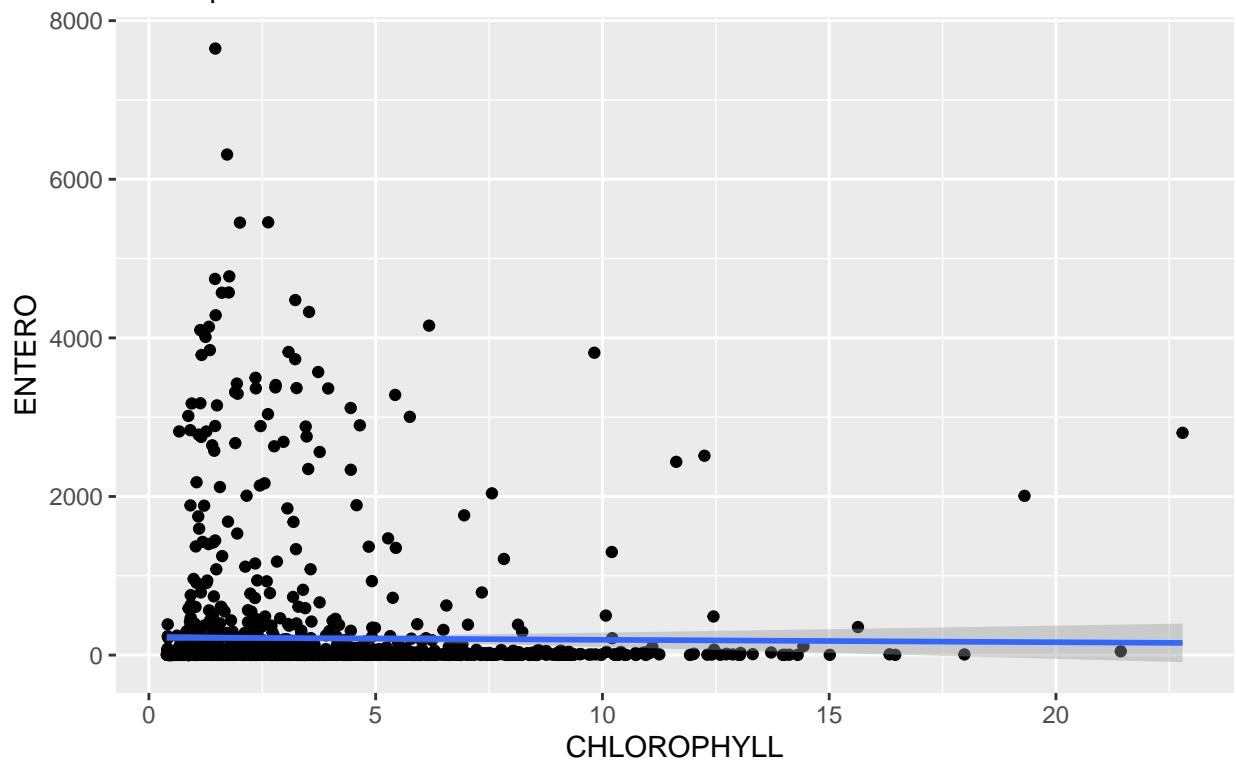
```

# All data
scatr(df = owt_df02_gb04_wkly,
      y = "ENTERO",
      x_lst = param_lst03)

```

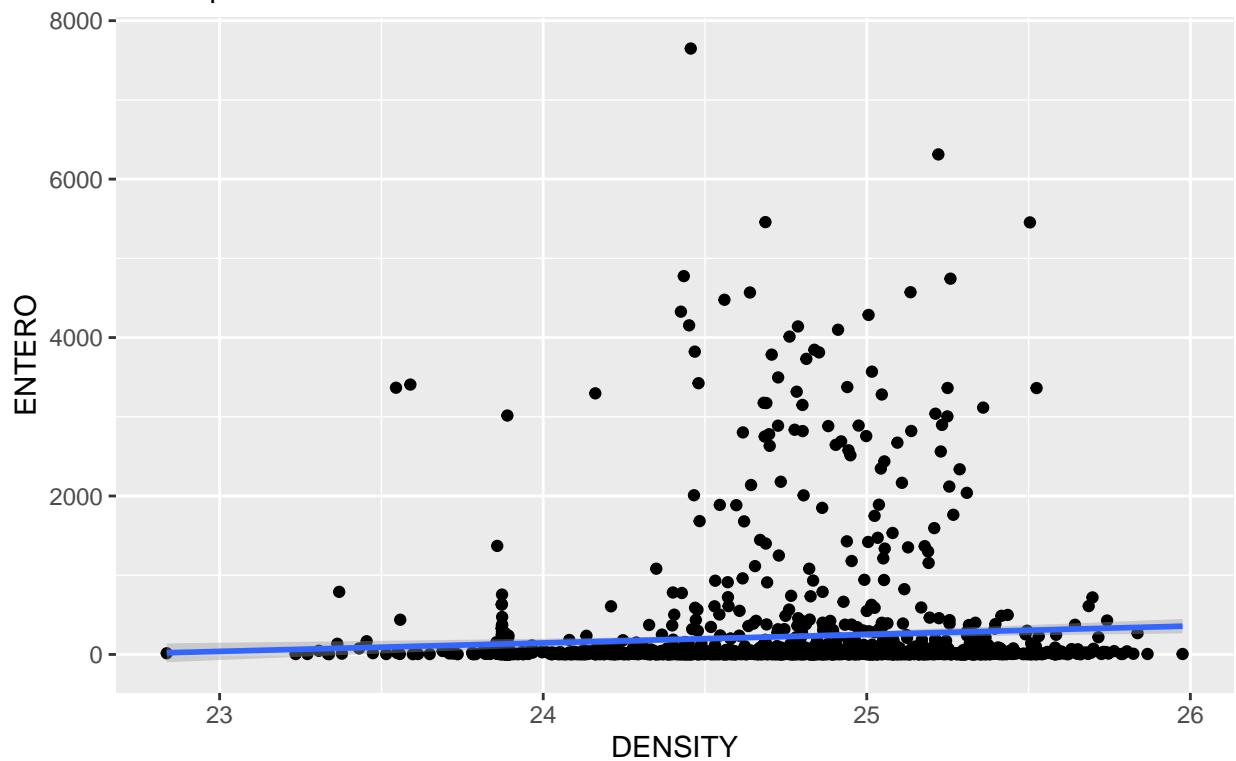
Figure

Scatterplot of CHLOROPHYLL and ENTERO Series



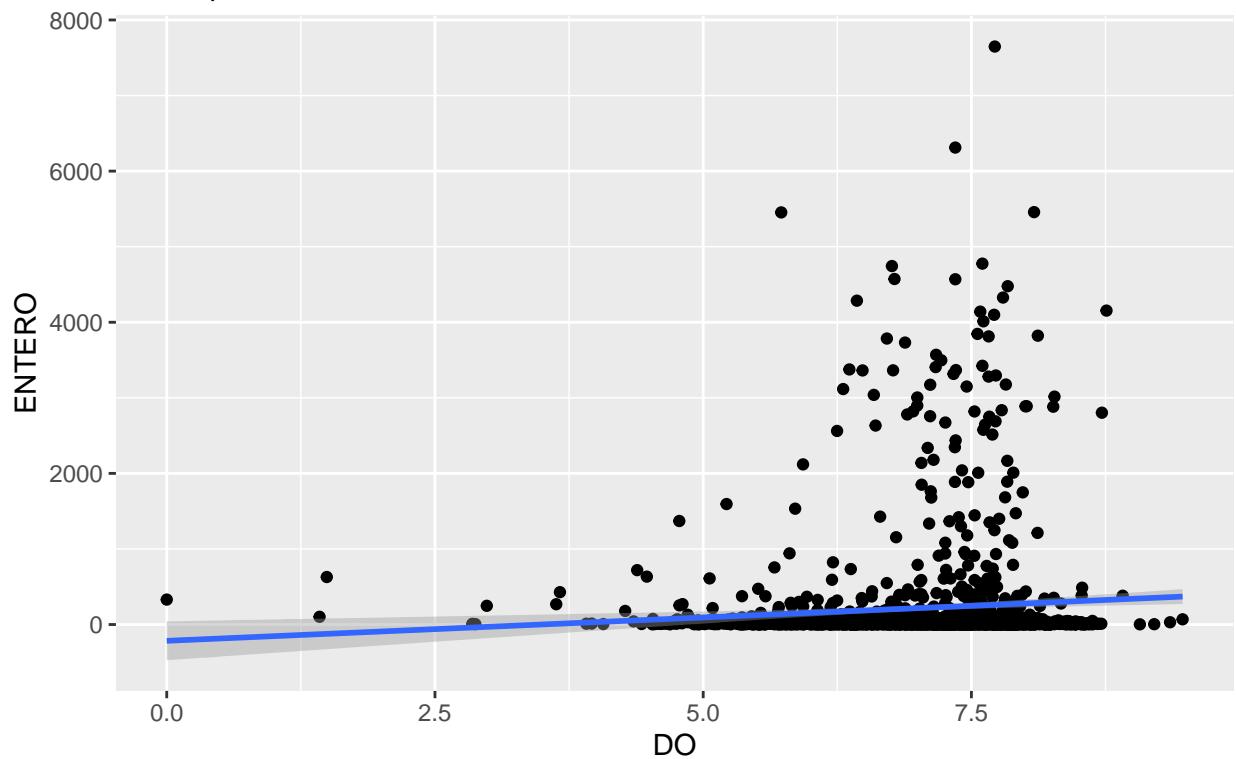
Figure

Scatterplot of DENSITY and ENTERO Series



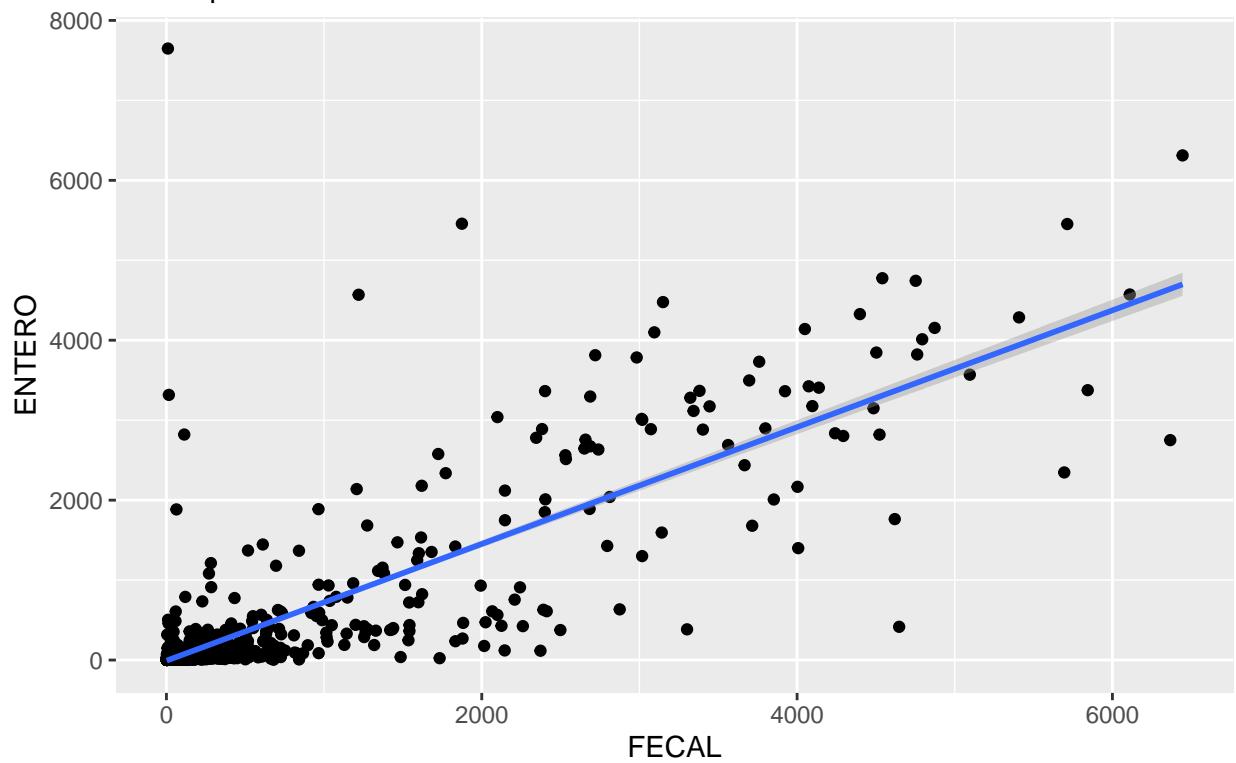
Figure

Scatterplot of DO and ENTERO Series



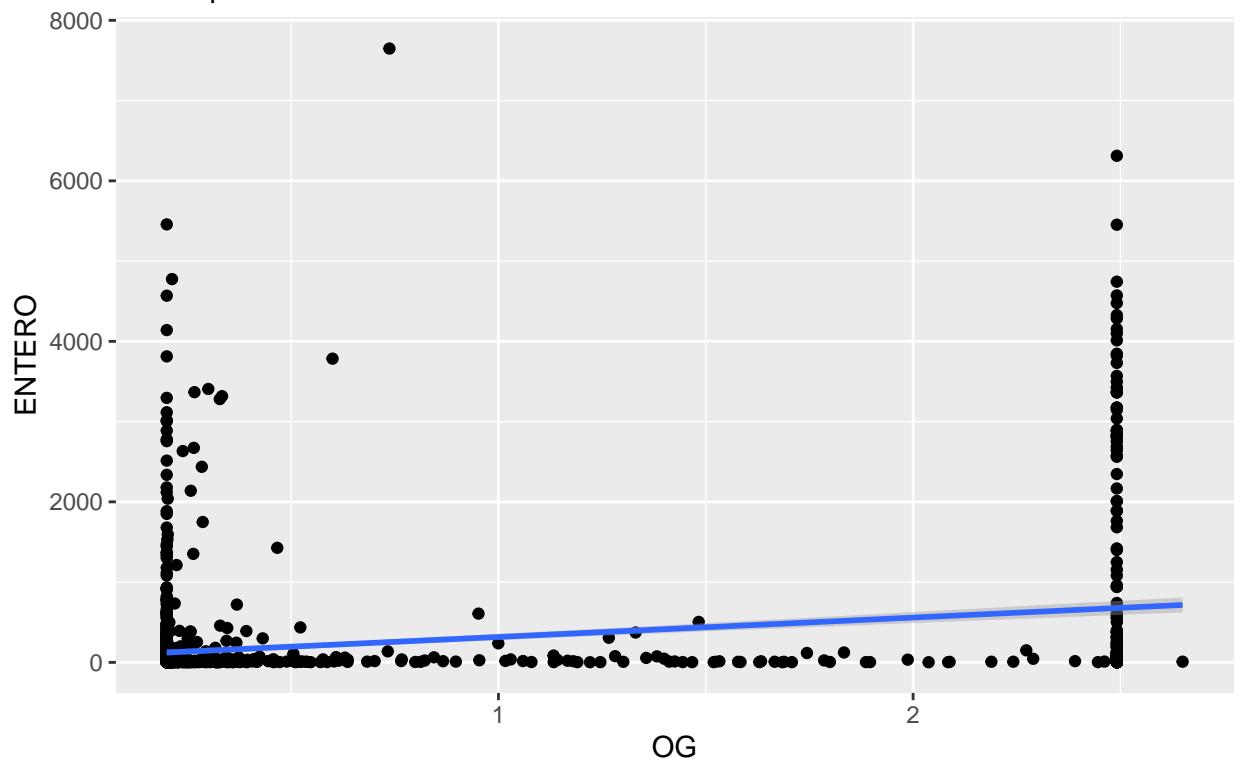
Figure

Scatterplot of FECAL and ENTERO Series



Figure

Scatterplot of OG and ENTERO Series



Figure

Scatterplot of PH and ENTERO Series

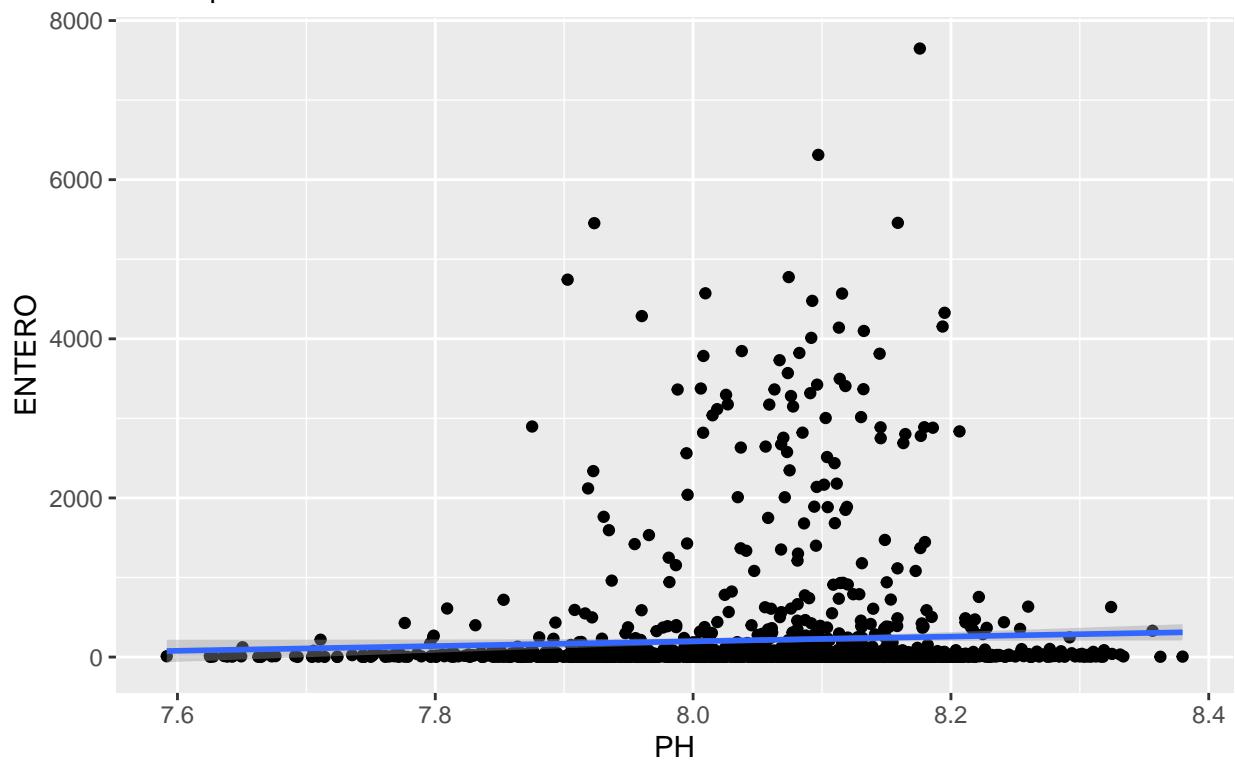


Figure
Scatterplot of SALINITY and ENTERO Series

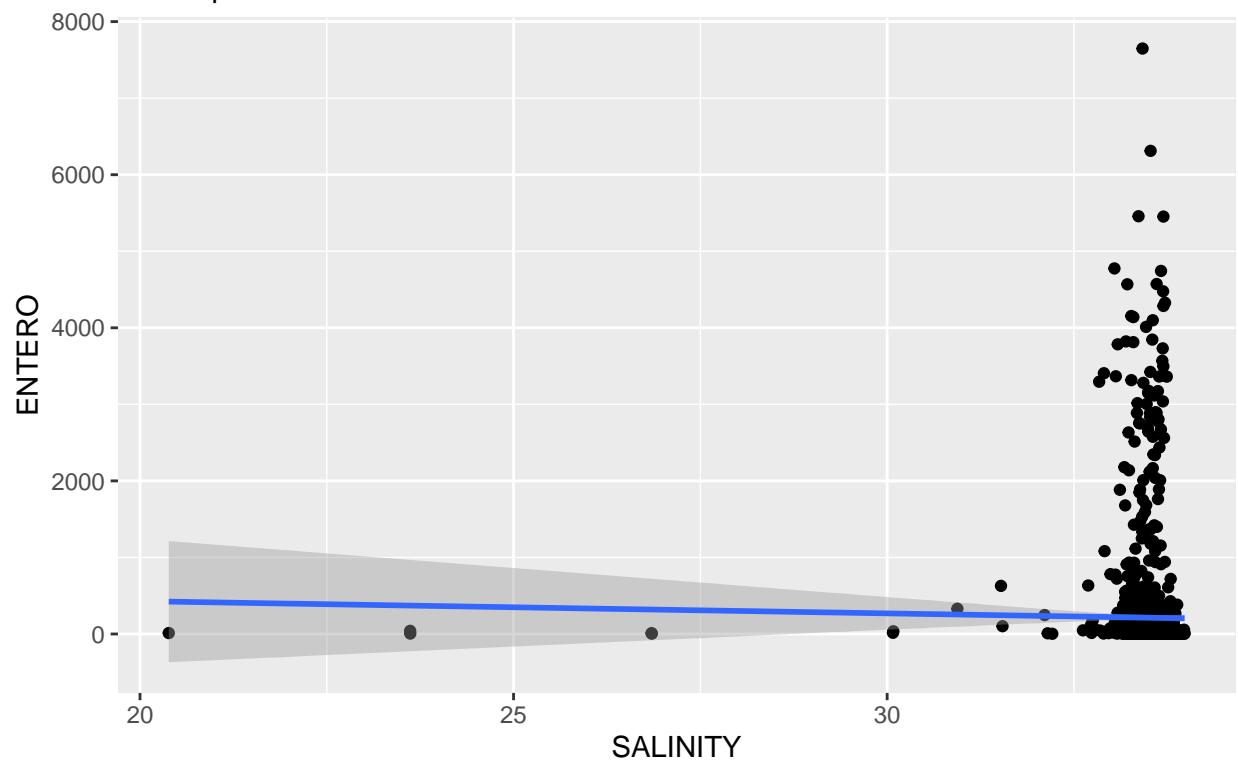


Figure
Scatterplot of SUSO and ENTERO Series

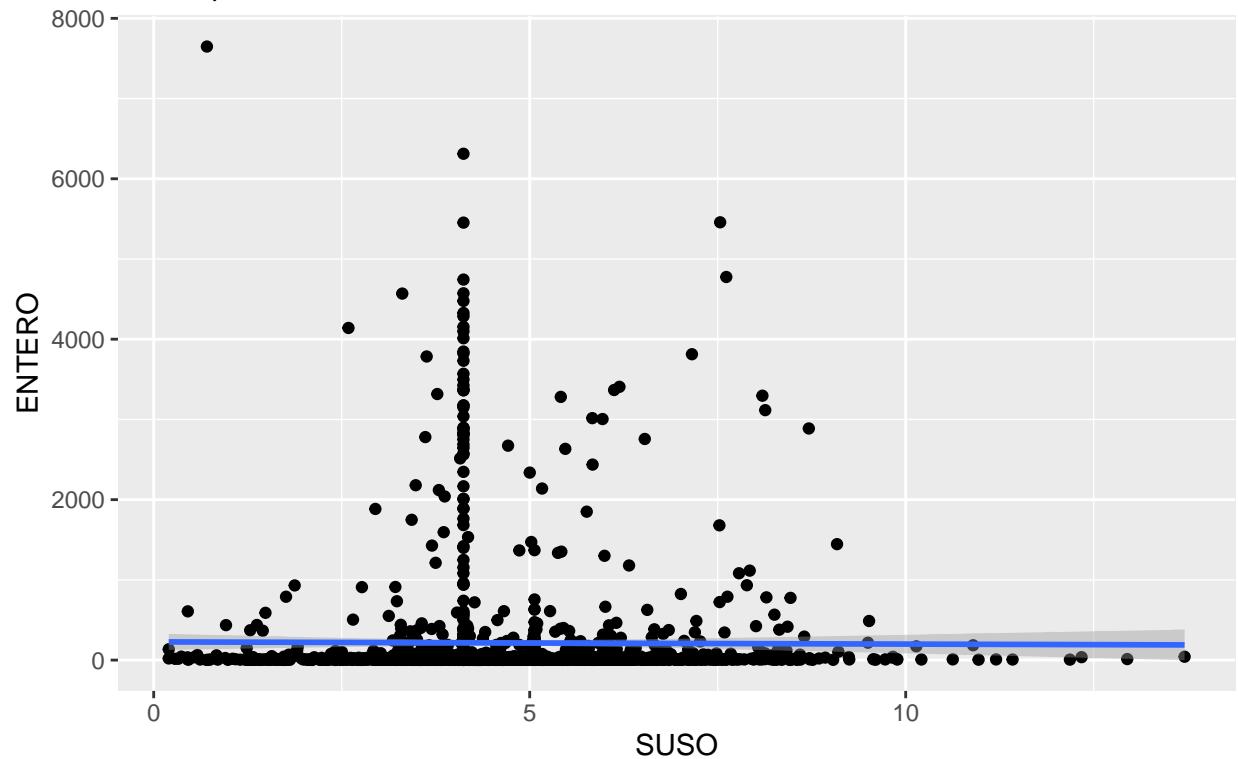
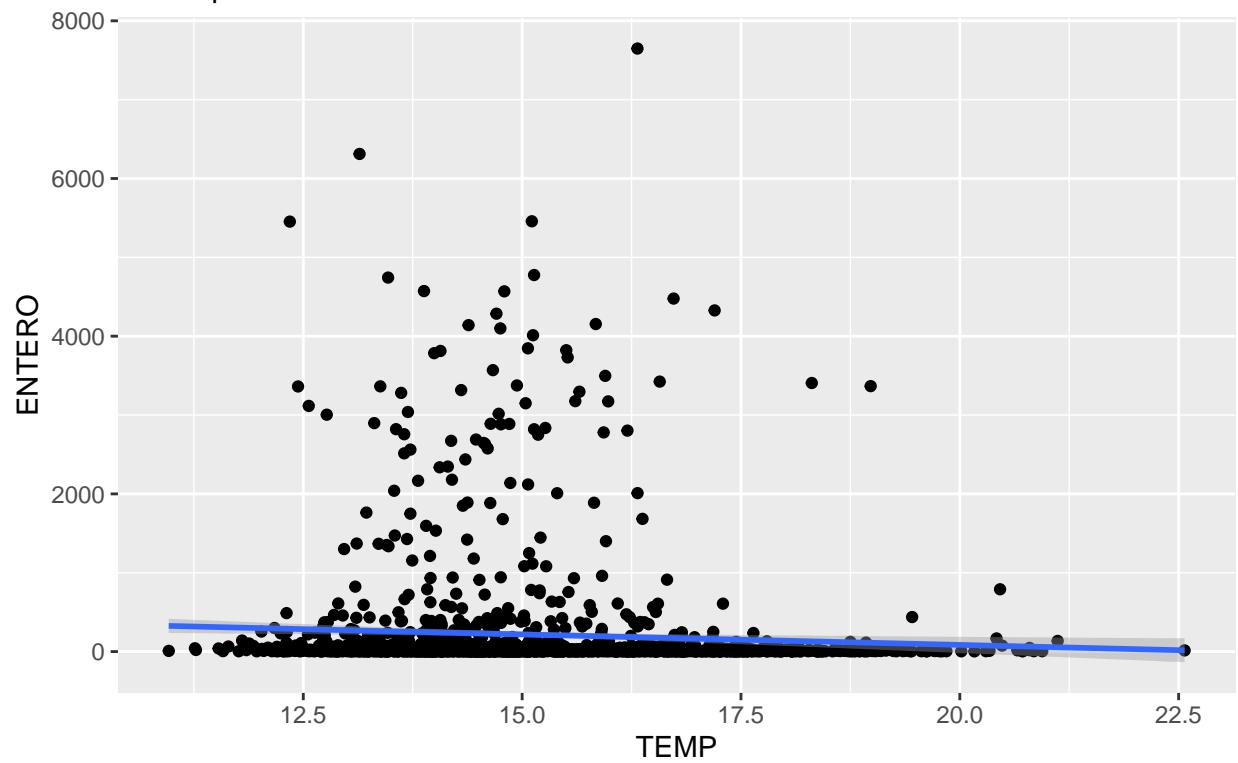
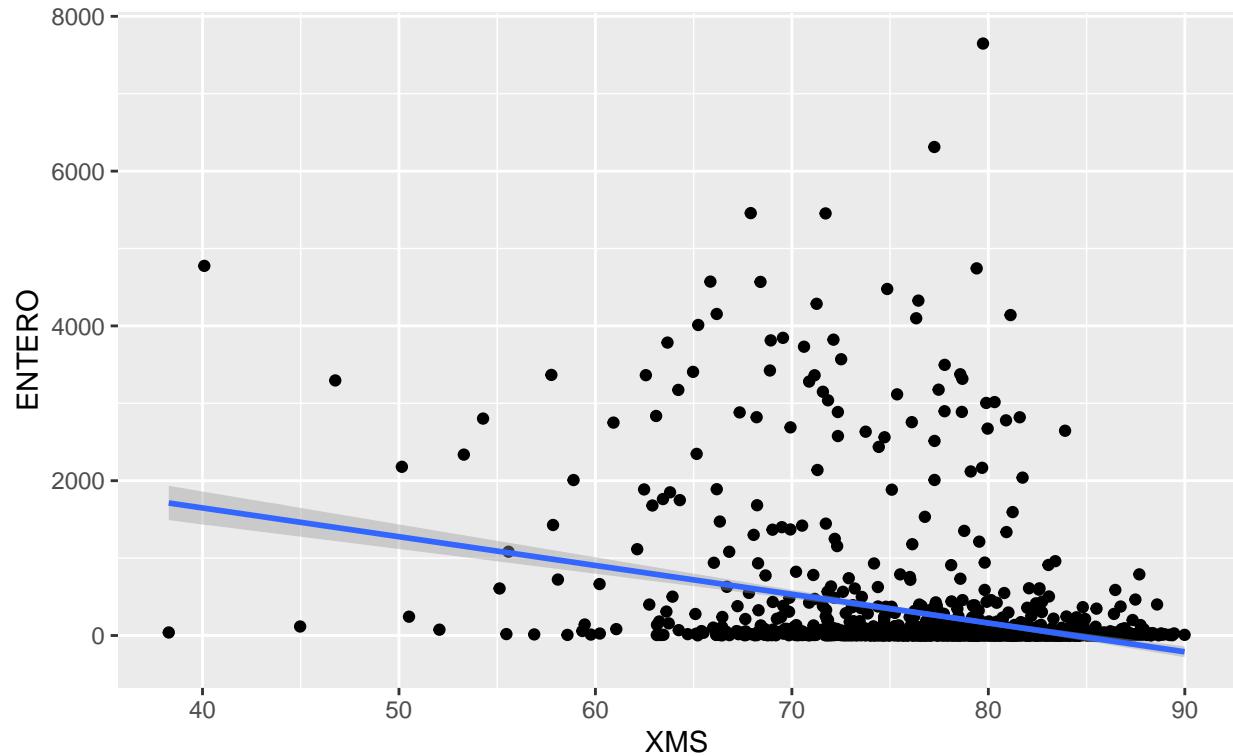


Figure
Scatterplot of TEMP and ENTERO Series



Figure

Scatterplot of XMS and ENTERO Series



```
# Excluding outliers
print(head(owt_df02_gb04_wkly02, 7))
```

```
##   date_sample CHLOROPHYLL DENSITY      DO     ENTERO    FECAL OG     PH
## 1 1990-11-19       1.07 23.854 6.980000      NA      NA NA 8.130
## 2 1991-01-07        NA     NA      NA 25.38462 88.46154 NA   NA
## 3 1991-01-14        NA     NA 5.445417 58.12973 137.21730 NA 8.195
## 4 1991-01-21        NA     NA      NA 23.20513 59.61538 NA   NA
## 5 1991-01-28        NA     NA      NA 31.81891 69.78365 NA   NA
## 6 1991-02-04        NA     NA      NA 154.23077 428.58974 NA   NA
## 7 1991-02-11        NA     NA      NA 16.83814 14.63141 NA   NA
##   SALINITY SUSO      TEMP      XMS
## 1 33.59550   NA 19.37000 60.22500
## 2      NA   NA 14.45000 81.96154
## 3 33.50113   NA 14.07478 82.04876
## 4      NA   NA 14.54487 70.19231
## 5      NA   NA 14.28846 77.61167
## 6      NA   NA 14.23462 81.83333
## 7      NA   NA 14.46154 70.83333

scatr(df = owt_df02_gb04_wkly02,
      y = "ENTERO",
      x_lst = param_lst03)
```

Figure

Scatterplot of CHLOROPHYLL and ENTERO Series

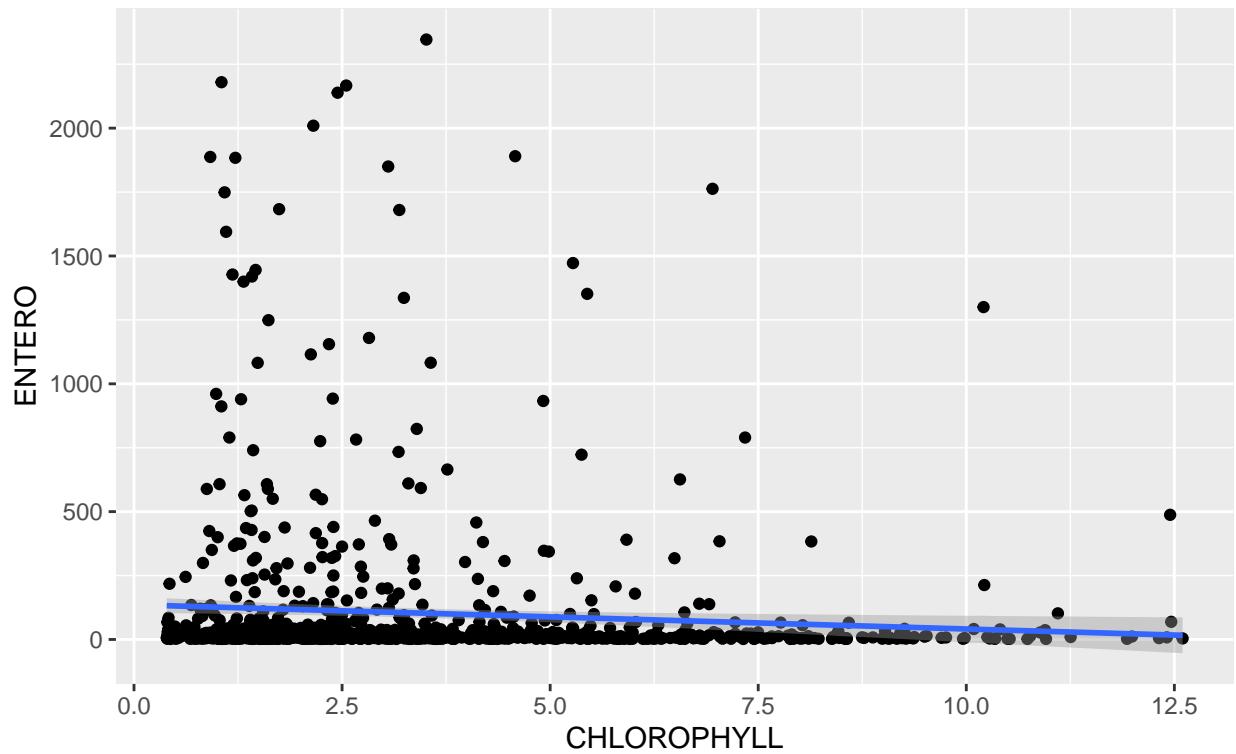
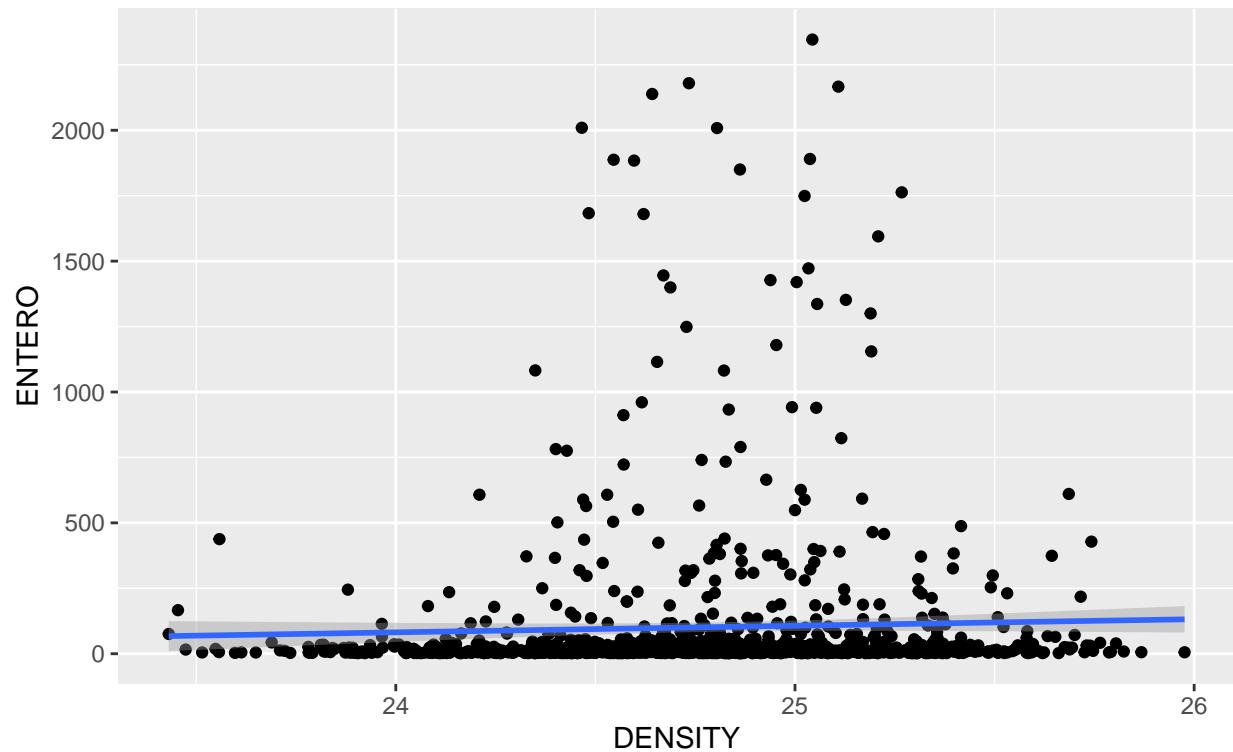


Figure
Scatterplot of DENSITY and ENTERO Series



Figure

Scatterplot of DO and ENTERO Series

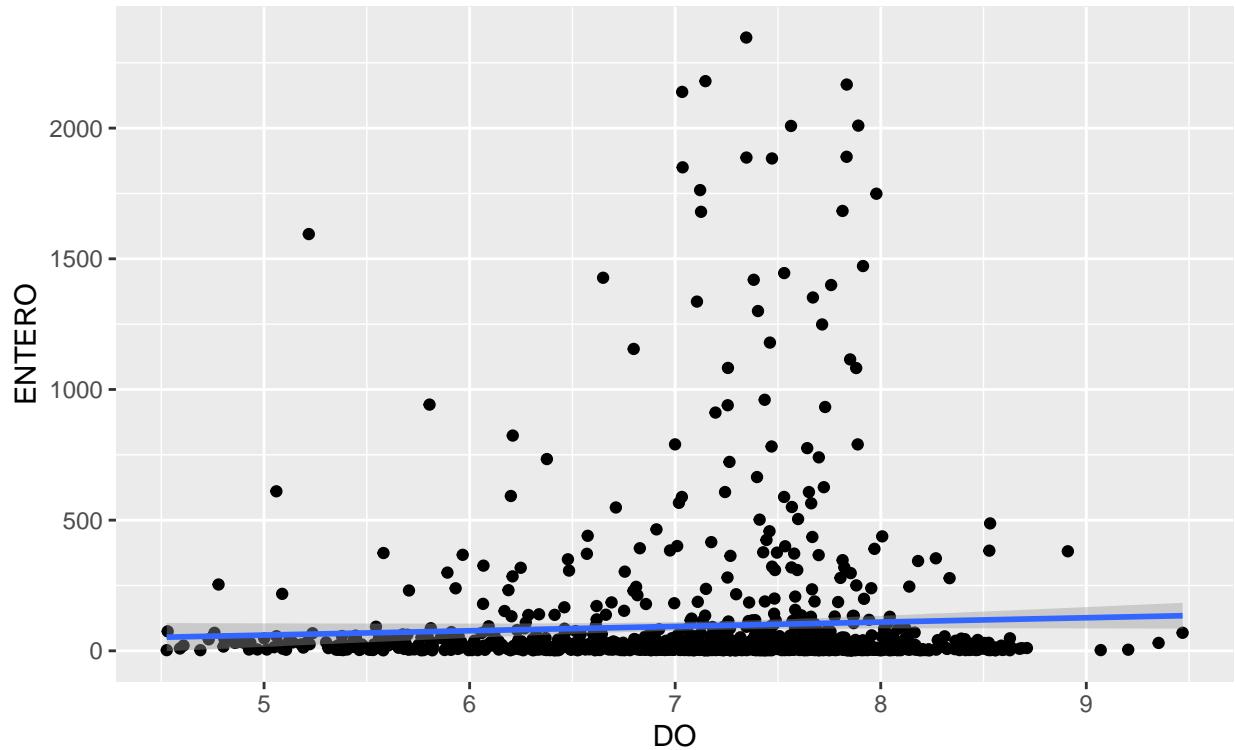


Figure
Scatterplot of FECAL and ENTERO Series

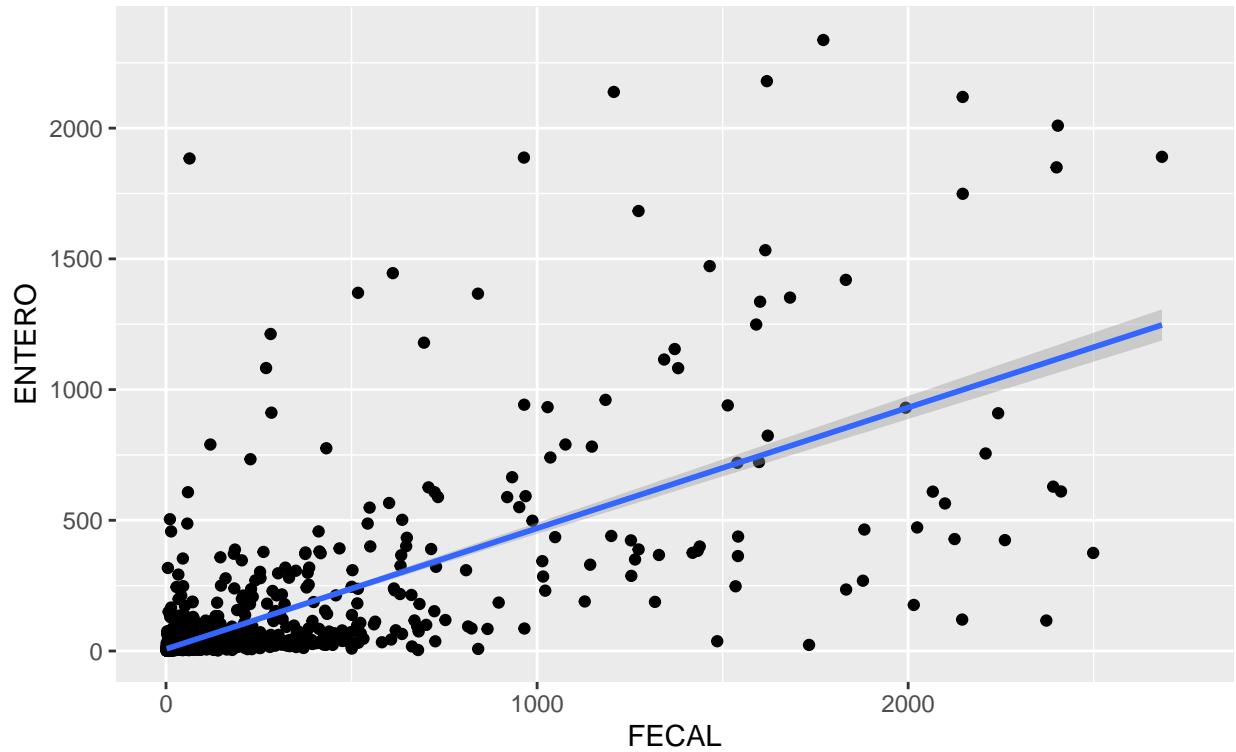
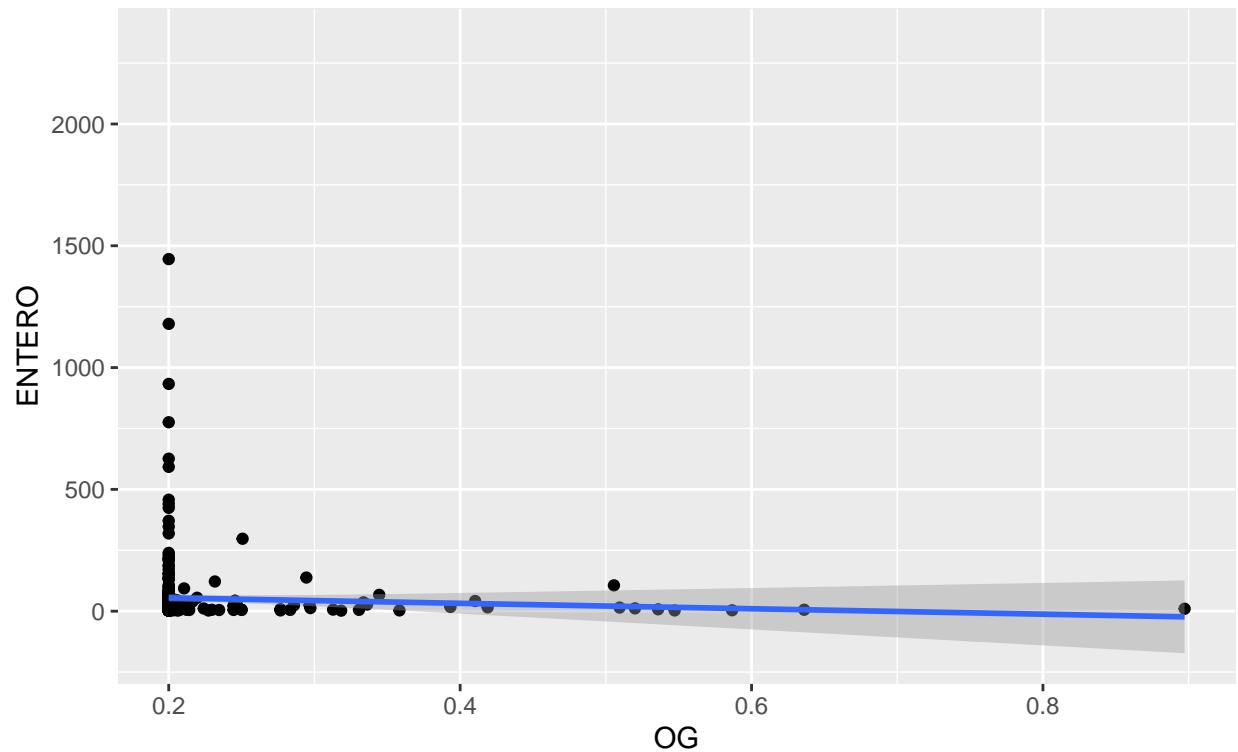


Figure
Scatterplot of OG and ENTERO Series



Figure

Scatterplot of PH and ENTERO Series

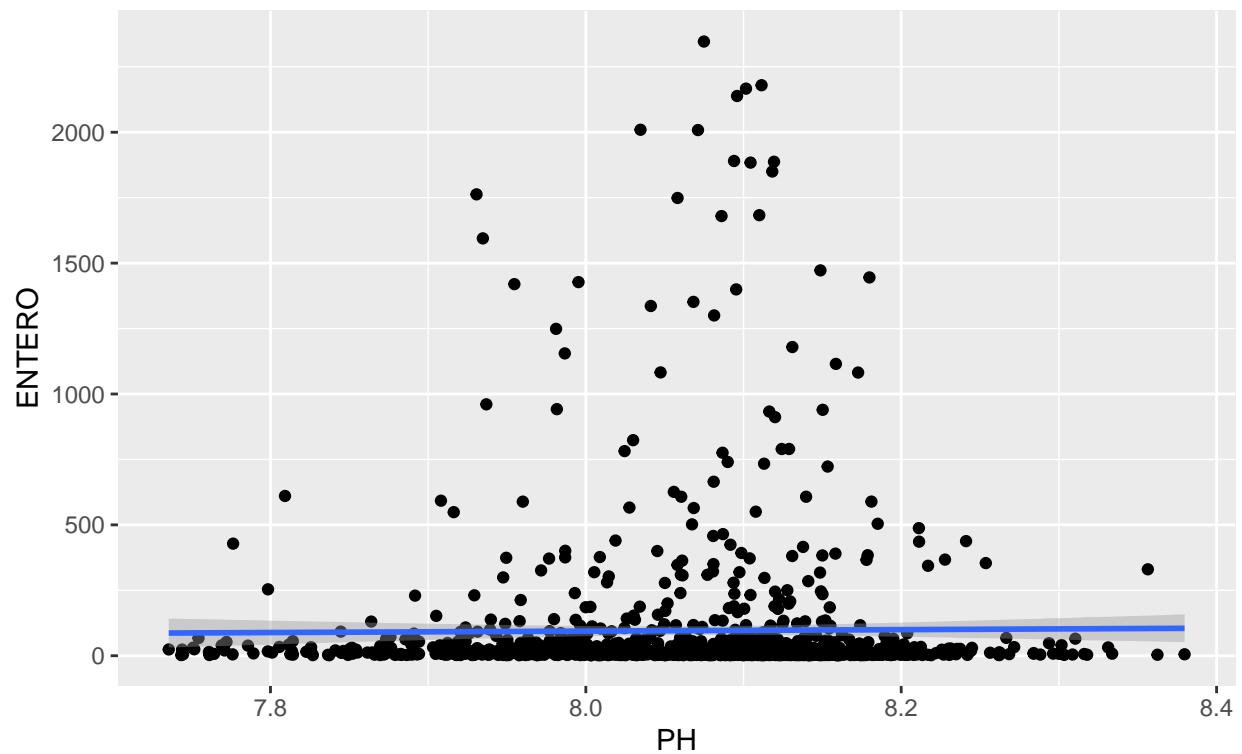
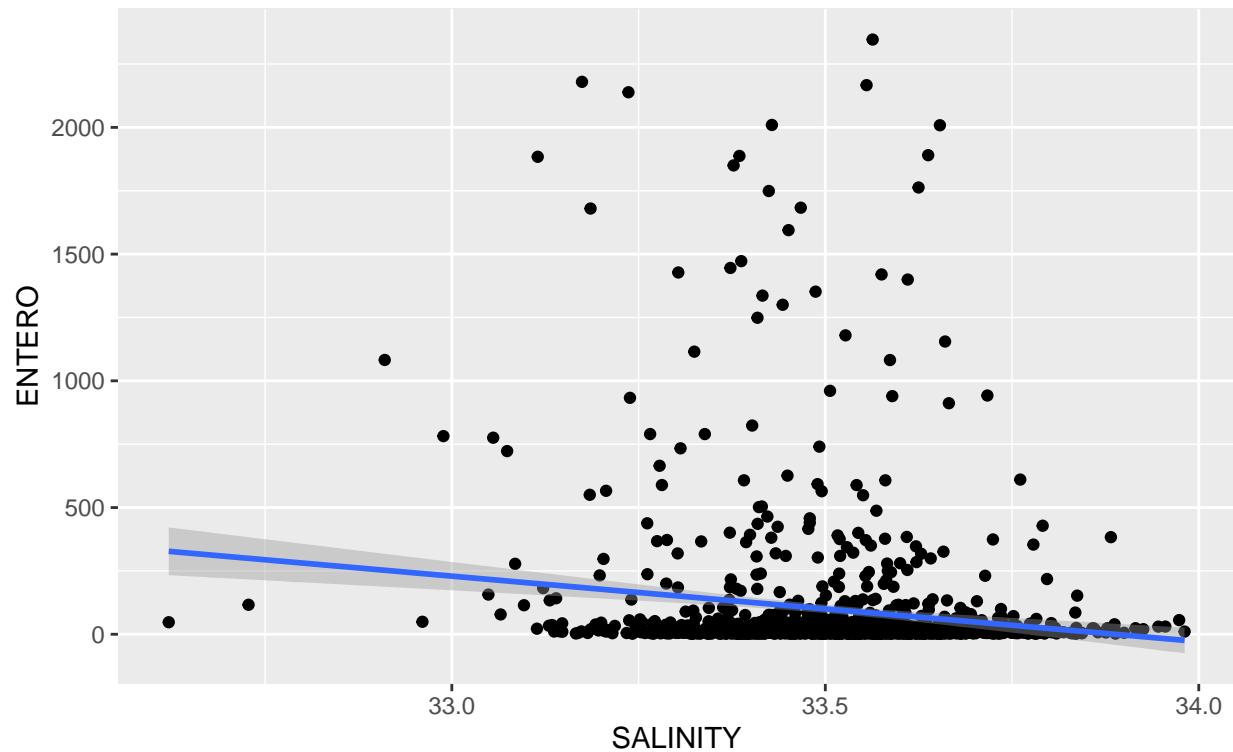


Figure
Scatterplot of SALINITY and ENTERO Series



Figure

Scatterplot of SUSO and ENTERO Series

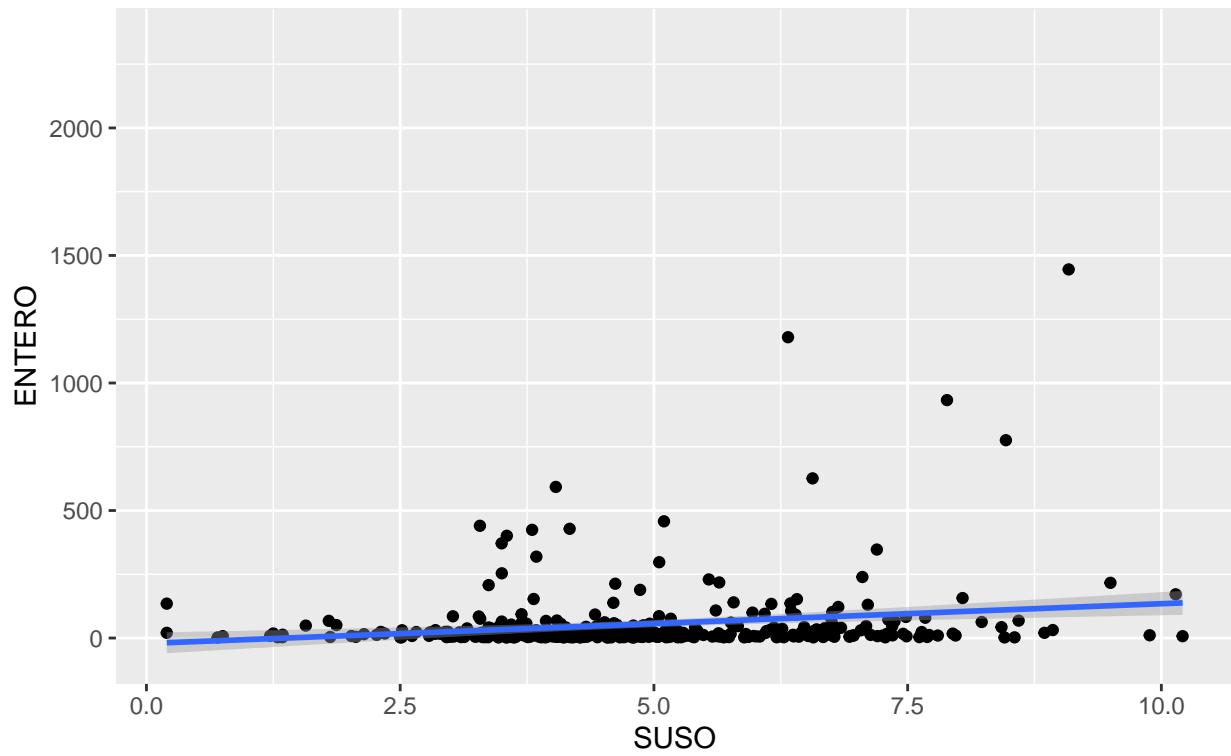
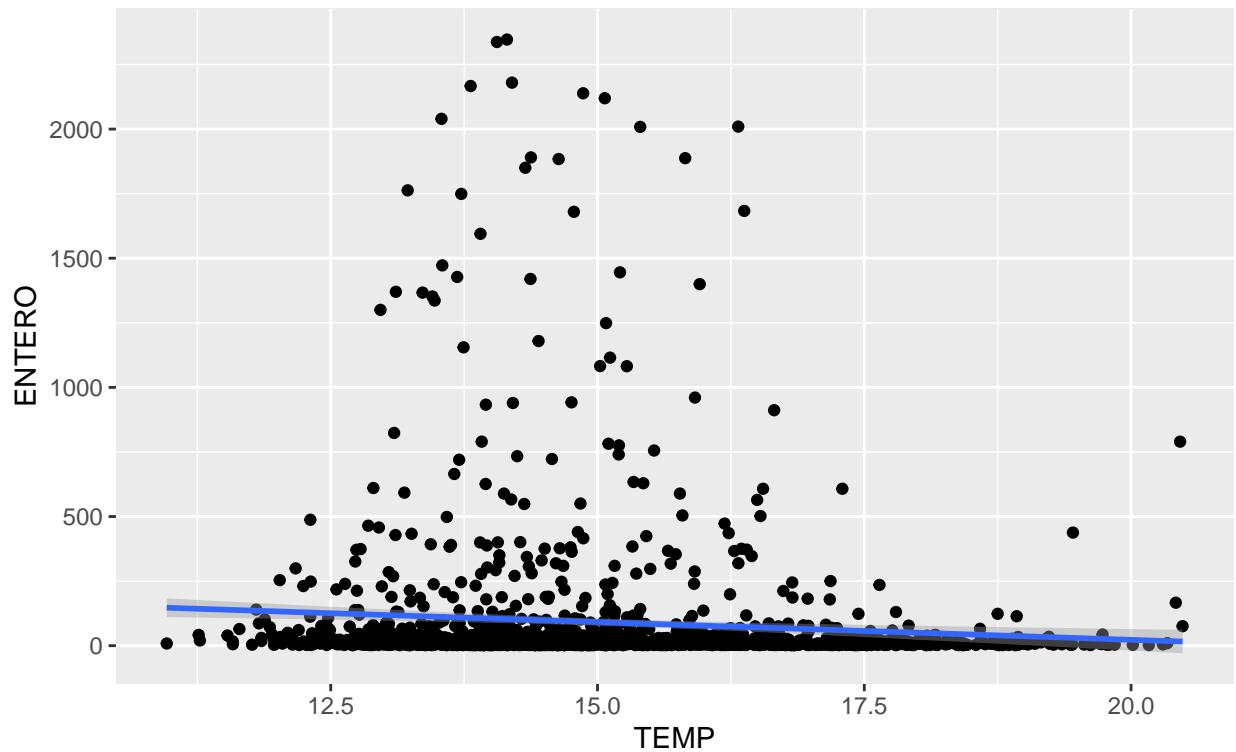
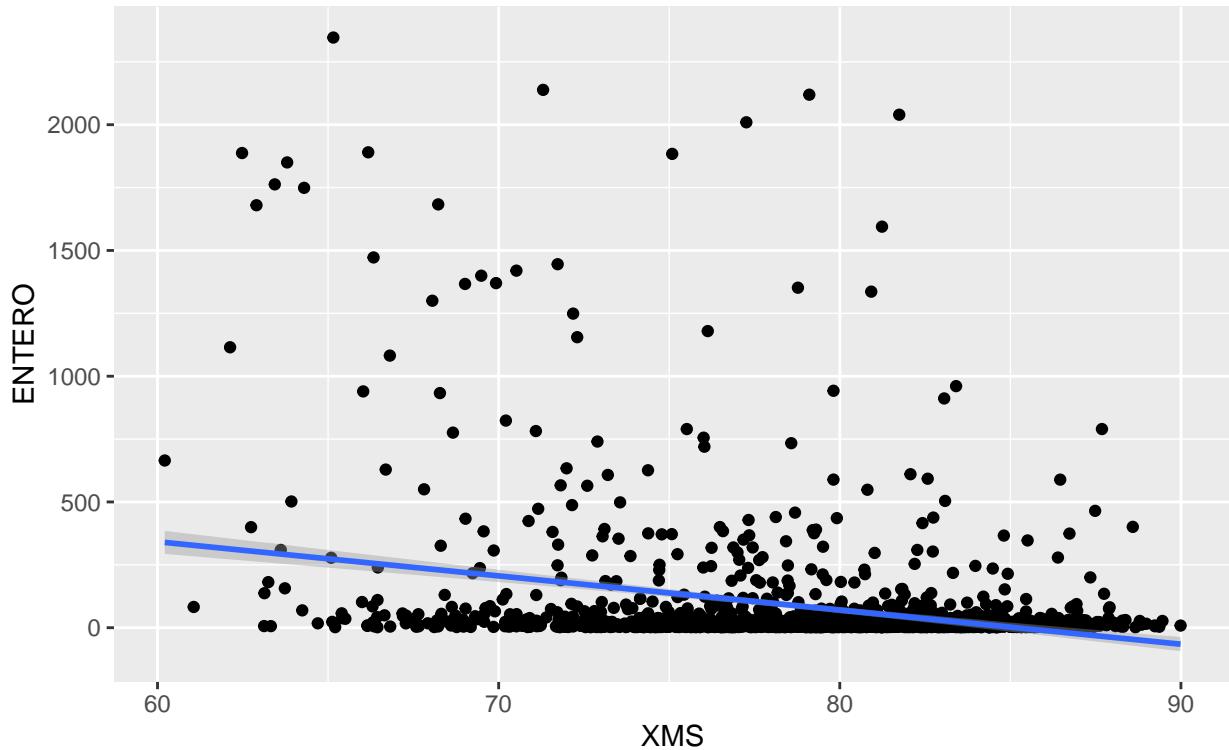


Figure
Scatterplot of TEMP and ENTERO Series



Figure

Scatterplot of XMS and ENTERO Series



Define custom function to display time series plots at multiple agg levels

```
# i = parameter
# j = project
# k = depth
time_plt <- function(df = NA,
                      date = NA,
                      l1 = c(),
                      l2_name = NA,
                      l2 = c(),
                      l3_name = NA,
                      l3 = c()) {
  if(length(l3) == 0 & length(l2) == 0) {
    for(i in l1) {
      df_01a <- df
      par(mar = c(5,5,5,2))
      try(print(acf(df_01a[, i],
                    pl = TRUE,
                    na.action = na.pass,
                    main = paste0("ACF Plot for ", i))))
      plot <- ggplot(df_01a, aes(x = df_01a[, date], y = df_01a[, i], group = 1)) +
        geom_line() +
        labs(x = "Time",
             y = i,
             title = "Figure",
             subtitle = "Time Series Plot") +
        theme_minimal()
      print(plot)
    }
  }
}
```

```

        subtitle = paste0("Time Series Plot for ", i))
    print(plot)
}
}
if(length(13) == 0) {
  for(i in 11) {
    for(j in 12) {
      df_01a <- df[df[, 12_name] == j, ]
      par(mar = c(5,5,5,2))
      try(print(acf(df_01a[, i],
                    pl = TRUE,
                    na.action = na.pass,
                    main = paste0("ACF Plot for ", i, " (", j, ")")))
      plot <- ggplot(df_01a, aes(x = df_01a[, date], y = df_01a[, i], group = 1)) +
        geom_line() +
        labs(x = "Time",
             y = i,
             title = "Figure",
             subtitle = paste0("Time Series Plot for ", i, " (", j, ")"))
      print(plot)
    }
  }
} else {
  for(i in 11) {
    for(j in 12) {
      for(k in 13) {
        df_01a <- df[df[, 12_name] == j & df[, 13_name] == k, ]
        par(mar = c(5,5,5,2))
        try(print(acf(df_01a[, i],
                      pl = TRUE,
                      na.action = na.pass,
                      main = paste0("ACF Plot for ", i, " (", j, ":", k, ")")))
        plot <- ggplot(df_01a, aes(x = df_01a[, date], y = df_01a[, i], group = 1)) +
          geom_line() +
          labs(x = "Time",
               y = i,
               title = "Figure",
               subtitle = paste0("Time Series Plot for ", i, " (", j, ":", k, ")"))
        print(plot)
      }
    }
  }
}
}

```

Setup reference value lists for time series plotting

```

param_lst04 <- c("CHLOROPHYLL",
                 "DENSITY",
                 "DO",
                 "ENTERO",

```

```

        "FECAL",
        "PH",
        "SALINITY",
        "TEMP",
        "XMS")

param_lst05 <- c("ENTERO")

uniq_proj <- unique(owt_df02_gb07_mrgd$project)
uniq_depth <- unique(owt_df02_gb07_mrgd$depth_m_bin)
uniq_proj

## [1] PL00 SB00
## Levels: PL00 SB00

uniq_depth

## [1] "[8,33)"    "[0,8)"      "[33,47)"    "[47,70)"    "[70,90)"    "Unknown"
## [7] "[112,120]" "[90,112]"

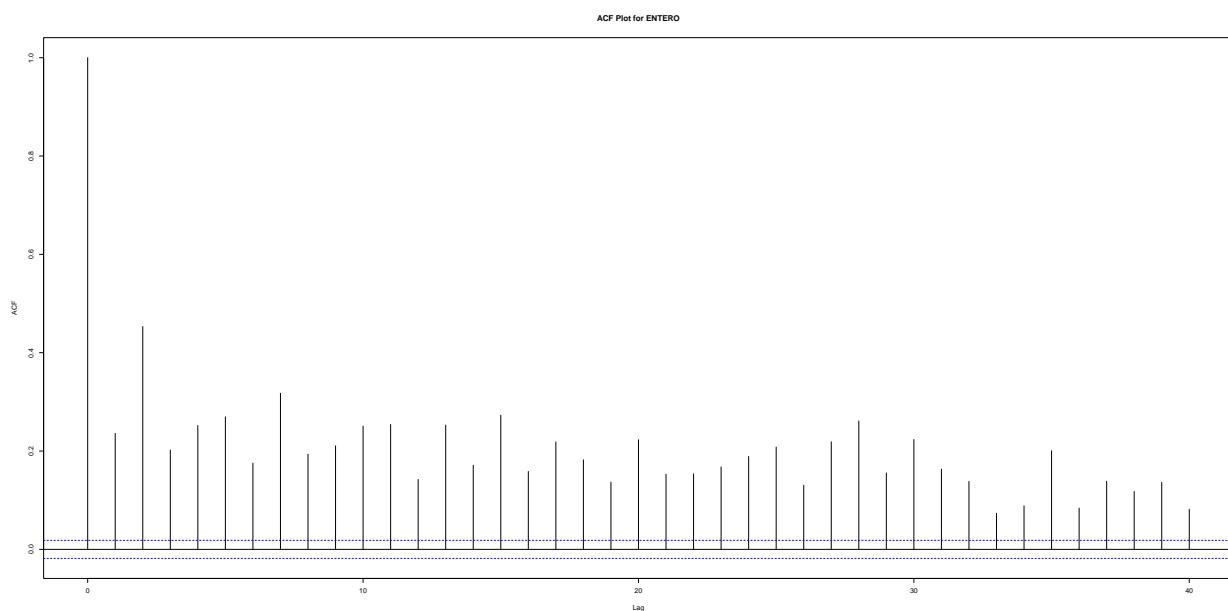
```

Run custom function on data aggregated by date_sample and parameter

```

time_plt(df = owt_df02_gb04_mrgd,
          date = "date_sample",
          l1 = param_lst05)

```



```

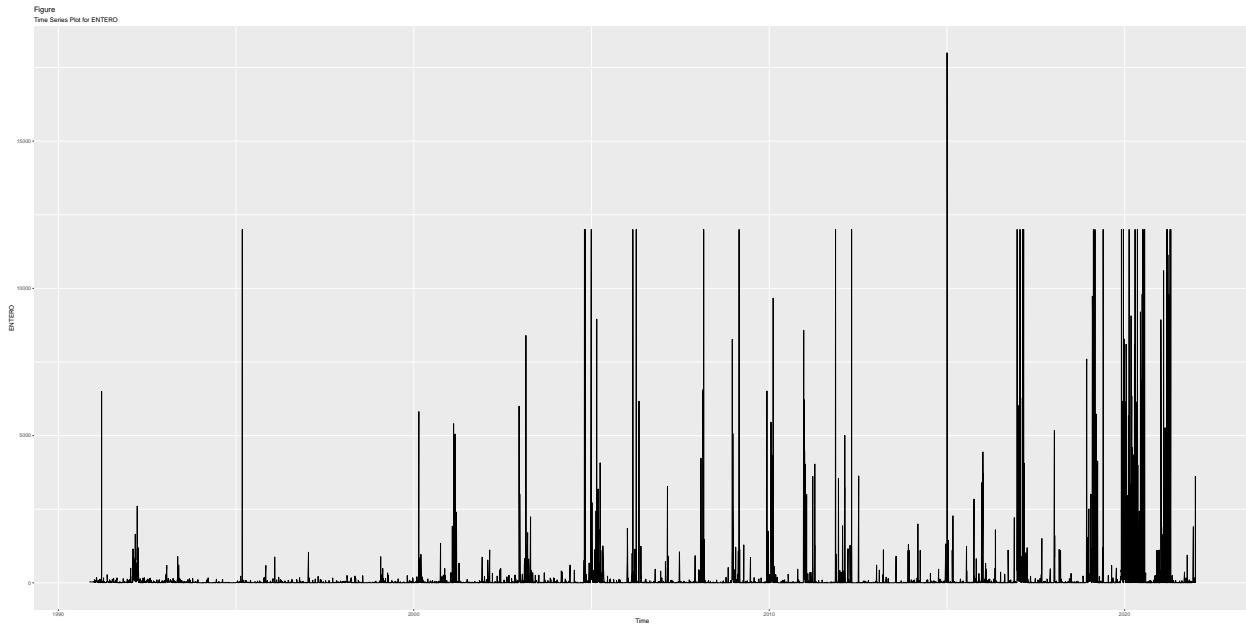
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0     1     2     3     4     5     6     7     8     9     10    11    12
## 1 1.000 0.236 0.453 0.202 0.252 0.270 0.175 0.318 0.194 0.210 0.250 0.254 0.142
## 13     14     15     16     17     18     19     20     21     22     23     24     25
## 0.253 0.171 0.273 0.158 0.218 0.182 0.137 0.223 0.153 0.154 0.168 0.189 0.208

```

```

##    26    27    28    29    30    31    32    33    34    35    36    37    38
## 0.130 0.219 0.261 0.156 0.224 0.163 0.138 0.073 0.089 0.200 0.084 0.138 0.118
##    39    40
## 0.136 0.082

```

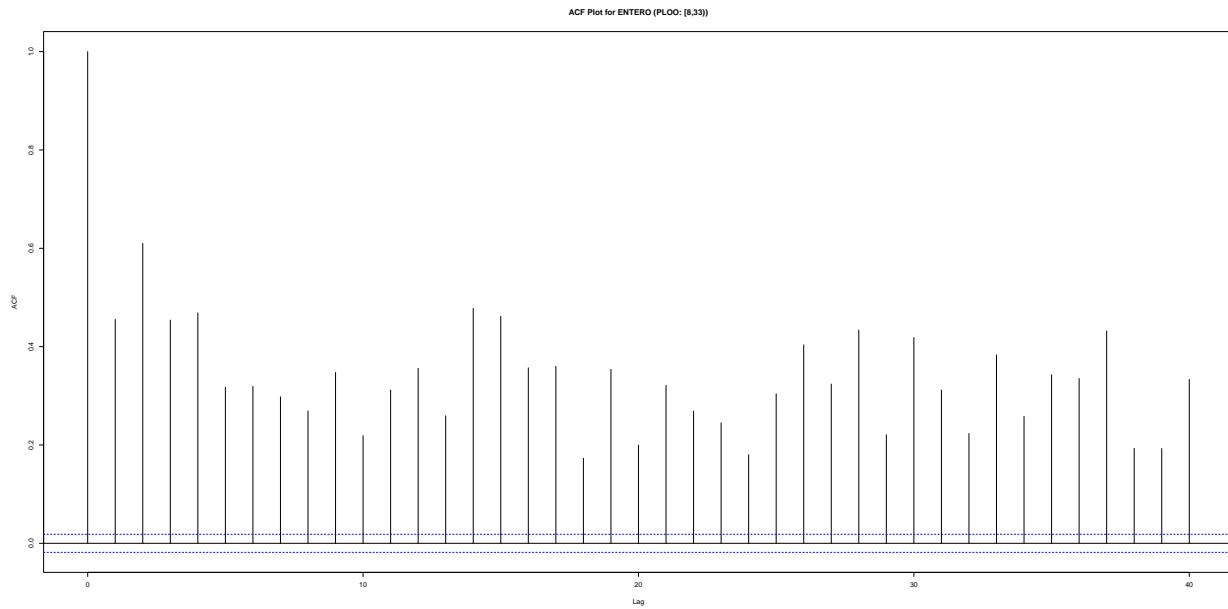


Run custom function on data aggregated by `date_sample`, `project`, `depth_m_bin` and `parameter`

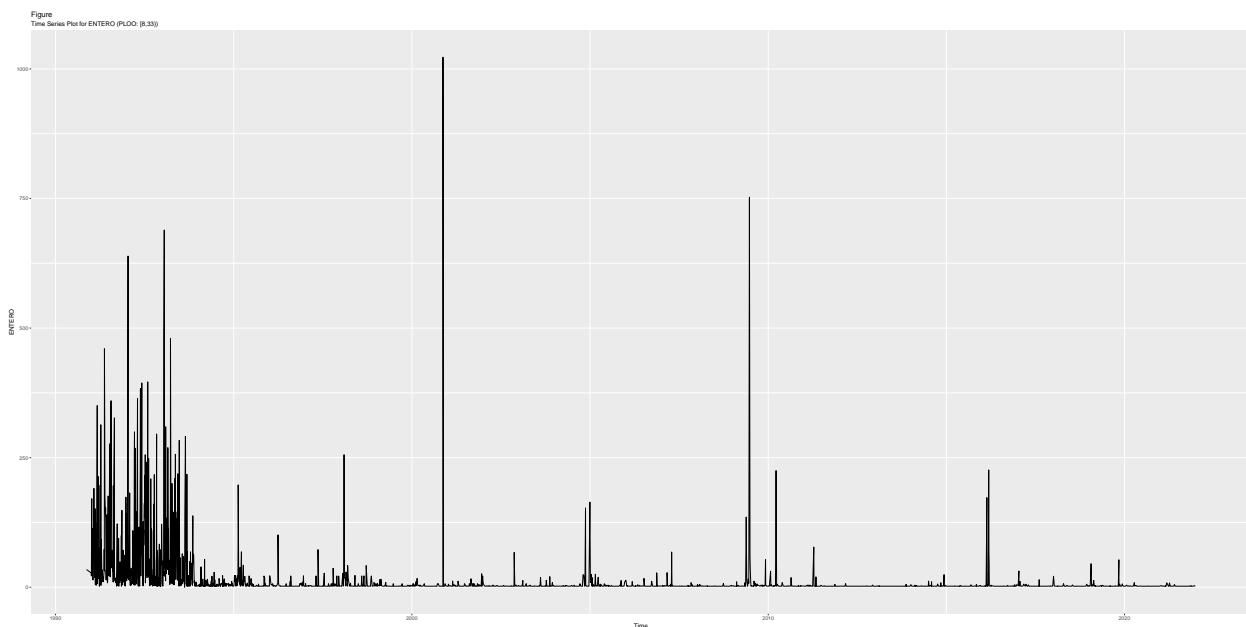
```

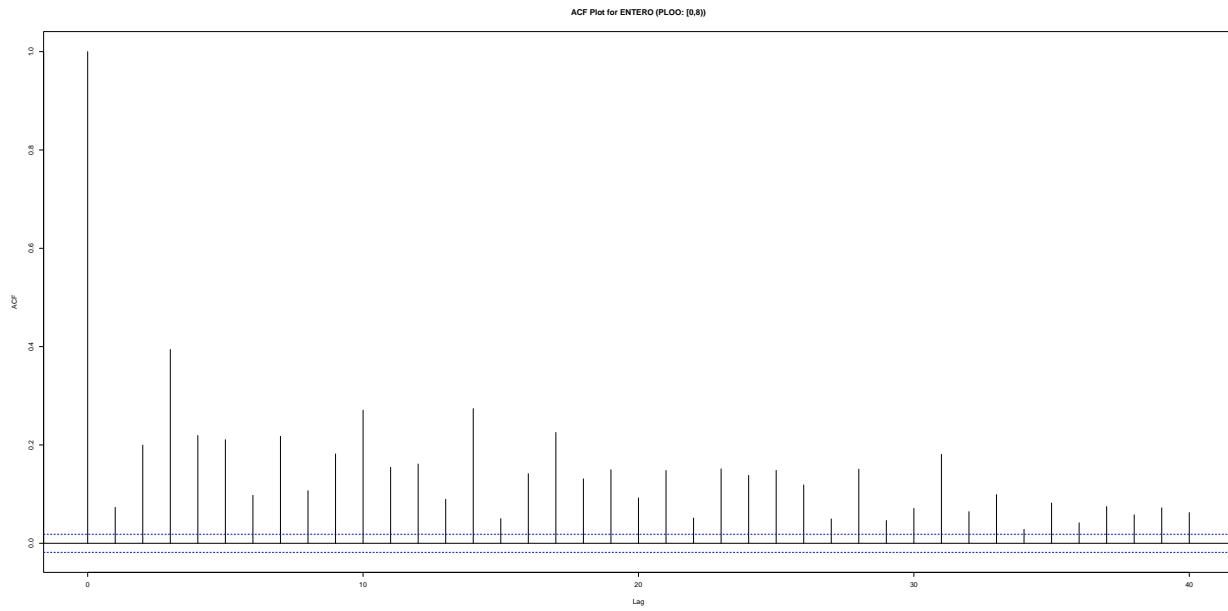
time_plt(df = owt_df02_gb07_mrgd,
          date = "date_sample",
          11 = param_lst05,
          12_name = "project",
          12 = uniq_proj,
          13_name = "depth_m_bin",
          13 = uniq_depth)

```

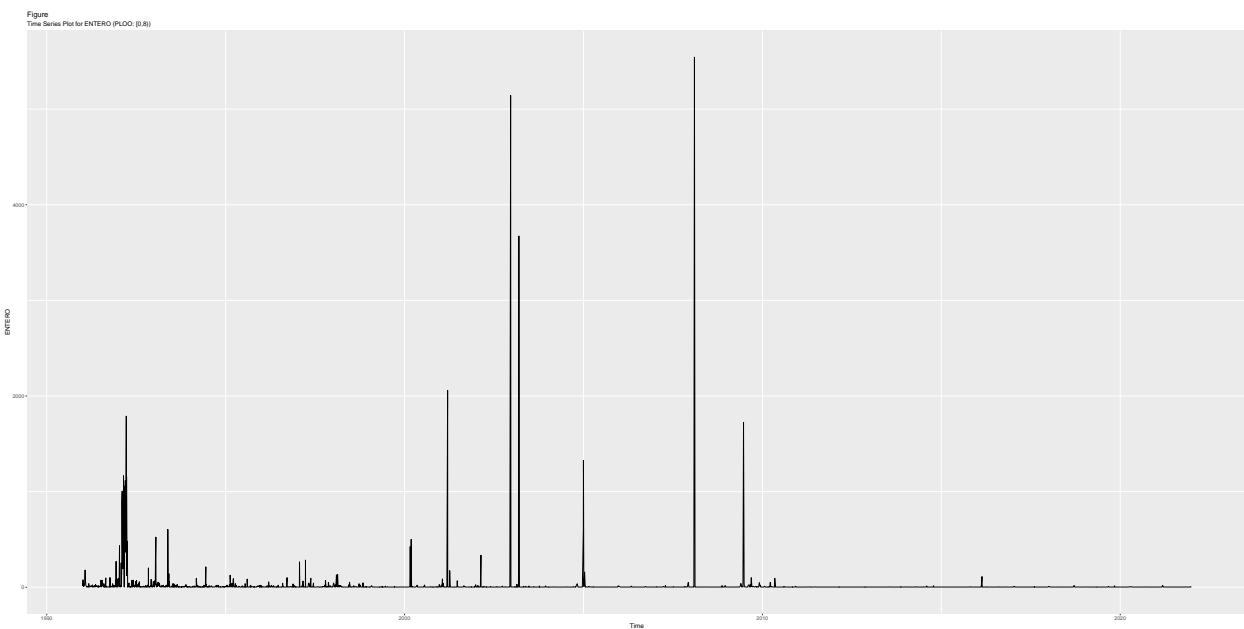


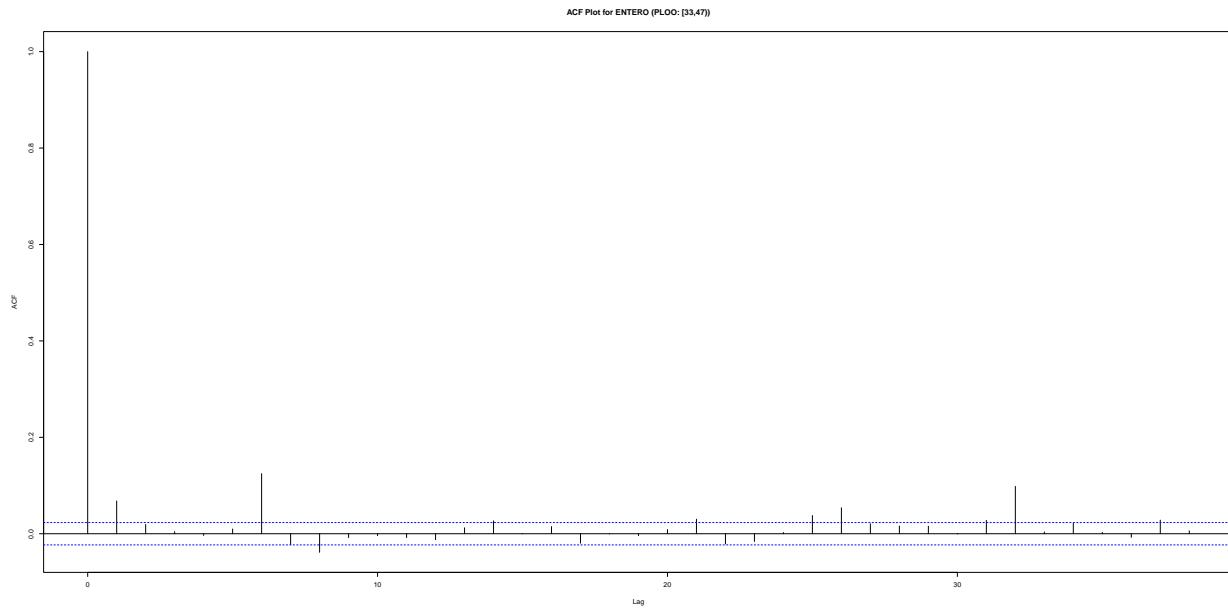
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10     11     12
## 1.000 0.455 0.610 0.454 0.469 0.317 0.319 0.298 0.269 0.347 0.219 0.312 0.356
##          13     14     15     16     17     18     19     20     21     22     23     24     25
## 0.259 0.478 0.462 0.357 0.360 0.173 0.354 0.200 0.321 0.269 0.245 0.180 0.304
##          26     27     28     29     30     31     32     33     34     35     36     37     38
## 0.403 0.324 0.434 0.221 0.418 0.312 0.223 0.383 0.258 0.343 0.335 0.432 0.193
##          39     40
## 0.193 0.333
```



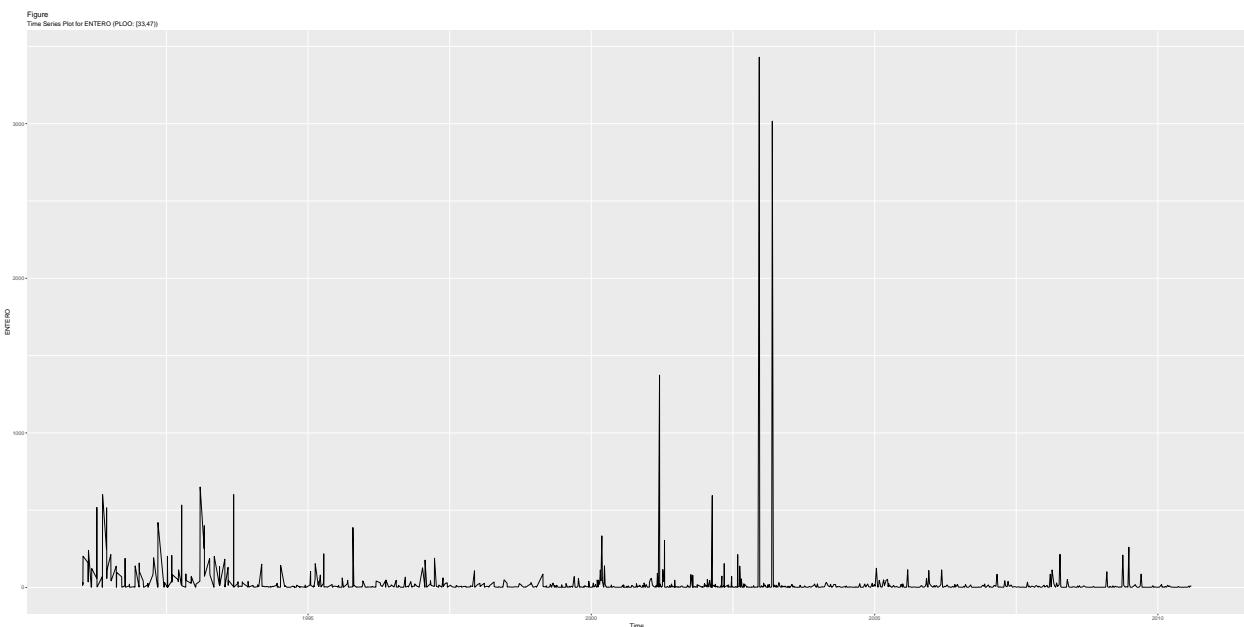


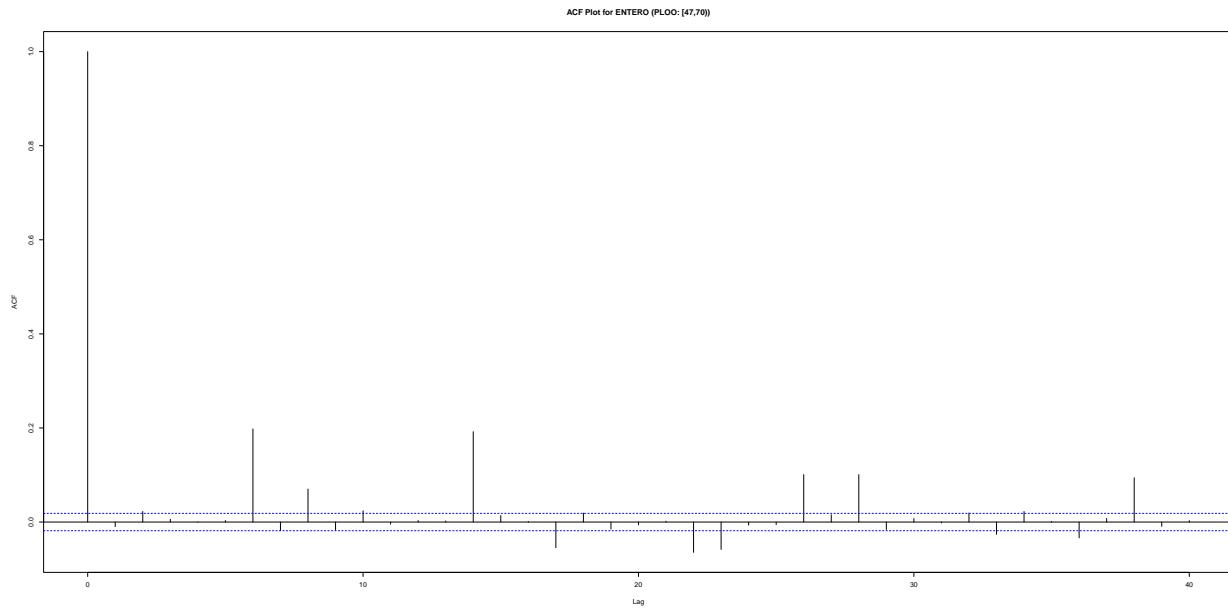
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10     11     12
## 1.000 0.073 0.200 0.394 0.219 0.211 0.098 0.217 0.107 0.182 0.271 0.155 0.161
##      13     14     15     16     17     18     19     20     21     22     23     24     25
## 0.090 0.274 0.050 0.142 0.225 0.131 0.150 0.092 0.148 0.051 0.151 0.138 0.148
##      26     27     28     29     30     31     32     33     34     35     36     37     38
## 0.119 0.050 0.151 0.046 0.071 0.181 0.064 0.099 0.028 0.082 0.042 0.075 0.058
##      39     40
## 0.072 0.062
```



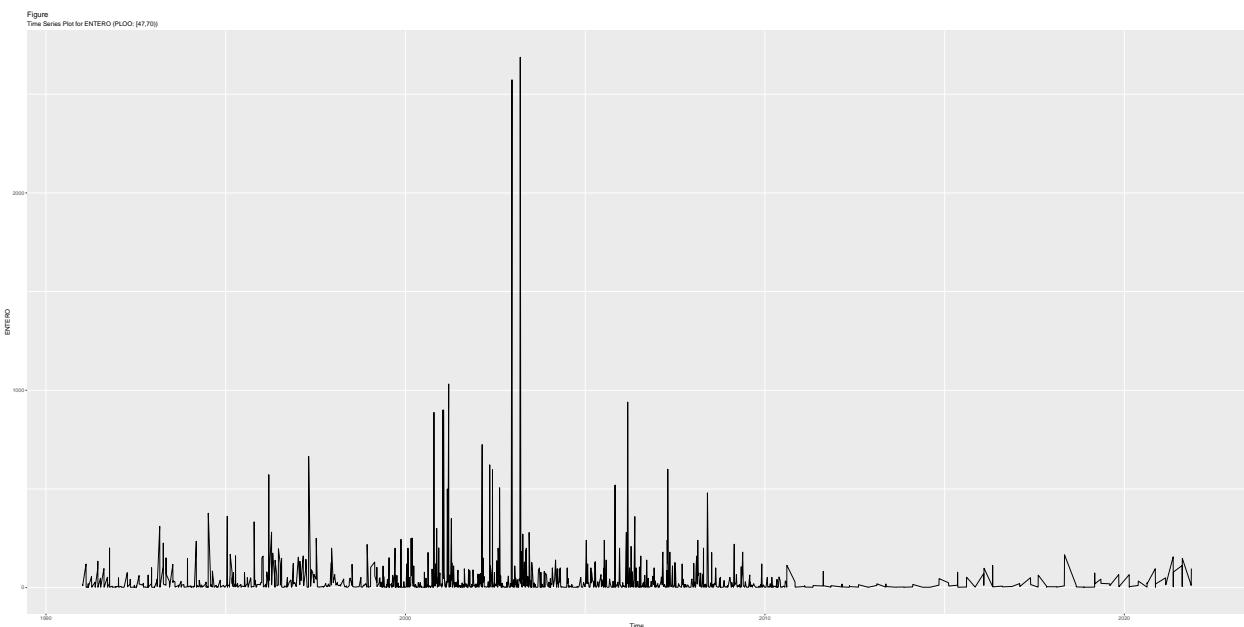


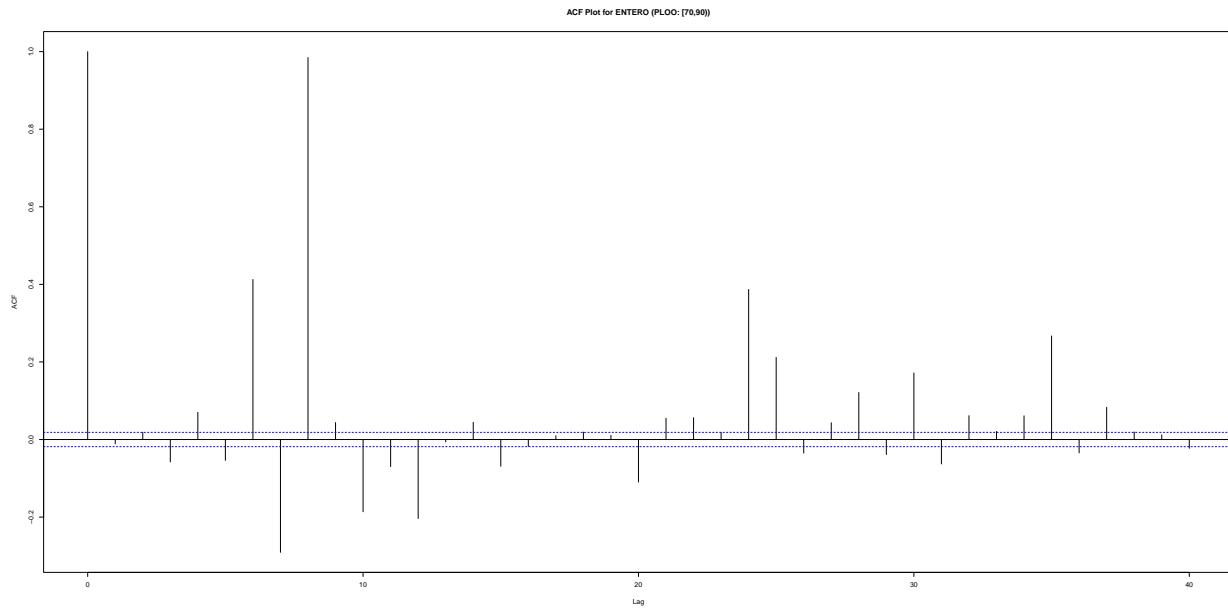
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
##  1.000  0.068  0.019  0.004 -0.004  0.010  0.125 -0.022 -0.039 -0.008 -0.004
##  11     12     13     14     15     16     17     18     19     20     21
## -0.008 -0.012  0.012  0.027  0.000  0.015 -0.020  0.000 -0.004  0.009  0.030
##  22     23     24     25     26     27     28     29     30     31     32
## -0.021 -0.016  0.003  0.038  0.054  0.021  0.016  0.016 -0.001  0.028  0.098
##  33     34     35     36     37     38
##  0.004  0.022  0.003 -0.008  0.028  0.006
```



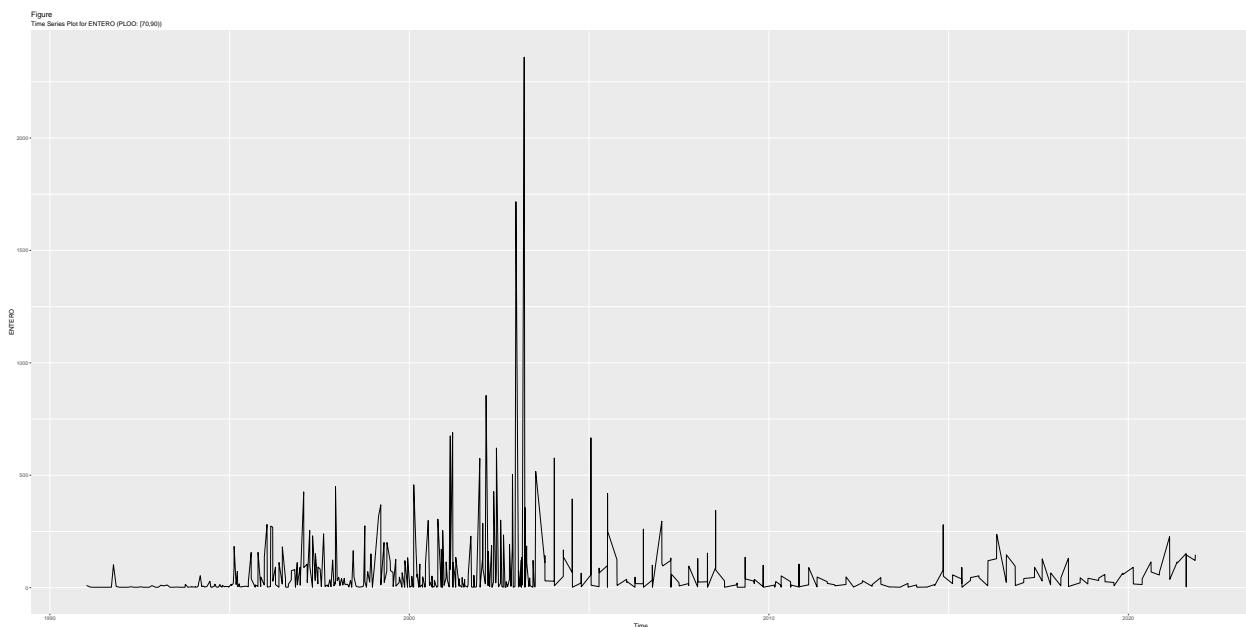


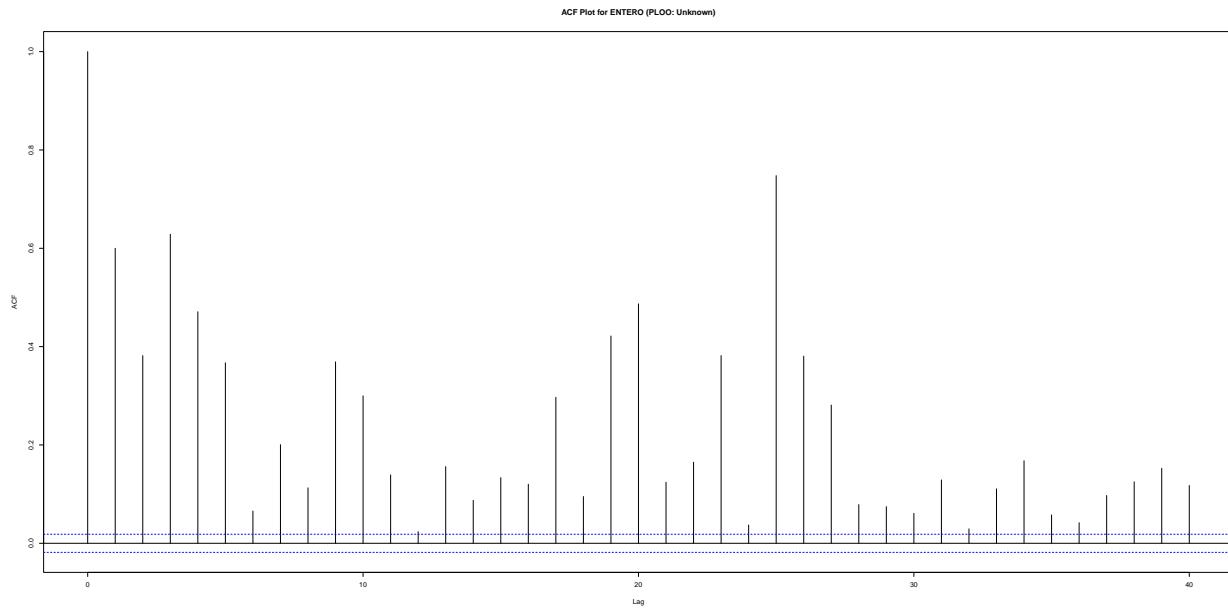
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
## 1.000 -0.010  0.022  0.006  0.000  0.003  0.198 -0.018  0.070 -0.017  0.024
##      11     12     13     14     15     16     17     18     19     20     21
## -0.004  0.003  0.002  0.192  0.014  0.001 -0.054  0.019 -0.015 -0.006  0.002
##      22     23     24     25     26     27     28     29     30     31     32
## -0.064 -0.058 -0.007 -0.005  0.101  0.015  0.101 -0.016  0.008 -0.002  0.019
##      33     34     35     36     37     38     39     40
## -0.026  0.022  0.001 -0.034  0.008  0.094 -0.009  0.003
```



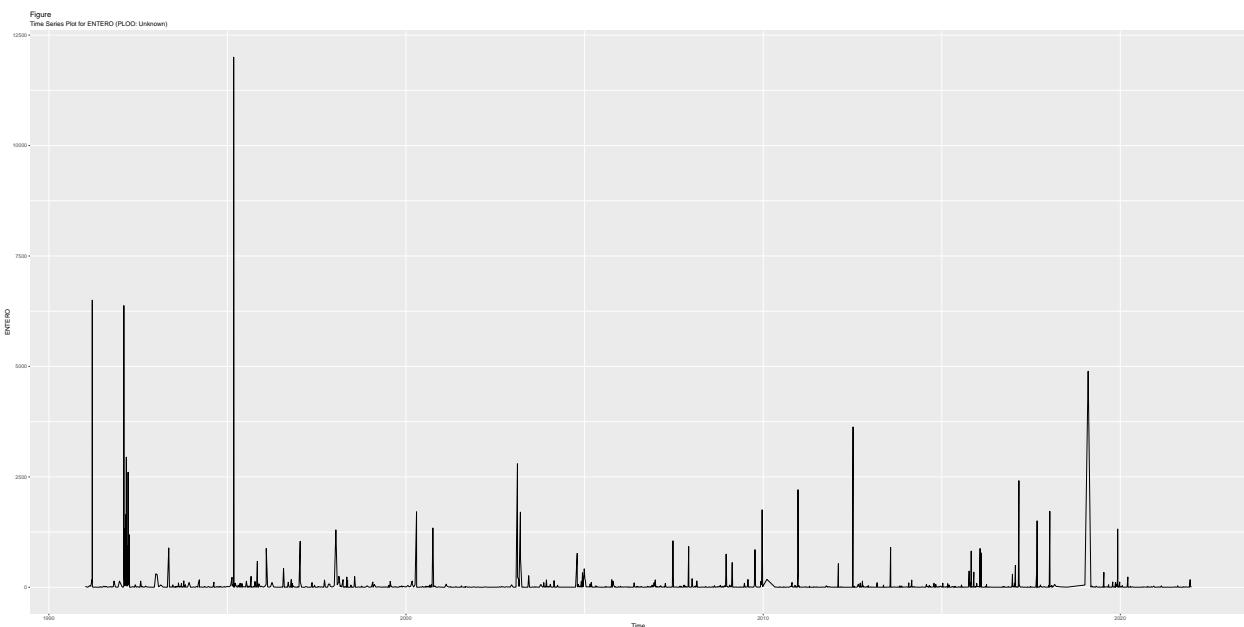


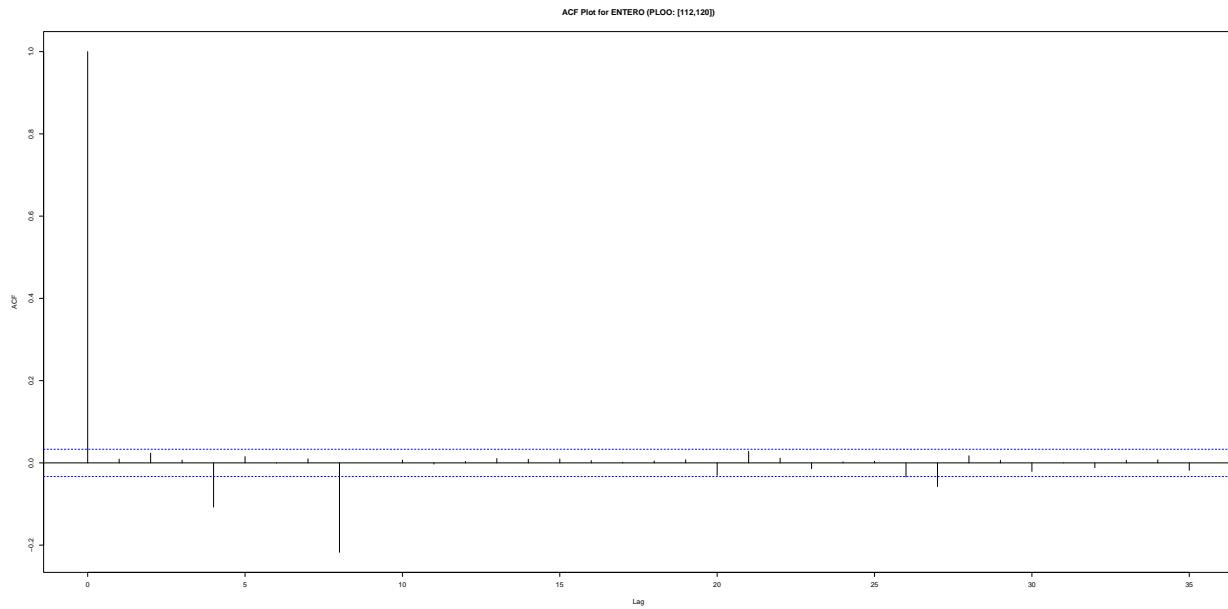
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
## 1.000 -0.011  0.019 -0.058  0.070 -0.054  0.413 -0.291  0.985  0.044 -0.186
##      11     12     13     14     15     16     17     18     19     20     21
## -0.070 -0.204 -0.006  0.044 -0.069 -0.018  0.010  0.019  0.011 -0.110  0.055
##      22     23     24     25     26     27     28     29     30     31     32
##  0.056  0.019  0.387  0.212 -0.035  0.043  0.121 -0.039  0.172 -0.063  0.062
##      33     34     35     36     37     38     39     40
##  0.021  0.061  0.267 -0.034  0.083  0.020  0.012 -0.023
```



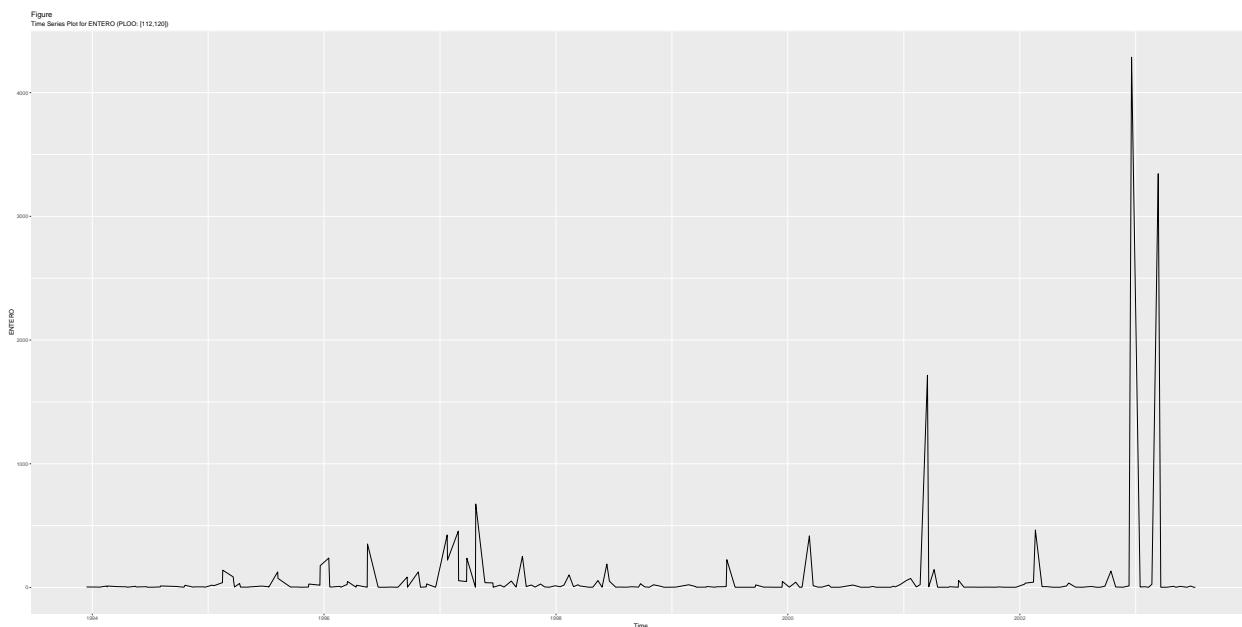


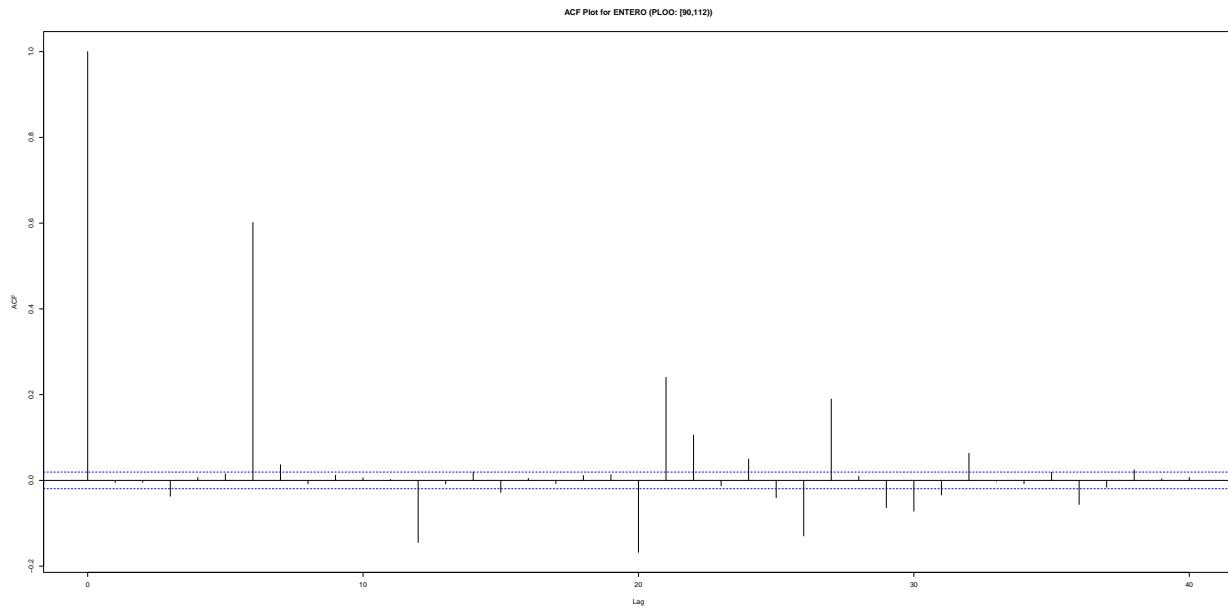
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10     11     12
## 1.000 0.600 0.382 0.628 0.471 0.367 0.066 0.201 0.113 0.369 0.300 0.139 0.024
##          13     14     15     16     17     18     19     20     21     22     23     24     25
## 0.156 0.087 0.134 0.120 0.297 0.095 0.422 0.487 0.124 0.165 0.382 0.037 0.748
##          26     27     28     29     30     31     32     33     34     35     36     37     38
## 0.381 0.281 0.079 0.074 0.061 0.129 0.029 0.111 0.168 0.058 0.042 0.097 0.125
##          39     40
## 0.153 0.118
```



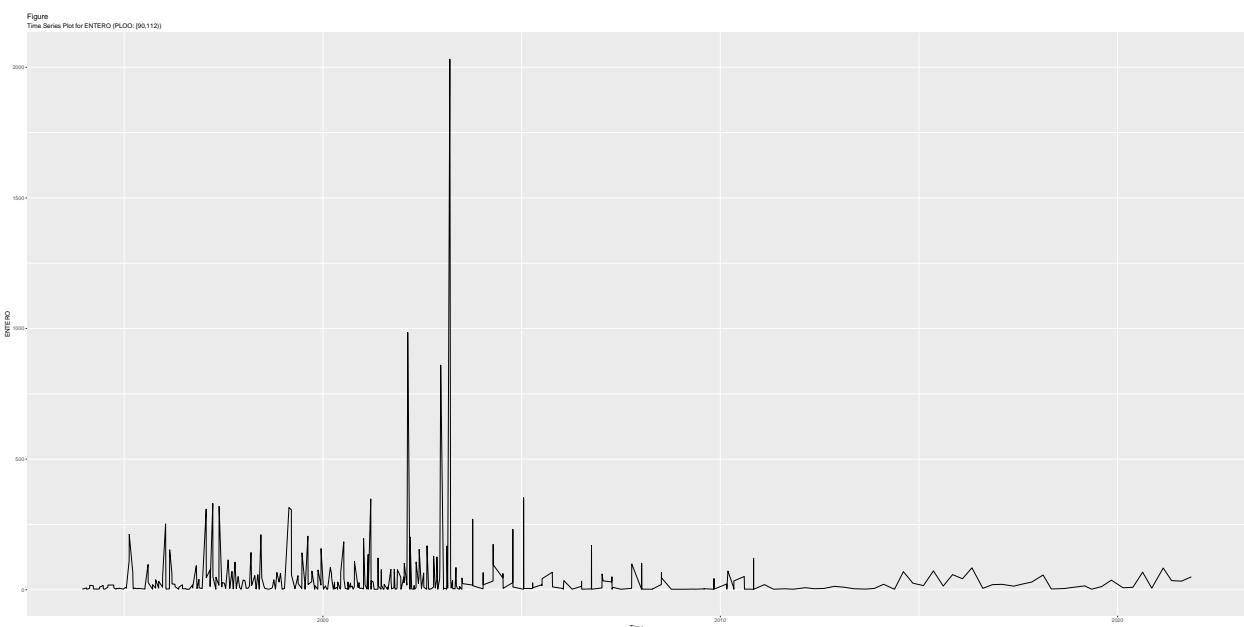


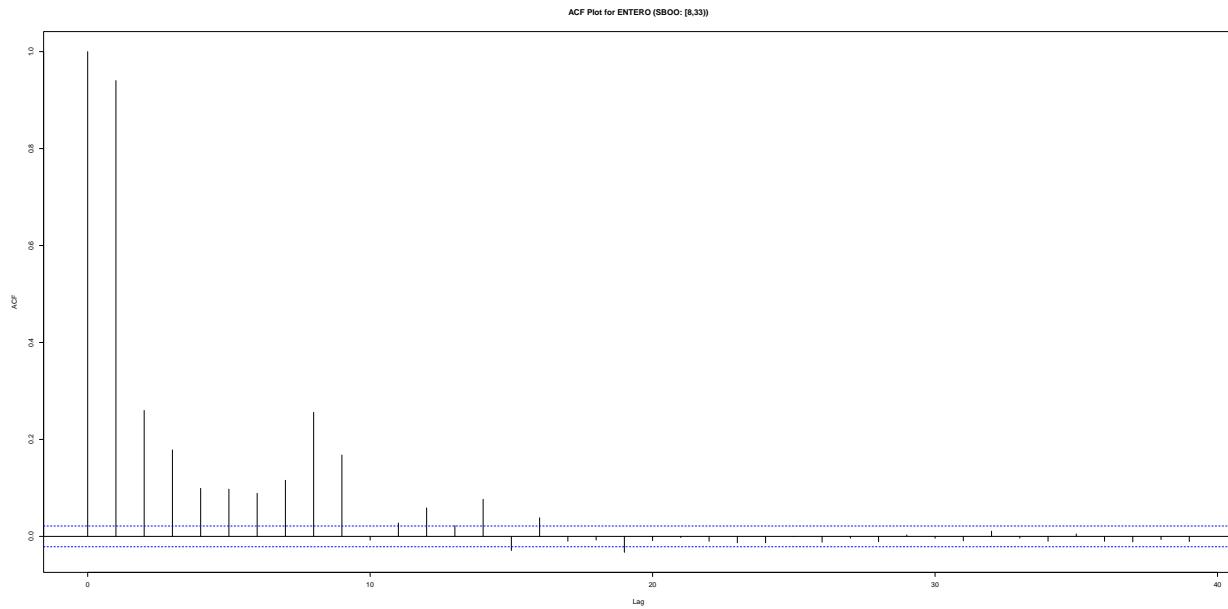
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
##  1.000  0.009  0.024  0.007 -0.108  0.015  0.000  0.010 -0.218    NA  0.006
##  11     12     13     14     15     16     17     18     19     20     21
## -0.003  0.004  0.011  0.008  0.009  0.006  0.001  0.005  0.008 -0.030  0.028
##  22     23     24     25     26     27     28     29     30     31     32
##  0.012 -0.014  0.003  0.004 -0.034 -0.058  0.017  0.006 -0.021  0.000 -0.012
##  33     34     35
##  0.006  0.007 -0.018
```



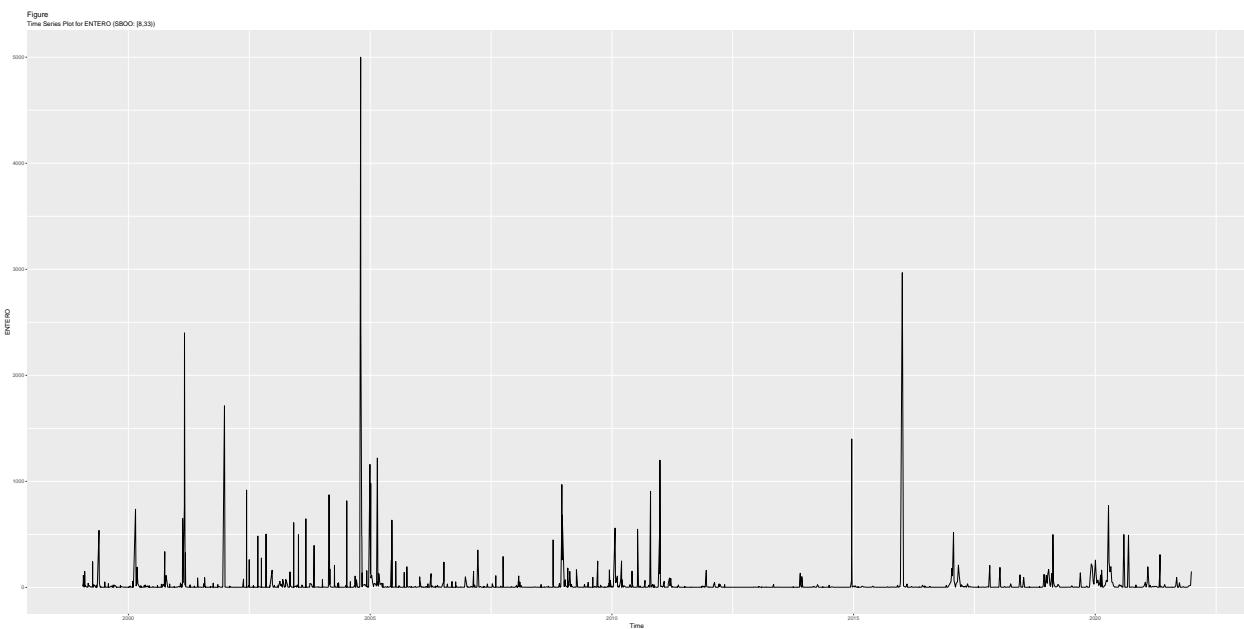


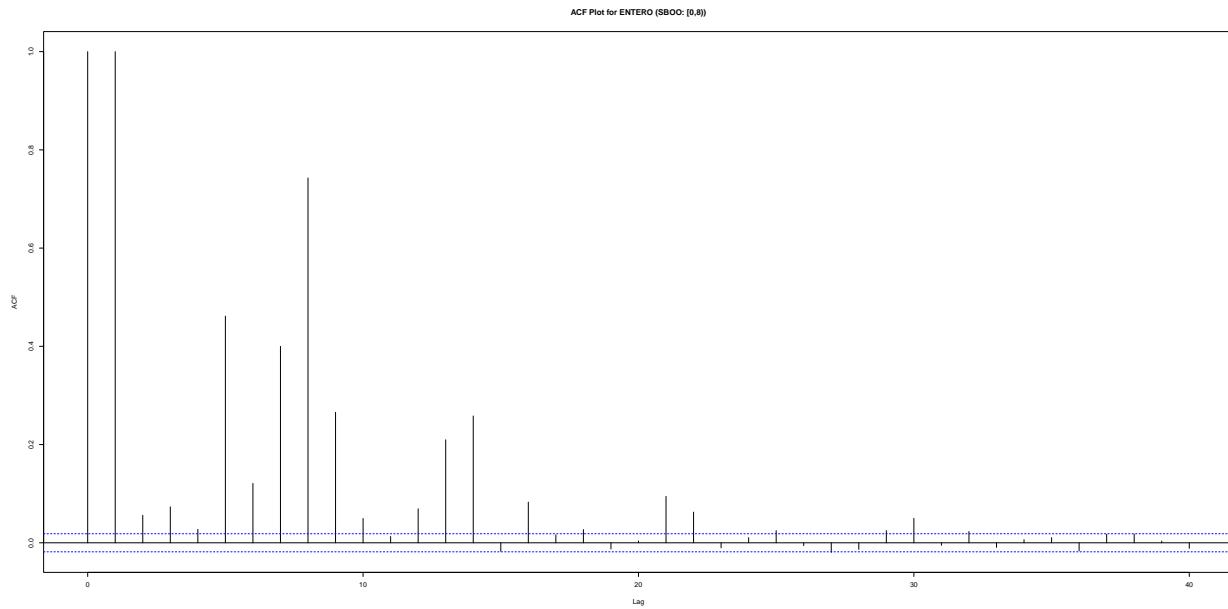
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
##  1.000 -0.005 -0.004 -0.037  0.007  0.015  0.602  0.037 -0.008  0.012  0.006
##          11     12     13     14     15     16     17     18     19     20     21
##  0.002 -0.145 -0.008  0.020 -0.028  0.005 -0.007  0.011  0.013 -0.168  0.240
##          22     23     24     25     26     27     28     29     30     31     32
##  0.106 -0.012  0.050 -0.040 -0.130  0.190  0.010 -0.064 -0.072 -0.034  0.063
##          33     34     35     36     37     38     39     40
##  -0.002 -0.008  0.018 -0.056 -0.016  0.025  0.004  0.007
```



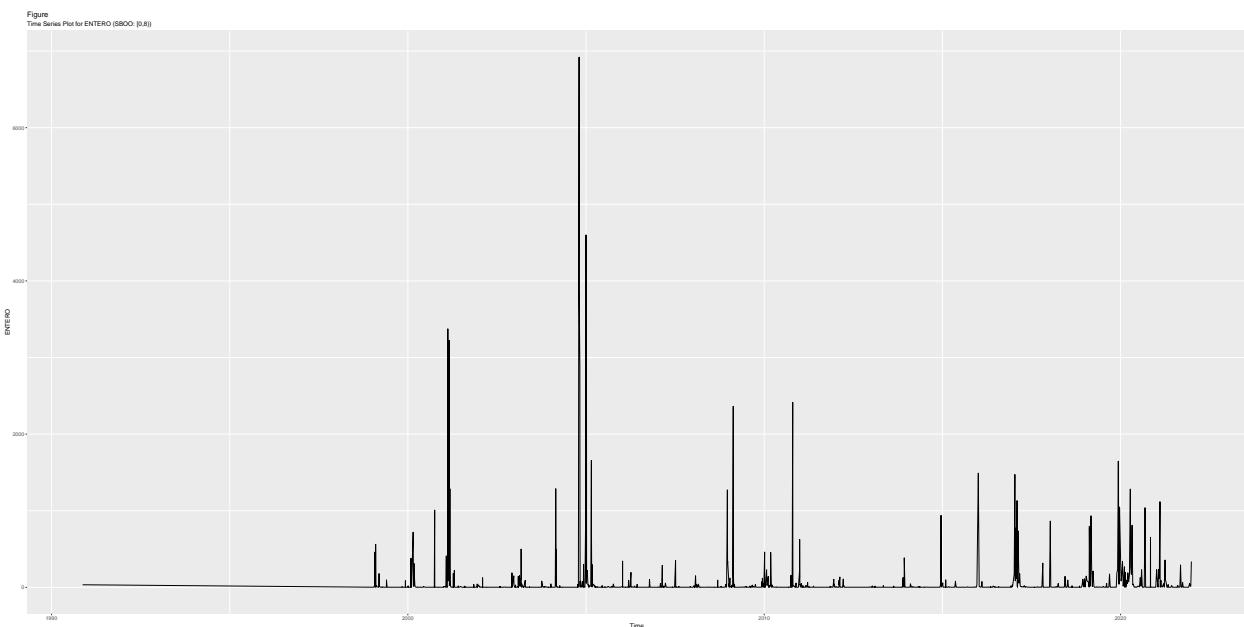


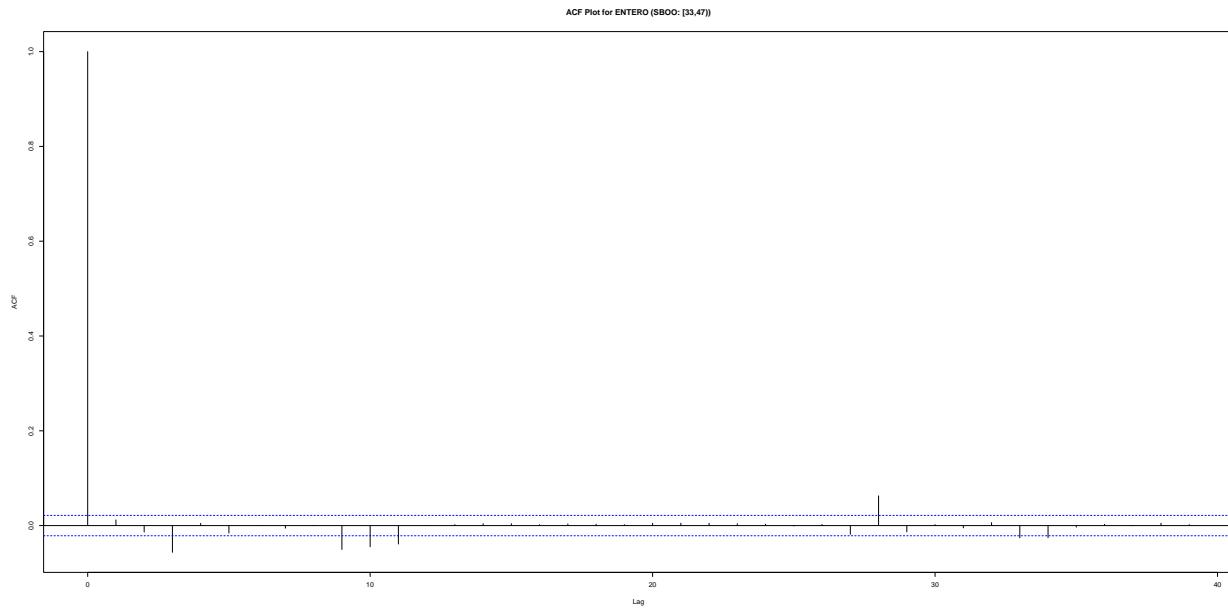
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
##  1.000  0.940  0.260  0.178  0.099  0.097  0.089  0.116  0.256  0.168 -0.008
##      11     12     13     14     15     16     17     18     19     20     21
##  0.028  0.059  0.022  0.077 -0.029  0.038 -0.010 -0.008 -0.033 -0.009 -0.002
##      22     23     24     25     26     27     28     29     30     31     32
## -0.010 -0.013 -0.013 -0.001 -0.012 -0.004 -0.011  0.003 -0.004 -0.009  0.011
##      33     34     35     36     37     38     39
## -0.003 -0.010  0.005 -0.010 -0.011 -0.006 -0.011
```



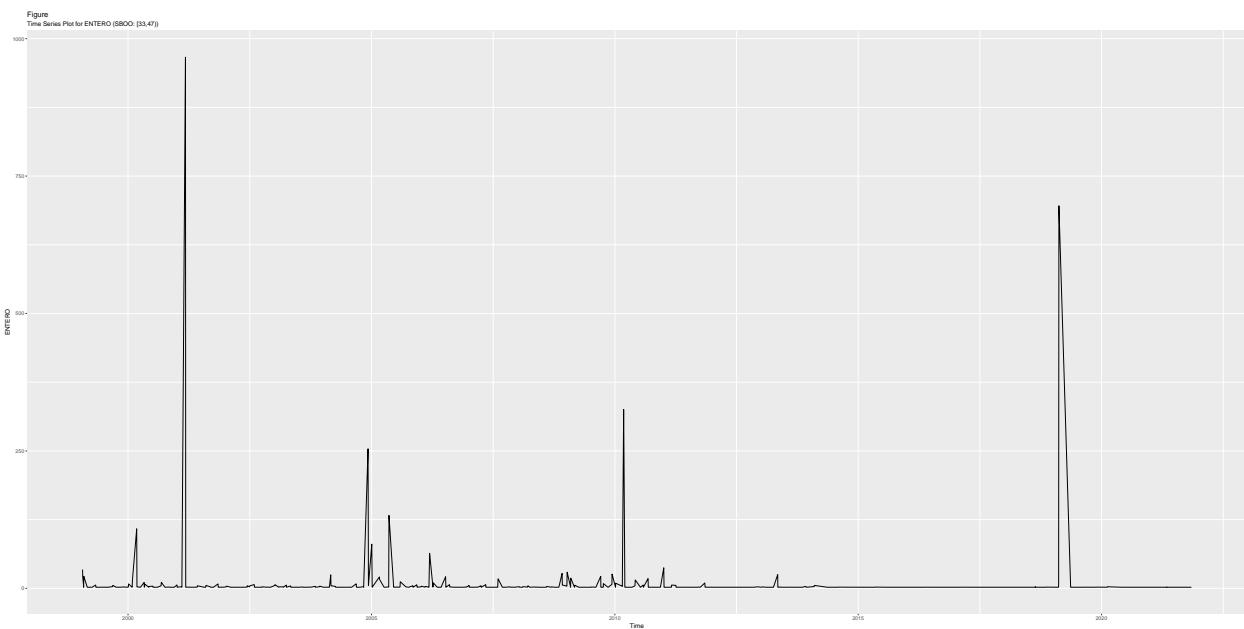


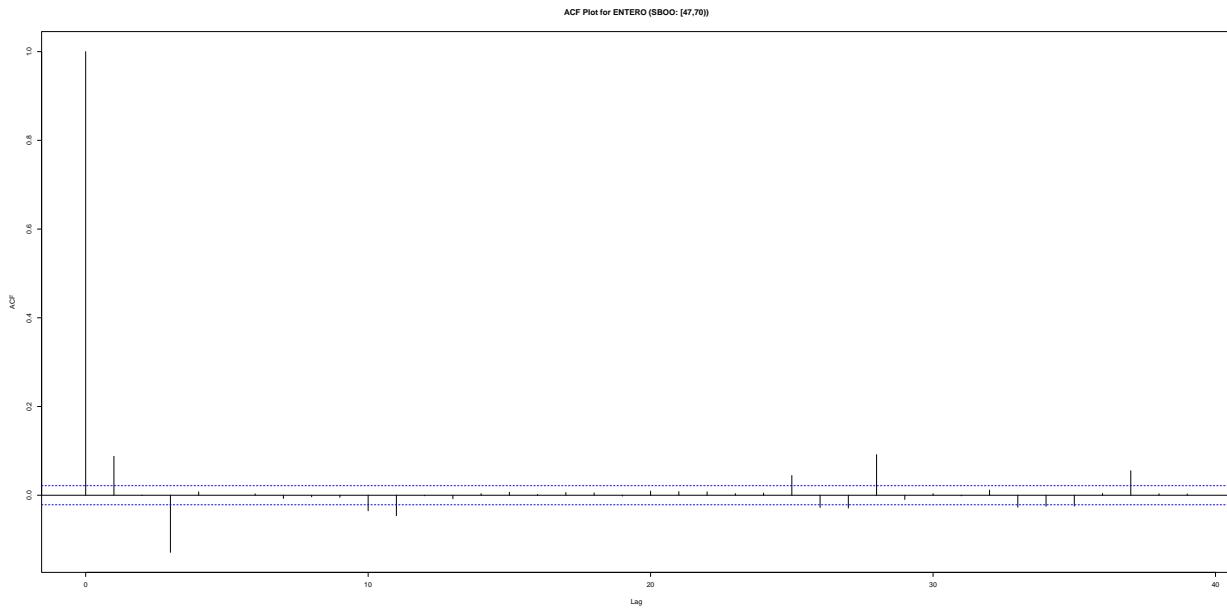
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
## 1.000  1.000  0.056  0.073  0.027  0.461  0.121  0.400  0.743  0.266  0.050
##      11     12     13     14     15     16     17     18     19     20     21
##  0.013  0.069  0.210  0.258 -0.017  0.083  0.016  0.027 -0.013  0.004  0.095
##      22     23     24     25     26     27     28     29     30     31     32
##  0.063 -0.010  0.010  0.025 -0.006 -0.019 -0.013  0.025  0.050 -0.005  0.023
##      33     34     35     36     37     38     39     40
## -0.009  0.006  0.010 -0.016  0.017  0.018  0.004 -0.011
```



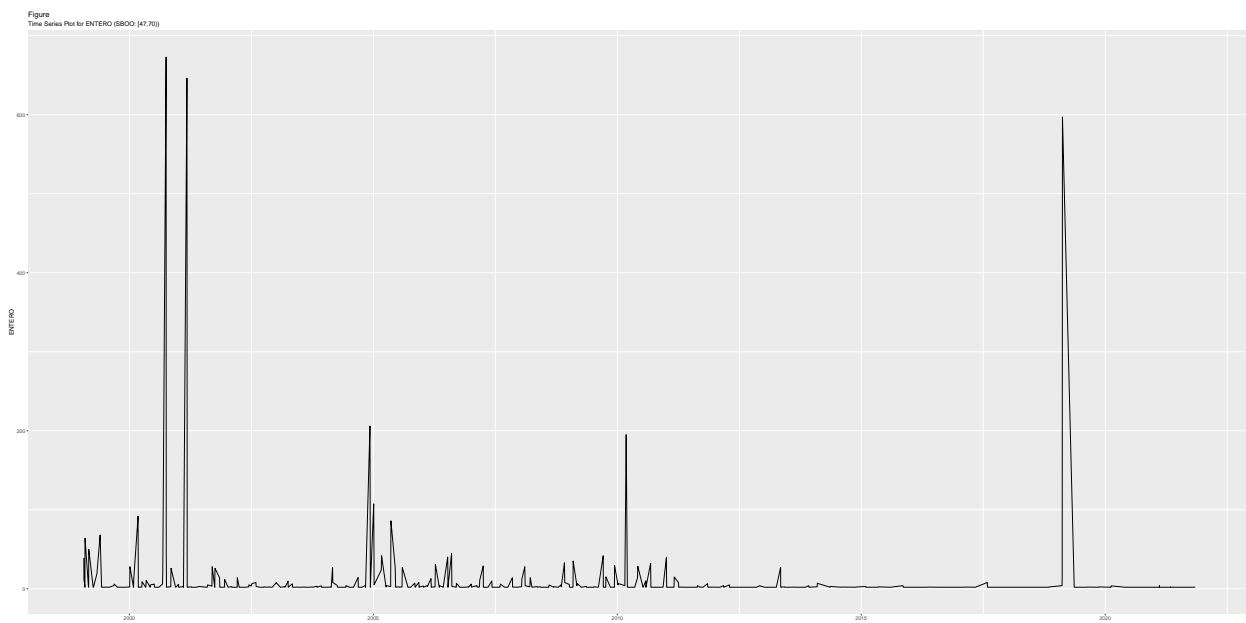


```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
## 1.000  0.012 -0.014 -0.056  0.005 -0.016  0.000 -0.005  0.001 -0.050 -0.045
##      11     12     13     14     15     16     17     18     19     20     21
## -0.039  0.000  0.002  0.004  0.004  0.002  0.004  0.003  0.002  0.005  0.005
##      22     23     24     25     26     27     28     29     30     31     32
##  0.005  0.004  0.003 -0.001  0.002 -0.018  0.063 -0.013  0.002 -0.005  0.006
##      33     34     35     36     37     38     39
## -0.026 -0.026 -0.003  0.003  0.000  0.005  0.002
```

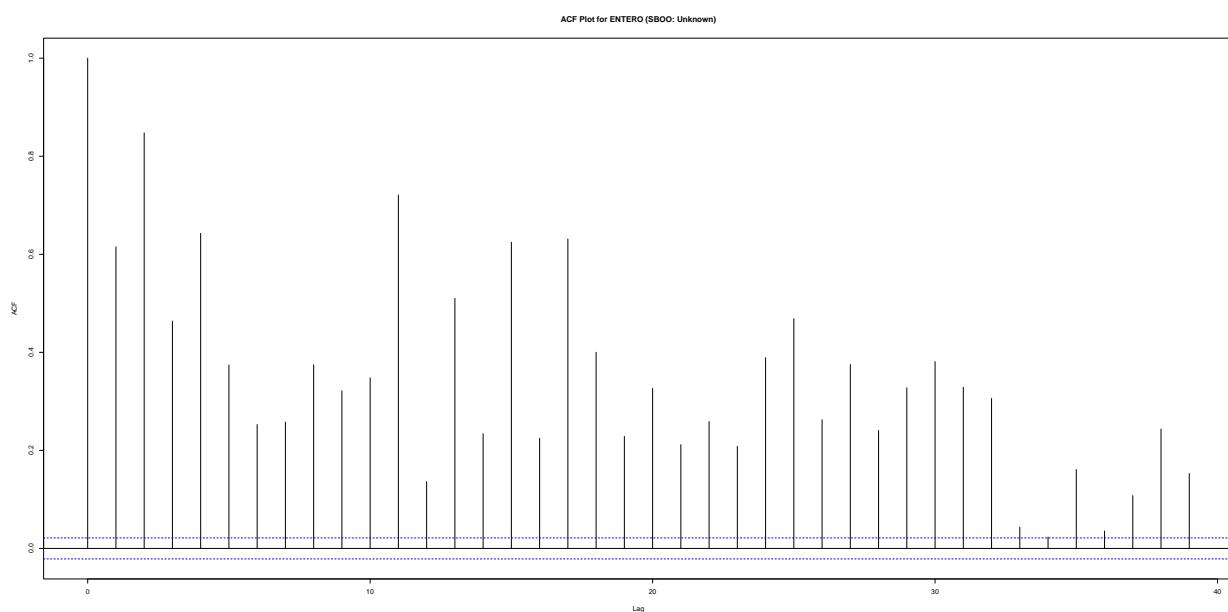
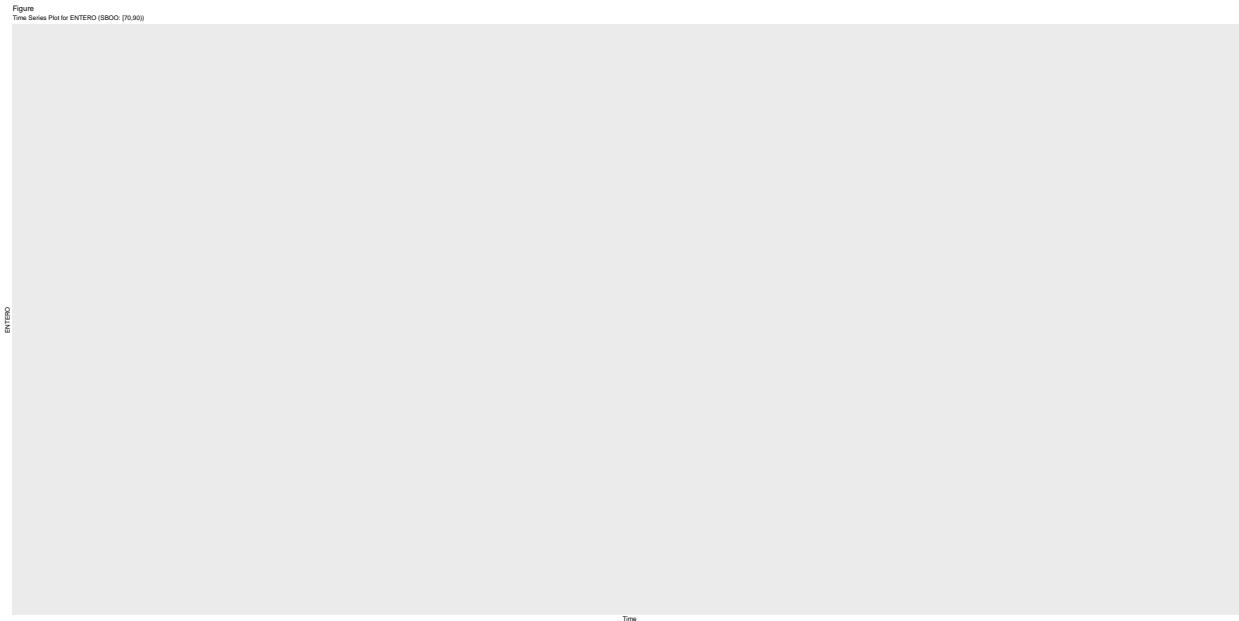




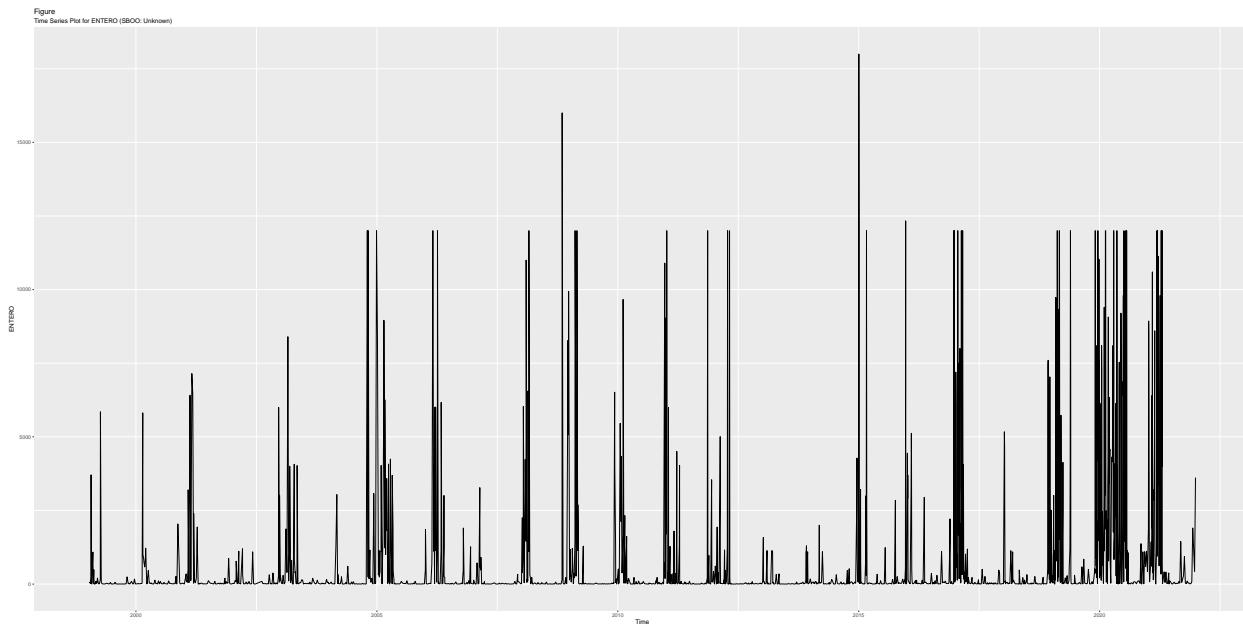
```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10
##  1.000  0.088 -0.001 -0.129  0.008    NA  0.003 -0.007 -0.004 -0.005 -0.035
##  11     12     13     14     15     16     17     18     19     20     21
## -0.046 -0.001 -0.008  0.004  0.007  0.002  0.006  0.005 -0.002  0.009  0.008
##  22     23     24     25     26     27     28     29     30     31     32
##  0.008  0.004  0.005  0.044 -0.028 -0.029  0.091 -0.010  0.004 -0.001  0.011
##  33     34     35     36     37     38     39
## -0.027 -0.025 -0.024  0.004  0.055  0.003  0.003
```



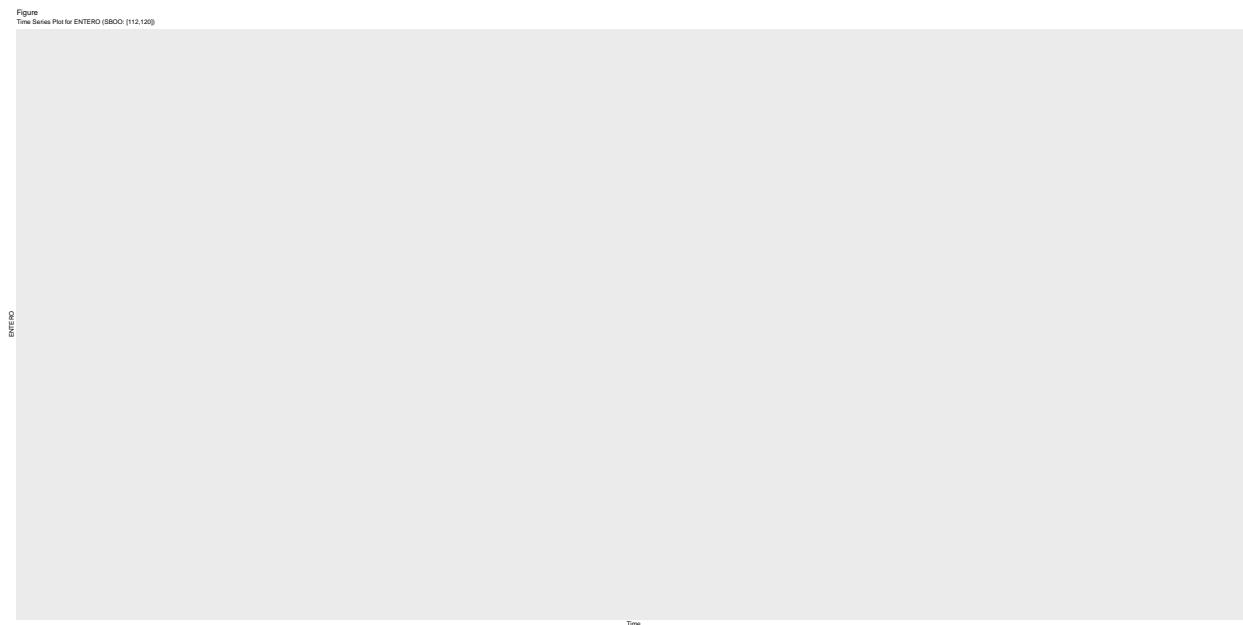
```
## Error in ts(coredata(x)) : 'ts' object must have one or more observations
```



```
##
## Autocorrelations of series 'df_01a[, i]', by lag
##
##          0      1      2      3      4      5      6      7      8      9      10     11     12
## 1 1.000 0.615 0.848 0.464 0.643 0.374 0.253 0.258 0.375 0.321 0.348 0.721 0.136
## 13     14     15     16     17     18     19     20     21     22     23     24     25
## 0.510 0.234 0.625 0.225 0.631 0.400 0.228 0.326 0.212 0.259 0.208 0.389 0.469
## 26     27     28     29     30     31     32     33     34     35     36     37     38
## 0.263 0.375 0.240 0.328 0.381 0.329 0.306 0.043 0.023 0.161 0.035 0.108 0.243
## 39
## 0.153
```



```
## Error in ts(coredata(x)) : 'ts' object must have one or more observations
```



```
## Error in ts(coredata(x)) : 'ts' object must have one or more observations
```



Convert df's to timetk tibbles for data aggregated by date_sample, project, and parameter

```
# Citation: https://business-science.github.io/timetk/index.html
train_start <- "1999-01-18"
train_end <- "2021-01-04"
test_start <- "2021-01-11"
test_end <- ""

#####
# Convert PL00 data for 01/18/1999 and 01/03/2022 to `timetk` TS tibble
owt_df02_gb09_ploo_wkly03_df01 <- owt_df02_gb09_wkly03[owt_df02_gb09_wkly03$project ==
  → "PL00" & owt_df02_gb09_wkly03$date_sample >= train_start, ]
owt_df02_gb09_ploo_wkly03_df02 <- owt_df02_gb09_ploo_wkly03_df01[, -c(2, 8, 11)]
#owt_df02_gb09_ploo_wkly03_df02$date_sample <-
  → yearweek(owt_df02_gb09_ploo_wkly03_df02$date_sample, week_start =
  → getOption("lubridate.week.end", 1))

owt_df02_gb09_ploo_wkly03_tb01 <- tibble(owt_df02_gb09_ploo_wkly03_df02)
owt_df02_gb09_ploo_wkly03_tb02 <- pad_by_time(.data = owt_df02_gb09_ploo_wkly03_tb01,
  → .date_var = date_sample,
  → .by = "week")

#-----
# Convert PL00 data (excluding outliers) for 01/18/1999 and 01/03/2022 to `timetk` TS
  → tibble
owt_df02_gb09_ploo_wkly02_df01 <- owt_df02_gb09_wkly02[owt_df02_gb09_wkly02$project ==
  → "PL00" & owt_df02_gb09_wkly02$date_sample >= train_start, ]
owt_df02_gb09_ploo_wkly02_df02 <- owt_df02_gb09_ploo_wkly02_df01[, -c(2, 8, 11)]

owt_df02_gb09_ploo_wkly02_tb01 <- tibble(owt_df02_gb09_ploo_wkly02_df02)
owt_df02_gb09_ploo_wkly02_tb02 <- pad_by_time(.data = owt_df02_gb09_ploo_wkly02_tb01,
```

```

        .date_var = date_sample,
        .by = "week")

#+++++
# Convert SBOO data for 01/18/1999 and 01/03/2022 to `timetk` TS tibble
owt_df02_gb09_sboo_wkly03_df01 <- owt_df02_gb09_wkly03[owt_df02_gb09_wkly03$project ==
  ~ "SBOO" & owt_df02_gb09_wkly03$date_sample >= train_start, ]
owt_df02_gb09_sboo_wkly03_df02 <- owt_df02_gb09_sboo_wkly03_df01[, -c(2, 8, 11)]

owt_df02_gb09_sboo_wkly03_tb01 <- tibble(owt_df02_gb09_sboo_wkly03_df02)
owt_df02_gb09_sboo_wkly03_tb02 <- pad_by_time(.data = owt_df02_gb09_sboo_wkly03_tb01,
                                               .date_var = date_sample,
                                               .by = "week")

#-----
# Convert SBOO data (excluding outliers) for 01/18/1999 and 01/03/2022 to `timetk` TS
# tibble
owt_df02_gb09_sboo_wkly02_df01 <- owt_df02_gb09_wkly02[owt_df02_gb09_wkly02$project ==
  ~ "SBOO" & owt_df02_gb09_wkly02$date_sample >= train_start, ]
owt_df02_gb09_sboo_wkly02_df02 <- owt_df02_gb09_sboo_wkly02_df01[, -c(2, 8, 11)]

owt_df02_gb09_sboo_wkly02_tb01 <- tibble(owt_df02_gb09_sboo_wkly02_df02)
owt_df02_gb09_sboo_wkly02_tb02 <- pad_by_time(.data = owt_df02_gb09_sboo_wkly02_tb01,
                                               .date_var = date_sample,
                                               .by = "week")

```

Partition tibbles for data aggregated by date_sample, project, and parameter

```

#+++++
# PLOO All - Training partition (01/18/1999-01/04/2021)
owt_df02_gb09_ploo_wkly03_train_tb02 <- owt_df02_gb09_ploo_wkly03_tb02 %>%
  filter_by_time(date_sample,
                 .end_date = train_end)

# PLOO All - Test partition (01/11/2021-01/03/2022)
owt_df02_gb09_ploo_wkly03_test_tb02 <- owt_df02_gb09_ploo_wkly03_tb02 %>%
  filter_by_time(date_sample,
                 .start_date = test_start)

#-----
# PLOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
owt_df02_gb09_ploo_wkly02_train_tb02 <- owt_df02_gb09_ploo_wkly02_tb02 %>%
  filter_by_time(date_sample,
                 .end_date = train_end)

# PLOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
owt_df02_gb09_ploo_wkly02_test_tb02 <- owt_df02_gb09_ploo_wkly02_tb02 %>%
  filter_by_time(date_sample,
                 .start_date = test_start)

#+++++
# SBOO All - Training partition (01/18/1999-01/04/2021)
```

```

owt_df02_gb09_sboo_wkly03_train_tb02 <- owt_df02_gb09_sboo_wkly03_tb02 %>%
  filter_by_time(date_sample,
    .end_date = train_end)

# SBOO All - Test partition (01/11/2021-01/03/2022)
owt_df02_gb09_sboo_wkly03_test_tb02 <- owt_df02_gb09_sboo_wkly03_tb02 %>%
  filter_by_time(date_sample,
    .start_date = test_start)

#-----
# SBOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
owt_df02_gb09_sboo_wkly02_train_tb02 <- owt_df02_gb09_sboo_wkly02_tb02 %>%
  filter_by_time(date_sample,
    .end_date = train_end)

# SBOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
owt_df02_gb09_sboo_wkly02_test_tb02 <- owt_df02_gb09_sboo_wkly02_tb02 %>%
  filter_by_time(date_sample,
    .start_date = test_start)

```

Display tibbles available for modeling

```

# Data sets for modeling
#####
# PLOO All - Training partition (01/18/1999-01/04/2021)
#print(head(owt_df02_gb09_ploo_wkly03_train_tb02, 10))
#print(dim(owt_df02_gb09_ploo_wkly03_train_tb02))

# PLOO All - Test partition (01/11/2021-01/03/2022)
#print(head(owt_df02_gb09_ploo_wkly03_test_tb02, 10))
#print(dim(owt_df02_gb09_ploo_wkly03_test_tb02))

#-----
# PLOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
#print(head(owt_df02_gb09_ploo_wkly02_train_tb02, 10))
#print(dim(owt_df02_gb09_ploo_wkly02_train_tb02))

# PLOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
#print(head(owt_df02_gb09_ploo_wkly02_test_tb02, 10))
#print(dim(owt_df02_gb09_ploo_wkly02_test_tb02))

#####
# SBOO All - Training partition (01/18/1999-01/04/2021)
#print(head(owt_df02_gb09_sboo_wkly03_train_tb02, 10))
#print(dim(owt_df02_gb09_sboo_wkly03_train_tb02))

# SBOO All - Test partition (01/11/2021-01/03/2022)
#print(head(owt_df02_gb09_sboo_wkly03_test_tb02, 10))
#print(dim(owt_df02_gb09_sboo_wkly03_test_tb02))

#-----
# SBOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)

```

```

#print(head(owt_df02_gb09_sboo_wkly02_train_tb02, 10))
#print(dim(owt_df02_gb09_sboo_wkly02_train_tb02))

# SBOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
#print(head(owt_df02_gb09_sboo_wkly02_test_tb02, 10))
#print(dim(owt_df02_gb09_sboo_wkly02_test_tb02))

```

Imputation using timetk ts_impute_vec() function

```

# Impute missing values using TS imputation w/ seasonality
qk_imp <- function(df = NA) {
  df$CHLOROPHYLL <- ts_impute_vec(df$CHLOROPHYLL,
                                      period = 3,
                                      lambda = NULL)

  df$DENSITY <- ts_impute_vec(df$DENSITY,
                                period = 3,
                                lambda = NULL)

  df$DO <- ts_impute_vec(df$DO,
                         period = 3,
                         lambda = NULL)

  df$ENTERO <- ts_impute_vec(df$ENTERO,
                               period = 3,
                               lambda = NULL)

  df$FECAL <- ts_impute_vec(df$FECAL,
                             period = 3,
                             lambda = NULL)

  df$PH <- ts_impute_vec(df$PH,
                         period = 3,
                         lambda = NULL)

  df$SALINITY <- ts_impute_vec(df$SALINITY,
                                period = 3,
                                lambda = NULL)

  df$TEMP <- ts_impute_vec(df$TEMP,
                            period = 3,
                            lambda = NULL)

  df$XMS <- ts_impute_vec(df$XMS,
                           period = 3,
                           lambda = NULL)
  return(df)
}

# PLOO All - Training partition (01/18/1999-01/04/2021)
owt_df02_gb09_ploo_wkly03_train_tb03 <- qk_imp(df = owt_df02_gb09_ploo_wkly03_train_tb02)
#print(head(owt_df02_gb09_ploo_wkly03_train_tb03, 10))

```

```

# PLOO All - Test partition (01/11/2021-01/03/2022)
owt_df02_gb09_ploo_wkly03_test_tb03 <- qk_imp(df = owt_df02_gb09_ploo_wkly03_test_tb02)
#print(head(owt_df02_gb09_ploo_wkly03_test_tb03, 10))

#-----
# PLOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
owt_df02_gb09_ploo_wkly02_train_tb03 <- qk_imp(df = owt_df02_gb09_ploo_wkly02_train_tb02)
#print(head(owt_df02_gb09_ploo_wkly02_train_tb03, 10))

# PLOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
owt_df02_gb09_ploo_wkly02_test_tb03 <- qk_imp(df = owt_df02_gb09_ploo_wkly02_test_tb02)
#print(head(owt_df02_gb09_ploo_wkly02_test_tb03, 10))

#####
# SBOO All - Training partition (01/18/1999-01/04/2021)
owt_df02_gb09_sboo_wkly03_train_tb03 <- qk_imp(df = owt_df02_gb09_sboo_wkly03_train_tb02)
#print(head(owt_df02_gb09_sboo_wkly03_train_tb03, 10))

# SBOO All - Test partition (01/11/2021-01/03/2022)
owt_df02_gb09_sboo_wkly03_test_tb03 <- qk_imp(df = owt_df02_gb09_sboo_wkly03_test_tb02)
#print(head(owt_df02_gb09_sboo_wkly03_test_tb03, 10))

#-----
# SBOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
owt_df02_gb09_sboo_wkly02_train_tb03 <- qk_imp(df = owt_df02_gb09_sboo_wkly02_train_tb02)
#print(head(owt_df02_gb09_sboo_wkly02_train_tb03, 10))

# SBOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
owt_df02_gb09_sboo_wkly02_test_tb03 <- qk_imp(df = owt_df02_gb09_sboo_wkly02_test_tb02)
#print(head(owt_df02_gb09_sboo_wkly02_test_tb03, 10))

```

Modeling

Holt-Winters Modeling for all Parameters and all tables

```

library("forecast")

# convert to time series object ts
params <- c("CHLOROPHYLL", "DENSITY", "DO", "ENTERO", "FECAL", "PH", "SALINITY", "TEMP",
           "XMS")

for (param in params) {

  z <- get(param, owt_df02_gb09_ploo_wkly03_train_tb03)
  ts_owt_df02_gb09_ploo_wkly03_train_tb03 <- ts(z, start = c(1999, 1), freq = 52)

  HW1 <- HoltWinters(ts_owt_df02_gb09_ploo_wkly03_train_tb03)

  # forecast library more robust features vs. predict()
  library(forecast)
  HW1_for <- forecast(HW1, h=52, level=c(80,95))
}

```

```

#visualize our predictions:
plot(HW1_for, xlim=c(2017, 2023))
lines(HW1_for$fitted, lty=2, col="purple")
mtext(param, side=3, line = -2)

print("Training Set Accuracy: ")
print(param)
library(MLmetrics)
print(accuracy(HW1_for))
ts_owt_df02_gb09_ploo_wkly03_test_tb03 <- ts(z, start = c(2021, 1), freq = 52)
print("Test Set Accuracy:")
print(accuracy(HW1_for, test = ts_owt_df02_gb09_ploo_wkly03_test_tb03))

#z2 <- get(param, owt_df02_gb09_ploo_wkly03_test_tb03)
#ts_owt_df02_gb09_ploo_wkly03_test_tb03 <- ts(z2, start = c(2021, 1), freq = 52)

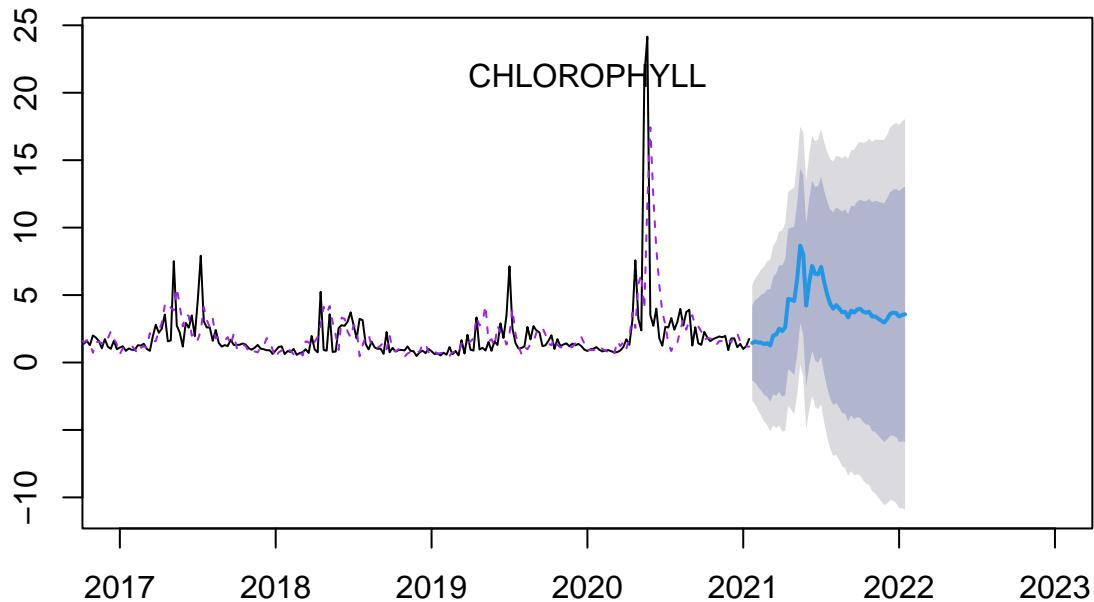
#print("MAPE")
#print(MAPE(y_pred = HW1_for$fitted, y_true = ts_owt_df02_gb09_ploo_wkly03_test_tb03))
#print("MAE")
#print(MAE(y_pred = HW1_for$fitted, y_true = ts_owt_df02_gb09_ploo_wkly03_test_tb03))

}

}

```

Forecasts from HoltWinters



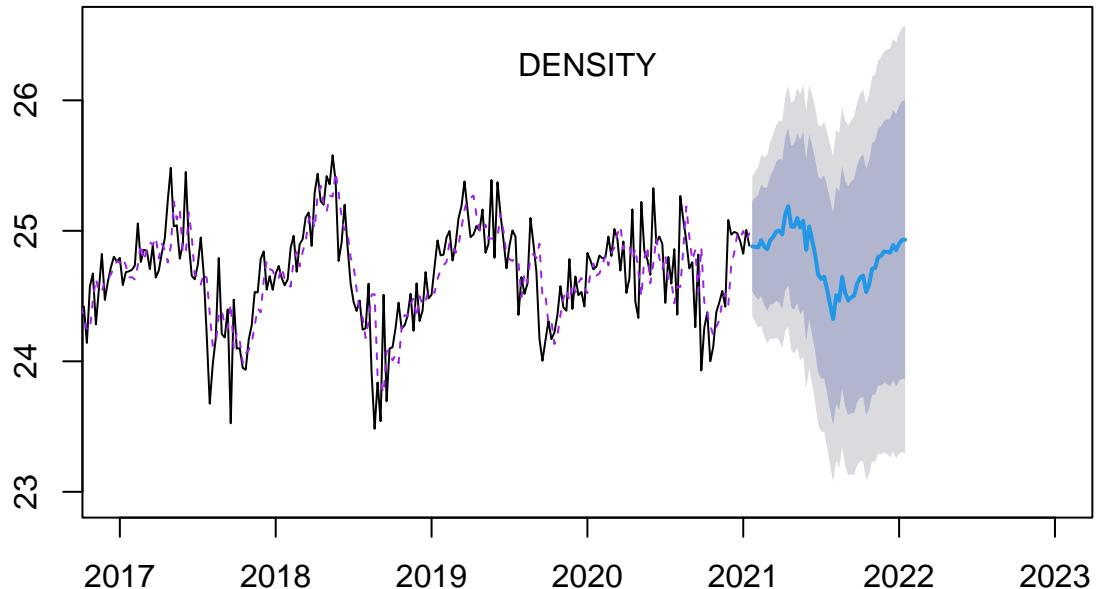
```
## [1] "Training Set Accuracy: "
```

```

## [1] "CHLOROPHYLL"
##               ME      RMSE       MAE       MPE       MAPE       MASE      ACF1
## Training set -0.09843704 2.1804 1.308285 -21.29443 51.71619 0.6397732 0.203878
## [1] "Test Set Accuracy:"
##               ME      RMSE       MAE       MPE       MAPE       MASE      ACF1
## Training set NaN   NaN  NaN  NaN  NaN  NaN  NA

```

Forecasts from HoltWinters

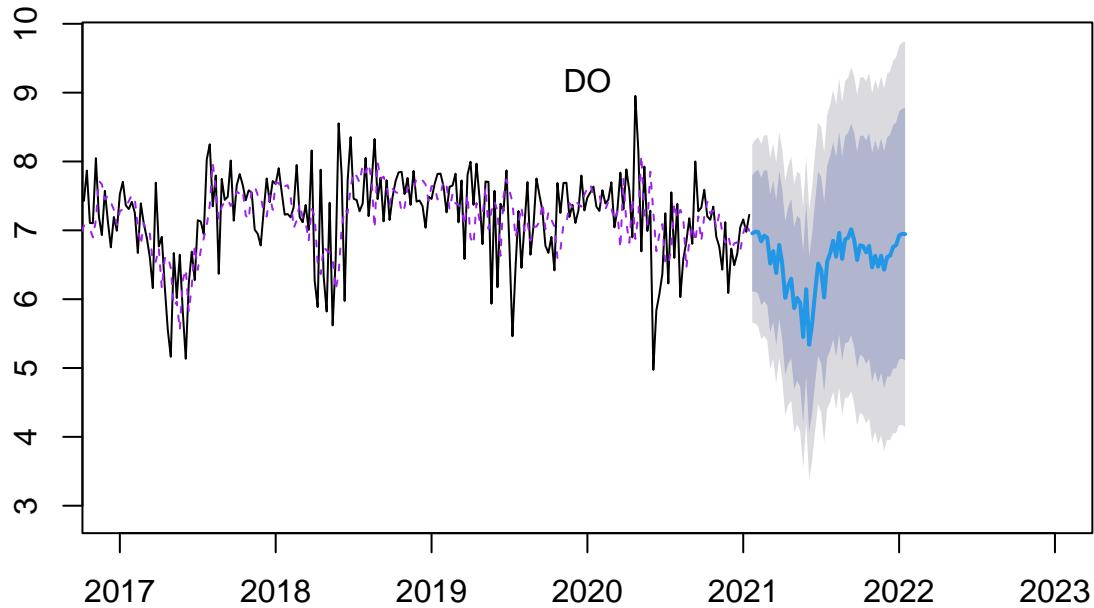


```

## [1] "Training Set Accuracy: "
## [1] "DENSITY"
##               ME      RMSE       MAE       MPE       MAPE       MASE
## Training set -0.00112412 0.2720603 0.2073202 -0.01345529 0.8388695 0.6194478
##               ACF1
## Training set 0.1771812
## [1] "Test Set Accuracy:"
##               ME      RMSE       MAE       MPE       MAPE       MASE      ACF1
## Training set NaN   NaN  NaN  NaN  NaN  NaN  NA

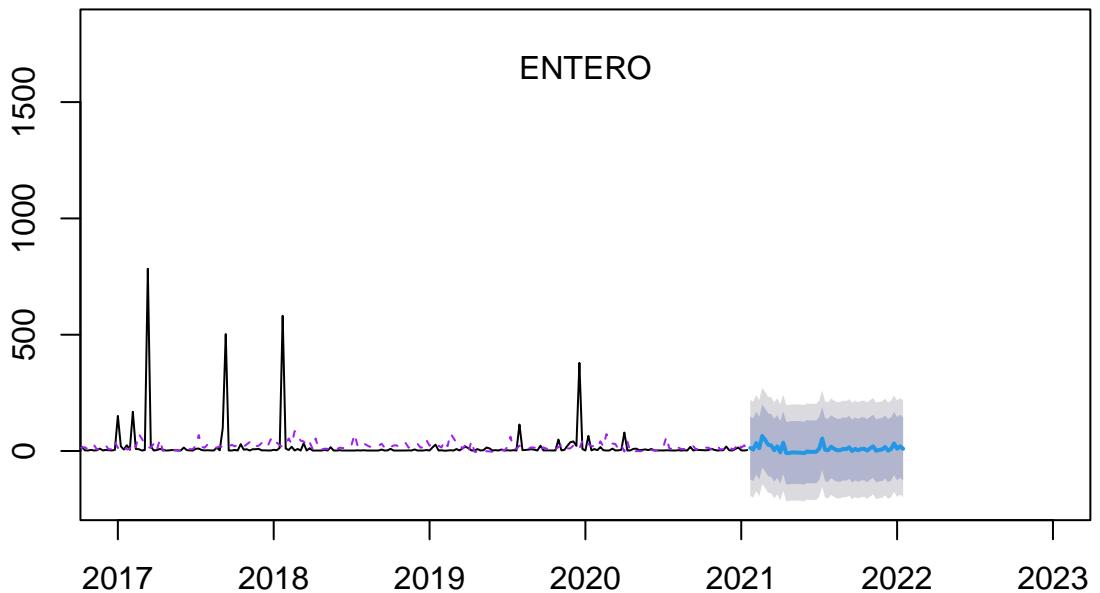
```

Forecasts from HoltWinters



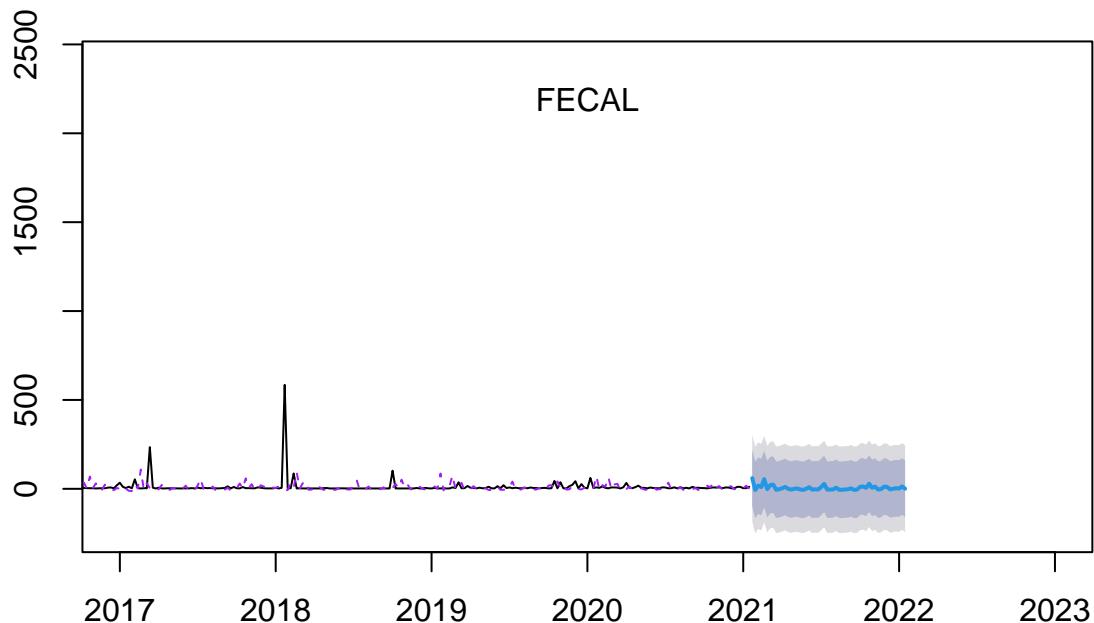
```
## [1] "Training Set Accuracy: "
## [1] "DO"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.0258745 0.660422 0.4966317 -0.3115491 7.357875 0.6600327
##               ACF1
## Training set 0.1605063
## [1] "Test Set Accuracy:"
##               ME      RMSE     MAE     MPE     MAPE     MASE
## Training set NaN    NaN    NaN    NaN    NaN    NA
```

Forecasts from HoltWinters



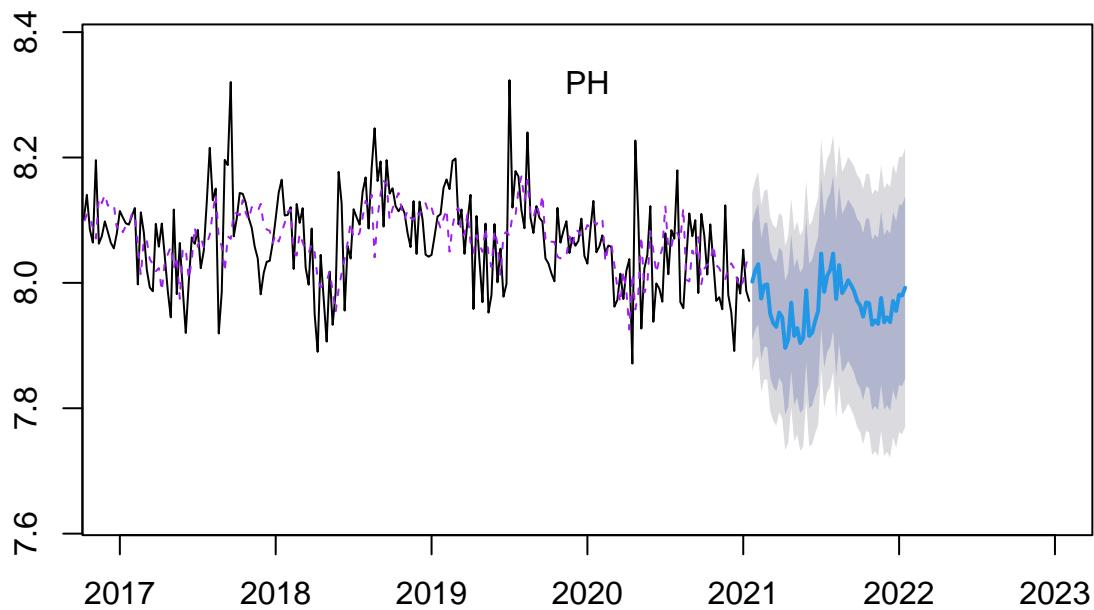
```
## [1] "Training Set Accuracy: "
## [1] "ENTERO"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -3.204651 105.3166 32.34395 -474.3885 522.7562 0.9910613
##               ACF1
## Training set 0.02565651
## [1] "Test Set Accuracy:"
##               ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
## Training set 1.707509 94.5543 30.87289 -288.2655 401.2359 1.76327 -0.008499782
```

Forecasts from HoltWinters



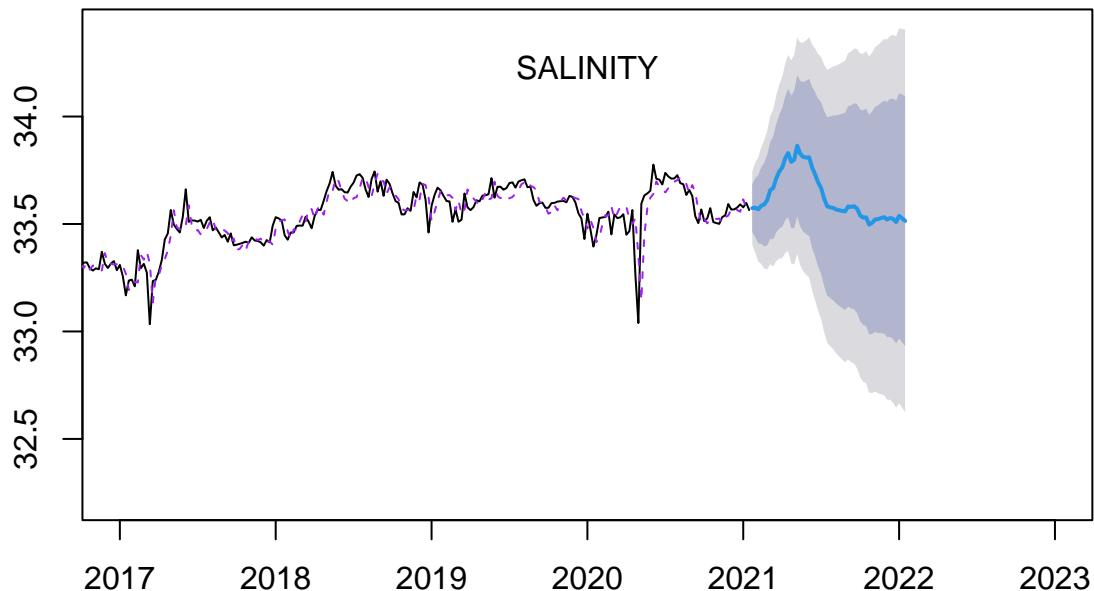
```
## [1] "Training Set Accuracy: "
## [1] "FECAL"
##          ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -3.474252 124.1303 44.49475 -376.5721 568.9474 0.9692438
##          ACF1
## Training set 0.0009713377
## [1] "Test Set Accuracy:"
##          ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.9859952 90.07573 47.14424 -344.7642 412.2666 0.7218798
##          ACF1
## Training set -0.04646794
```

Forecasts from HoltWinters



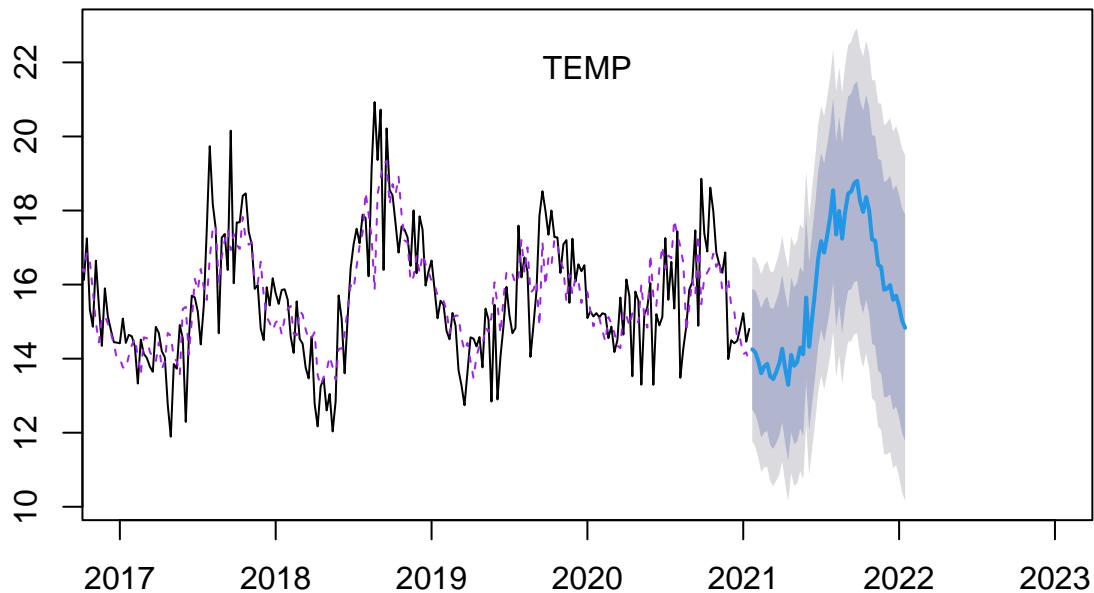
```
## [1] "Training Set Accuracy: "
## [1] "PH"
##               ME        RMSE       MAE       MPE       MAPE       MASE
## Training set 0.00285767 0.07267275 0.05446864 0.02974103 0.6761781 0.684549
##               ACF1
## Training set 0.2544343
## [1] "Test Set Accuracy:"
##               ME        RMSE      MAE      MPE      MAPE      MASE
## Training set NaN     NaN     NaN     NaN     NaN     NA
```

Forecasts from HoltWinters



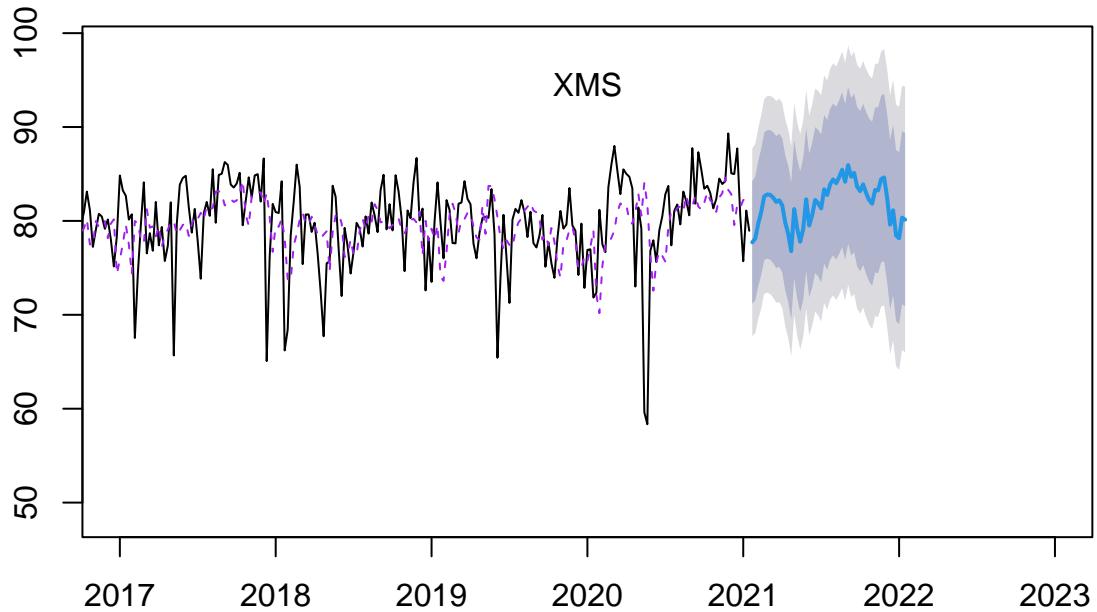
```
## [1] "Training Set Accuracy: "
## [1] "SALINITY"
##               ME        RMSE        MAE        MPE        MAPE       MASE
## Training set 0.001385062 0.08670362 0.05302033 0.003693586 0.1584602 0.430918
##                   ACF1
## Training set 0.0629771
## [1] "Test Set Accuracy:"
##               ME        RMSE       MAE       MPE       MAPE      MASE
## Training set NaN     NaN     NaN     NaN     NaN     NA
```

Forecasts from HoltWinters



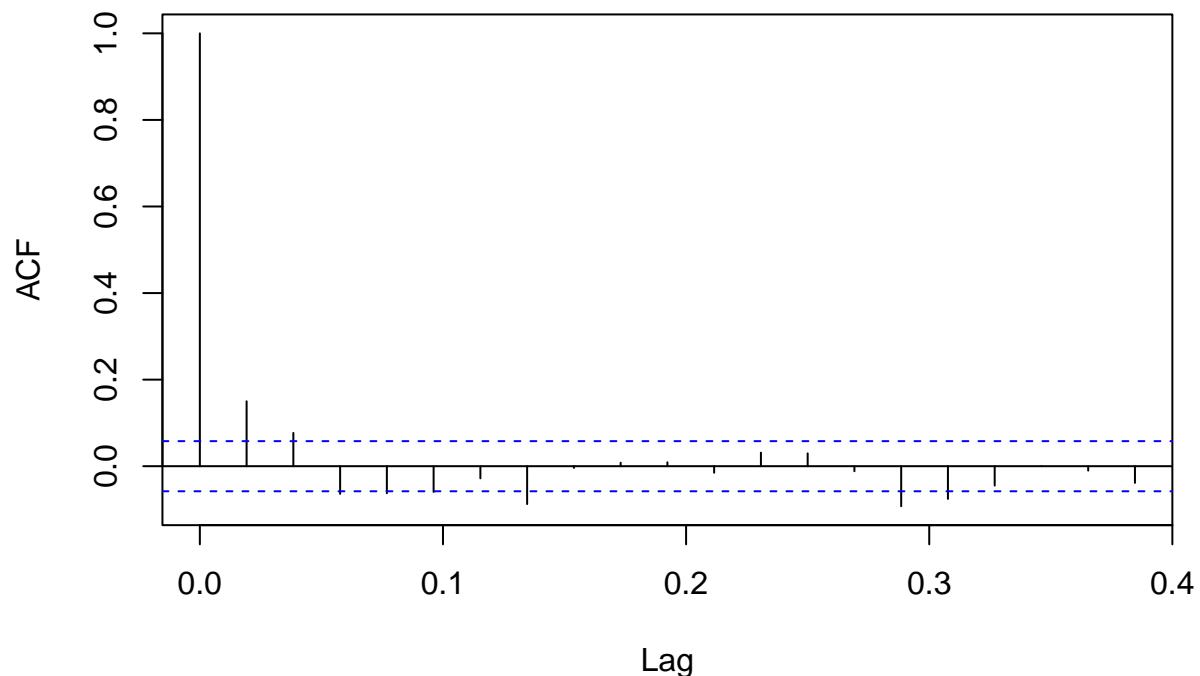
```
## [1] "Training Set Accuracy: "
## [1] "TEMP"
##               ME      RMSE       MAE       MPE      MAPE      MASE
## Training set -0.03670735 1.2691 0.9629089 -0.8010885 6.336469 0.7015829
##                   ACF1
## Training set 0.1725499
## [1] "Test Set Accuracy:"
##               ME      RMSE     MAE     MPE     MAPE     MASE
## Training set NaN    NaN    NaN    NaN    NaN    NA
```

Forecasts from HoltWinters



```
## [1] "Training Set Accuracy: "
## [1] "XMS"
##          ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.1441697 5.093418 3.646157 -0.1597366 4.690327 0.7195253
##          ACF1
## Training set 0.1500687
## [1] "Test Set Accuracy:"
##          ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
## Training set 0.4416314 2.67797 1.937611 0.4721335 2.283652 0.5676533 0.04073519
acf(HW1_for$residuals, lag.max=20, na.action=na.pass)
```

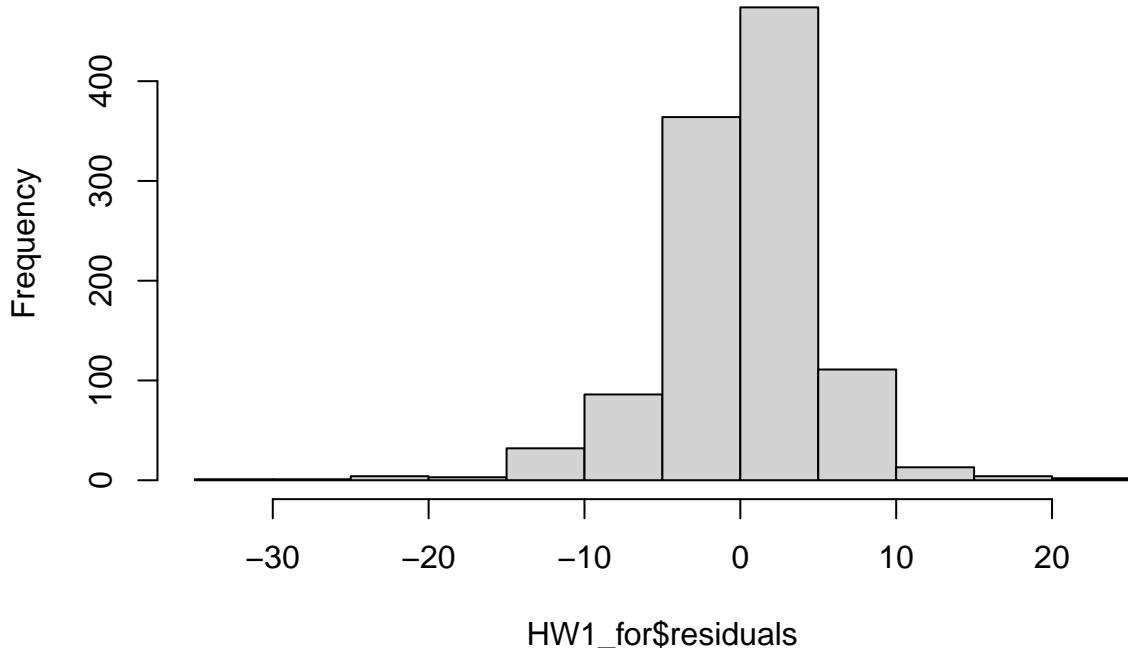
Series HW1_for\$residuals



```
Box.test(HW1_for$residuals, lag=20, type="Ljung-Box")
```

```
##  
## Box-Ljung test  
##  
## data: HW1_for$residuals  
## X-squared = 75.799, df = 20, p-value = 2.004e-08  
hist(HW1_for$residuals)
```

Histogram of HW1_for\$residuals



```
library("forecast")

# convert to time series object ts
params <- c("CHLOROPHYLL", "DENSITY", "DO", "ENTERO", "FECAL", "PH", "SALINITY", "TEMP",
           "XMS")

for (param in params) {
  #print(param)

  z11 <- get(param, owt_df02_gb09_ploo_wkly02_train_tb03)
  ts_owt_df02_gb09_ploo_wkly02_train_tb03 <- ts(z11, start = c(1999, 1), freq = 52)

  HW1 <- HoltWinters(ts_owt_df02_gb09_ploo_wkly02_train_tb03)

  # forecast library more robust features vs. predict()
  library(forecast)
  HW1_for11 <- forecast(HW1, h=104, level=c(80,95))
  #visualize our predictions:
  plot(HW1_for11, xlim=c(2017, 2023))
  lines(HW1_for11$fitted, lty=2, col="purple")
  mtext(param, side=3, line = -2)

  print("Training Set Accuracy: ")
  print(param)
  print(accuracy(HW1_for11))
```

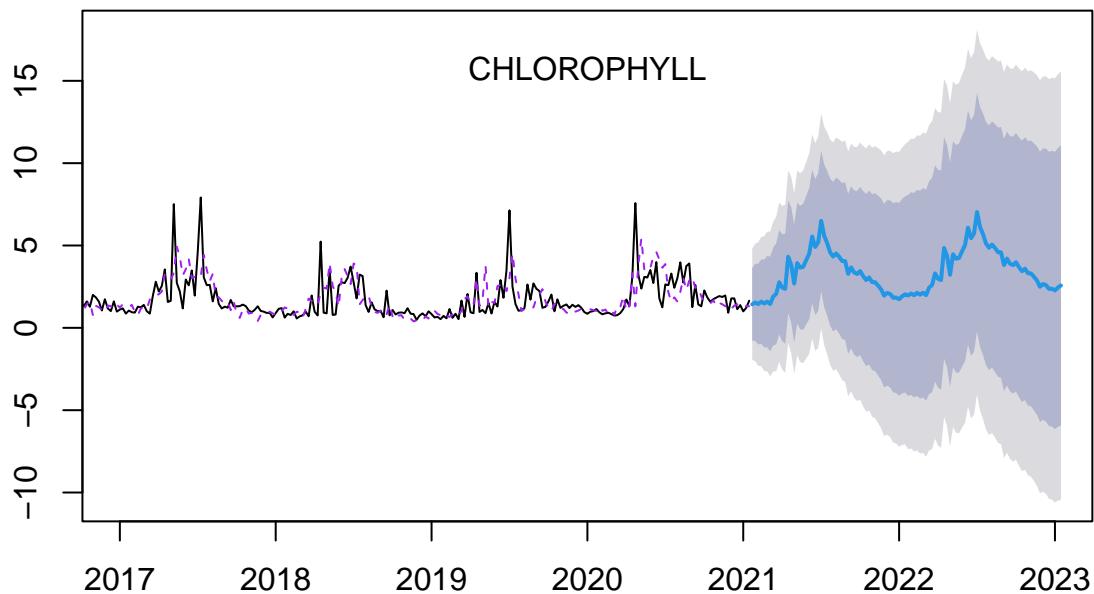
```

z211 <- get(param, owt_df02_gb09_ploo_wkly02_test_tb03)
ts_owt_df02_gb09_ploo_wkly02_test_tb03 <- ts(z211, start = c(2021, 1), freq = 52)

print("Test set: MAPE")
print(MAPE(y_pred = HW1_for11$fitted, y_true = ts_owt_df02_gb09_ploo_wkly02_test_tb03))
print("Test Set: MAE")
print(MAE(y_pred = HW1_for11$fitted, y_true = ts_owt_df02_gb09_ploo_wkly02_test_tb03))
}

```

Forecasts from HoltWinters

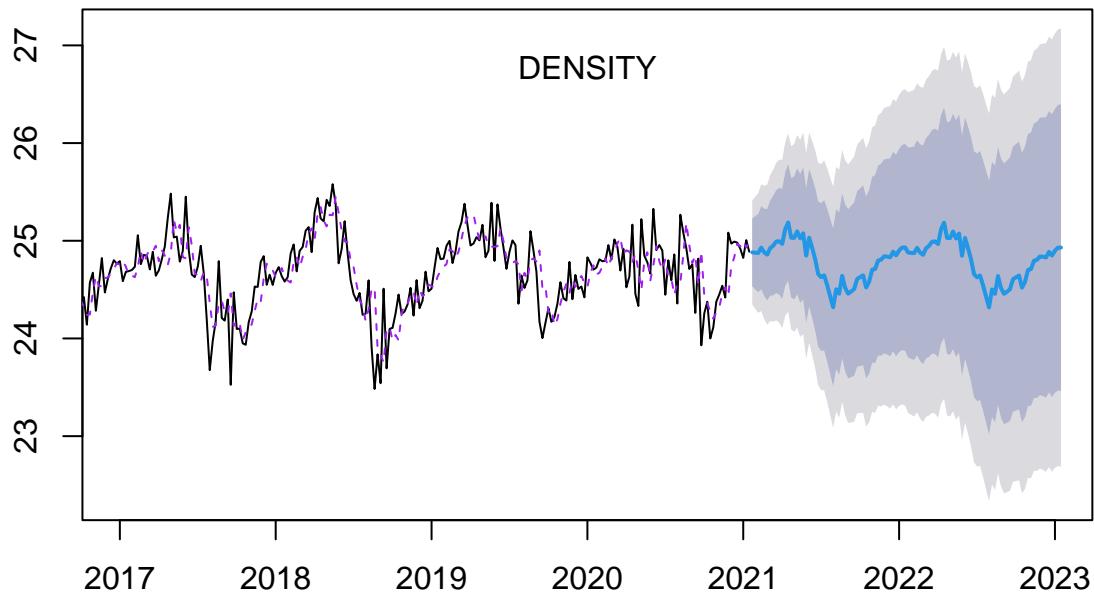


```

## [1] "Training Set Accuracy: "
## [1] "CHLOROPHYLL"
##               ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
## Training set -0.07230778 1.725906 1.13443 -16.8394 46.7532 0.6076721 0.2434585
## [1] "Test set: MAPE"
## [1] 0.1718524
## [1] "Test Set: MAE"
## [1] 0.2409885

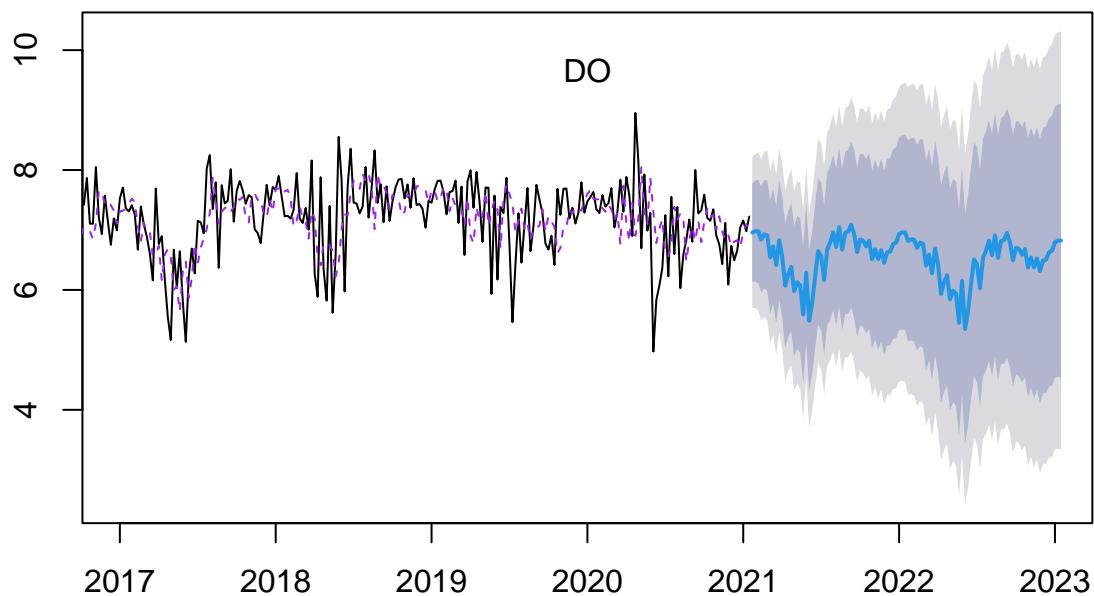
```

Forecasts from HoltWinters



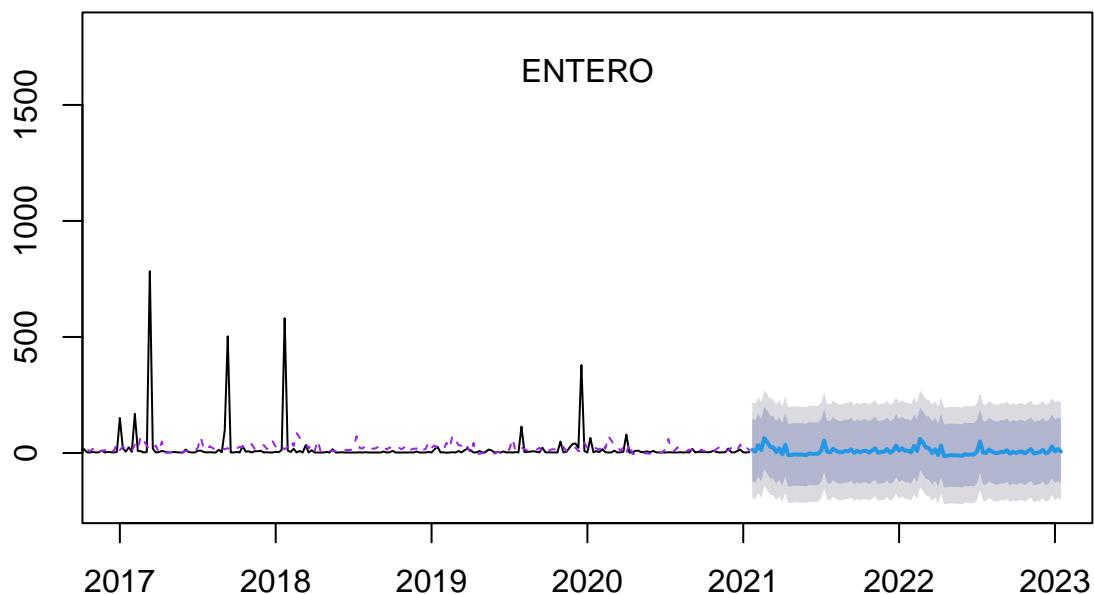
```
## [1] "Training Set Accuracy: "
## [1] "DENSITY"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.001112587 0.2715231 0.2071139 -0.01337993 0.837877 0.6208778
##               ACF1
## Training set 0.1791689
## [1] "Test set: MAPE"
## [1] 0.005575966
## [1] "Test Set: MAE"
## [1] 0.1403075
```

Forecasts from HoltWinters



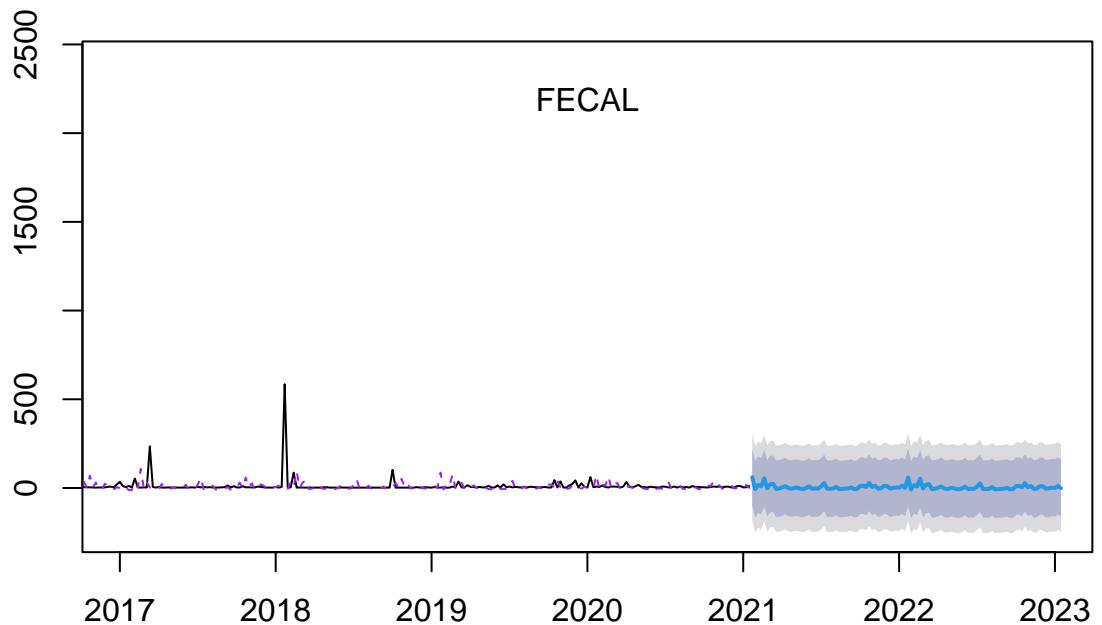
```
## [1] "Training Set Accuracy: "
## [1] "DO"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.02545076 0.6398213 0.481578 -0.2703567 7.050892 0.6767534
##               ACF1
## Training set 0.1841093
## [1] "Test set: MAPE"
## [1] 0.05605313
## [1] "Test Set: MAE"
## [1] 0.3813092
```

Forecasts from HoltWinters



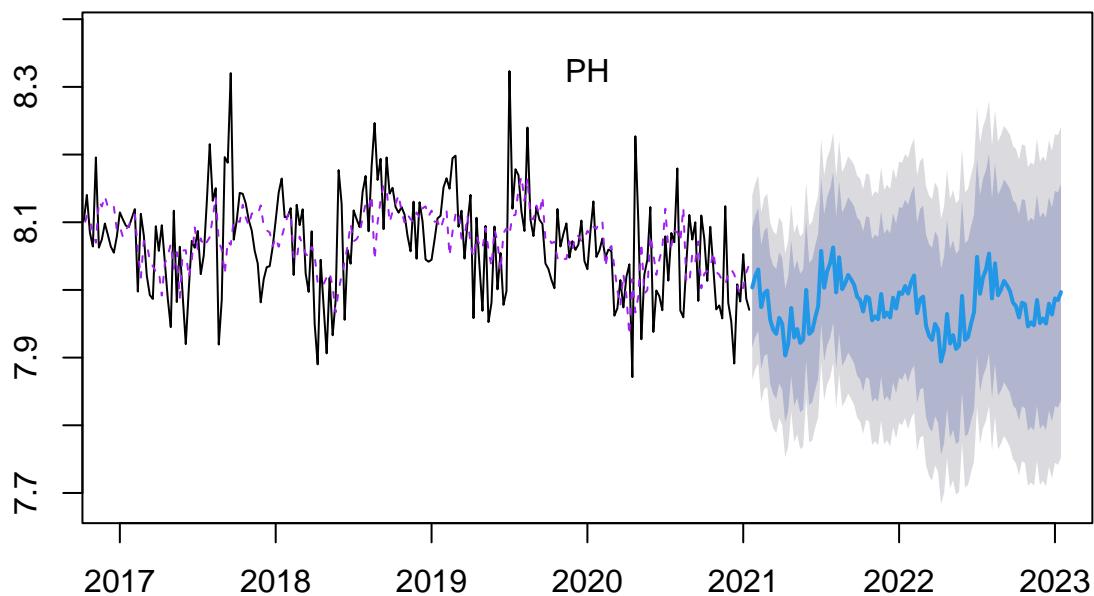
```
## [1] "Training Set Accuracy: "
## [1] "ENTERO"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -3.204651 105.3166 32.34395 -474.3885 522.7562 0.9910613
##               ACF1
## Training set 0.02565651
## [1] "Test set: MAPE"
## [1] 4.903701
## [1] "Test Set: MAE"
## [1] 14.25214
```

Forecasts from HoltWinters



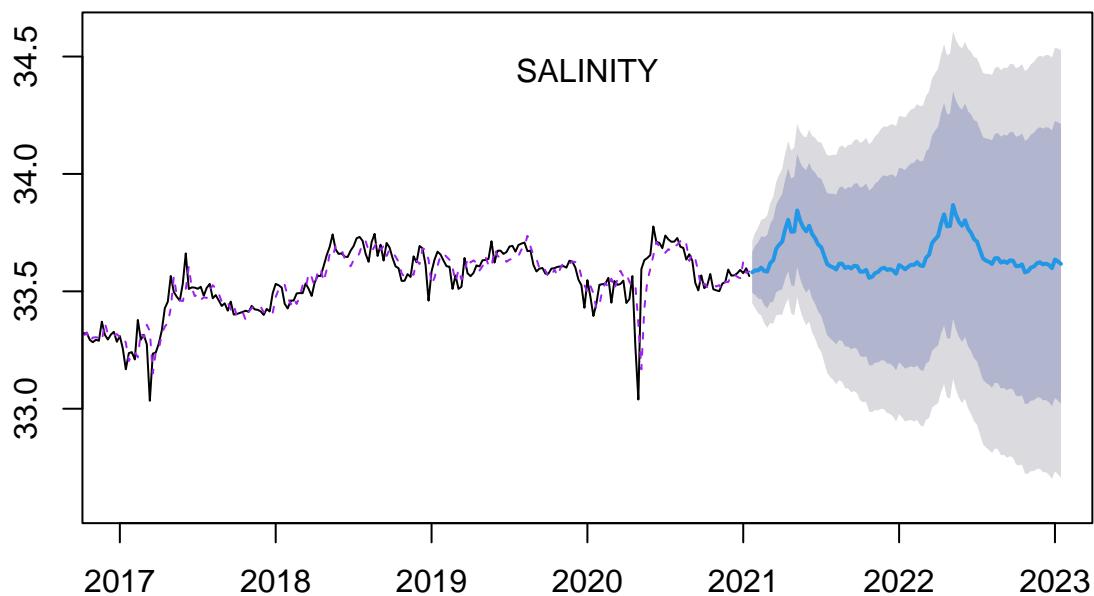
```
## [1] "Training Set Accuracy: "
## [1] "FECAL"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -3.474252 124.1303 44.49475 -376.5721 568.9474 0.9692438
##               ACF1
## Training set 0.0009713377
## [1] "Test set: MAPE"
## [1] 0.7808016
## [1] "Test Set: MAE"
## [1] 4.385288
```

Forecasts from HoltWinters



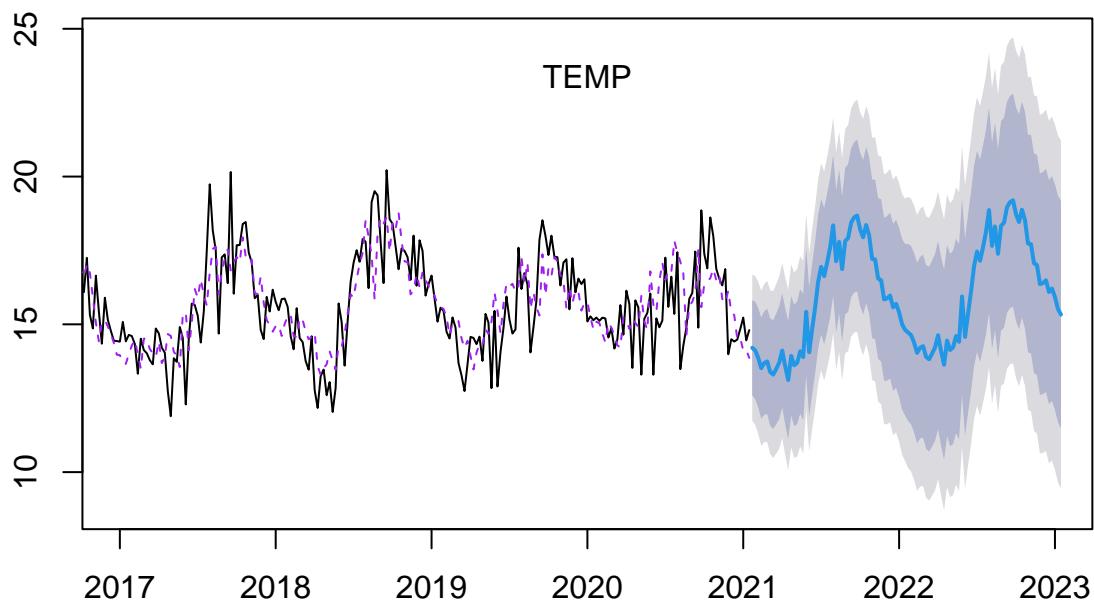
```
## [1] "Training Set Accuracy: "
## [1] "PH"
##               ME        RMSE        MAE        MPE        MAPE        MASE
## Training set 0.001620217 0.06933147 0.05215344 0.01451201 0.6469997 0.6740749
##               ACF1
## Training set 0.2460483
## [1] "Test set: MAPE"
## [1] 0.002251599
## [1] "Test Set: MAE"
## [1] 0.01802032
```

Forecasts from HoltWinters



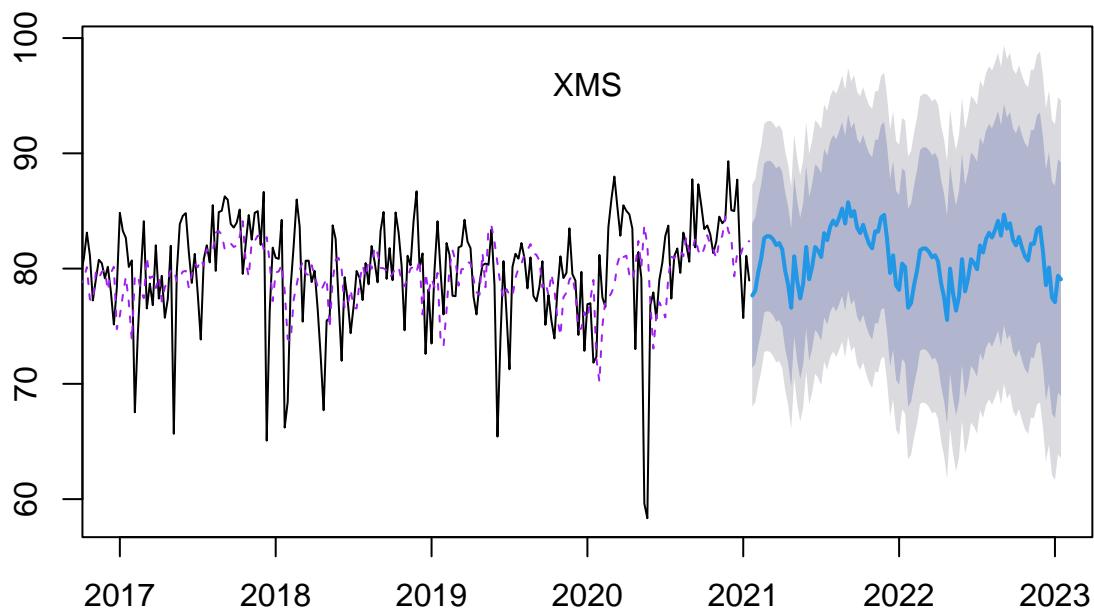
```
## [1] "Training Set Accuracy: "
## [1] "SALINITY"
##               ME      RMSE      MAE      MPE      MAPE
## Training set -0.0007432887 0.06837147 0.04810312 -0.002499238 0.143628
##             MASE      ACF1
## Training set 0.4088266 0.05644603
## [1] "Test set: MAPE"
## [1] 0.0005866524
## [1] "Test Set: MAE"
## [1] 0.01971718
```

Forecasts from HoltWinters



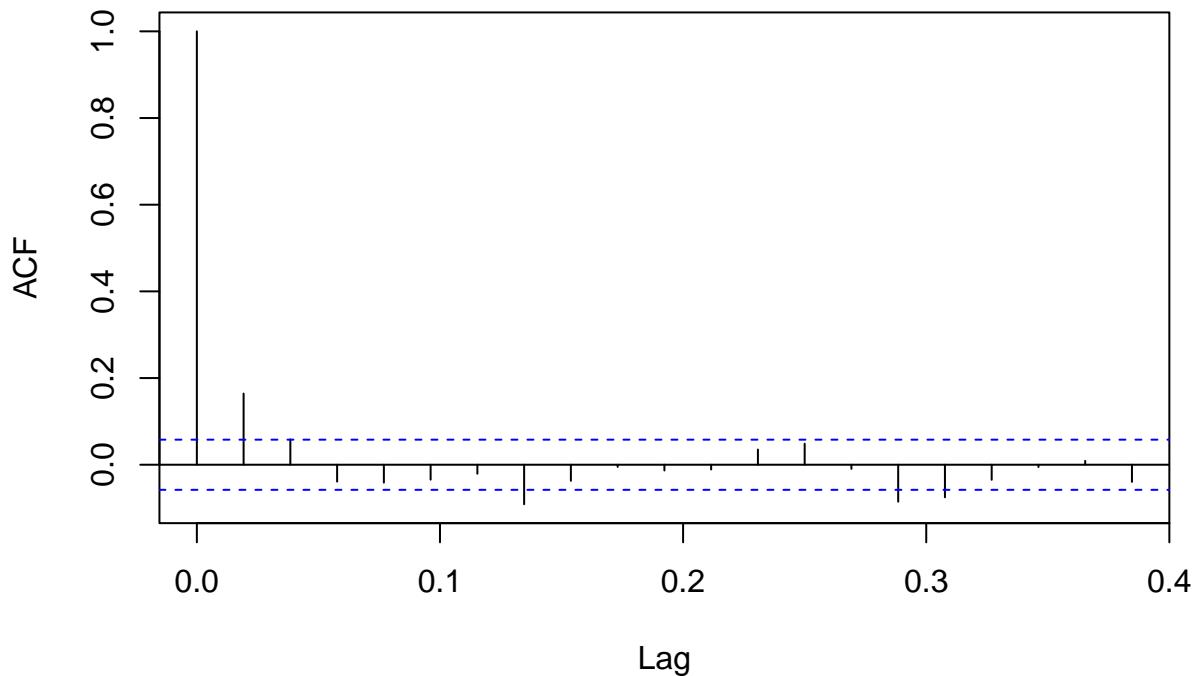
```
## [1] "Training Set Accuracy: "
## [1] "TEMP"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.03940712 1.257878 0.958221 -0.8131094 6.317697 0.7049208
##               ACF1
## Training set 0.182524
## [1] "Test set: MAPE"
## [1] 0.03212671
## [1] "Test Set: MAE"
## [1] 0.4503736
```

Forecasts from HoltWinters



```
## [1] "Training Set Accuracy: "
## [1] "XMS"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.1664348 4.909606 3.580805 -0.09478933 4.566404 0.7202584
##               ACF1
## Training set 0.1642423
## [1] "Test set: MAPE"
## [1] 0.09010108
## [1] "Test Set: MAE"
## [1] 6.649647
acf(HW1_for11$residuals, lag.max=20, na.action=na.pass)
```

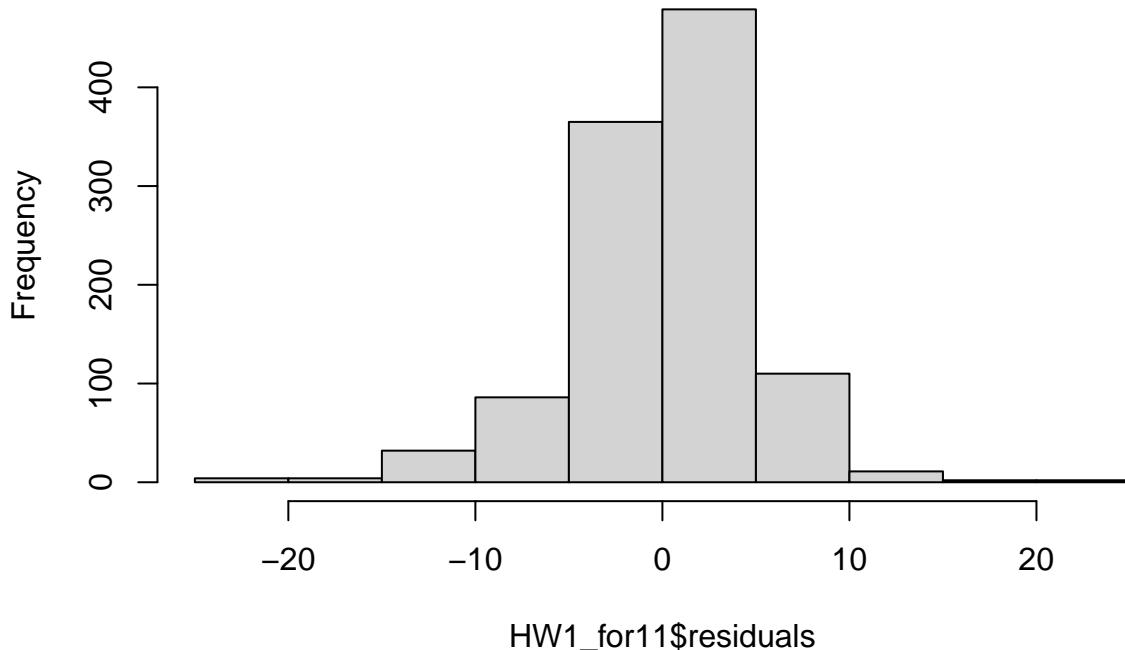
Series HW1_for11\$residuals



```
Box.test(HW1_for11$residuals, lag=20, type="Ljung-Box")
```

```
##  
## Box-Ljung test  
##  
## data: HW1_for11$residuals  
## X-squared = 71.463, df = 20, p-value = 1.049e-07  
hist(HW1_for11$residuals)
```

Histogram of HW1_for11\$residuals



```
library("forecast")

# convert to time series object ts
params <- c("CHLOROPHYLL", "DENSITY", "DO", "ENTERO", "FECAL", "PH", "SALINITY", "TEMP",
           "XMS")

for (param in params) {

  z <- get(param, owt_df02_gb09_sboo_wkly03_train_tb03)
  ts_owt_df02_gb09_sboo_wkly03_train_tb03 <- ts(z, start = c(1999, 1), freq = 52)

  HW1 <- HoltWinters(ts_owt_df02_gb09_sboo_wkly03_train_tb03)

  # forecast library more robust features vs. predict()
  library(forecast)
  HW1_for <- forecast(HW1, h=52, level=c(80,95))
  #visualize our predictions:
  plot(HW1_for, xlim=c(2017, 2023))
  lines(HW1_for$fitted, lty=2, col="purple")
  mtext(param, side=3, line = -2)

  print("Accuracy: ")
  print(param)
  library(MLmetrics)
  print(accuracy(HW1_for))
```

```

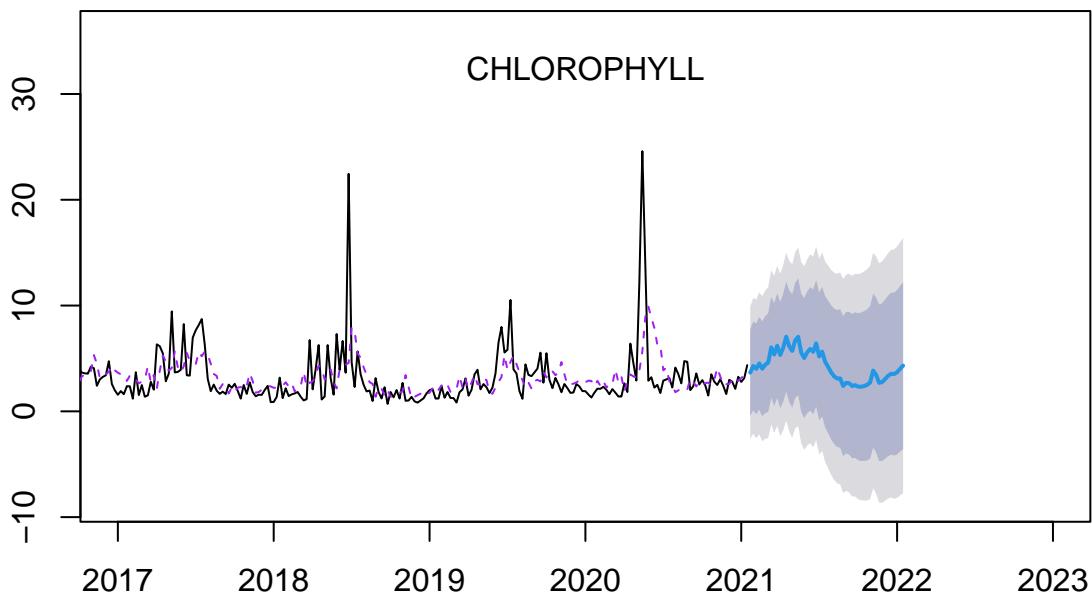
# test set
z2 <- get(param, owt_df02_gb09_sboo_wkly03_test_tb03)
ts_owt_df02_gb09_sboo_wkly03_test_tb03 <- ts(z2, start = c(2021, 2), freq = 52)

print("Test Set Accuracy: ")
print(accuracy(HW1_for, test = ts_owt_df02_gb09_sboo_wkly03_test_tb03))

#print("Test set: MAPE")
#print(MAPE(y_pred = HW1_for$fitted, y_true = ts_owt_df02_gb09_sboo_wkly03_test_tb03))
#print("Test Set: MAE")
#print(MAE(y_pred = HW1_for$fitted, y_true = ts_owt_df02_gb09_sboo_wkly03_test_tb03))
}

```

Forecasts from HoltWinters

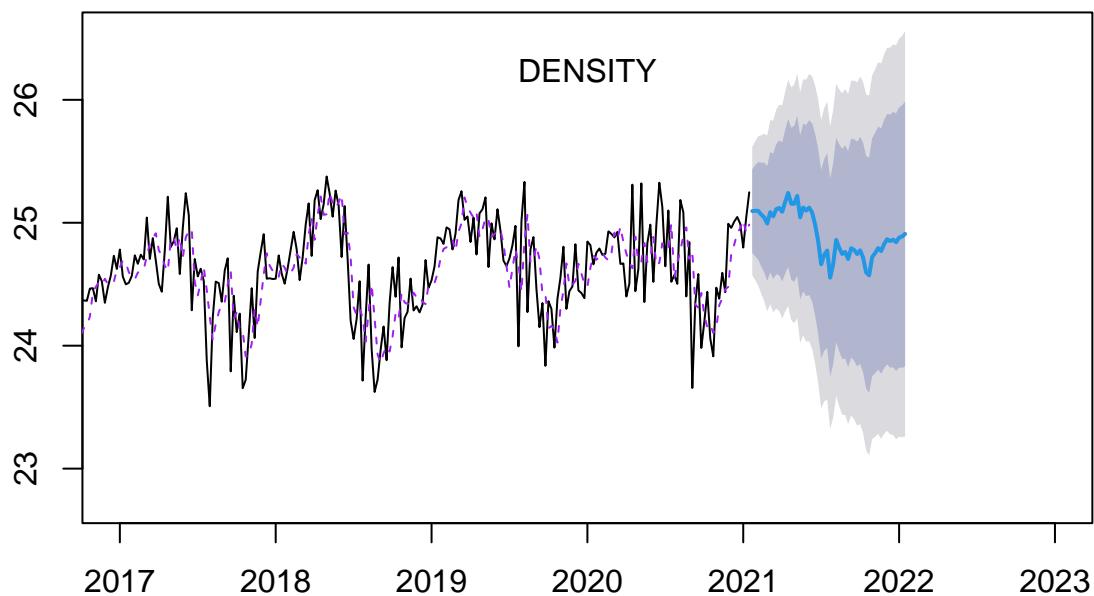


```

## [1] "Accuracy: "
## [1] "CHLOROPHYLL"
##               ME      RMSE       MAE       MPE       MAPE       MASE       ACF1
## Training set -0.1022793 3.1907 1.971592 -26.97607 48.25139 0.6671699 0.1393202
## [1] "Test Set Accuracy: "
##               ME      RMSE     MAE     MPE     MAPE     MASE     ACF1
## Training set NaN    NaN    NaN    NaN    NaN    NA

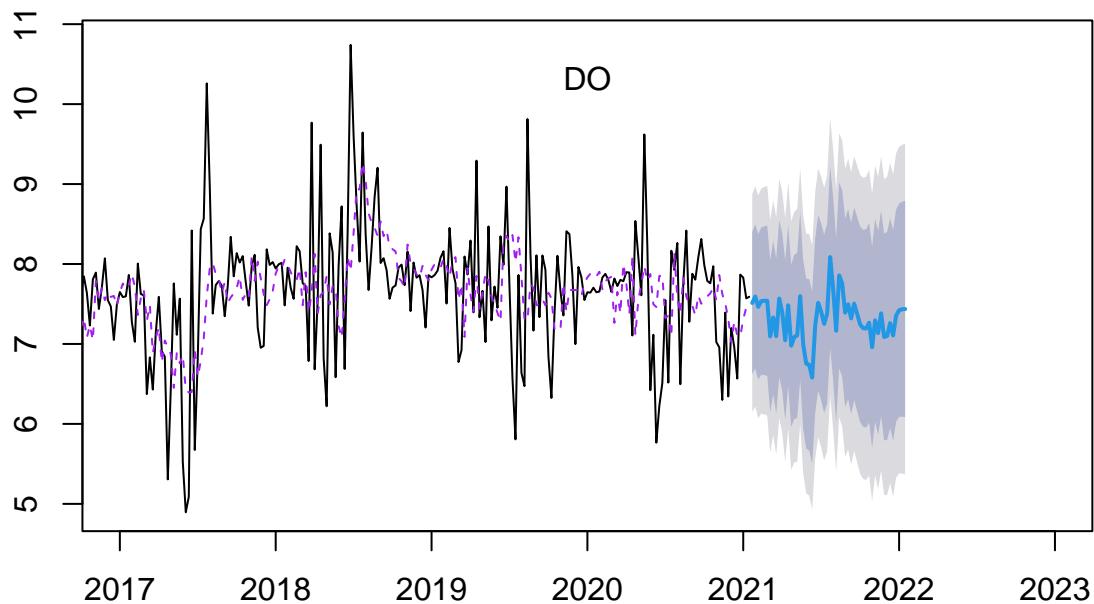
```

Forecasts from HoltWinters



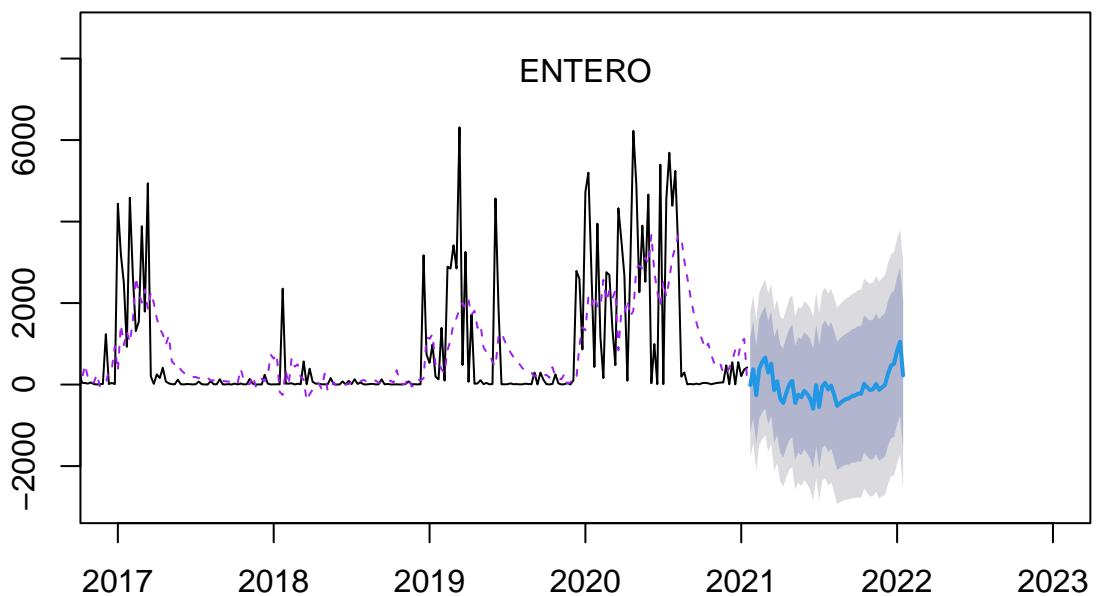
```
## [1] "Accuracy: "
## [1] "DENSITY"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.00868597 0.2661097 0.1956398 0.02645349 0.7947002 0.5767382
##               ACF1
## Training set 0.09458735
## [1] "Test Set Accuracy: "
##               ME      RMSE     MAE     MPE     MAPE     MASE     ACF1
## Training set NaN    NaN    NaN    NaN    NaN    NA
```

Forecasts from HoltWinters



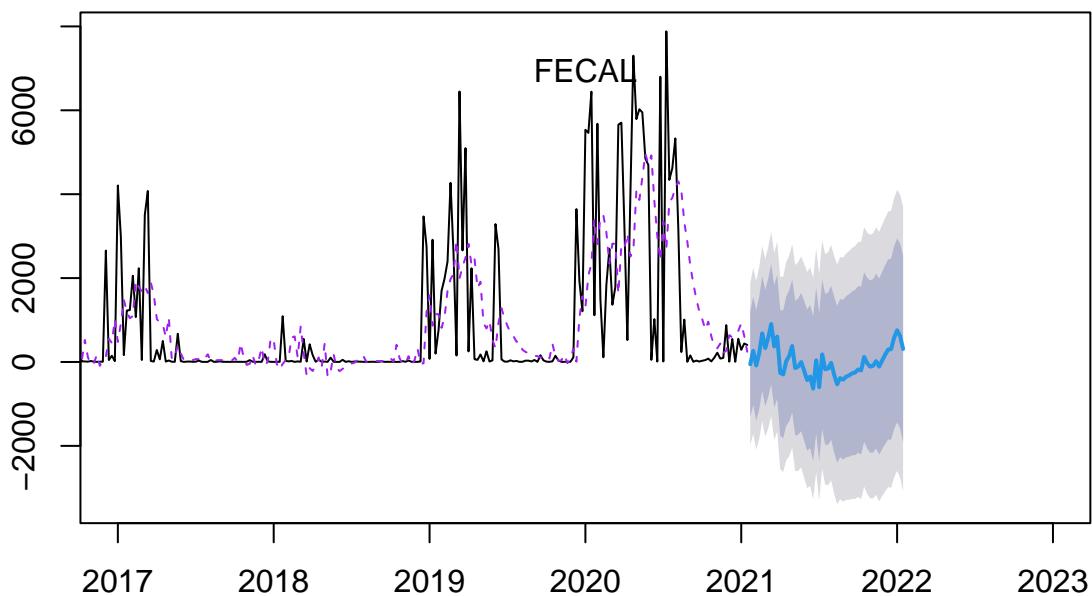
```
## [1] "Accuracy: "
## [1] "DO"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.02593868 0.6952922 0.4998909 -0.3376457 6.742103 0.6979608
##               ACF1
## Training set 0.1367533
## [1] "Test Set Accuracy: "
##               ME      RMSE     MAE     MPE     MAPE     MASE
## Training set NaN    NaN    NaN    NaN    NaN    NA
```

Forecasts from HoltWinters



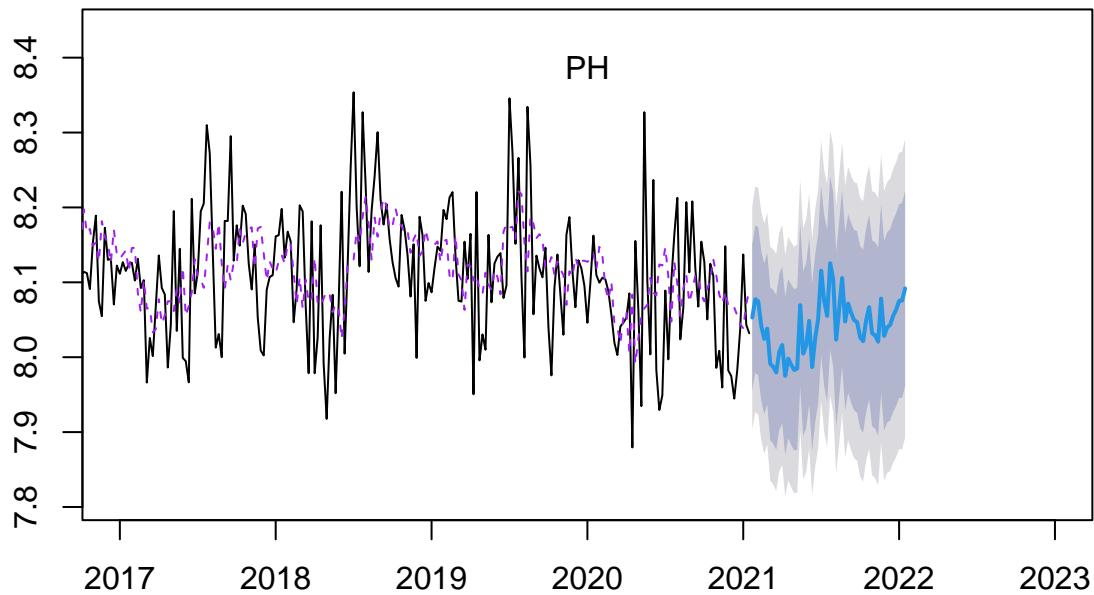
```
## [1] "Accuracy: "
## [1] "ENTERO"
##          ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -8.237838 913.6779 433.4422 -1818.639 2346.492 0.8845875
##          ACF1
## Training set 0.07100116
## [1] "Test Set Accuracy: "
##          ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set -49.54731 134.8451 93.16884 -786.598 949.6231  NaN 0.4392103
```

Forecasts from HoltWinters



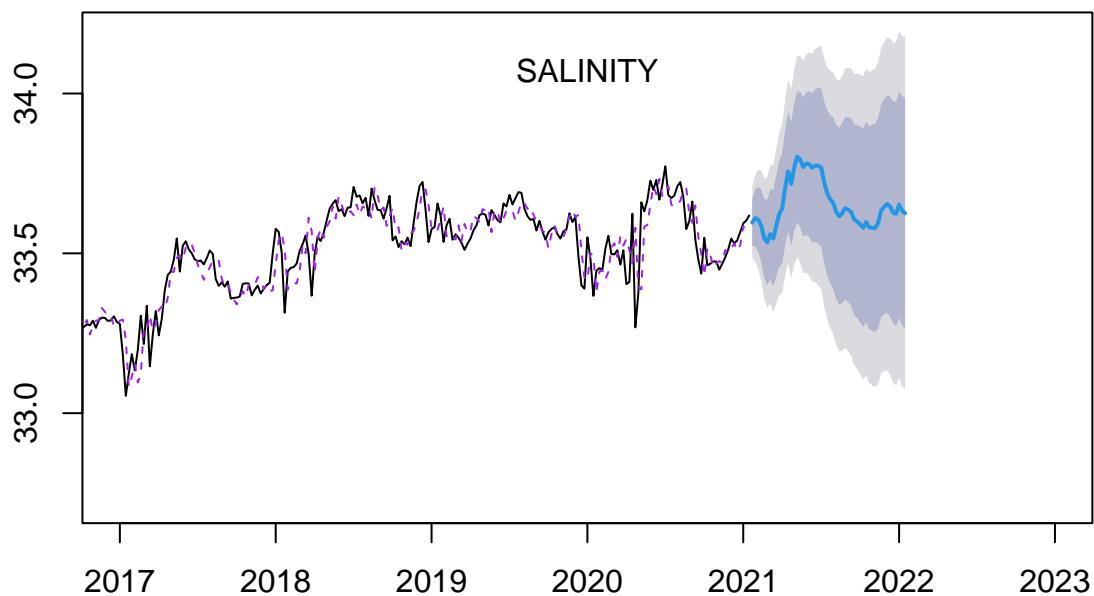
```
## [1] "Accuracy: "
## [1] "FECAL"
##          ME      RMSE       MAE       MPE      MAPE      MASE
## Training set -2.423009 986.0725 516.5492 -1721.053 2728.081 0.8481016
##          ACF1
## Training set 0.08313998
## [1] "Test Set Accuracy: "
##          ME      RMSE       MAE       MPE      MAPE MASE      ACF1
## Training set 67.32981 356.4424 217.1848 -161.3297 213.255  NaN -0.3499716
```

Forecasts from HoltWinters



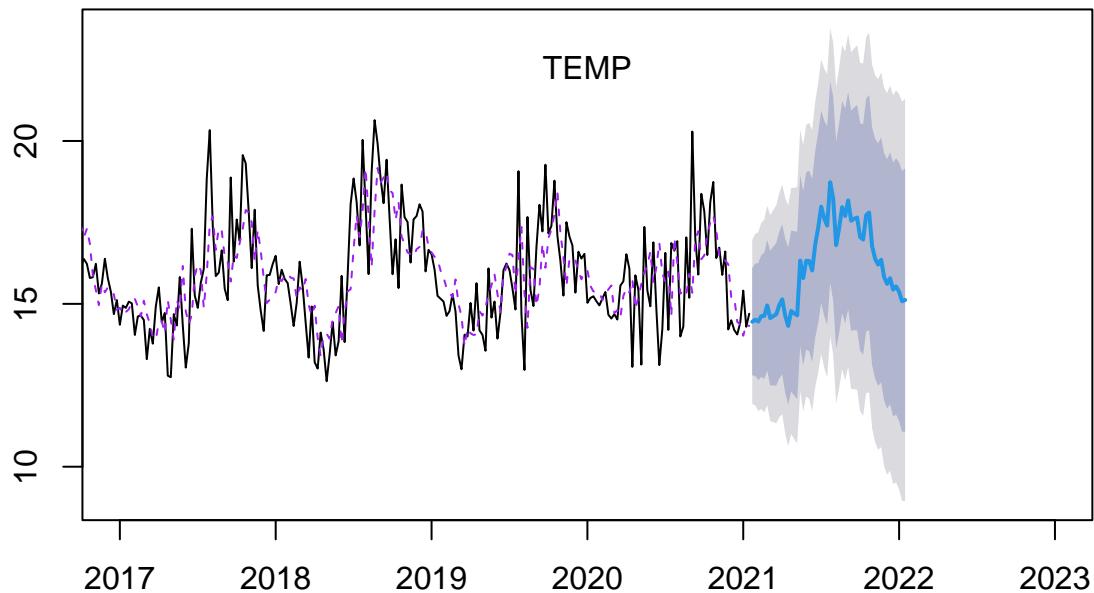
```
## [1] "Accuracy: "
## [1] "PH"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.002480009 0.07616416 0.05771275 -0.03748209 0.7123814 0.7056536
##                   ACF1
## Training set 0.1898242
## [1] "Test Set Accuracy: "
##               ME      RMSE     MAE     MPE     MAPE     MASE
## Training set NaN    NaN    NaN    NaN    NaN    NA
```

Forecasts from HoltWinters



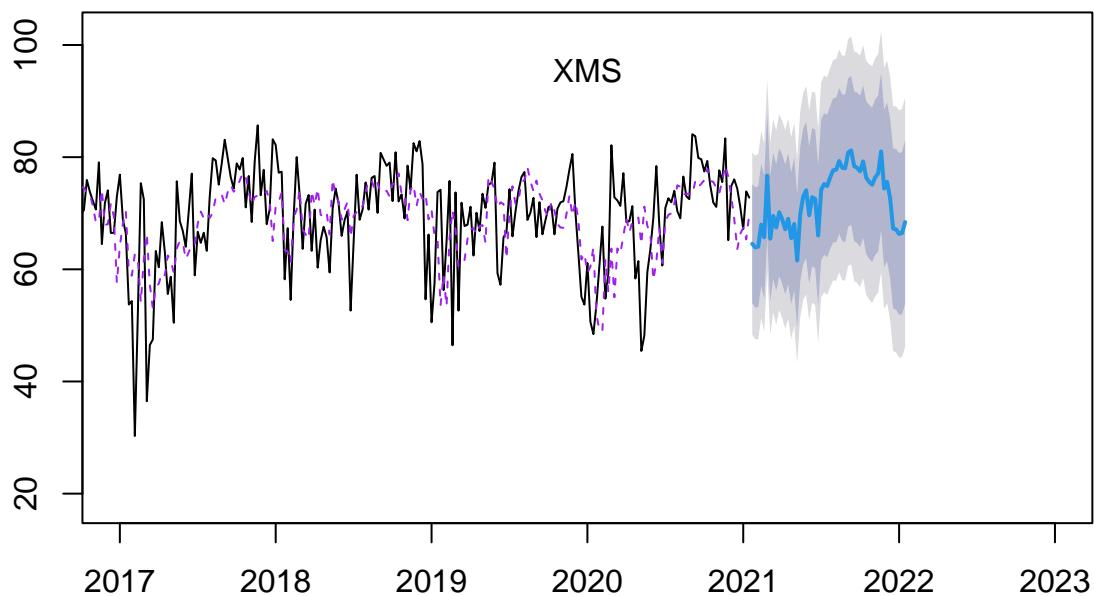
```
## [1] "Accuracy: "
## [1] "SALINITY"
##               ME      RMSE      MAE      MPE      MAPE
## Training set -0.0003848443 0.05763247 0.04015352 -0.00132097 0.1199759
##                   MASE      ACF1
## Training set 0.3420641 0.07059847
## [1] "Test Set Accuracy: "
##               ME      RMSE     MAE     MPE     MAPE     MASE     ACF1
## Training set NaN    NaN    NaN    NaN    NaN    NA
```

Forecasts from HoltWinters



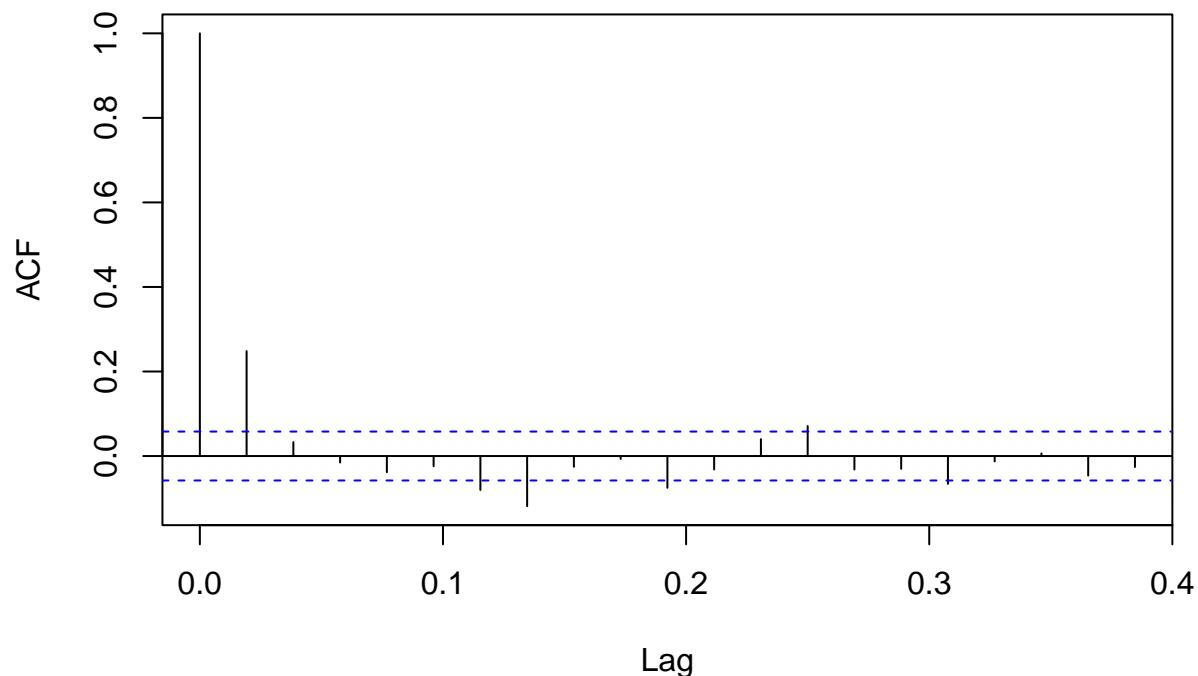
```
## [1] "Accuracy: "
## [1] "TEMP"
##          ME      RMSE       MAE       MPE      MAPE      MASE
## Training set -0.04812992 1.284493 0.9654215 -0.8723829 6.330799 0.6500255
##          ACF1
## Training set 0.1110604
## [1] "Test Set Accuracy: "
##          ME      RMSE     MAE     MPE     MAPE     MASE     ACF1
## Training set NaN    NaN    NaN    NaN    NaN    NA
```

Forecasts from HoltWinters



```
## [1] "Accuracy: "
## [1] "XMS"
##          ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
## Training set 0.3391581 8.286845 5.843124 -0.9457464 8.95783 0.7447144 0.2482904
## [1] "Test Set Accuracy: "
##          ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
## Training set 0.2873632 1.760245 0.6370177 0.2424696 0.9294769  NaN 0.2522239
acf(HW1_for$residuals, lag.max=20, na.action=na.pass)
```

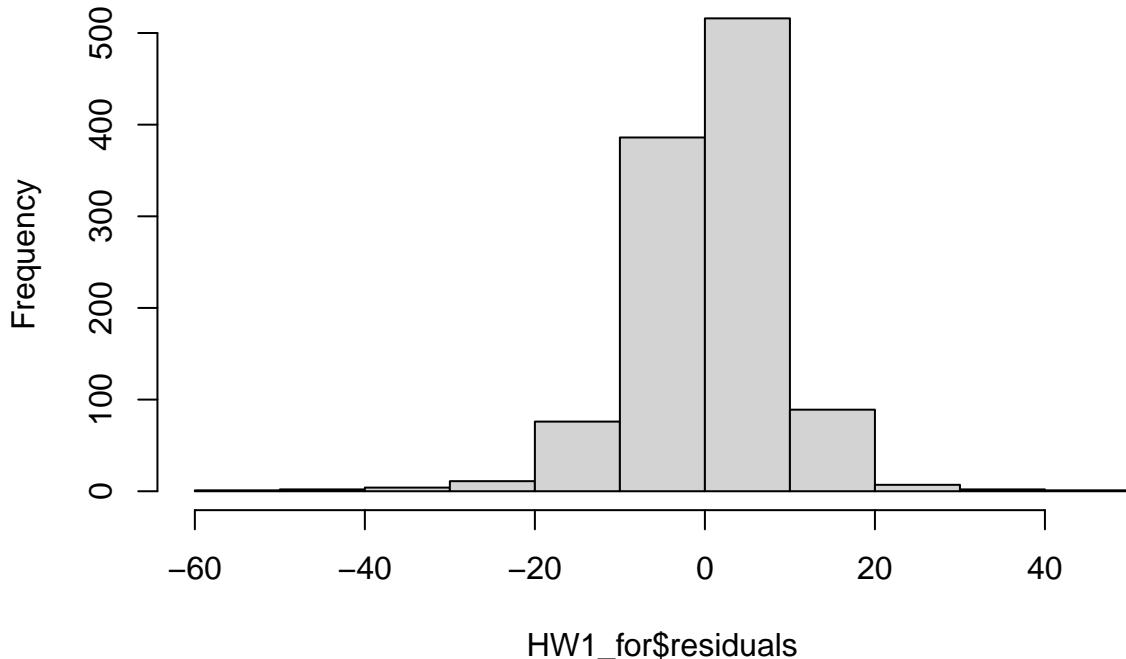
Series HW1_for\$residuals



```
Box.test(HW1_for$residuals, lag=20, type="Ljung-Box")
```

```
##  
## Box-Ljung test  
##  
## data: HW1_for$residuals  
## X-squared = 119.98, df = 20, p-value = 3.331e-16  
hist(HW1_for$residuals)
```

Histogram of HW1_for\$residuals



```
library("forecast")

# convert to time series object ts
params <- c("CHLOROPHYLL", "DENSITY", "DO", "ENTERO", "FECAL", "PH", "SALINITY", "TEMP",
           "XMS")

for (param in params) {
  #print(param)

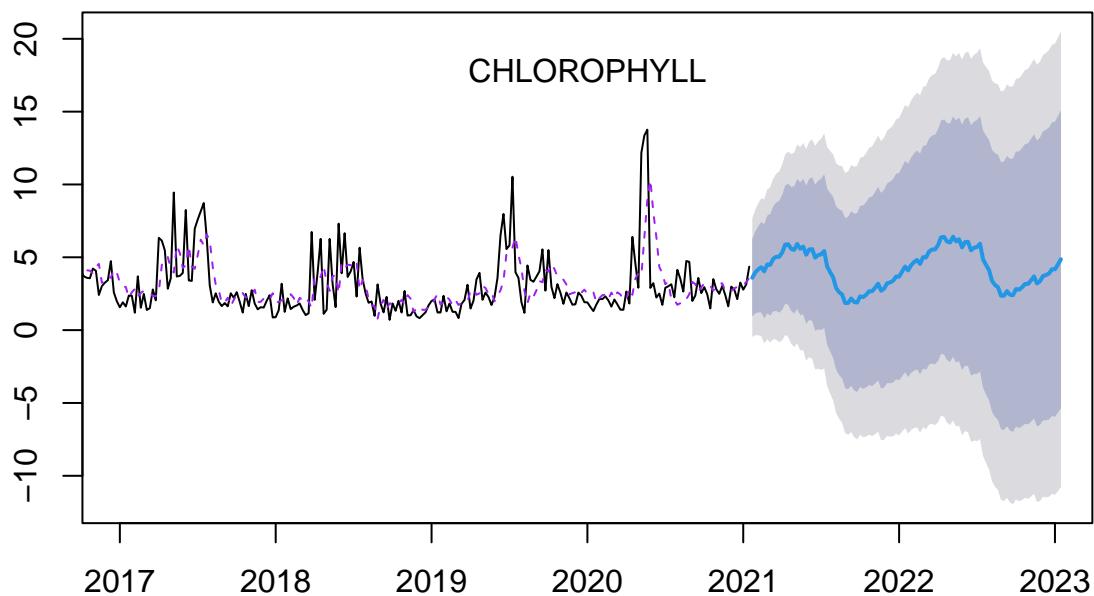
  z <- get(param, owt_df02_gb09_sboo_wkly02_train_tb03)
  ts_owt_df02_gb09_sboo_wkly02_train_tb03 <- ts(z, start = c(1999, 1), freq = 52)

  HW1 <- HoltWinters(ts_owt_df02_gb09_sboo_wkly02_train_tb03)

  # forecast library more robust features vs. predict()
  library(forecast)
  HW1_for <- forecast(HW1, h=104, level=c(80,95))
  #visualize our predictions:
  plot(HW1_for, xlim=c(2017, 2023))
  lines(HW1_for$fitted, lty=2, col="purple")
  mtext(param, side=3, line = -2)

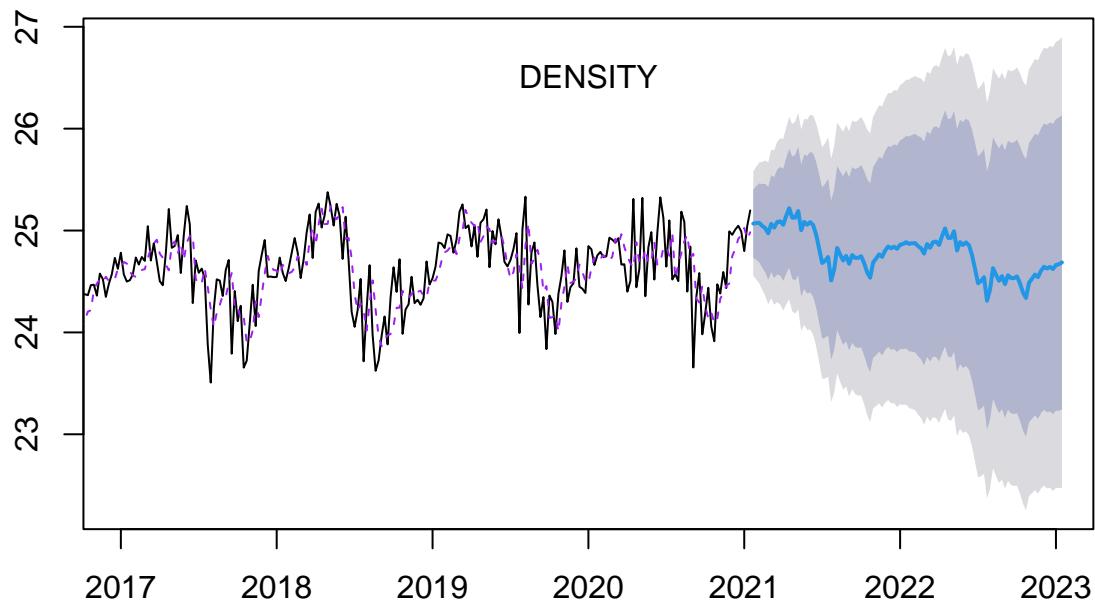
  print("Accuracy: ")
  print(param)
  print(accuracy(HW1_for))
}
```

Forecasts from HoltWinters



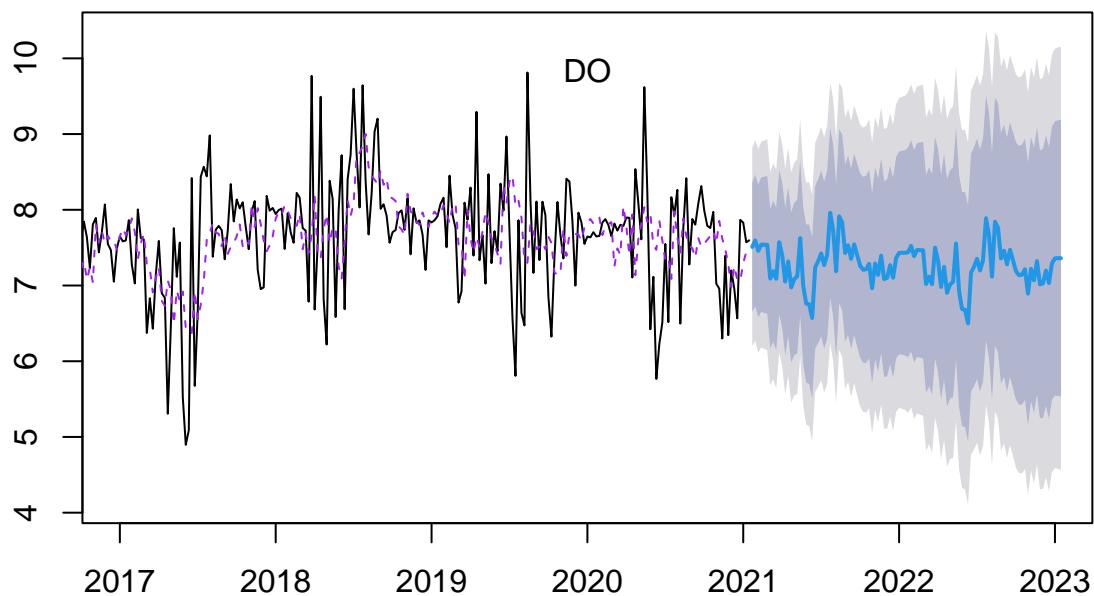
```
## [1] "Accuracy: "
## [1] "CHLOROPHYLL"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.06694596 2.07424 1.446251 -19.13824 39.30235 0.6219099
##                   ACF1
## Training set 0.1182405
```

Forecasts from HoltWinters



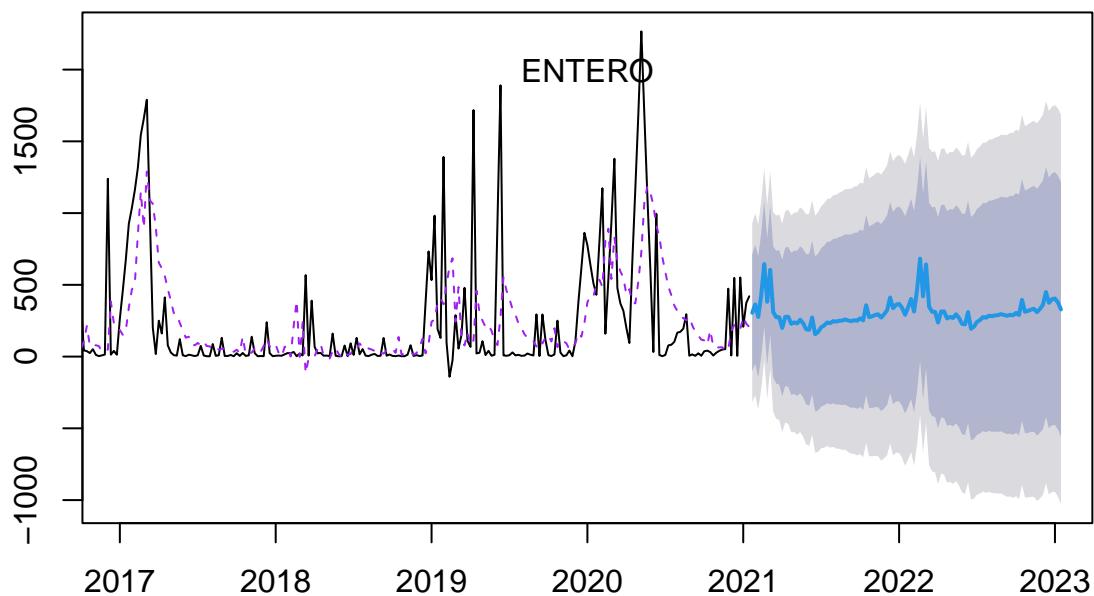
```
## [1] "Accuracy: "
## [1] "DENSITY"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.008688512 0.2608637 0.1927412 0.02679585 0.7821223 0.5777927
##               ACF1
## Training set 0.09581955
```

Forecasts from HoltWinters



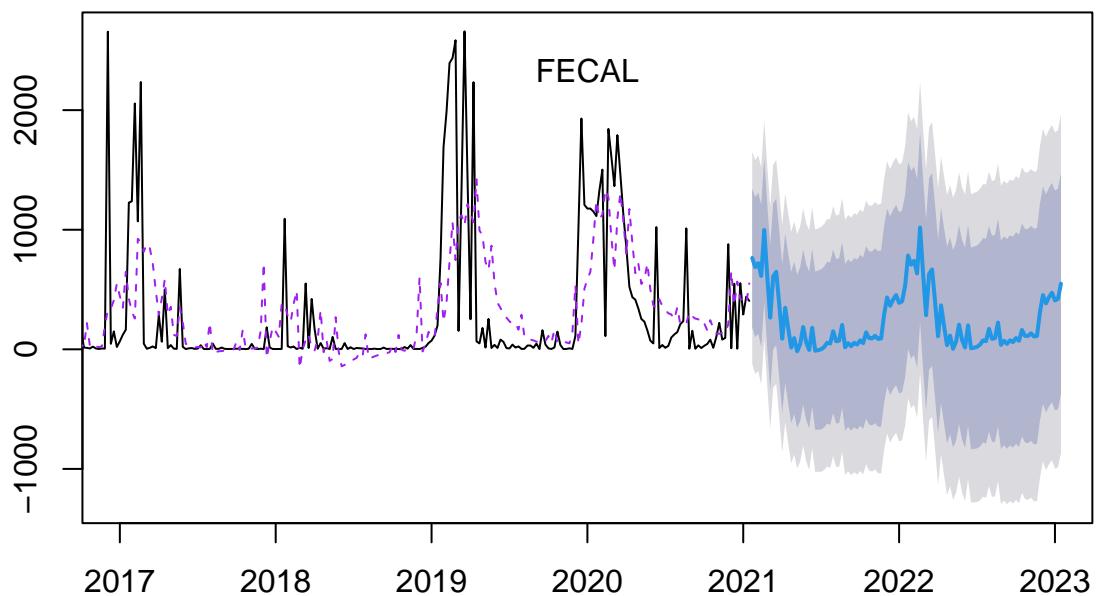
```
## [1] "Accuracy: "
## [1] "DO"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.02467105 0.6680607 0.4898582 -0.3108788 6.644379 0.6989592
##               ACF1
## Training set 0.1516258
```

Forecasts from HoltWinters



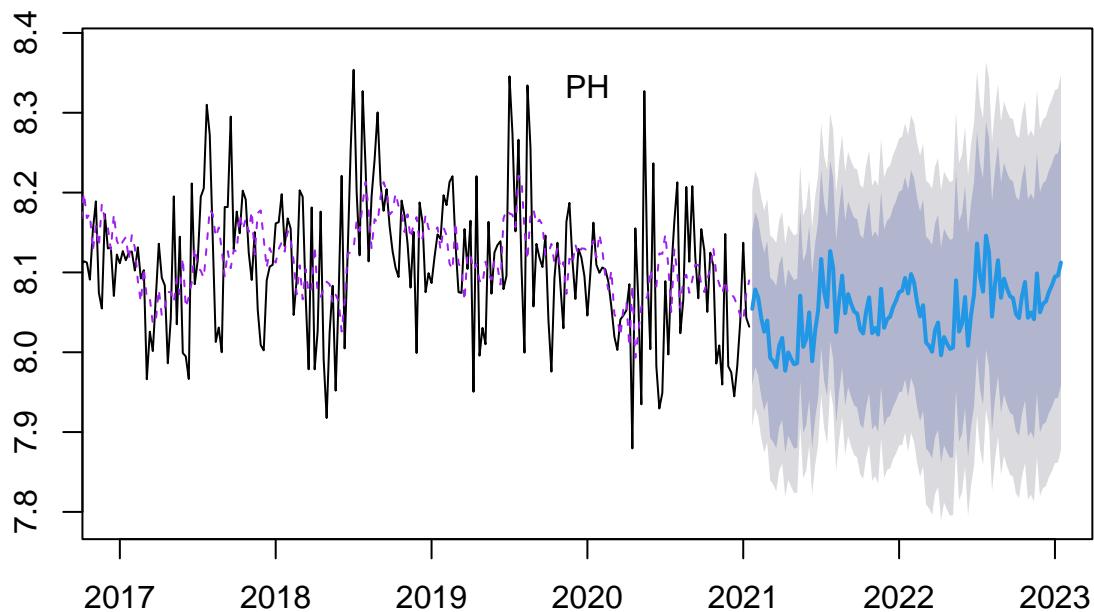
```
## [1] "Accuracy: "
## [1] "ENTERO"
##               ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
## Training set -2.640892 317.5309 168.5037 -947.1598 1027.944 0.8465839 0.1238312
```

Forecasts from HoltWinters



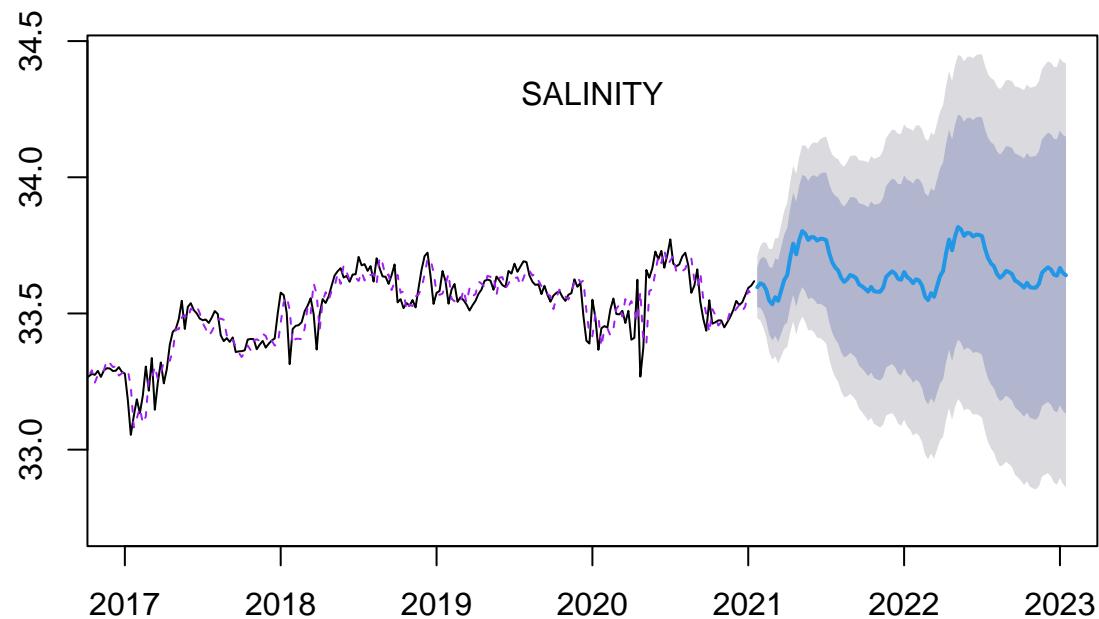
```
## [1] "Accuracy: "
## [1] "FECAL"
##               ME      RMSE      MAE      MPE      MAPE      MASE      ACF1
## Training set -2.411267 453.1053 257.4368 -1237.933 1623.945 0.8751207 0.1190698
```

Forecasts from HoltWinters



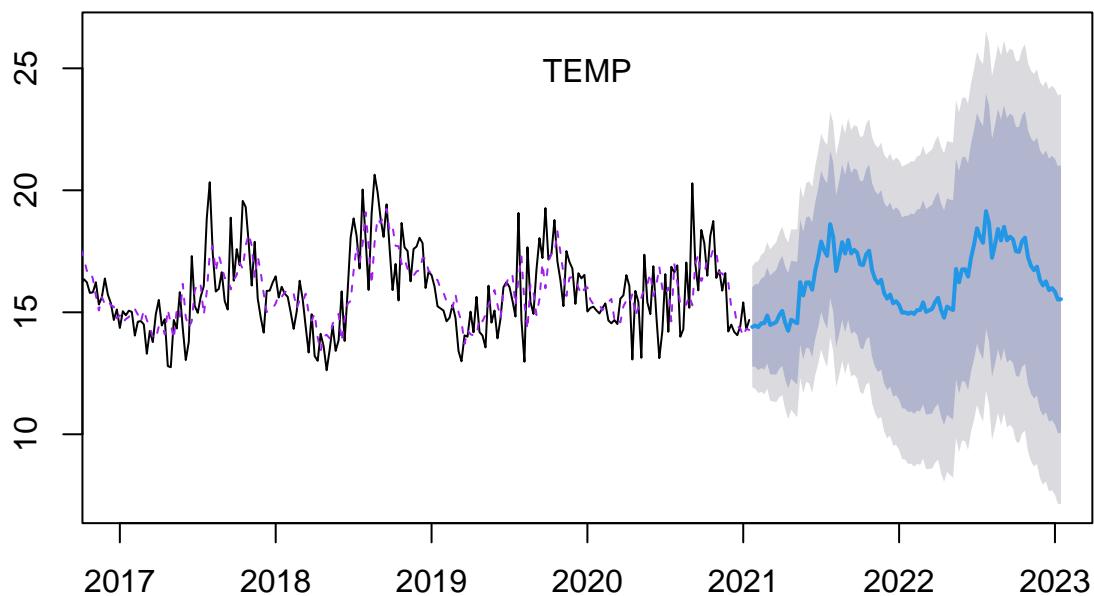
```
## [1] "Accuracy: "
## [1] "PH"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.002574413 0.07509104 0.05699028 -0.03846183 0.7037097 0.7067346
##                   ACF1
## Training set 0.2008171
```

Forecasts from HoltWinters



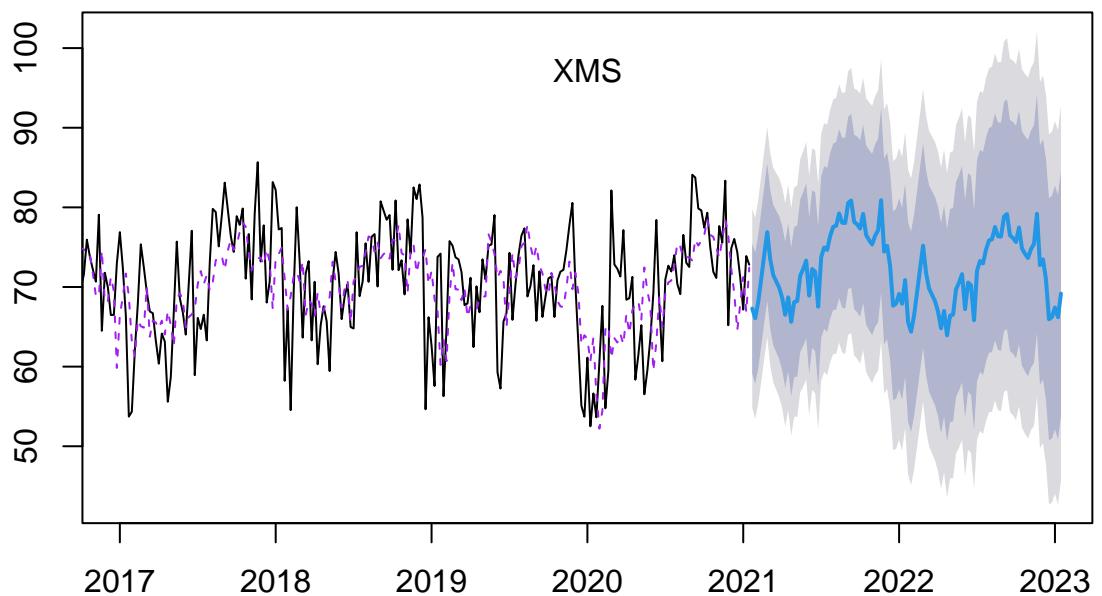
```
## [1] "Accuracy: "
## [1] "SALINITY"
##               ME      RMSE      MAE      MPE      MAPE
## Training set -0.0003848443 0.05763247 0.04015352 -0.00132097 0.1199759
##               MASE      ACF1
## Training set 0.3420641 0.07059847
```

Forecasts from HoltWinters



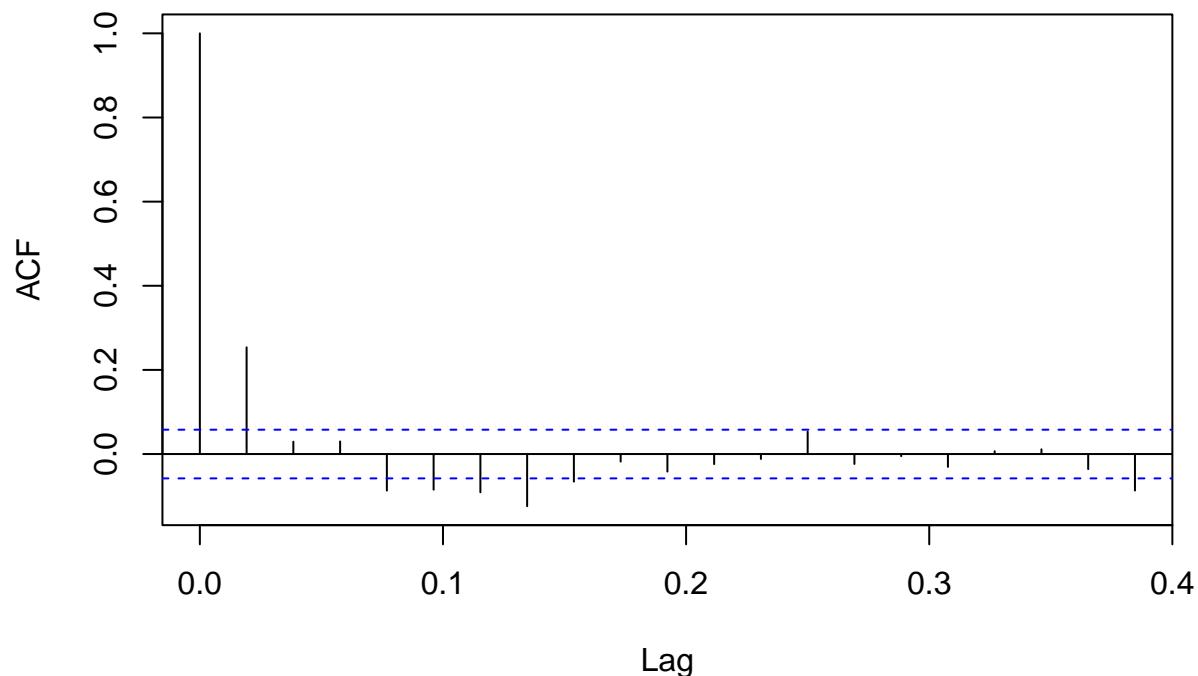
```
## [1] "Accuracy: "
## [1] "TEMP"
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.04561308 1.266222 0.9546388 -0.8460127 6.281475 0.6534357
##                   ACF1
## Training set 0.1068047
```

Forecasts from HoltWinters



```
## [1] "Accuracy: "
## [1] "XMS"
##          ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.1912608 6.364792 4.912165 -0.3472524 6.839092 0.7313659
##          ACF1
## Training set 0.2537163
acf(HW1_for$residuals, lag.max=20, na.action=na.pass)
```

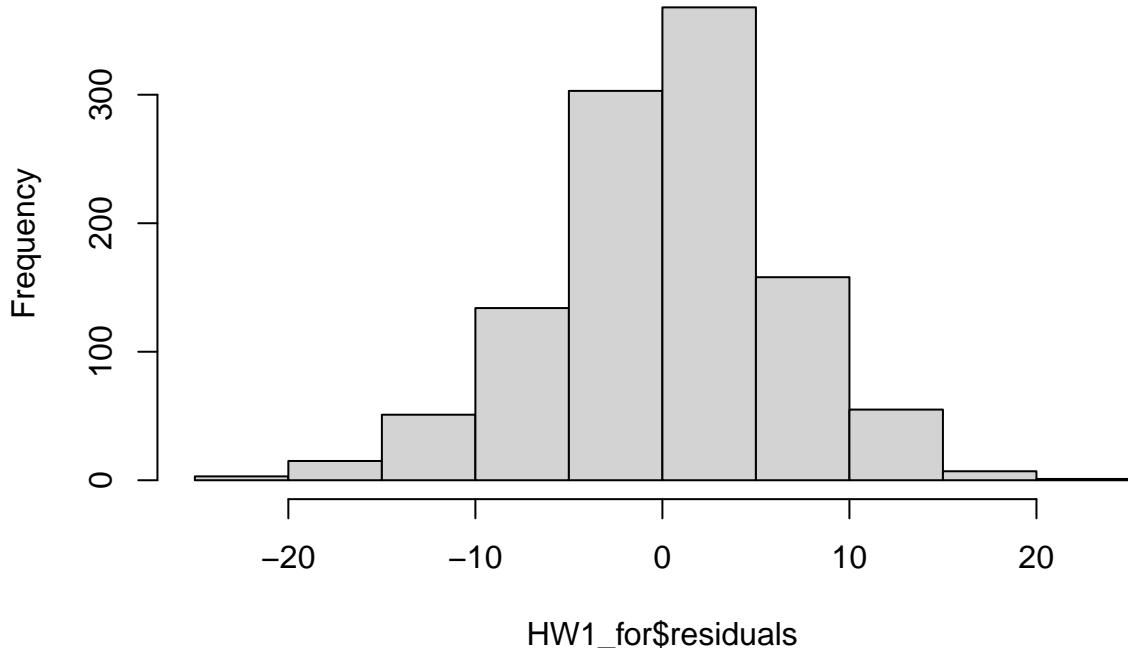
Series HW1_for\$residuals



```
Box.test(HW1_for$residuals, lag=20, type="Ljung-Box")
```

```
##  
## Box-Ljung test  
##  
## data: HW1_for$residuals  
## X-squared = 137.71, df = 20, p-value < 2.2e-16  
hist(HW1_for$residuals)
```

Histogram of HW1_for\$residuals



```
train_window <- window(ts_owt_df02_gb09_sboo_wkly02_train_tb03, start=c(2013, 1),
  end=c(2021, 1))

fit.mmn <- ets(train_window)
summary(fit.mmn)

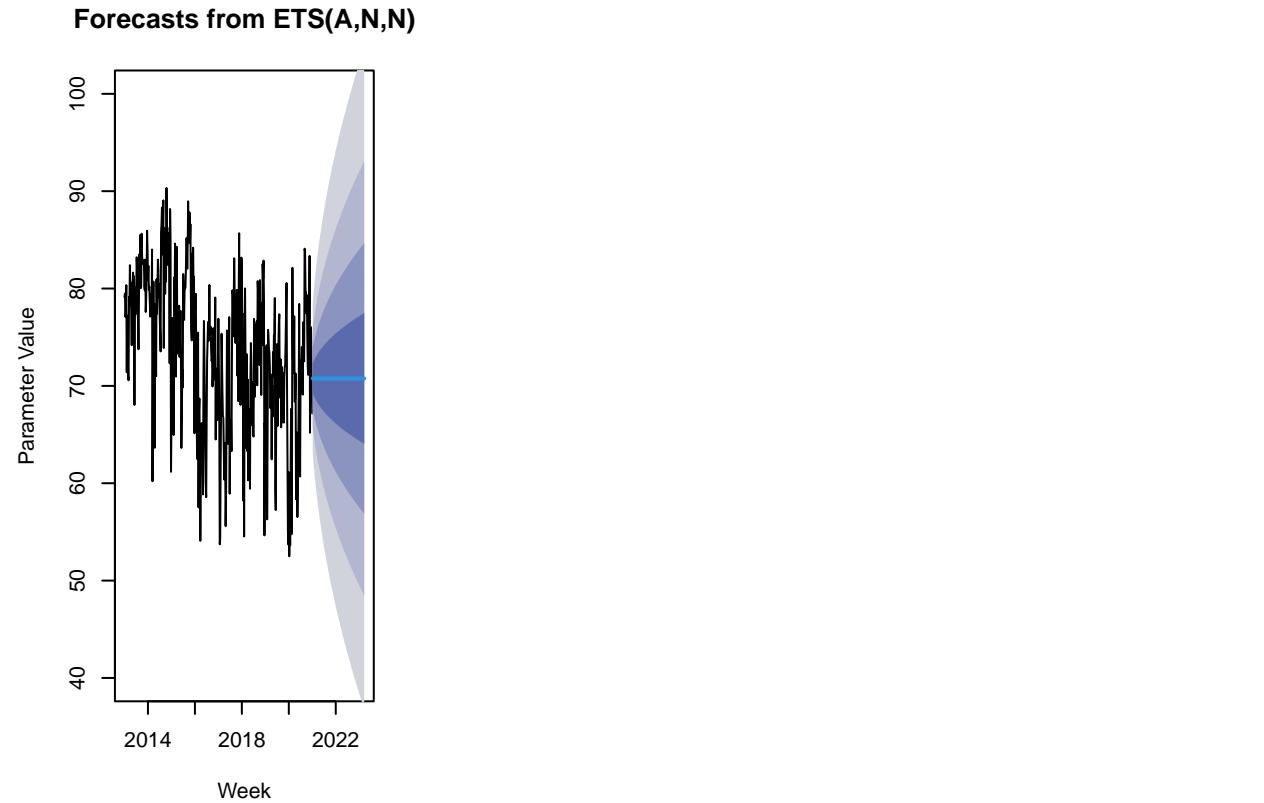
## ETS(A,N,N)
##
## Call:
##   ets(y = train_window)
##
##   Smoothing parameters:
##     alpha = 0.4044
##
##   Initial states:
##     l = 78.4301
##
##   sigma:  5.9761
##
##       AIC      AICc      BIC
## 4010.792 4010.850 4022.891
##
## Training set error measures:
##           ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.04546615 5.961759 4.449106 -0.6486891 6.329285 0.6455445
##           ACF1
```

```

## Training set 0.1009433
people.ets.AAN.pred <- forecast(fit.mmn, h = 115, level = c(0.2, 0.4, 0.6, 0.8))

par(mfrow = c(1, 3)) # This command sets the plot window to show 1 row of 3 plots.
plot(people.ets.AAN.pred, xlab = "Week", ylab = "Parameter Value", ylim = c(40, 100))

```



Linear Regression Modeling

Create custom function to automate linear regression modeling

```

lr_ts_mod <- function(tb_train = NA,
                      tb_test = NA,
                      date = NA,
                      param = NA,
                      ext_pred = c(),
                      train_start = c(),
                      test_start = c(),
                      freq = NA,
                      h = NA,
                      formula = NA) {
  # Function to perform TS linear regression w/ or w/o external variables
  #print(tb_train)
  #print(tb_test)
  tb_full01 <- rbind(tb_train, tb_test)
  #print(tb_full01)

```

```

ts_full01 <- ts(tb_full01[, 2:10],
                  start = train_start,
                  freq = freq)
#print(ts_full01)

train_ts01 <- window(ts_full01, end = c(2021, 5))
test_ts01 <- window(ts_full01, start = c(2021, 6))
#print(tail(train_ts01))
#print(colnames(train_ts01))
#print(colnames(test_ts01))

#print(train_ts01)
#print(test_ts01)
#print(test_ts01[, ext_pred])

# TSLM Citation:
# https://www.rdocumentation.org/packages/forecast/versions/8.19/topics/tslm
lin_mod_fit <- tslm(formula = as.formula(formula),
                     data = train_ts01)

lin_mod_prd <- forecast(lin_mod_fit,
                        h = h,
                        newdata = data.frame(test_ts01[, ext_pred]))

#tb_train_s1 <- subset(x = tb_train, select = c(date, param))
#tb_test_s1 <- subset(x = tb_test, select = c(date, param))

#print(lin_mod_prd)
#print(tb_test[, param])
print(accuracy(lin_mod_prd,
               as.matrix(tb_test[, param])))

# Multiple Object return() Citation:
# https://www.geeksforgeeks.org/return-value-from-r-function/
return(list(train_ts01[, param],
            test_ts01[, param],
            lin_mod_prd))
}

}

```

PLOO: Imputed, All - Including External Variables (Forecasting ENTERO)

```

# PLOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly03_train_tb03
# PLOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly03_test_tb03

owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                   ENTERO)

owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                       ENTERO,

```

```

        .frequency = "auto",
        .trend = "auto")

#print(lubridate::isoweek(ymd(train_start)))
#print(lubridate::isoweek(ymd(test_start)))

#print(tail(owt_df02_gb09_ploo_wkly03_train_tb02))
#print(head(owt_df02_gb09_ploo_wkly03_test_tb02))

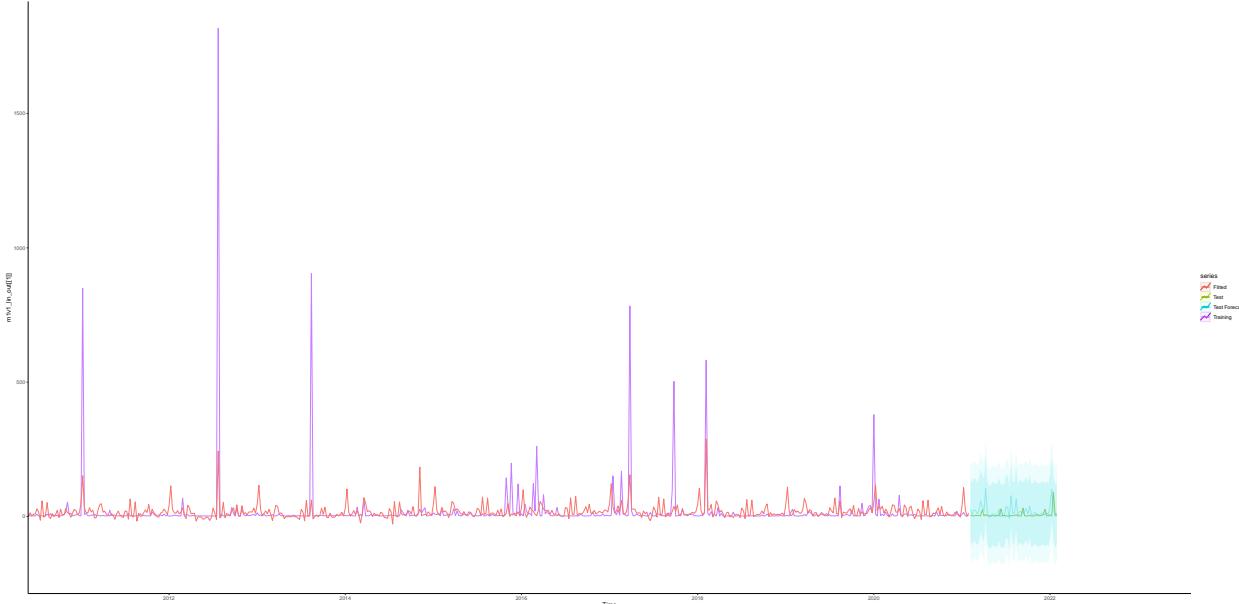
m1v1_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly03_train_tb03,
                           tb_test = owt_df02_gb09_ploo_wkly03_test_tb03,
                           date = "date_sample",
                           param = "ENTERO",
                           ext_pred = c("CHLOROPHYLL",
                                       "DENSITY",
                                       "DO",
                                       "FECAL",
                                       "PH",
                                       "SALINITY",
                                       "TEMP",
                                       "XMS"),
                           train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                           test_start = c(2021, 6),
                           freq = 52,
                           h = 52,
                           formula = "ENTERO ~ trend + season + CHLOROPHYLL + DENSITY + DO
                           ↪ + FECAL + PH + SALINITY + TEMP + XMS")

##                                     ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -1.046722e-15 86.77428 28.51601 -201.2632 394.7822 0.8768111
## Test set      -1.359639e+01 30.01797 19.75175 -520.9396 564.2274 0.6073274
##                                     ACF1
## Training set 0.00946572
## Test set      NA

#print(m1v1_lin_out[[3]])

# Autoplot Citation:
# USD. (n.d.). ADS 506 Lab 3.2.R [Module 3 course materials].
autoplot(m1v1_lin_out[[1]], series = 'Training') +
  autolayer(m1v1_lin_out[[2]], series = 'Test') +
  autolayer(m1v1_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m1v1_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m1v1_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 570.24826   0.02487   66.67114  -21.37696  -36.12629  -29.12206
## season6    season7    season8    season9    season10   season11
## -14.04468  -29.91413  -21.67273  -29.07968  -40.74223  -25.73621
## season12   season13   season14   season15   season16   season17
## 11.01291   5.96744  -20.16249  -20.45878  -22.42186  -34.73134
## season18   season19   season20   season21   season22   season23
## -30.49355  -25.85471  -32.51986  -33.84756  -25.75848  -21.82754
## season24   season25   season26   season27   season28   season29
## -35.33516  -38.07910  -35.25317  -6.16428  -15.81276  -46.54864
## season30   season31   season32   season33   season34   season35
## 28.14340  -32.83728  -31.49919  22.09408  -38.20827  -30.32434
## season36   season37   season38   season39   season40   season41
## -25.65753  -30.56741  -23.12911  -10.87565  -27.90870  -0.39450
## season42   season43   season44   season45   season46   season47
## -35.55193  -34.93334  -22.74350  -36.29355  -34.33324  -32.74456
## season48   season49   season50   season51   season52   CHLOROPHYLL
## -29.80809  -28.64711  -23.51158  -24.64886  -32.16327  0.34342
## DENSITY      D0      FECAL        PH      SALINITY     TEMP
## 38.85919   -0.56045   0.42542   54.67497  -60.46816  8.42882
## XMS
## -0.71608
```

```

##
## Error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -1.046722e-15 86.77428 28.51601 -201.2632 394.7822 0.8737683
##                      ACF1
## Training set 0.00946572
##
## Forecasts:
##             Point Forecast      Lo 80      Hi 80      Lo 95      Hi 95
## 2021.096    29.4680279   -87.97340 146.9095 -150.23415 209.1702
## 2021.115     7.4653502  -109.93365 124.8644 -172.17192 187.1026
## 2021.135    24.3485243   -92.95329 141.6503 -155.14003 203.8371
## 2021.154    23.3998700   -93.96530 140.7650 -156.18563 202.9854
## 2021.173     9.8409381  -107.34956 127.0314 -169.47728 189.1592
## 2021.192    21.6933632   -95.48725 138.8740 -157.60973 200.9965
## 2021.212    58.4282465   -58.86386 175.7204 -121.04545 237.9019
## 2021.231    35.9361707   -81.53464 153.4070 -143.81097 215.6833
## 2021.250    21.6577231   -95.54228 138.8577 -157.67505 200.9905
## 2021.269    104.0456494  -13.41867 221.5100  -75.69157 283.7829
## 2021.288     15.1157139  -102.14898 132.3804  -164.31604 194.5475
## 2021.308     -1.9715247  -119.29318 115.3501  -181.49044 177.5474
## 2021.327     0.7637612  -116.60771 118.1352  -178.83137 180.3589
## 2021.346     9.4352817  -107.81352 126.6841  -169.97216 188.8427
## 2021.365     9.8876088  -107.28083 127.0561  -169.39687 189.1721
## 2021.385     3.0450184  -114.14350 120.2335  -176.27018 182.3602
## 2021.404     7.5140680  -109.80647 124.8346  -172.00314 187.0313
## 2021.423     26.0014362  -91.35884 143.3617  -153.57658 205.5795
## 2021.442     -0.7386557  -117.98935 116.5120  -180.14900 178.6717
## 2021.462     3.7781511  -113.36451 120.9208  -175.46688 183.0232
## 2021.481     0.9642838  -116.41144 118.3400  -178.63736 180.5659
## 2021.500     36.3200348  -80.94624 153.5863  -143.11413 215.7542
## 2021.519     34.1802522  -83.25204 151.6125  -145.50796 213.8685
## 2021.538     -6.9186153  -124.21905 110.3818  -186.40507 172.5678
## 2021.558     77.3585967  -40.11327 194.8305  -102.39017 257.1074
## 2021.577     11.4755034  -105.77118 128.7222  -167.92869 190.8797
## 2021.596     13.2590347  -103.93369 130.4518  -166.06260 192.5807
## 2021.615     64.7489345  -52.39421 181.8921  -114.49684 243.9947
## 2021.635     5.0722820  -112.13887 122.2834  -174.27755 184.4221
## 2021.654     18.6293788  -98.63286 135.8916  -160.79861 198.0574
## 2021.673     17.6142618  -99.87302 135.1015  -162.15809 197.3866
## 2021.692     10.3404587  -107.08947 127.7704  -169.34413 190.0250
## 2021.712     20.3485507  -96.85490 137.5520  -158.98949 199.6866
## 2021.731     29.4222818  -87.87739 146.7220  -150.06300 208.9076
## 2021.750     10.2053873  -107.29138 127.7022  -169.58147 189.9922
## 2021.769     39.3936280  -78.09263 156.8799  -140.37715 219.1644
## 2021.788     4.5437551  -112.93016 122.0177  -175.20815 184.2957
## 2021.808     7.0126751  -110.53367 124.5590  -172.85004 186.8754
## 2021.827     17.1021792  -100.48607 134.6904  -162.82466 197.0290
## 2021.846     8.6768013  -108.90284 126.2564  -171.23687 188.5905
## 2021.865     6.4066977  -111.10639 123.9198  -173.40513 186.2185
## 2021.885     6.8703892  -110.40029 124.1411  -172.57053 186.3113
## 2021.904     12.3824905  -105.31637 130.0814  -167.71361 192.4786
## 2021.923     11.9819734  -105.37078 129.3347  -167.58453 191.5485
## 2021.942     5.5885194  -112.27808 123.4551  -174.76424 185.9413

```

```

## 2021.962      13.5630803 -104.07625 131.2024 -166.44193 193.5681
## 2021.981      6.1574358 -111.34330 123.6582 -173.63550 185.9504
## 2022.000      38.5978583 -79.24010 156.4358 -141.71108 218.9068
## 2022.019     101.5686784 -16.19915 219.3365 -78.63295 281.7703
## 2022.038      28.4714562 -89.04633 145.9892 -151.34757 208.2905
## 2022.058       0.8251637 -116.57631 118.2266 -178.81589 180.4662
## 2022.077     12.6666412 -104.72084 130.0541 -166.95300 192.2863

```

PLOO: Imputed, Excluding Outliers - Including External Variables (Forecasting ENTERO)

```

# PLOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly02_train_tb03
# PLOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly02_test_tb03

owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
                    ENTERO)

owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        ENTERO,
                        .frequency = "auto",
                        .trend = "auto")

m2v1_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "ENTERO",
                            ext_pred = c("CHLOROPHYLL",
                                        "DENSITY",
                                        "DO",
                                        "FECAL",
                                        "PH",
                                        "SALINITY",
                                        "TEMP",
                                        "XMS"),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "ENTERO ~ trend + season + CHLOROPHYLL + DENSITY + DO
                           + FECAL + PH + SALINITY + TEMP + XMS")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -3.071546e-16 86.77712 28.67443 -201.1468 395.1431 0.8816822
## Test set      -1.247129e+01 29.36381 18.89189 -489.1608 535.6733 0.5808884
##               ACF1
## Training set 0.008521948
## Test set      NA

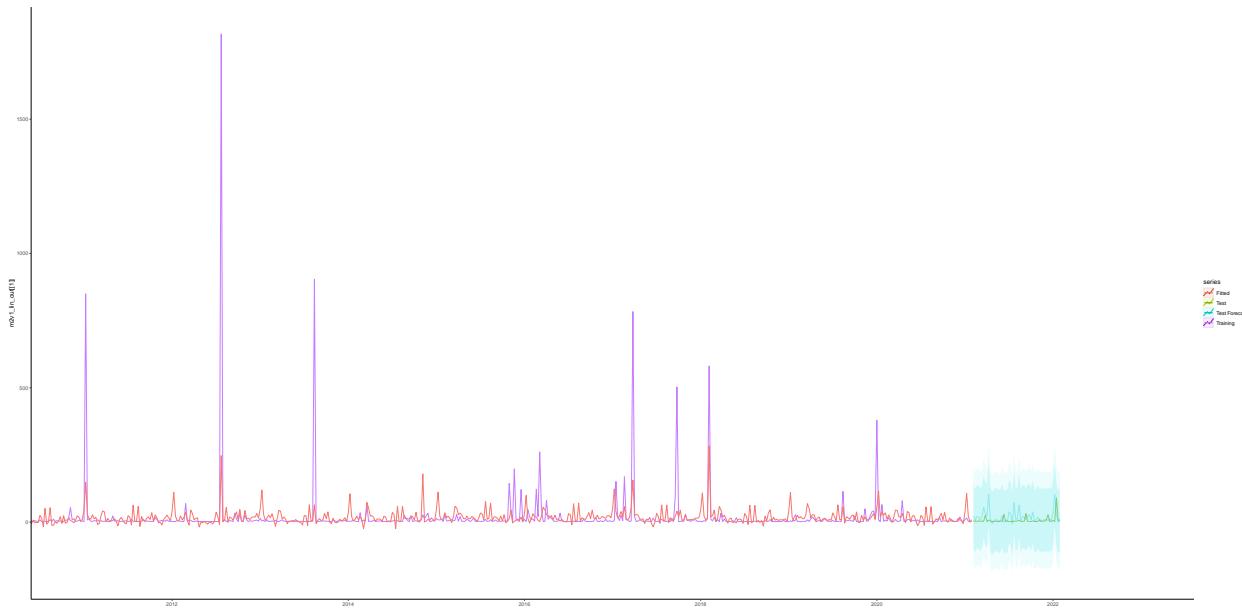
autoplot(m2v1_lin_out[[1]], series = 'Training') +
  autolayer(m2v1_lin_out[[2]], series = 'Test') +
  autolayer(m2v1_lin_out[[3]], series = 'Test Forecast', alpha = .3) +

```

```

autolayer(m2v1_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m2v1_lin_out[[3]])
```

```

##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 566.52070     0.01909   67.86909  -22.10525  -36.58812  -30.60997
## season6    season7    season8    season9    season10   season11
## -15.42820    -30.86519  -23.29226  -30.79680  -41.70029  -26.92888
## season12   season13   season14   season15   season16   season17
## 10.55011     6.55161  -18.54021  -19.75047  -20.62650  -31.81568
## season18   season19   season20   season21   season22   season23
## -27.18784   -22.71148  -30.11554  -30.27887  -23.13177  -18.84428
## season24   season25   season26   season27   season28   season29
## -33.20013   -33.77937  -30.24041  -3.40619   -12.38781  -42.98687
## season30   season31   season32   season33   season34   season35
## 31.31994   -31.11144  -30.20355  23.67099  -36.19962  -24.34365
## season36   season37   season38   season39   season40   season41
## -21.12460   -28.03628  -20.73011  -9.02166  -26.50083   1.68746
## season42   season43   season44   season45   season46   season47
## -34.03457   -33.75832  -20.19064  -34.22012  -32.25841  -31.69945
## season48   season49   season50   season51   season52 CHLOROPHYLL

```

```

## -28.60027 -28.30176 -23.36001 -24.36158 -32.13873 -1.18342
## DENSITY DO FECAL PH SALINITY TEMP
## 41.73314 2.54420 0.42466 56.87757 -63.89572 8.20753
## XMS
## -0.49305
##
##
## Error measures:
## ME RMSE MAE MPE MAPE MASE
## Training set -3.071546e-16 86.77712 28.67443 -201.1468 395.1431 0.8786224
## ACF1
## Training set 0.008521948
##
## Forecasts:
## Point Forecast Lo 80 Hi 80 Lo 95 Hi 95
## 2021.096 24.2918214 -93.17017 141.7538 -155.44182 204.0255
## 2021.115 4.9027823 -112.51926 122.3248 -174.76974 184.5753
## 2021.135 20.3174627 -96.99865 137.6336 -159.19298 199.8279
## 2021.154 20.3769823 -96.99447 137.7484 -159.21812 199.9721
## 2021.173 8.2850284 -108.91208 125.4821 -171.04332 187.6134
## 2021.192 19.5146098 -97.67703 136.7062 -159.80536 198.8346
## 2021.212 55.1373452 -62.16457 172.4393 -124.35136 234.6260
## 2021.231 33.2545388 -84.24426 150.7533 -146.53543 213.0445
## 2021.250 23.4533801 -93.74827 140.6550 -155.88192 202.7887
## 2021.269 103.3003644 -14.16383 220.7646 -76.43666 283.0374
## 2021.288 12.0106577 -105.26060 129.2819 -167.43115 191.4525
## 2021.308 -5.3522353 -122.68154 111.9771 -184.88286 174.1784
## 2021.327 3.6094779 -113.75807 120.9770 -175.97967 183.1986
## 2021.346 9.6756462 -107.59628 126.9476 -169.76718 189.1185
## 2021.365 7.2843518 -109.88922 124.4579 -172.00798 186.5767
## 2021.385 1.9348547 -115.26357 119.1333 -177.39551 181.2652
## 2021.404 7.3168285 -110.00560 124.6393 -172.20326 186.8369
## 2021.423 22.9862070 -94.35294 140.3254 -156.55947 202.5319
## 2021.442 -0.5008495 -117.76090 116.7592 -179.92550 178.9238
## 2021.462 4.6632922 -112.47928 121.8059 -174.58161 183.9082
## 2021.481 2.6358012 -114.75302 120.0246 -176.98589 182.2575
## 2021.500 37.9537846 -79.33810 155.2457 -141.51957 217.4271
## 2021.519 30.1517554 -87.35057 147.6541 -149.64362 209.9471
## 2021.538 -7.4481895 -124.74606 109.8497 -186.93072 172.0343
## 2021.558 72.4441698 -45.04822 189.9366 -107.33600 252.2243
## 2021.577 9.6889927 -107.56416 126.9421 -169.72511 189.1031
## 2021.596 12.5907657 -104.60866 129.7902 -166.74113 191.9227
## 2021.615 64.0293987 -53.11569 181.1745 -115.21934 243.2781
## 2021.635 5.3048771 -111.90548 122.5152 -174.04374 184.6535
## 2021.654 21.4573252 -95.81112 138.7258 -157.98018 200.8948
## 2021.673 18.8427738 -98.65586 136.3414 -160.94695 198.6325
## 2021.692 9.9949824 -107.43631 127.4263 -169.69170 189.6817
## 2021.712 20.8338278 -96.38546 138.0531 -158.52845 200.1961
## 2021.731 28.1233994 -89.17837 145.4252 -151.36509 207.6119
## 2021.750 8.3785499 -109.15580 125.9129 -171.46582 188.2229
## 2021.769 38.1730304 -79.33998 155.6860 -141.63869 217.9848
## 2021.788 3.3254726 -114.17029 120.8212 -176.45986 183.1108
## 2021.808 7.7254556 -109.82480 125.2757 -172.14326 187.5942
## 2021.827 18.1941473 -99.41124 135.7995 -161.75892 198.1472

```

```

## 2021.846      8.4106520 -109.19158 126.0129 -171.53758 188.3589
## 2021.865      5.8309091 -111.71381 123.3756 -174.02932 185.6911
## 2021.885      7.0293792 -110.25205 124.3108 -172.42798 186.4867
## 2021.904      8.6491917 -109.07817 126.3766 -171.49052 188.7889
## 2021.923      9.8730096 -107.50148 127.2475 -169.72675 189.4728
## 2021.942      4.0254122 -113.87745 121.9283 -176.38283 184.4337
## 2021.962      12.9785344 -104.69052 130.6476 -167.07195 193.0290
## 2021.981      4.7061594 -112.85137 122.2637 -175.17368 184.5860
## 2022.000      35.9851031 -81.93069 153.9009 -144.44293 216.4131
## 2022.019      102.0493988 -15.72552 219.8243 -78.16308 282.2619
## 2022.038      26.2551581 -91.28878 143.7991 -153.60388 206.1142
## 2022.058      -0.7352182 -118.14393 116.6735 -180.38735 178.9169
## 2022.077      11.5191875 -105.89270 128.9311 -168.13780 191.1762

```

SBOO: Imputed, All - Including External Variables (Forecasting ENTERO)

```

# SBOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly03_train_tb03
# SBOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly03_test_tb03

owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    ENTERO)

owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        ENTERO,
                        .frequency = "auto",
                        .trend = "auto")

m3v1_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly03_train_tb03,
                           tb_test = owt_df02_gb09_sboo_wkly03_test_tb03,
                           date = "date_sample",
                           param = "ENTERO",
                           ext_pred = c("CHLOROPHYLL",
                                       "DENSITY",
                                       "DO",
                                       "FECAL",
                                       "PH",
                                       "SALINITY",
                                       "TEMP",
                                       "XMS"),
                           train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                           test_start = c(2021, 6),
                           freq = 52,
                           h = 52,
                           formula = "ENTERO ~ trend + season + CHLOROPHYLL + DENSITY + DO
                           + FECAL + PH + SALINITY + TEMP + XMS")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -2.998788e-15 506.8252 220.4953 -3.930906 1165.3447 0.5455759
## Test set     -6.012224e+01 558.4625 327.0337 -907.847612 970.4077 0.8091859
##                      ACF1

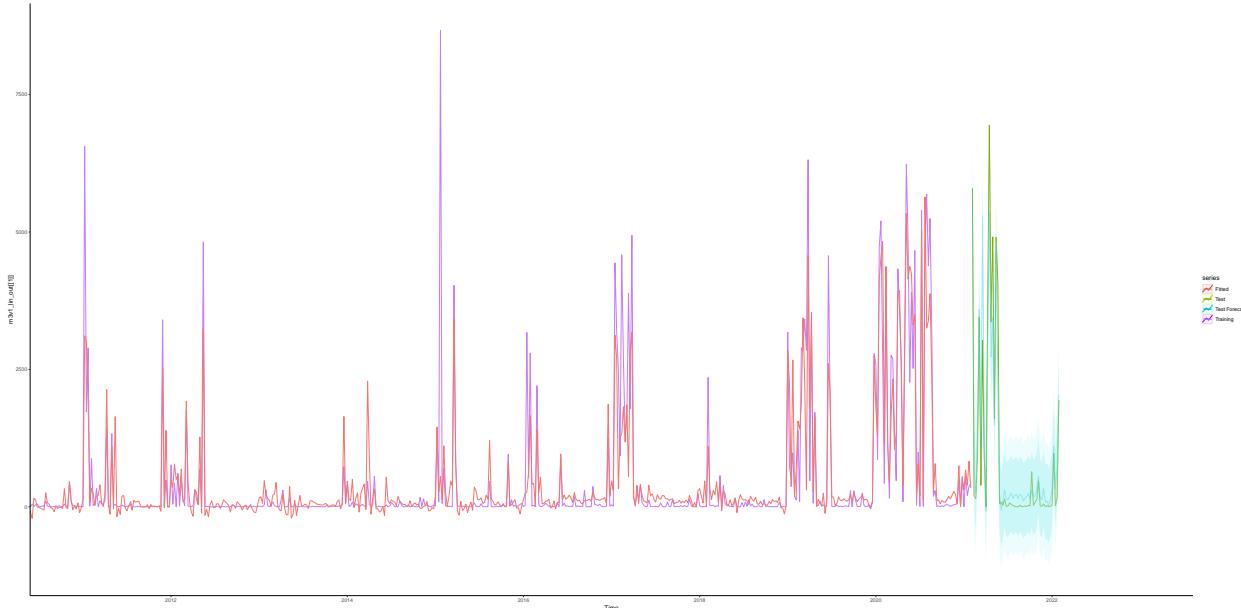
```

```

## Training set 0.009563594
## Test set NA

autoplot(m3v1_lin_out[[1]], series = 'Training') +
  autolayer(m3v1_lin_out[[2]], series = 'Test') +
  autolayer(m3v1_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m3v1_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m3v1_lin_out[[3]])
```

```

##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
##  9968.5071     0.1491   -32.6756   -128.9393   236.0108  -204.9225
##  season6    season7    season8    season9    season10   season11
##  -98.4207    -19.3807  -302.6474   -56.2837  -27.8692  179.9122
##  season12   season13   season14   season15   season16   season17
##  -244.5132   -253.5372  -389.2049  -365.1314  -198.7332 -325.1748
##  season18   season19   season20   season21   season22   season23
##  -310.9846   -221.5305  -341.7518  -286.6543  -181.6924 -381.3937
##  season24   season25   season26   season27   season28   season29
##  -131.5418   -59.3853  -165.0153  -144.7574  -123.4365 -145.0994
##  season30   season31   season32   season33   season34   season35
##  -171.8793   -65.1013  -102.5399  -109.7631  -112.5281 -156.7857

```

```

##    season36      season37      season38      season39      season40      season41
## -176.3867     -150.0919     -154.8852     -164.6777     -167.0776     -179.5270
##    season42      season43      season44      season45      season46      season47
## -190.8826     -172.5472     -169.8456     -176.9456     -201.5565     -173.0299
##    season48      season49      season50      season51      season52      CHLOROPHYLL
## -137.7666     -222.9988     -255.6710     -297.5341     -182.6593      -7.9164
##    DENSITY       DO        FECAL         PH      SALINITY      TEMP
## -65.6198       8.2910      0.7018     -228.9458     -168.0713     -14.6016
##    XMS
## -7.4523
##
##
## Error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -2.998788e-15 506.8252 220.4953 -3.930906 1165.345 0.4499963
##                      ACF1
## Training set 0.009563594
##
## Forecasts:
##             Point Forecast      Lo 80      Hi 80      Lo 95      Hi 95
## 2021.096      5801.68275 5103.12390 6500.2416 4732.78777 6870.5777
## 2021.115      613.66951   -71.35680 1298.6958 -434.51874 1661.8578
## 2021.135      256.39699   -428.24078 941.0348 -791.19674 1303.9907
## 2021.154      1434.03951   748.57957 2119.4994 385.18774 2482.8913
## 2021.173      3592.83105 2905.49836 4280.1637 2541.11370 4644.5484
## 2021.192      1034.78148  350.14153 1719.4214 -12.81559 2082.3785
## 2021.212      5293.06731 4598.69367 5987.4409 4230.57631 6355.5583
## 2021.231      1120.00407 433.92651 1806.0816 70.20725 2169.8009
## 2021.250      -76.65877  -761.19533 607.8778 -1124.09763 970.7801
## 2021.269      2982.52536 2294.68036 3670.3704 1930.02410 4035.0266
## 2021.288      5358.63325 4657.35806 6059.9084 4285.58189 6431.6846
## 2021.308      2725.02712 2036.80358 3413.2507 1671.94664 3778.1076
## 2021.327      3443.09651 2750.45638 4135.7366 2383.25802 4502.9350
## 2021.346      1489.33880  804.41493 2174.2627 441.30730 2537.3703
## 2021.365      4740.92494 4048.75430 5433.0956 3681.80484 5800.0450
## 2021.385      2283.04579 1596.79524 2969.2963 1232.98427 3333.1073
## 2021.404      233.97172 -452.64330 920.5867 -816.64748 1284.5909
## 2021.423      -54.75073 -739.72895 630.2275 -1102.86540 993.3639
## 2021.442      121.23137 -567.43501 809.8977 -932.52671 1174.9894
## 2021.462      313.65886 -372.43727 999.7550 -736.16638 1363.4841
## 2021.481      149.02770 -536.13529 834.1907 -899.36969 1197.4251
## 2021.500      130.79897 -553.95266 815.5506 -916.96899 1178.5669
## 2021.519      203.90110 -485.35152 893.1537 -850.75401 1258.5562
## 2021.538      247.58318 -438.40845 933.5748 -802.08214 1297.2485
## 2021.558      155.68109 -529.57563 840.9378 -892.85972 1204.2219
## 2021.577      214.30489 -470.54810 899.1579 -833.61817 1262.2280
## 2021.596      225.17207 -459.80489 910.1490 -822.94067 1273.2848
## 2021.615      155.03140 -529.94171 840.0045 -893.07544 1203.1382
## 2021.635      228.01771 -456.80787 912.8433 -819.86340 1275.8988
## 2021.654      208.03571 -476.57932 892.6507 -839.52323 1255.5947
## 2021.673      107.93657 -578.41147 794.2846 -942.27411 1158.1473
## 2021.692      156.67617 -528.54058 841.8929 -891.80349 1205.1558
## 2021.712      184.43735 -500.67401 869.5487 -863.88104 1232.7557
## 2021.731      246.17742 -438.61660 930.9714 -801.65540 1294.0103

```

```

## 2021.750    156.81105 -528.81650  842.4386 -892.29718 1205.9193
## 2021.769    309.22242 -376.15847  994.6033 -739.50840 1357.9532
## 2021.788    178.40081 -508.88625  865.6879 -873.24672 1230.0483
## 2021.808    211.59358 -474.81162  897.9988 -838.70457 1261.8917
## 2021.827    312.78000 -376.39401 1001.9540 -741.75483 1367.3148
## 2021.846    557.09652 -128.97868 1243.1717 -492.69668 1606.8897
## 2021.865    176.79566 -510.48585  864.0772 -874.84337 1228.4347
## 2021.885    129.77258 -555.07072  814.6159 -918.13564 1177.6808
## 2021.904    341.93195 -345.92050 1029.7844 -710.58071 1394.4446
## 2021.923     94.51956 -594.07779  783.1169 -959.13289 1148.1720
## 2021.942    104.48815 -583.26606  792.2424 -947.87419 1156.8505
## 2021.962     21.49827 -666.41098  709.4075 -1031.10129 1074.0978
## 2021.981    139.22373 -548.18872  826.6362 -912.61566 1191.0631
## 2022.000    309.36129 -378.15401  996.8766 -742.63548 1361.3581
## 2022.019   1100.82360  411.58417 1790.0630    46.18867 2155.4585
## 2022.038    334.23006 -352.43866 1020.8988 -716.47132 1384.9314
## 2022.058     775.02158   87.61685 1462.4263 -276.80600 1826.8492
## 2022.077   2041.32067 1354.89344 2727.7479   990.98880 3091.6525

```

SBOO: Imputed, Excluding Outliers - Including External Variables (Forecasting ENTERO)

```

# SBOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly02_train_tb03
# SBOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly02_test_tb03

owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
                    ENTERO)

owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        ENTERO,
                        .frequency = "auto",
                        .trend = "auto")

m4v1_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "ENTERO",
                            ext_pred = c("CHLOROPHYLL",
                                         "DENSITY",
                                         "DO",
                                         "FECAL",
                                         "PH",
                                         "SALINITY",
                                         "TEMP",
                                         "XMS"),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "ENTERO ~ trend + season + CHLOROPHYLL + DENSITY + DO
                                         + FECAL + PH + SALINITY + TEMP + XMS")

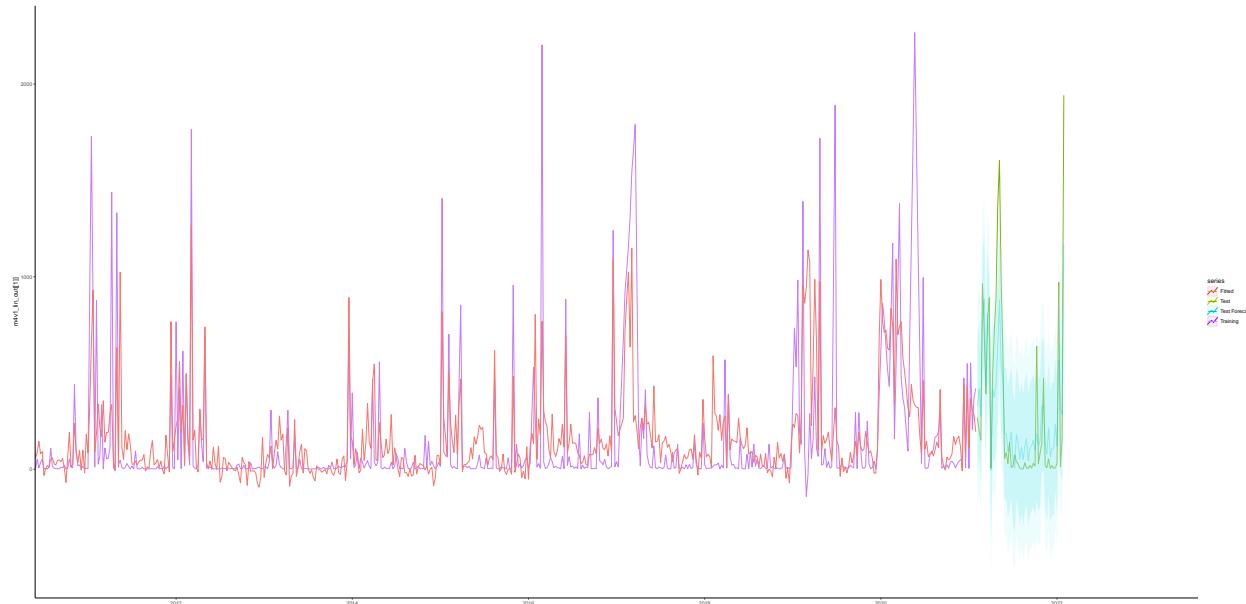
```

```

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 1.257115e-14 252.9268 131.7942 -416.3427 828.0949 0.8154878
## Test set     2.250579e+01 249.7221 176.5312 -573.1820 603.3266 1.0923018
##             ACF1
## Training set 0.3185982
## Test set     NA

autoplot(m4v1_lin_out[[1]], series = 'Training') +
  autolayer(m4v1_lin_out[[2]], series = 'Test') +
  autolayer(m4v1_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m4v1_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m4v1_lin_out[[3]])
```

```

##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend      season2      season3      season4      season5
##   1.132e+04    6.964e-02    2.816e+01    7.040e+01    2.186e+01   -4.172e+01
##   season6      season7      season8      season9      season10     season11
##   -6.058e+01   1.317e+02    2.653e+01    3.840e+01    2.094e+02    6.160e+01
##   season12     season13     season14     season15     season16     season17
##   9.932e+01   -3.406e+01   -1.130e+02   -3.840e+00   -9.550e+01   -5.590e+01
##   season18     season19     season20     season21     season22     season23

```

```

## -4.587e+01 -2.817e+00 -2.644e+01 4.028e+01 2.584e+01 4.764e+01
## season24 season25 season26 season27 season28 season29
## 7.138e-01 5.009e+00 6.930e+01 -3.577e+01 -5.507e+01 -2.167e+01
## season30 season31 season32 season33 season34 season35
## -1.513e+01 -5.060e+01 -3.650e+01 -3.183e+01 -2.637e+01 -3.140e+01
## season36 season37 season38 season39 season40 season41
## -4.765e+01 -2.689e+01 -3.760e+01 -4.059e+01 -4.512e+01 -5.418e+01
## season42 season43 season44 season45 season46 season47
## -4.104e+01 -4.196e+01 1.677e+01 -4.208e+01 -5.494e+01 -2.804e+01
## season48 season49 season50 season51 season52 CHLOROPHYLL
## -4.030e+01 -6.690e+01 -6.090e+01 -4.679e+01 1.070e+02 1.390e+00
## DENSITY DO FECAL PH SALINITY TEMP
## -1.081e+02 2.303e+01 3.628e-01 -3.638e+02 -1.492e+02 -1.722e+01
## XMS
## -7.965e+00
##
##
## Error measures:
## ME RMSE MAE MPE MAPE MASE
## Training set 1.257115e-14 252.9268 131.7942 -416.3427 828.0949 0.6621506
## ACF1
## Training set 0.3185982
##
## Forecasts:
## Point Forecast Lo 80 Hi 80 Lo 95 Hi 95
## 2021.096 328.579212 -13.85744 671.0159 -195.39785 852.5563
## 2021.115 415.817329 73.91323 757.7214 -107.34485 938.9795
## 2021.135 276.622148 -64.96889 618.2132 -246.06101 799.3053
## 2021.154 782.226753 439.19071 1125.2628 257.33253 1307.1210
## 2021.173 884.389967 542.47802 1226.3019 361.21578 1407.5642
## 2021.192 433.971340 92.07520 775.8675 -89.17866 957.1213
## 2021.212 804.613955 462.00034 1147.2276 280.36612 1328.8618
## 2021.231 655.836992 313.02120 998.6528 131.27978 1180.3942
## 2021.250 -5.280339 -346.98084 336.4202 -528.13100 517.5703
## 2021.269 415.180072 72.89840 757.4617 -108.55986 938.9200
## 2021.288 374.550579 30.02199 719.0792 -152.62746 901.7286
## 2021.308 444.501128 102.17003 786.8322 -79.31442 968.3167
## 2021.327 643.969930 299.39761 988.5422 116.72499 1171.2149
## 2021.346 879.742355 535.65679 1223.8279 353.24222 1406.2425
## 2021.365 541.970641 199.85146 884.0898 18.47935 1065.4619
## 2021.385 472.606250 130.54437 814.6681 -50.79736 996.0099
## 2021.404 187.129094 -155.37969 529.6379 -336.95834 711.2165
## 2021.423 184.083771 -157.64121 525.8087 -338.80433 706.9719
## 2021.442 91.432632 -252.46972 435.3350 -434.78716 617.6524
## 2021.462 134.631652 -207.85191 477.1152 -389.41720 658.6805
## 2021.481 193.570829 -148.29371 535.4354 -329.53083 716.6725
## 2021.500 56.536691 -285.10934 398.1827 -466.23061 579.3040
## 2021.519 6.176224 -336.00992 348.3624 -517.41753 529.7700
## 2021.538 182.614613 -159.71561 524.9448 -341.19960 706.4288
## 2021.558 137.164301 -204.80048 479.1291 -386.09074 660.4193
## 2021.577 53.421233 -288.32964 395.1721 -469.50649 576.3490
## 2021.596 114.920179 -226.88117 456.7215 -408.08479 637.9251
## 2021.615 48.840847 -292.98721 390.6689 -474.20499 571.8867
## 2021.635 119.293456 -222.43518 461.0221 -403.60024 642.1872

```

```

## 2021.654    159.778854 -182.02297  501.5807 -363.22683  682.7845
## 2021.673    44.292194 -298.21089  386.7953 -479.78653  568.3709
## 2021.692    110.331331 -231.60614  452.2688 -412.88192  633.5446
## 2021.712    124.644389 -217.30221  466.5910 -398.58282  647.8716
## 2021.731    149.272854 -192.45454  491.0002 -373.61894  672.1647
## 2021.750    101.894205 -240.24754  444.0360 -421.63162  625.4200
## 2021.769    184.361732 -157.79508  526.5185 -339.18713  707.9106
## 2021.788    124.461260 -218.50474  467.4273 -400.32579  649.2483
## 2021.808    148.370544 -194.16584  490.9069 -375.75913  672.5002
## 2021.827    327.842739 -16.32666  672.0121 -198.78568  854.4712
## 2021.846    336.676912 -6.02420  679.3780 -187.70482  861.0586
## 2021.865    137.021702 -205.81632  479.8597 -387.56952  661.6129
## 2021.885    79.113959 -262.68863  420.9165 -443.89289  602.1208
## 2021.904    215.443377 -127.77561  558.6624 -309.73078  740.6175
## 2021.923    66.569991 -277.16863  410.3086 -459.39928  592.5393
## 2021.942    106.341905 -236.92140  449.6052 -418.90006  631.5839
## 2021.962    107.611363 -235.86000  451.0827 -417.94897  633.1717
## 2021.981    234.481737 -108.66648  577.6300 -290.58413  759.5476
## 2022.000    120.963269 -222.40221  464.3287 -404.43503  646.3616
## 2022.019    565.273282  220.50373  910.0428   37.72654 1092.8200
## 2022.038    318.880581 -23.60629  661.3675 -205.17333  842.9345
## 2022.058    282.790080 -60.20735  625.7875 -242.04505  807.6252
## 2022.077    1166.493195  820.68563 1512.3008   637.35815 1695.6282

```

PLOO: Imputed, All - Excluding External Variables (Forecasting ENTERO)

```

# PLOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly03_train_tb03
# PLOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly03_test_tb03

owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    ENTERO)

owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        ENTERO,
                        .frequency = "auto",
                        .trend = "auto")

m1v2_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly03_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly03_test_tb03,
                            date = "date_sample",
                            param = "ENTERO",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "ENTERO ~ trend + season")

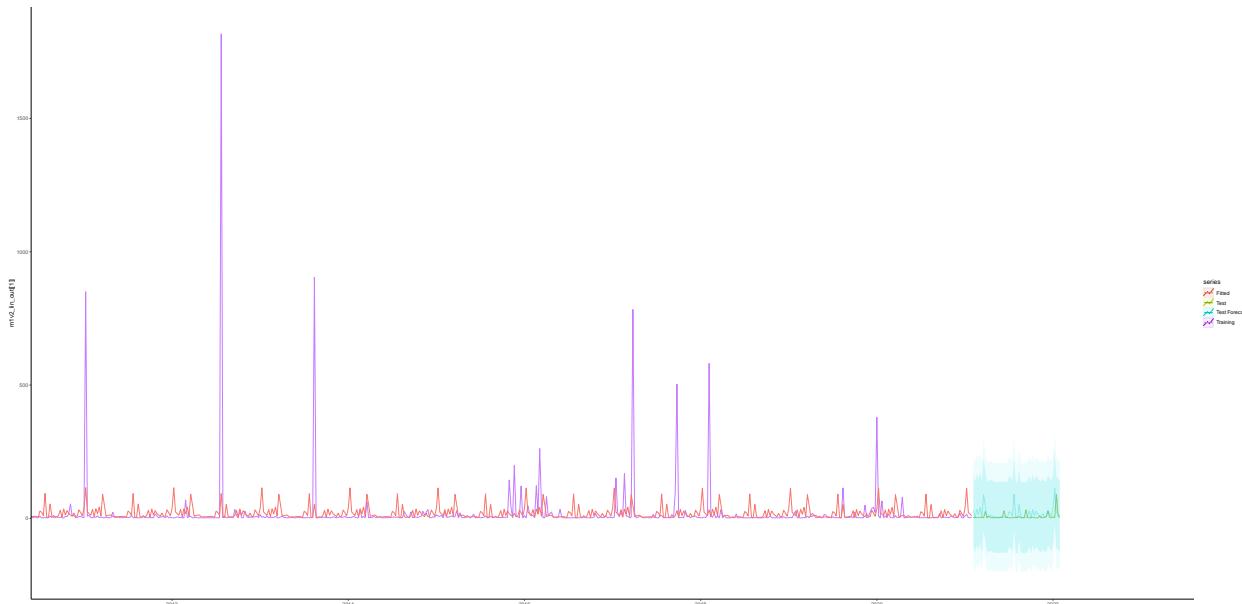
```

```

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 3.739460e-16 98.91472 27.58437 -378.3600 400.8285 0.8481648
## Test set     -1.168561e+01 29.06294 16.71202 -490.5666 509.6556 0.5138615
##              ACF1
## Training set 0.02162603
## Test set      NA

autoplot(m1v2_lin_out[[1]], series = 'Training') +
  autolayer(m1v2_lin_out[[2]], series = 'Test') +
  autolayer(m1v2_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m1v2_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m1v2_lin_out[[3]])
```

```

##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend      season2      season3      season4      season5
## 40.822117    -0.004268    76.649781   -13.521074   -20.219680   -26.377586
## season6      season7      season8      season9      season10     season11
## -4.590507   -31.615742   -2.210463   -20.911339    4.748728   -28.893819
## season12     season13     season14     season15     season16     season17
## 52.622820    13.151594   -29.851194   -27.604926   -25.836072   -25.193009
## season18     season19     season20     season21     season22     season23
## -31.013795   -32.841052   -31.293345   -32.527051   -31.102873   -31.150050

```

```

##    season24      season25      season26      season27      season28      season29
## -30.420647   -31.575550   -33.733539   -10.931432   -15.780782   -27.699048
##    season30      season31      season32      season33      season34      season35
##  54.732247   -34.243870   -34.401081   15.705067   -29.491730   -34.066359
##    season36      season37      season38      season39      season40      season41
##  31.631422   -33.608599   -26.303982   -7.834926   -33.407788   -3.131881
##    season42      season43      season44      season45      season46      season47
## -25.860403   -9.119190   -19.416854   -25.557574   -30.488701   -18.444005
##    season48      season49      season50      season51      season52
## -30.604981   -29.867781   -6.184421   -16.420304   -28.345843
##
##
## Error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 3.73946e-16 98.91472 27.58437 -378.36 400.8285 0.8452214
##                               ACF1
## Training set 0.02162603
##
## Forecasts:
##             Point Forecast      Lo 80      Hi 80      Lo 95      Hi 95
## 2021.096      31.331803 -101.64498 164.3086 -172.14094 234.8045
## 2021.115      4.302301 -128.67448 137.2791 -199.17044 207.7750
## 2021.135      33.703312 -99.27347 166.6801 -169.76943 237.1761
## 2021.154      14.998167 -117.97861 147.9749 -188.47458 218.4709
## 2021.173      40.653966 -92.32282 173.6307 -162.81878 244.1267
## 2021.192      7.007151 -125.96963 139.9839 -196.46559 210.4799
## 2021.212      88.519522 -44.45726 221.4963 -114.95322 291.9923
## 2021.231      49.044027 -83.93275 182.0208 -154.42872 252.5168
## 2021.250      6.036971 -126.93981 139.0138 -197.43577 209.5097
## 2021.269      8.278971 -124.69781 141.2558 -195.19377 211.7517
## 2021.288      10.043557 -122.93322 143.0203 -193.42919 213.5163
## 2021.308      10.682352 -122.29443 143.6591 -192.79039 214.1551
## 2021.327      4.857298 -128.11948 137.8341 -198.61545 208.3300
## 2021.346      3.025773 -129.95101 136.0026 -200.44697 206.4985
## 2021.365      4.569212 -128.40757 137.5460 -198.90353 208.0420
## 2021.385      3.331238 -129.64554 136.3080 -200.14151 206.8040
## 2021.404      4.751147 -128.22563 137.7279 -198.72160 208.2239
## 2021.423      4.699702 -128.27708 137.6765 -198.77304 208.1724
## 2021.442      5.424837 -127.55194 138.4016 -198.04791 208.8976
## 2021.462      4.265666 -128.71112 137.2424 -199.20708 207.7384
## 2021.481      2.103409 -130.87337 135.0802 -201.36934 205.5762
## 2021.500      24.901248 -108.07553 157.8780 -178.57150 228.3740
## 2021.519      20.047630 -112.92915 153.0244 -183.42512 223.5204
## 2021.538      8.125095 -124.85169 141.1019 -195.34765 211.5978
## 2021.558      90.552122 -42.42466 223.5289 -112.92062 294.0249
## 2021.577      1.571738 -131.40504 134.5485 -201.90101 205.0445
## 2021.596      1.410258 -131.56652 134.3870 -202.06249 204.8830
## 2021.615      51.512138 -81.46464 184.4889 -151.96061 254.9849
## 2021.635      6.311073 -126.66571 139.2879 -197.16167 209.7838
## 2021.654      1.732176 -131.24461 134.7090 -201.74057 205.2049
## 2021.673      4.162844 -128.81394 137.1396 -199.30990 207.6356
## 2021.692      2.181399 -130.79538 135.1582 -201.29135 205.6541
## 2021.712      9.481749 -123.49503 142.4585 -193.99100 212.9545
## 2021.731      27.946536 -105.03025 160.9233 -175.52621 231.4193

```

```

## 2021.750      2.369407 -130.60737 135.3462 -201.10334 205.8422
## 2021.769      32.641045 -100.33574 165.6178 -170.83170 236.1138
## 2021.788      9.908255 -123.06853 142.8850 -193.56449 213.3810
## 2021.808      26.645200 -106.33158 159.6220 -176.82754 230.1179
## 2021.827      16.343268 -116.63351 149.3200 -187.12948 219.8160
## 2021.846      10.198280 -122.77850 143.1751 -193.27447 213.6710
## 2021.865      5.262885 -127.71390 138.2397 -198.20986 208.7356
## 2021.885      17.303312 -115.67347 150.2801 -186.16943 220.7761
## 2021.904      5.138069 -127.83871 138.1149 -198.33468 208.6108
## 2021.923      5.871000 -127.10578 138.8478 -197.60174 209.3437
## 2021.942      29.550092 -103.42669 162.5269 -173.92265 233.0228
## 2021.962      19.309940 -113.66684 152.2867 -184.16280 222.7827
## 2021.981      7.380134 -125.59665 140.3569 -196.09261 210.8529
## 2022.000      35.721709 -97.25507 168.6985 -167.75104 239.1945
## 2022.019      112.367221 -20.60956 245.3440 -91.10552 315.8400
## 2022.038      22.192098 -110.67535 155.0595 -181.11335 225.4975
## 2022.058      15.489225 -117.37822 148.3567 -187.81622 218.7947
## 2022.077      9.327051 -123.54039 142.1945 -193.97839 212.6325

```

PLOO: Imputed, Excluding Outliers - Excluding External Variables (Forecasting ENTERO)

```

# PLOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly02_train_tb03
# PLOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly02_test_tb03

owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
                    ENTERO)

owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        ENTERO,
                        .frequency = "auto",
                        .trend = "auto")

m2v2_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "ENTERO",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "ENTERO ~ trend + season")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 3.739460e-16 98.91472 27.58437 -378.3600 400.8285 0.8481648
## Test set     -1.168561e+01 29.06294 16.71202 -490.5666 509.6556 0.5138615
##               ACF1
## Training set 0.02162603
## Test set      NA

```

```

autoplot(m2v2_lin_out[[1]], series = 'Training') +
  autolayer(m2v2_lin_out[[2]], series = 'Test') +
  autolayer(m2v2_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m2v2_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m2v2_lin_out[[3]])
```

```

##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 40.822117   -0.004268   76.649781  -13.521074  -20.219680  -26.377586
## season6      season7    season8    season9    season10   season11
## -4.590507  -31.615742  -2.210463  -20.911339   4.748728  -28.893819
## season12     season13    season14    season15   season16   season17
## 52.622820   13.151594  -29.851194  -27.604926  -25.836072  -25.193009
## season18     season19    season20    season21   season22   season23
## -31.013795  -32.841052  -31.293345  -32.527051  -31.102873  -31.150050
## season24     season25    season26    season27   season28   season29
## -30.420647  -31.575550  -33.733539  -10.931432  -15.780782  -27.699048
## season30     season31    season32    season33   season34   season35
## 54.732247  -34.243870  -34.401081   15.705067  -29.491730  -34.066359
## season36     season37    season38    season39   season40   season41
## -31.631422  -33.608599  -26.303982  -7.834926  -33.407788  -3.131881

```

```

##      season42      season43      season44      season45      season46      season47
## -25.860403     -9.119190    -19.416854    -25.557574    -30.488701    -18.444005
##      season48      season49      season50      season51      season52
## -30.604981    -29.867781    -6.184421    -16.420304    -28.345843
##
##
## Error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 3.73946e-16 98.91472 27.58437 -378.36 400.8285 0.8452214
##                      ACF1
## Training set 0.02162603
##
## Forecasts:
##             Point Forecast      Lo 80      Hi 80      Lo 95      Hi 95
## 2021.096      31.331803   -101.64498  164.3086   -172.14094 234.8045
## 2021.115       4.302301   -128.67448  137.2791   -199.17044 207.7750
## 2021.135      33.703312   -99.27347  166.6801   -169.76943 237.1761
## 2021.154      14.998167   -117.97861  147.9749   -188.47458 218.4709
## 2021.173      40.653966   -92.32282  173.6307   -162.81878 244.1267
## 2021.192       7.007151   -125.96963  139.9839   -196.46559 210.4799
## 2021.212      88.519522   -44.45726  221.4963   -114.95322 291.9923
## 2021.231      49.044027   -83.93275  182.0208   -154.42872 252.5168
## 2021.250       6.036971   -126.93981  139.0138   -197.43577 209.5097
## 2021.269       8.278971   -124.69781  141.2558   -195.19377 211.7517
## 2021.288      10.043557   -122.93322  143.0203   -193.42919 213.5163
## 2021.308      10.682352   -122.29443  143.6591   -192.79039 214.1551
## 2021.327       4.857298   -128.11948  137.8341   -198.61545 208.3300
## 2021.346       3.025773   -129.95101  136.0026   -200.44697 206.4985
## 2021.365      4.569212   -128.40757  137.5460   -198.90353 208.0420
## 2021.385       3.331238   -129.64554  136.3080   -200.14151 206.8040
## 2021.404      4.751147   -128.22563  137.7279   -198.72160 208.2239
## 2021.423       4.699702   -128.27708  137.6765   -198.77304 208.1724
## 2021.442      5.424837   -127.55194  138.4016   -198.04791 208.8976
## 2021.462       4.265666   -128.71112  137.2424   -199.20708 207.7384
## 2021.481       2.103409   -130.87337  135.0802   -201.36934 205.5762
## 2021.500      24.901248   -108.07553  157.8780   -178.57150 228.3740
## 2021.519      20.047630   -112.92915  153.0244   -183.42512 223.5204
## 2021.538       8.125095   -124.85169  141.1019   -195.34765 211.5978
## 2021.558      90.552122   -42.42466  223.5289   -112.92062 294.0249
## 2021.577      1.571738   -131.40504  134.5485   -201.90101 205.0445
## 2021.596      1.410258   -131.56652  134.3870   -202.06249 204.8830
## 2021.615      51.512138   -81.46464  184.4889   -151.96061 254.9849
## 2021.635       6.311073   -126.66571  139.2879   -197.16167 209.7838
## 2021.654      1.732176   -131.24461  134.7090   -201.74057 205.2049
## 2021.673      4.162844   -128.81394  137.1396   -199.30990 207.6356
## 2021.692      2.181399   -130.79538  135.1582   -201.29135 205.6541
## 2021.712      9.481749   -123.49503  142.4585   -193.99100 212.9545
## 2021.731      27.946536   -105.03025  160.9233   -175.52621 231.4193
## 2021.750       2.369407   -130.60737  135.3462   -201.10334 205.8422
## 2021.769      32.641045   -100.33574  165.6178   -170.83170 236.1138
## 2021.788       9.908255   -123.06853  142.8850   -193.56449 213.3810
## 2021.808      26.645200   -106.33158  159.6220   -176.82754 230.1179
## 2021.827      16.343268   -116.63351  149.3200   -187.12948 219.8160
## 2021.846      10.198280   -122.77850  143.1751   -193.27447 213.6710

```

```

## 2021.865      5.262885 -127.71390 138.2397 -198.20986 208.7356
## 2021.885      17.303312 -115.67347 150.2801 -186.16943 220.7761
## 2021.904      5.138069 -127.83871 138.1149 -198.33468 208.6108
## 2021.923      5.871000 -127.10578 138.8478 -197.60174 209.3437
## 2021.942      29.550092 -103.42669 162.5269 -173.92265 233.0228
## 2021.962      19.309940 -113.66684 152.2867 -184.16280 222.7827
## 2021.981      7.380134 -125.59665 140.3569 -196.09261 210.8529
## 2022.000      35.721709 -97.25507 168.6985 -167.75104 239.1945
## 2022.019     112.367221 -20.60956 245.3440 -91.10552 315.8400
## 2022.038     22.192098 -110.67535 155.0595 -181.11335 225.4975
## 2022.058     15.489225 -117.37822 148.3567 -187.81622 218.7947
## 2022.077      9.327051 -123.54039 142.1945 -193.97839 212.6325

```

SBOO: Imputed, All - Excluding External Variables (Forecasting ENTERO)

```

# SBOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly03_train_tb03
# SBOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly03_test_tb03

owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    ENTERO)

owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        ENTERO,
                        .frequency = "auto",
                        .trend = "auto")

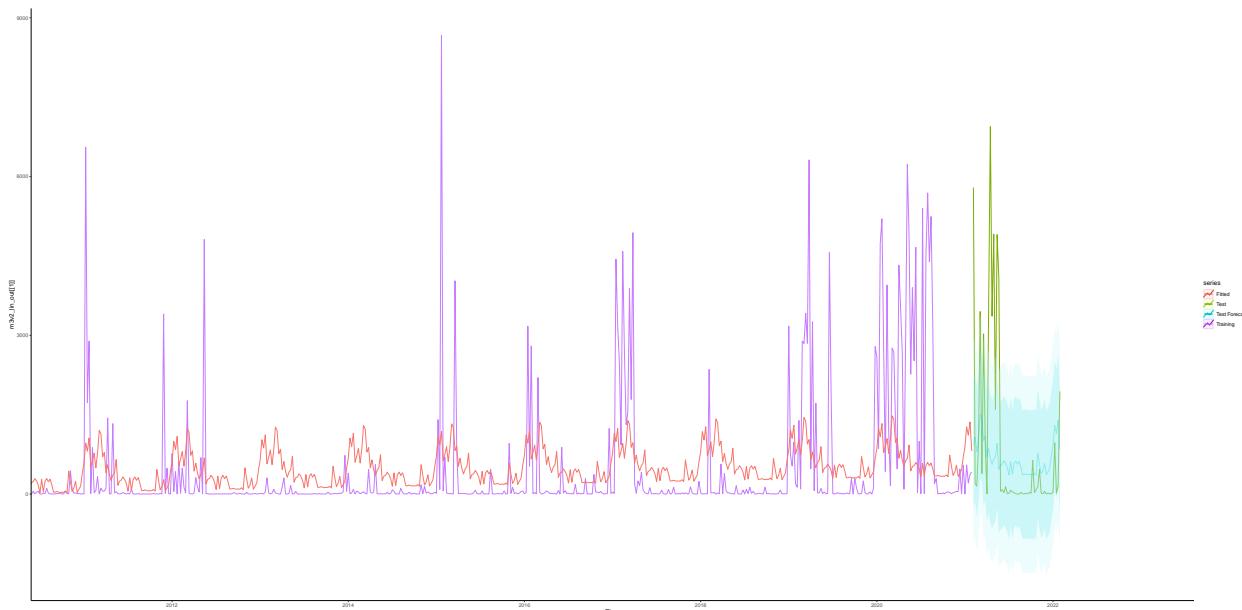
m3v2_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly03_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly03_test_tb03,
                            date = "date_sample",
                            param = "ENTERO",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "ENTERO ~ trend + season")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 2.091498e-14 905.3827 482.0386 -2744.347 3518.457 1.192717
## Test set      2.722014e+02 1686.6494 1062.7625 -3264.586 3297.939 2.629614
##               ACF1
## Training set 0.3235555
## Test set      NA

autoplot(m3v2_lin_out[[1]], series = 'Training') +
  autolayer(m3v2_lin_out[[2]], series = 'Test') +
  autolayer(m3v2_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m3v2_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),

```

```
xlim = c(2011, 2023))
```



```
summary(m3v2_lin_out[[3]])
```

```
##  
## Forecast method: Linear regression model  
##  
## Model Information:  
##  
## Call:  
## tslm(formula = as.formula(formula), data = train_ts01)  
##  
## Coefficients:  
## (Intercept) trend season2 season3 season4 season5  
## 225.589 0.584 377.402 220.371 468.883 -79.510  
## season6 season7 season8 season9 season10 season11  
## 37.908 182.148 -96.917 179.569 611.742 543.122  
## season12 season13 season14 season15 season16 season17  
## 107.326 192.044 -192.463 -41.844 -231.977 -341.002  
## season18 season19 season20 season21 season22 season23  
## -241.934 -197.504 52.943 -435.244 -353.935 -336.785  
## season24 season25 season26 season27 season28 season29  
## -278.963 -325.793 -402.667 -548.081 -297.207 -532.705  
## season30 season31 season32 season33 season34 season35  
## -331.355 -282.207 -345.915 -295.453 -401.295 -541.771  
## season36 season37 season38 season39 season40 season41  
## -542.016 -530.118 -542.174 -549.356 -543.853 -550.093  
## season42 season43 season44 season45 season46 season47  
## -522.702 -557.171 -149.617 -355.891 -534.109 -474.039  
## season48 season49 season50 season51 season52  
## -343.716 -554.582 -497.802 -435.141 -191.823  
##  
##
```

```

## Error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 2.091498e-14 905.3827 482.0386 -2744.347 3518.457 0.9837651
##          ACF1
## Training set 0.3235555
##
## Forecasts:
##           Point Forecast      Lo 80      Hi 80      Lo 95      Hi 95
## 2021.096     933.9135 -283.24496 2151.072 -928.5062 2796.333
## 2021.115    1078.7367 -138.42179 2295.895 -783.6830 2941.156
## 2021.135     800.2559 -416.90261 2017.414 -1062.1638 2662.676
## 2021.154    1077.3259 -139.83257 2294.484 -785.0938 2939.746
## 2021.173     1510.0825 292.92405 2727.241 -352.3372 3372.502
## 2021.192     1442.0468 224.88834 2659.205 -420.3729 3304.467
## 2021.212     1006.8347 -210.32378 2223.993 -855.5850 2869.254
## 2021.231    1092.1371 -125.02136 2309.296 -770.2826 2954.557
## 2021.250     708.2144 -508.94410 1925.373 -1154.2053 2570.634
## 2021.269     859.4173 -357.74117 2076.576 -1003.0024 2721.837
## 2021.288     669.8676 -547.29088 1887.026 -1192.5521 2532.287
## 2021.308     561.4273 -655.73122 1778.586 -1300.9924 2423.847
## 2021.327     661.0793 -556.07921 1878.238 -1201.3404 2523.499
## 2021.346     706.0926 -511.06583 1923.251 -1156.3270 2568.512
## 2021.365     957.1243 -260.03420 2174.283 -905.2954 2819.544
## 2021.385     469.5212 -747.63727 1686.680 -1392.8985 2331.941
## 2021.404     551.4139 -665.74462 1768.572 -1311.0058 2413.834
## 2021.423     569.1475 -648.01098 1786.306 -1293.2722 2431.567
## 2021.442     627.5533 -589.60514 1844.712 -1234.8664 2489.973
## 2021.462     581.3083 -635.85022 1798.467 -1281.1114 2443.728
## 2021.481     505.0179 -712.14054 1722.176 -1357.4018 2367.438
## 2021.500     360.1879 -856.97056 1577.346 -1502.2318 2222.608
## 2021.519     611.6455 -605.51297 1828.804 -1250.7742 2474.065
## 2021.538     376.7316 -840.42688 1593.890 -1485.6881 2239.151
## 2021.558     578.6659 -638.49255 1795.824 -1283.7538 2441.086
## 2021.577     628.3976 -588.76084 1845.556 -1234.0221 2490.817
## 2021.596     565.2740 -651.88451 1782.432 -1297.1457 2427.694
## 2021.615     616.3201 -600.83841 1833.479 -1246.0996 2478.740
## 2021.635     511.0615 -706.09695 1728.220 -1351.3582 2373.481
## 2021.654     371.1697 -845.98877 1588.328 -1491.2500 2233.589
## 2021.673     371.5091 -845.64940 1588.668 -1490.9106 2233.929
## 2021.692     383.9902 -833.16830 1601.149 -1478.4295 2246.410
## 2021.712     372.5186 -844.63991 1589.677 -1489.9011 2234.938
## 2021.731     365.9208 -851.23764 1583.079 -1496.4989 2228.341
## 2021.750     372.0077 -845.15073 1589.166 -1490.4119 2234.427
## 2021.769     366.3518 -850.80667 1583.510 -1496.0679 2228.771
## 2021.788     394.3269 -822.83160 1611.485 -1468.0928 2256.747
## 2021.808     360.4414 -856.71709 1577.600 -1501.9783 2222.861
## 2021.827     768.5797 -448.57877 1985.738 -1093.8400 2630.999
## 2021.846     562.8895 -654.26893 1780.048 -1299.5301 2425.309
## 2021.865     385.2560 -831.90252 1602.414 -1477.1637 2247.676
## 2021.885     445.9096 -771.24887 1663.068 -1416.5101 2308.329
## 2021.904     576.8165 -640.34200 1793.975 -1285.6032 2439.236
## 2021.923     366.5346 -850.62383 1583.693 -1495.8850 2228.954
## 2021.942     423.8983 -793.26020 1641.057 -1438.5214 2286.318
## 2021.962     487.1430 -730.01543 1704.302 -1375.2766 2349.563

```

```

## 2021.981      731.0454 -486.11309 1948.204 -1131.3743 2593.465
## 2022.000      923.4524 -293.70608 2140.611 -938.9673 2785.872
## 2022.019     1301.4385   84.28001 2518.597 -560.9812 3163.858
## 2022.038     1144.9914  -71.16632 2361.149 -715.8970 3005.880
## 2022.058     1394.0872  177.92955 2610.245 -466.8011 3254.976
## 2022.077     846.2787 -369.87902 2062.436 -1014.6097 2707.167

```

SBOO: Imputed, Excluding Outliers - Excluding External Variables (Forecasting ENTERO)

```

# SBOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly02_train_tb03
# SBOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly02_test_tb03

owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
                    ENTERO)

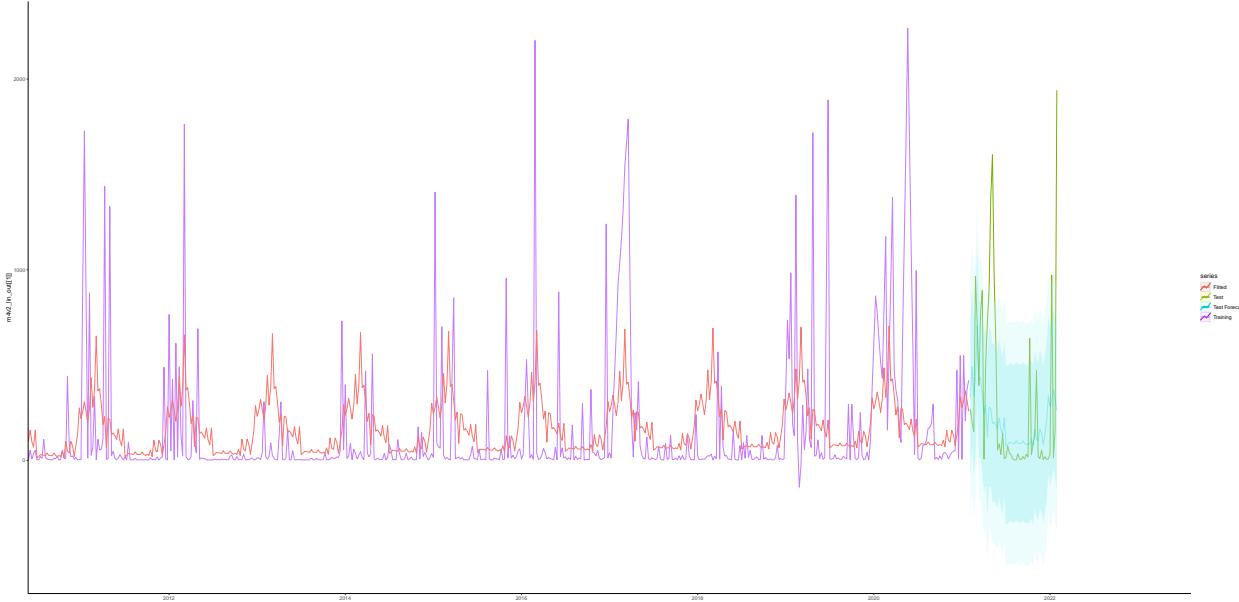
owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        ENTERO,
                        .frequency = "auto",
                        .trend = "auto")

m4v2_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "ENTERO",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "ENTERO ~ trend + season")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 3.250492e-14 308.4913 170.2934 -1106.7267 1236.1387 1.053705
## Test set      1.062070e+02 436.4987 271.1846  -756.8449  795.3771 1.677978
##               ACF1
## Training set 0.3150918
## Test set      NA

autoplot(m4v2_lin_out[[1]], series = 'Training') +
  autolayer(m4v2_lin_out[[2]], series = 'Test') +
  autolayer(m4v2_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m4v2_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m4v2_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 150.9575       0.1106   33.6051   87.0187   35.7086  -20.6701
## season6        season7    season8    season9    season10   season11
## 50.3431       212.9155   57.8940  154.1038  431.6208 143.4790
## season12       season13   season14   season15   season16   season17
## 154.6630       70.5984  -33.5729   8.0804  -155.0037 -0.8022
## season18       season19   season20   season21   season22   season23
## -6.6287      -85.9898  -78.8099 -93.1244 -111.9608 -57.2997
## season24       season25   season26   season27   season28   season29
## -119.6352     -146.6747  -58.2069 -203.1475 -197.0144 -186.8287
## season30       season31   season32   season33   season34   season35
## -188.6234     -190.2536  -193.4259 -178.4375 -192.4056 -193.0506
## season36       season37   season38   season39   season40   season41
## -192.8218     -180.4513  -192.0335 -198.7418 -192.7655 -198.5321
## season42       season43   season44   season45   season46   season47
## -170.6676     -204.6637  -118.7866 -171.1712 -180.1809 -119.6379
## season48       season49   season50   season51   season52
## -142.9127     -199.2341  -141.9810 -78.8469  55.5372
##
## Error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 3.250492e-14 308.4913 170.2934 -1106.727 1236.139 0.8555755
```

```

##          ACF1
## Training set 0.3150918
##
## Forecasts:
##           Point Forecast      Lo 80      Hi 80      Lo 95      Hi 95
## 2021.096      328.27252   -86.450263  742.9953  -306.31032  962.8554
## 2021.115      490.95556    76.232773  905.6783  -143.62728 1125.5384
## 2021.135      336.04459   -78.678190  750.7674  -298.53824  970.6274
## 2021.154      432.36500    17.642222  847.0878  -202.21783 1066.9478
## 2021.173      709.99258   295.269801 1124.7154   75.40975 1344.5754
## 2021.192      421.96145     7.238666  836.6842  -212.62139 1056.5443
## 2021.212      433.25602    18.533242  847.9788  -201.32681 1067.8389
## 2021.231      349.30200   -65.420787  764.0248  -285.28084  983.8848
## 2021.250      245.24129   -169.481492  659.9641  -389.34155  879.8241
## 2021.269      287.00523   -127.717553  701.7280  -347.57761  921.5881
## 2021.288      124.03171   -290.691077  538.7545  -510.55113  758.6145
## 2021.308      278.34388   -136.378897  693.0667  -356.23895  912.9267
## 2021.327      272.62793   -142.094852  687.3507  -361.95490  907.2108
## 2021.346      193.37749   -221.345297  608.1003  -441.20535  827.9603
## 2021.365      200.66792   -214.054862  615.3907  -433.91491  835.2508
## 2021.385      186.46409   -228.258690  601.1869  -448.11874  821.0469
## 2021.404      167.73822   -246.984564  582.4610  -466.84462  802.3211
## 2021.423      222.50992   -192.212867  637.2327  -412.07292  857.0928
## 2021.442      160.28511   -254.437674  575.0079  -474.29773  794.8679
## 2021.462      133.35616   -281.366620  548.0789  -501.22667  767.9390
## 2021.481      221.93456   -192.788224  636.6573  -412.64828  856.5174
## 2021.500      77.10454   -337.618244  491.8273  -557.47830  711.6874
## 2021.519      83.34826   -331.374518  498.0710  -551.23457  717.9311
## 2021.538      93.64455   -321.078231  508.3673  -540.93828  728.2274
## 2021.558      91.96050   -322.762284  506.6833  -542.62234  726.5433
## 2021.577      90.44087   -324.281916  505.1636  -544.14197  725.0237
## 2021.596      87.37918   -327.343607  502.1020  -547.20366  721.9620
## 2021.615      102.47814  -312.244640  517.2009  -532.10469  737.0610
## 2021.635      88.62067   -326.102116  503.3434  -545.96217  723.2035
## 2021.654      88.08633   -326.636455  502.8091  -546.49651  722.6692
## 2021.673      88.42570   -326.297080  503.1485  -546.15713  723.0085
## 2021.692      100.90680  -313.815983  515.6296  -533.67604  735.4896
## 2021.712      89.43519   -325.287588  504.1580  -545.14764  724.0180
## 2021.731      82.83747   -331.885316  497.5602  -551.74537  717.4203
## 2021.750      88.92437   -325.798412  503.6472  -545.65846  723.5072
## 2021.769      83.26843   -331.454348  497.9912  -551.31440  717.8513
## 2021.788      111.24350  -303.479284  525.9663  -523.33934  745.8263
## 2021.808      77.35802   -337.364767  492.0808  -557.22482  711.9409
## 2021.827      163.34576   -251.377025  578.0685  -471.23708  797.9286
## 2021.846      111.07170  -303.651085  525.7945  -523.51114  745.6545
## 2021.865      102.17259  -312.550196  516.8954  -532.41025  736.7554
## 2021.885      162.82623  -251.896548  577.5490  -471.75660  797.4091
## 2021.904      139.66199  -275.060795  554.3848  -494.92085  774.2448
## 2021.923      83.45127   -331.271508  498.1741  -551.13156  718.0341
## 2021.942      140.81490  -273.907880  555.5377  -493.76793  775.3977
## 2021.962      204.05967  -210.663109  618.7825  -430.52316  838.6425
## 2021.981      338.55431  -76.168468  753.2771  -296.02852  973.1371
## 2022.000      283.12774  -131.595043  697.8505  -351.45510  917.7106
## 2022.019      316.84349  -97.879294  731.5663  -317.73935  951.4263

```

```

## 2022.038      370.36768 -44.014108 784.7495 -263.69338 1004.4287
## 2022.058      319.16816 -95.213622 733.5499 -314.89290  953.2292
## 2022.077      262.90003 -151.481756 677.2818 -371.16103  896.9611

```

PLOO All: Imputed - Excluding External Variables (Forecasting DENSITY)

```

# PLOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly03_train_tb03
# PLOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly03_test_tb03

owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    DENSITY)

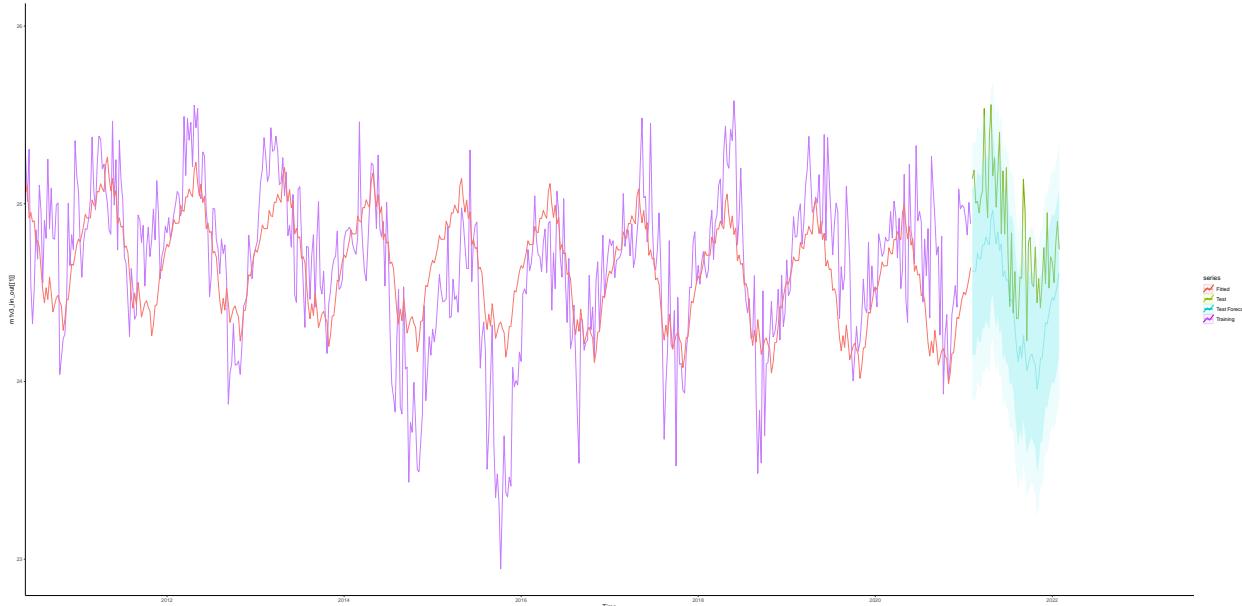
owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        DENSITY,
                        .frequency = "auto",
                        .trend = "auto")

m1v3_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly03_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly03_test_tb03,
                            date = "date_sample",
                            param = "DENSITY",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "DENSITY ~ trend + season")

##               ME        RMSE       MAE       MPE       MAPE       MASE
## Training set -1.556207e-17 0.3503373 0.2742432 -0.02019261 1.110196 1.320782
## Test set      3.777035e-01 0.4351803 0.3804691  1.51503645 1.526371 1.832377
##             ACF1
## Training set 0.7064924
## Test set     NA

autoplot(m1v3_lin_out[[1]], series = 'Training') +
  autolayer(m1v3_lin_out[[2]], series = 'Test') +
  autolayer(m1v3_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m1v3_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m1v3_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 25.1605258 -0.0005763 -0.0139985  0.0277806  0.0773615  0.1416388
##   season6    season7    season8    season9    season10   season11
##  0.1203487  0.1223233  0.1235907  0.2250269  0.1966168  0.1916811
##   season12   season13   season14   season15   season16   season17
##  0.2733601  0.2726401  0.3183751  0.2929450  0.2756329  0.4283849
##   season18   season19   season20   season21   season22   season23
##  0.4714110  0.3565331  0.2824009  0.3510641  0.2477110  0.2844833
##   season24   season25   season26   season27   season28   season29
##  0.1017596  0.1332048  0.0818576  0.0866414 -0.0332705 -0.0234003
##   season30   season31   season32   season33   season34   season35
## -0.0571402 -0.1796645 -0.2983021 -0.3700808 -0.2852211 -0.3496621
##   season36   season37   season38   season39   season40   season41
## -0.2241718 -0.3097002 -0.4174868 -0.3792932 -0.3384987 -0.3239866
##   season42   season43   season44   season45   season46   season47
## -0.3600467 -0.3826167 -0.5190471 -0.4593628 -0.3477045 -0.3443540
##   season48   season49   season50   season51   season52
## -0.2499449 -0.1436323 -0.1493562 -0.0926189 -0.0328901
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE        MASE
## Training set -1.556207e-17 0.3503373 0.2742432 -0.02019261 1.110196 0.8194057
```

```

##          ACF1
## Training set 0.7064924
##
## Forecasts:
##      Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      24.61928 24.14830 25.09026 23.89862 25.33995
## 2021.115      24.62068 24.14970 25.09166 23.90002 25.34134
## 2021.135      24.62137 24.15039 25.09235 23.90071 25.34203
## 2021.154      24.72223 24.25125 25.19321 24.00157 25.44289
## 2021.173      24.69325 24.22227 25.16422 23.97258 25.41391
## 2021.192      24.68773 24.21676 25.15871 23.96707 25.40840
## 2021.212      24.76884 24.29786 25.23982 24.04817 25.48950
## 2021.231      24.76754 24.29656 25.23852 24.04688 25.48820
## 2021.250      24.81270 24.34172 25.28368 24.09204 25.53336
## 2021.269      24.78669 24.31571 25.25767 24.06603 25.50735
## 2021.288      24.76880 24.29783 25.23978 24.04814 25.48947
## 2021.308      24.92098 24.45000 25.39196 24.20032 25.64164
## 2021.327      24.96343 24.49245 25.43441 24.24277 25.68409
## 2021.346      24.84798 24.37700 25.31895 24.12731 25.56864
## 2021.365      24.77327 24.30229 25.24425 24.05261 25.49393
## 2021.385      24.84135 24.37038 25.31233 24.12069 25.56202
## 2021.404      24.73742 24.26645 25.20840 24.01676 25.45809
## 2021.423      24.77362 24.30264 25.24460 24.05296 25.49428
## 2021.442      24.59032 24.11934 25.06130 23.86966 25.31098
## 2021.462      24.62119 24.15021 25.09217 23.90053 25.34185
## 2021.481      24.56927 24.09829 25.04024 23.84860 25.28993
## 2021.500      24.57347 24.10249 25.04445 23.85281 25.29414
## 2021.519      24.45299 23.98201 24.92396 23.73232 25.17365
## 2021.538      24.46228 23.99130 24.93326 23.74162 25.18294
## 2021.558      24.42796 23.95698 24.89894 23.70730 25.14863
## 2021.577      24.30486 23.83388 24.77584 23.58420 25.02552
## 2021.596      24.18565 23.71467 24.65663 23.46499 24.90631
## 2021.615      24.11329 23.64231 24.58427 23.39263 24.83396
## 2021.635      24.19758 23.72660 24.66856 23.47691 24.91824
## 2021.654      24.13256 23.66158 24.60354 23.41190 24.85322
## 2021.673      24.25747 23.78650 24.72845 23.53681 24.97814
## 2021.692      24.17137 23.70039 24.64235 23.45071 24.89203
## 2021.712      24.06301 23.59203 24.53398 23.34234 24.78367
## 2021.731      24.10062 23.62964 24.57160 23.37996 24.82129
## 2021.750      24.14084 23.66986 24.61182 23.42018 24.86150
## 2021.769      24.15478 23.68380 24.62576 23.43412 24.87544
## 2021.788      24.11814 23.64716 24.58912 23.39748 24.83880
## 2021.808      24.09499 23.62402 24.56597 23.37433 24.81566
## 2021.827      23.95799 23.48701 24.42897 23.23733 24.67865
## 2021.846      24.01710 23.54612 24.48807 23.29643 24.73776
## 2021.865      24.12818 23.65720 24.59916 23.40752 24.84884
## 2021.885      24.13095 23.65997 24.60193 23.41029 24.85161
## 2021.904      24.22479 23.75381 24.69576 23.50412 24.94545
## 2021.923      24.33052 23.85954 24.80150 23.60986 25.05118
## 2021.942      24.32422 23.85324 24.79520 23.60356 25.04488
## 2021.962      24.38038 23.90940 24.85136 23.65972 25.10104
## 2021.981      24.43953 23.96856 24.91051 23.71887 25.16020
## 2022.000      24.47185 24.00087 24.94283 23.75119 25.19251
## 2022.019      24.45727 23.98629 24.92825 23.73661 25.17794

```

```

## 2022.038      24.49848 24.02788 24.96907 23.77841 25.21855
## 2022.058      24.54748 24.07689 25.01807 23.82741 25.26755
## 2022.077      24.61118 24.14059 25.08177 23.89111 25.33125

```

PLOO Excluding Outliers: Imputed - Excluding External Variables (Forecasting DENSITY)

```

# PLOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly02_train_tb03
# PLOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly02_test_tb03

owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
                    DENSITY)

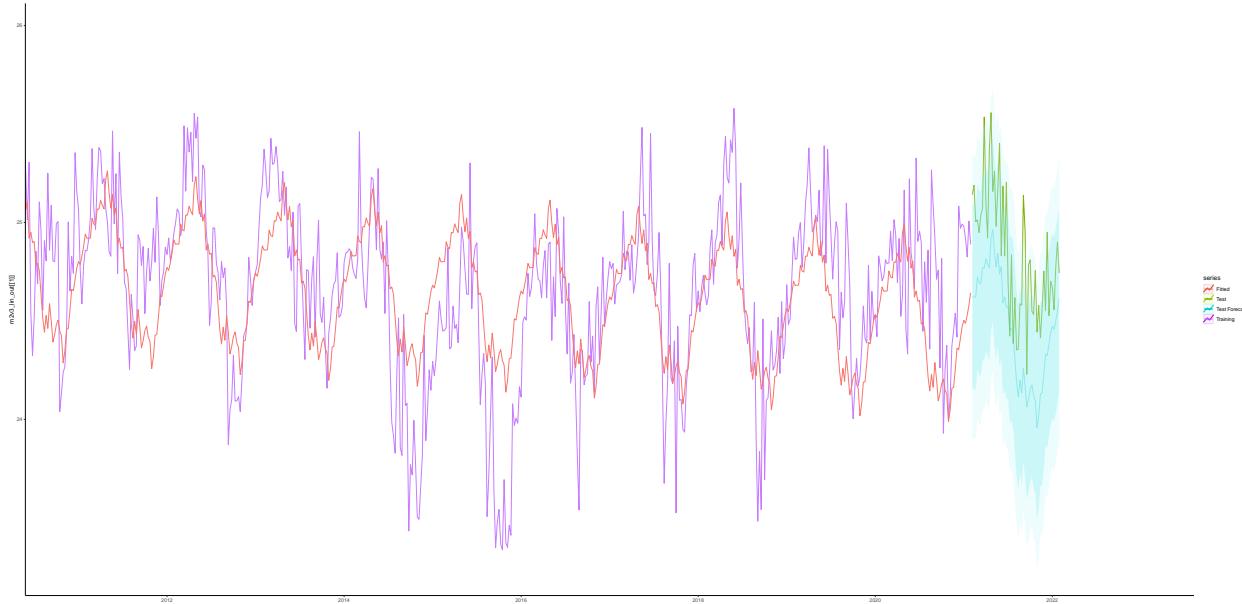
owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        DENSITY,
                        .frequency = "auto",
                        .trend = "auto")

m2v3_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "DENSITY",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "DENSITY ~ trend + season")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 2.796938e-17 0.3485679 0.2736529 -0.01996944 1.107586 1.321202
## Test set     3.761243e-01 0.4336376 0.3789111  1.50865787 1.520078 1.829391
##               ACF1
## Training set 0.7046418
## Test set     NA

autoplot(m2v3_lin_out[[1]], series = 'Training') +
  autolayer(m2v3_lin_out[[2]], series = 'Test') +
  autolayer(m2v3_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m2v3_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m2v3_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 25.1592432 -0.0005744 -0.0139648  0.0278971  0.0781413  0.1422164
##   season6    season7    season8    season9    season10   season11
##  0.1206828  0.1223464  0.1236649  0.2249494  0.1966133  0.1918159
##   season12   season13   season14   season15   season16   season17
##  0.2732921  0.2727331  0.3187065  0.2929821  0.2758615  0.4275024
##   season18   season19   season20   season21   season22   season23
##  0.4703928  0.3563714  0.2825144  0.3513254  0.2478709  0.2847145
##   season24   season25   season26   season27   season28   season29
##  0.1017506  0.1332591  0.0818842  0.0866295 -0.0333260 -0.0233663
##   season30   season31   season32   season33   season34   season35
## -0.0584356 -0.1794493 -0.2979102 -0.3700239 -0.2849689 -0.3496441
##   season36   season37   season38   season39   season40   season41
## -0.2239530 -0.3095001 -0.4174060 -0.3790865 -0.3280387 -0.3046191
##   season42   season43   season44   season45   season46   season47
## -0.3598039 -0.3822471 -0.5187880 -0.4592765 -0.3478977 -0.3441984
##   season48   season49   season50   season51   season52
## -0.2496997 -0.1436264 -0.1493883 -0.0927520 -0.0329772
##
## Error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 2.796938e-17 0.3485679 0.2736529 -0.01996944 1.107586 0.8203458
```

```

##          ACF1
## Training set 0.7046418
##
## Forecasts:
##           Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      24.62052 24.15192 25.08912 23.90350 25.33755
## 2021.115      24.62161 24.15301 25.09021 23.90459 25.33864
## 2021.135      24.62236 24.15376 25.09096 23.90533 25.33938
## 2021.154      24.72307 24.25447 25.19167 24.00604 25.44009
## 2021.173      24.69416 24.22556 25.16276 23.97713 25.41118
## 2021.192      24.68878 24.22018 25.15738 23.97176 25.40581
## 2021.212      24.76969 24.30109 25.23829 24.05266 25.48671
## 2021.231      24.76855 24.29995 25.23715 24.05153 25.48558
## 2021.250      24.81395 24.34535 25.28255 24.09693 25.53097
## 2021.269      24.78765 24.31905 25.25625 24.07063 25.50468
## 2021.288      24.76996 24.30136 25.23856 24.05294 25.48698
## 2021.308      24.92103 24.45243 25.38963 24.20400 25.63805
## 2021.327      24.96334 24.49474 25.43194 24.24632 25.68036
## 2021.346      24.84875 24.38015 25.31735 24.13172 25.56577
## 2021.365      24.77431 24.30571 25.24291 24.05729 25.49134
## 2021.385      24.84255 24.37395 25.31115 24.12553 25.55957
## 2021.404      24.73852 24.26992 25.20712 24.02150 25.45554
## 2021.423      24.77479 24.30619 25.24339 24.05777 25.49181
## 2021.442      24.59125 24.12265 25.05985 23.87423 25.30827
## 2021.462      24.62219 24.15359 25.09079 23.90516 25.33921
## 2021.481      24.57024 24.10164 25.03884 23.85321 25.28726
## 2021.500      24.57441 24.10581 25.04301 23.85739 25.29143
## 2021.519      24.45388 23.98528 24.92248 23.73686 25.17090
## 2021.538      24.46326 23.99466 24.93186 23.74624 25.18029
## 2021.558      24.42762 23.95902 24.89622 23.71060 25.14464
## 2021.577      24.30603 23.83743 24.77463 23.58901 25.02305
## 2021.596      24.18700 23.71840 24.65560 23.46997 24.90402
## 2021.615      24.11431 23.64571 24.58291 23.39729 24.83133
## 2021.635      24.19879 23.73019 24.66739 23.48177 24.91581
## 2021.654      24.13354 23.66494 24.60214 23.41652 24.85056
## 2021.673      24.25866 23.79006 24.72726 23.54163 24.97568
## 2021.692      24.17253 23.70393 24.64113 23.45551 24.88956
## 2021.712      24.06405 23.59545 24.53265 23.34703 24.78108
## 2021.731      24.10180 23.63320 24.57040 23.38478 24.81882
## 2021.750      24.15227 23.68367 24.62087 23.43525 24.86930
## 2021.769      24.17512 23.70652 24.64372 23.45810 24.89214
## 2021.788      24.11936 23.65076 24.58796 23.40234 24.83638
## 2021.808      24.09634 23.62774 24.56494 23.37932 24.81336
## 2021.827      23.95923 23.49063 24.42783 23.24220 24.67625
## 2021.846      24.01816 23.54956 24.48676 23.30114 24.73519
## 2021.865      24.12897 23.66037 24.59757 23.41195 24.84599
## 2021.885      24.13209 23.66349 24.60069 23.41507 24.84911
## 2021.904      24.22602 23.75742 24.69462 23.50899 24.94304
## 2021.923      24.33152 23.86292 24.80012 23.61449 25.04854
## 2021.942      24.32518 23.85658 24.79378 23.60816 25.04220
## 2021.962      24.38124 23.91264 24.84984 23.66422 25.09826
## 2021.981      24.44044 23.97184 24.90904 23.72342 25.15746
## 2022.000      24.47284 24.00424 24.94144 23.75582 25.18987
## 2022.019      24.45831 23.98971 24.92691 23.74128 25.17533

```

```

## 2022.038      24.49959 24.03138 24.96781 23.78316 25.21603
## 2022.058      24.54926 24.08105 25.01748 23.83283 25.26570
## 2022.077      24.61276 24.14455 25.08098 23.89633 25.32920

```

SBOO All: Imputed - Excluding External Variables (Forecasting DENSITY)

```

# SBOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly03_train_tb03
# SBOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly03_test_tb03

owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    DENSITY)

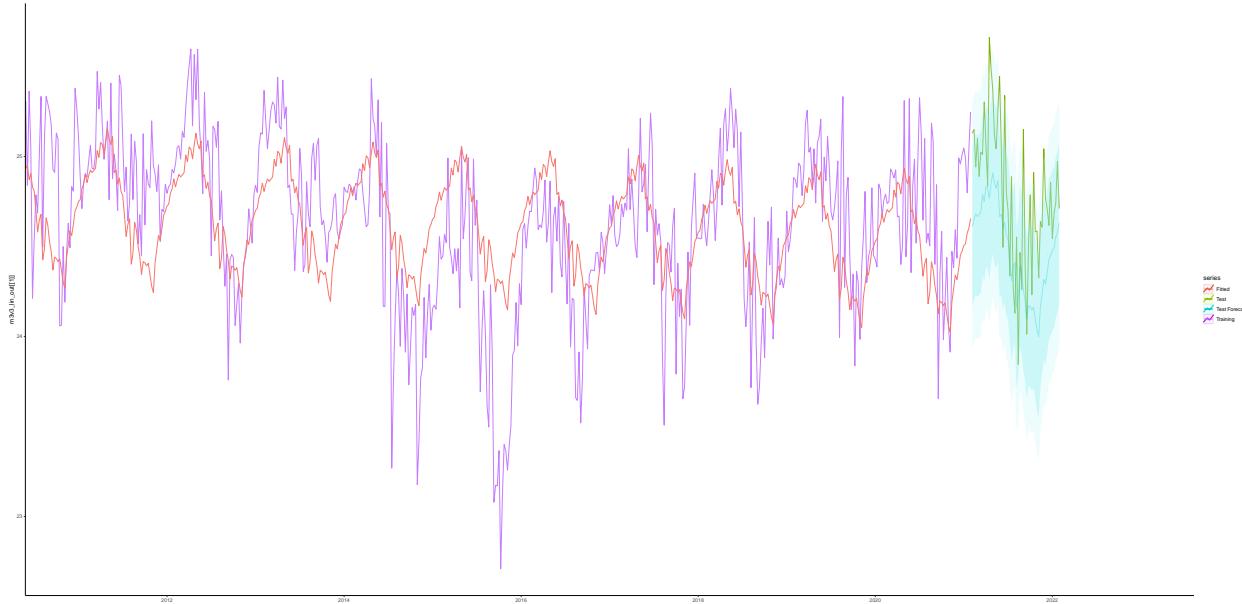
owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        DENSITY,
                        .frequency = "auto",
                        .trend = "auto")

m3v3_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly03_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly03_test_tb03,
                            date = "date_sample",
                            param = "DENSITY",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "DENSITY ~ trend + season")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -2.798007e-17 0.3326557 0.2541997 -0.01841579 1.032368 1.263408
## Test set      3.166582e-01 0.4235576 0.3602488  1.26390269 1.444778 1.790487
##               ACF1
## Training set 0.6520061
## Test set     NA

autoplot(m3v3_lin_out[[1]], series = 'Training') +
  autolayer(m3v3_lin_out[[2]], series = 'Test') +
  autolayer(m3v3_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m3v3_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m3v3_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 25.0417603   -0.0004698   0.0110090   0.0712780   0.0980308   0.1525658
##   season6    season7    season8    season9    season10   season11
## 0.1078284   0.1471860   0.1784557   0.1650903   0.1773321   0.1894318
##   season12   season13   season14   season15   season16   season17
## 0.2886061   0.2512015   0.3338875   0.3233242   0.2689084   0.3502046
##   season18   season19   season20   season21   season22   season23
## 0.4120513   0.3532771   0.3264399   0.3700406   0.1716783   0.1838657
##   season24   season25   season26   season27   season28   season29
## 0.1083453   0.1423525   0.0683264   0.0448021  -0.0636511  -0.1804622
##   season30   season31   season32   season33   season34   season35
## -0.1129465  -0.0813626  -0.3329194  -0.2726196  -0.0988885  -0.1411537
##   season36   season37   season38   season39   season40   season41
## -0.2303418  -0.2876174  -0.3867274  -0.3155147  -0.3218860  -0.3383215
##   season42   season43   season44   season45   season46   season47
## -0.3233811  -0.3860008  -0.4507198  -0.4841374  -0.3174195  -0.2429598
##   season48   season49   season50   season51   season52
## -0.1657881  -0.1907846  -0.1278259  -0.0528468  -0.0307239
##
## Error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -2.798007e-17 0.3326557 0.2541997 -0.01841579 1.032368 0.7493704
```

```

##          ACF1
## Training set 0.6520061
##
## Forecasts:
##      Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      24.61029 24.16308 25.05750 23.92600 25.29458
## 2021.115      24.64918 24.20197 25.09639 23.96489 25.33347
## 2021.135      24.67998 24.23277 25.12719 23.99569 25.36427
## 2021.154      24.66614 24.21894 25.11335 23.98185 25.35043
## 2021.173      24.67792 24.23071 25.12512 23.99363 25.36221
## 2021.192      24.68955 24.24234 25.13675 24.00526 25.37384
## 2021.212      24.78825 24.34104 25.23546 24.10396 25.47254
## 2021.231      24.75038 24.30317 25.19758 24.06609 25.43467
## 2021.250      24.83259 24.38538 25.27980 24.14830 25.51688
## 2021.269      24.82156 24.37435 25.26877 24.13727 25.50585
## 2021.288      24.76667 24.31947 25.21388 24.08238 25.45096
## 2021.308      24.84750 24.40029 25.29471 24.16321 25.53179
## 2021.327      24.90888 24.46167 25.35609 24.22459 25.59317
## 2021.346      24.84963 24.40242 25.29684 24.16534 25.53392
## 2021.365      24.82233 24.37512 25.26953 24.13804 25.50662
## 2021.385      24.86546 24.41825 25.31266 24.18117 25.54975
## 2021.404      24.66662 24.21942 25.11383 23.98233 25.35091
## 2021.423      24.67834 24.23113 25.12555 23.99405 25.36263
## 2021.442      24.60235 24.15514 25.04956 23.91806 25.28664
## 2021.462      24.63589 24.18868 25.08310 23.95160 25.32018
## 2021.481      24.56139 24.11419 25.00860 23.87710 25.24568
## 2021.500      24.53740 24.09019 24.98461 23.85311 25.22169
## 2021.519      24.42848 23.98127 24.87568 23.74419 25.11277
## 2021.538      24.31120 23.86399 24.75840 23.62691 24.99549
## 2021.558      24.37824 23.93103 24.82545 23.69395 25.06253
## 2021.577      24.40936 23.96215 24.85656 23.72507 25.09365
## 2021.596      24.15733 23.71012 24.60454 23.47304 24.84162
## 2021.615      24.21716 23.76995 24.66437 23.53287 24.90145
## 2021.635      24.39042 23.94321 24.83763 23.70613 25.07471
## 2021.654      24.34769 23.90048 24.79489 23.66340 25.03198
## 2021.673      24.25803 23.81082 24.70524 23.57374 24.94232
## 2021.692      24.20028 23.75307 24.64749 23.51599 24.88457
## 2021.712      24.10070 23.65349 24.54791 23.41641 24.78499
## 2021.731      24.17145 23.72424 24.61865 23.48716 24.85574
## 2021.750      24.16460 23.71740 24.61181 23.48031 24.84889
## 2021.769      24.14770 23.70049 24.59491 23.46341 24.83199
## 2021.788      24.16217 23.71496 24.60938 23.47788 24.84646
## 2021.808      24.09908 23.65187 24.54629 23.41479 24.78337
## 2021.827      24.03389 23.58668 24.48110 23.34960 24.71818
## 2021.846      24.00000 23.55280 24.44721 23.31571 24.68429
## 2021.865      24.16625 23.71904 24.61346 23.48196 24.85054
## 2021.885      24.24024 23.79303 24.68745 23.55595 24.92453
## 2021.904      24.31694 23.86974 24.76415 23.63265 25.00123
## 2021.923      24.29148 23.84427 24.73869 23.60719 24.97577
## 2021.942      24.35397 23.90676 24.80118 23.66968 25.03826
## 2021.962      24.42848 23.98127 24.87568 23.74419 25.11277
## 2021.981      24.45013 24.00292 24.89734 23.76584 25.13442
## 2022.000      24.48038 24.03318 24.92759 23.79609 25.16467
## 2022.019      24.49092 24.04371 24.93813 23.80663 25.17521

```

```

## 2022.038      24.55072 24.10388 24.99756 23.86699 25.23445
## 2022.058      24.57700 24.13016 25.02385 23.89328 25.26073
## 2022.077      24.63107 24.18423 25.07791 23.94734 25.31480

```

SBOO Excluding Outliers: Imputed - Excluding External Variables (Forecasting DENSITY)

```

# SBOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly02_train_tb03
# SBOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly02_test_tb03

owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
                    DENSITY)

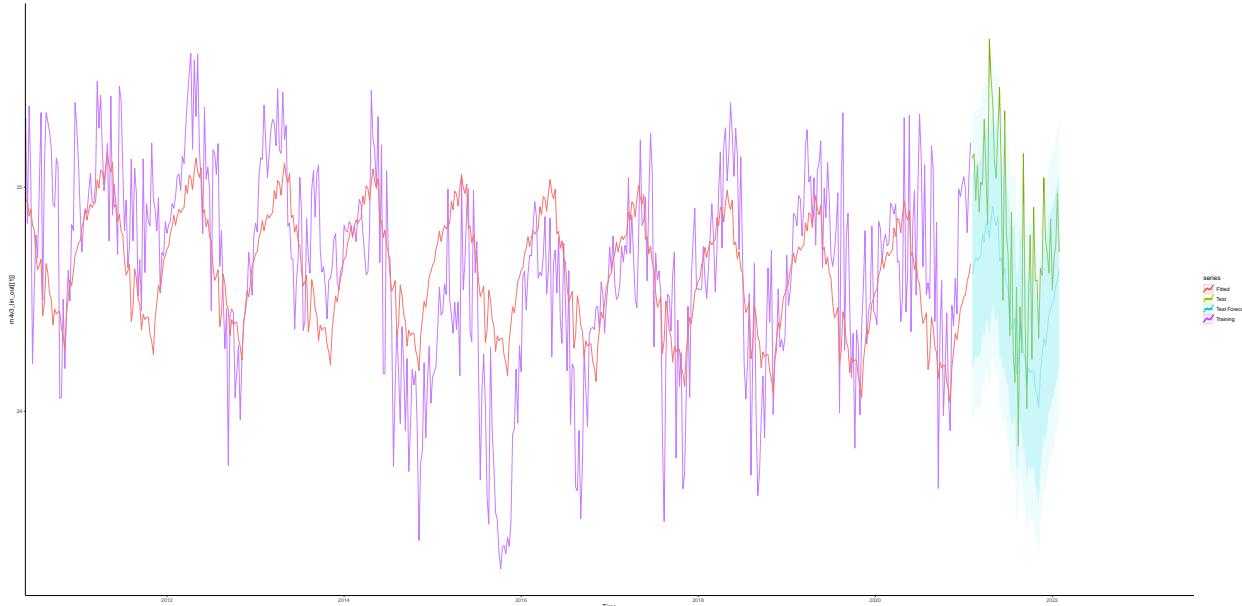
owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        DENSITY,
                        .frequency = "auto",
                        .trend = "auto")

m4v3_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "DENSITY",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "DENSITY ~ trend + season")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 1.537781e-17 0.3223322 0.2498774 -0.01720746 1.013680 1.259573
## Test set     3.070166e-01 0.4160535 0.3528652  1.22485103 1.415072 1.778710
##               ACF1
## Training set 0.6443114
## Test set     NA

autoplot(m4v3_lin_out[[1]], series = 'Training') +
  autolayer(m4v3_lin_out[[2]], series = 'Test') +
  autolayer(m4v3_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m4v3_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m4v3_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 25.0356824 -0.0004601  0.0116001  0.0730078  0.0998429  0.1509991
##   season6    season7    season8    season9    season10   season11
##  0.1069505  0.1485823  0.1794448  0.1647678  0.1786420  0.1897574
##   season12   season13   season14   season15   season16   season17
##  0.2885086  0.2523327  0.3345139  0.3241873  0.2703485  0.3521452
##   season18   season19   season20   season21   season22   season23
##  0.4123527  0.3540656  0.3276523  0.3698347  0.1716294  0.1838007
##   season24   season25   season26   season27   season28   season29
##  0.1091518  0.1414890  0.0681124  0.0485362 -0.0632368 -0.1280942
##   season30   season31   season32   season33   season34   season35
## -0.1087901 -0.0809060 -0.3329658 -0.2747655 -0.0988908 -0.1408935
##   season36   season37   season38   season39   season40   season41
## -0.2296922 -0.2567784 -0.3691782 -0.2990309 -0.3212594 -0.3101461
##   season42   season43   season44   season45   season46   season47
## -0.3102373 -0.3851553 -0.4165798 -0.4753008 -0.3170392 -0.2427899
##   season48   season49   season50   season51   season52
## -0.1654119 -0.1909596 -0.1276126 -0.0521993 -0.0309902
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE       MASE
## Training set 1.537781e-17 0.3223322 0.2498774 -0.01720746 1.01368 0.7490735
```

```

##          ACF1
## Training set 0.6443114
##
## Forecasts:
##           Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      24.61448 24.18115 25.04781 23.95143 25.27754
## 2021.115      24.65566 24.22233 25.08899 23.99260 25.31871
## 2021.135      24.68606 24.25273 25.11939 24.02300 25.34911
## 2021.154      24.67092 24.23759 25.10425 24.00787 25.33397
## 2021.173      24.68433 24.25100 25.11766 24.02128 25.34739
## 2021.192      24.69499 24.26166 25.12832 24.03194 25.35804
## 2021.212      24.79328 24.35995 25.22661 24.13023 25.45634
## 2021.231      24.75665 24.32332 25.18998 24.09359 25.41970
## 2021.250      24.83837 24.40504 25.27170 24.17531 25.50142
## 2021.269      24.82758 24.39425 25.26091 24.16453 25.49063
## 2021.288      24.77328 24.33995 25.20661 24.11023 25.43634
## 2021.308      24.85462 24.42129 25.28795 24.19156 25.51767
## 2021.327      24.91436 24.48104 25.34769 24.25131 25.57742
## 2021.346      24.85562 24.42229 25.28895 24.19256 25.51867
## 2021.365      24.82874 24.39541 25.26207 24.16569 25.49180
## 2021.385      24.87047 24.43714 25.30380 24.20741 25.53352
## 2021.404      24.67180 24.23847 25.10513 24.00875 25.33486
## 2021.423      24.68351 24.25018 25.11684 24.02046 25.34657
## 2021.442      24.60840 24.17507 25.04173 23.94535 25.27146
## 2021.462      24.64028 24.20695 25.07361 23.97723 25.30334
## 2021.481      24.56644 24.13311 24.99977 23.90339 25.22950
## 2021.500      24.54641 24.11308 24.97974 23.88335 25.20946
## 2021.519      24.43417 24.00084 24.86750 23.77112 25.09723
## 2021.538      24.36886 23.93553 24.80219 23.70580 25.03191
## 2021.558      24.38770 23.95437 24.82103 23.72465 25.05076
## 2021.577      24.41513 23.98180 24.84846 23.75207 25.07818
## 2021.596      24.16261 23.72928 24.59594 23.49955 24.82566
## 2021.615      24.22035 23.78702 24.65368 23.55729 24.88340
## 2021.635      24.39576 23.96243 24.82909 23.73271 25.05881
## 2021.654      24.35330 23.91997 24.78663 23.69024 25.01635
## 2021.673      24.26404 23.83071 24.69737 23.60098 24.92709
## 2021.692      24.23649 23.80316 24.66982 23.57344 24.89955
## 2021.712      24.12363 23.69030 24.55696 23.46058 24.78669
## 2021.731      24.19332 23.75999 24.62665 23.53027 24.85637
## 2021.750      24.17063 23.73730 24.60396 23.50758 24.83369
## 2021.769      24.18128 23.74795 24.61461 23.51823 24.84434
## 2021.788      24.18073 23.74740 24.61406 23.51768 24.84379
## 2021.808      24.10536 23.67203 24.53869 23.44230 24.76841
## 2021.827      24.07347 23.64014 24.50680 23.41042 24.73653
## 2021.846      24.01429 23.58096 24.44762 23.35124 24.67734
## 2021.865      24.17209 23.73876 24.60542 23.50904 24.83515
## 2021.885      24.24588 23.81255 24.67921 23.58283 24.90893
## 2021.904      24.32280 23.88947 24.75613 23.65974 24.98585
## 2021.923      24.29679 23.86346 24.73012 23.63374 24.95984
## 2021.942      24.35968 23.92635 24.79301 23.69662 25.02273
## 2021.962      24.43463 24.00130 24.86796 23.77158 25.09769
## 2021.981      24.45538 24.02205 24.88871 23.79233 25.11843
## 2022.000      24.48591 24.05258 24.91924 23.82286 25.14896
## 2022.019      24.49705 24.06372 24.93038 23.83400 25.16010

```

```

## 2022.038      24.55800 24.12502 24.99097 23.89549 25.22051
## 2022.058      24.58437 24.15140 25.01735 23.92186 25.24688
## 2022.077      24.63507 24.20210 25.06804 23.97256 25.29758

```

PLOO All: Imputed - Excluding External Variables (Forecasting PH)

```

# PLOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly03_train_tb03
# PLOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly03_test_tb03

owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    PH)

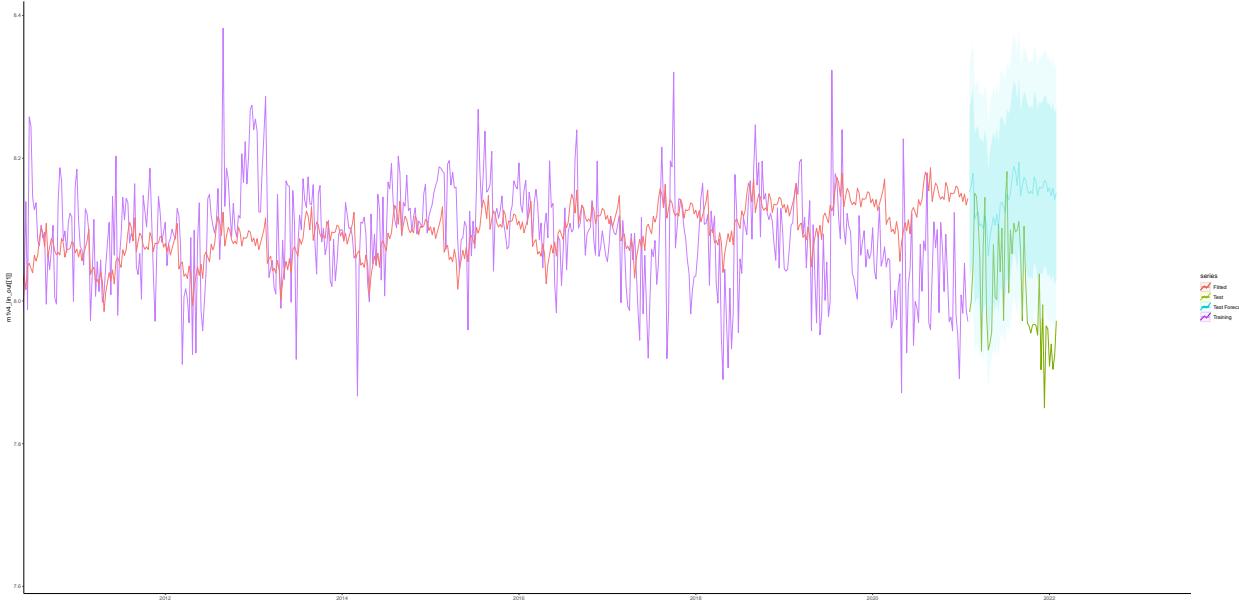
owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        PH,
                        .frequency = "auto",
                        .trend = "auto")

m1v4_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly03_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly03_test_tb03,
                            date = "date_sample",
                            param = "PH",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "PH ~ trend + season")

##               ME        RMSE       MAE       MPE       MAPE       MASE
## Training set -9.269220e-18 0.08929282 0.07080095 -0.01237585 0.8807666 1.277369
## Test set      -1.245855e-01 0.15000693 0.12993314 -1.56348438 1.6290748 2.344214
##               ACF1
## Training set 0.6564464
## Test set     NA

autoplot(m1v4_lin_out[[1]], series = 'Training') +
  autolayer(m1v4_lin_out[[2]], series = 'Test') +
  autolayer(m1v4_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m1v4_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m1v4_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 7.9792102  0.0001500 -0.0113925 -0.0012053 -0.0166947 -0.0075052
##   season6    season7    season8    season9    season10   season11
## 0.0011960  0.0106141  0.0269733 -0.0367986 -0.0302831 -0.0273073
##   season12   season13   season14   season15   season16   season17
## -0.0475963 -0.0444153 -0.0510328 -0.0338475 -0.0473597 -0.0897882
##   season18   season19   season20   season21   season22   season23
## -0.0631879 -0.0492182 -0.0359508 -0.0476054 -0.0322878 -0.0521070
##   season24   season25   season26   season27   season28   season29
## -0.0200069 -0.0156886 -0.0228587 -0.0294771 -0.0050681 -0.0130589
##   season30   season31   season32   season33   season34   season35
## -0.0052088  0.0185250  0.0330742  0.0258301  0.0065064  0.0386156
##   season36   season37   season38   season39   season40   season41
## -0.0086332  0.0050999  0.0168375  0.0122134 -0.0006408 -0.0062569
##   season42   season43   season44   season45   season46   season47
## -0.0029286 -0.0069489  0.0165172  0.0095988 -0.0102944  0.0014298
##   season48   season49   season50   season51   season52
## 0.0001438  0.0014341  0.0105906  0.0085482 -0.0049809
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE        MASE
## Training set -9.26922e-18 0.08929282 0.07080095 -0.01237585 0.8807666 0.8898097
```

```

##          ACF1
## Training set 0.6564464
##
## Forecasts:
##           Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      8.152664 8.032622 8.272705 7.968984 8.336344
## 2021.115      8.162232 8.042190 8.282273 7.978552 8.345912
## 2021.135      8.178741 8.058699 8.298782 7.995061 8.362421
## 2021.154      8.115119 7.995078 8.235161 7.931439 8.298799
## 2021.173      8.121785 8.001743 8.241826 7.938105 8.305465
## 2021.192      8.124910 8.004869 8.244952 7.941230 8.308590
## 2021.212      8.104772 7.984730 8.224813 7.921092 8.288452
## 2021.231      8.108103 7.988061 8.228144 7.924423 8.291783
## 2021.250      8.101635 7.981594 8.221677 7.917955 8.285315
## 2021.269      8.118970 7.998929 8.239012 7.935290 8.302650
## 2021.288      8.105608 7.985567 8.225650 7.921928 8.289288
## 2021.308      8.063330 7.943288 8.183371 7.879650 8.247010
## 2021.327      8.090080 7.970039 8.210122 7.906400 8.273760
## 2021.346      8.104200 7.984158 8.224242 7.920520 8.287880
## 2021.365      8.117617 7.997576 8.237659 7.933937 8.301297
## 2021.385      8.106113 7.986071 8.226154 7.922433 8.289793
## 2021.404      8.121581 8.001539 8.241622 7.937901 8.305261
## 2021.423      8.101911 7.981870 8.221953 7.918231 8.285591
## 2021.442      8.134162 8.014120 8.254203 7.950482 8.317842
## 2021.462      8.138630 8.018588 8.258671 7.954950 8.322310
## 2021.481      8.131610 8.011568 8.251651 7.947930 8.315290
## 2021.500      8.125141 8.005100 8.245183 7.941461 8.308821
## 2021.519      8.149701 8.029659 8.269742 7.966021 8.333381
## 2021.538      8.141860 8.021818 8.261901 7.958180 8.325540
## 2021.558      8.149860 8.029818 8.269901 7.966180 8.333540
## 2021.577      8.173744 8.053702 8.293785 7.990064 8.357424
## 2021.596      8.188443 8.068402 8.308485 8.004763 8.372123
## 2021.615      8.181349 8.061307 8.301391 7.997669 8.365029
## 2021.635      8.162175 8.042134 8.282217 7.978495 8.345855
## 2021.654      8.194435 8.074393 8.314476 8.010755 8.378115
## 2021.673      8.147336 8.027294 8.267377 7.963656 8.331016
## 2021.692      8.161219 8.041177 8.281261 7.977539 8.344899
## 2021.712      8.173107 8.053065 8.293148 7.989427 8.356787
## 2021.731      8.168633 8.048591 8.288674 7.984953 8.352313
## 2021.750      8.155928 8.035887 8.275970 7.972248 8.339608
## 2021.769      8.150462 8.030421 8.270504 7.966782 8.334142
## 2021.788      8.153941 8.033899 8.273982 7.970261 8.337621
## 2021.808      8.150070 8.030029 8.270112 7.966390 8.333750
## 2021.827      8.173687 8.053645 8.293728 7.990007 8.357367
## 2021.846      8.166918 8.046877 8.286960 7.983238 8.350598
## 2021.865      8.147175 8.027134 8.267217 7.963495 8.330855
## 2021.885      8.159049 8.039008 8.279091 7.975369 8.342729
## 2021.904      8.157913 8.037872 8.277955 7.974233 8.341593
## 2021.923      8.159354 8.039312 8.279395 7.975674 8.343034
## 2021.942      8.168660 8.048619 8.288702 7.984980 8.352340
## 2021.962      8.166768 8.046727 8.286810 7.983088 8.350448
## 2021.981      8.153389 8.033347 8.273430 7.969709 8.337069
## 2022.000      8.158520 8.038478 8.278561 7.974840 8.342200
## 2022.019      8.147277 8.027236 8.267319 7.963597 8.330957

```

```

## 2022.038      8.157615 8.037672 8.277557 7.974086 8.341144
## 2022.058      8.142275 8.022333 8.262218 7.958746 8.325804
## 2022.077      8.151615 8.031672 8.271558 7.968086 8.335144

```

PLOO Excluding Outliers: Imputed - Excluding External Variables (Forecasting PH)

```

# PLOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly02_train_tb03
# PLOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly02_test_tb03

owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
    PH)

owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
    PH,
    .frequency = "auto",
    .trend = "auto")

m2v4_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "PH",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "PH ~ trend + season")

##               ME        RMSE       MAE       MPE       MAPE       MASE
## Training set -1.104657e-17 0.08640738 0.06927462 -0.01155372 0.8610721 1.276506
## Test set      -1.225481e-01 0.14774555 0.12779428 -1.53798322 1.6023184 2.354833
##               ACF1
## Training set 0.6478792
## Test set     NA

autoplot(m2v4_lin_out[[1]], series = 'Training') +
  autolayer(m2v4_lin_out[[2]], series = 'Test') +
  autolayer(m2v4_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m2v4_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m2v4_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 7.9815006  0.0001441 -0.0116517  0.0002109 -0.0158001 -0.0065501
##   season6    season7    season8    season9    season10   season11
## 0.0040766  0.0117627  0.0276796 -0.0322873 -0.0231654 -0.0189713
##   season12   season13   season14   season15   season16   season17
## -0.0423245 -0.0432401 -0.0487886 -0.0294078 -0.0438132 -0.0900486
##   season18   season19   season20   season21   season22   season23
## -0.0600143 -0.0412534 -0.0297337 -0.0466314 -0.0185566 -0.0464367
##   season24   season25   season26   season27   season28   season29
## -0.0178877 -0.0149252 -0.0204894 -0.0219769 -0.0037518 -0.0115109
##   season30   season31   season32   season33   season34   season35
## -0.0034972  0.0222177  0.0346162  0.0270503  0.0076727  0.0390644
##   season36   season37   season38   season39   season40   season41
## -0.0071824  0.0062641  0.0181014  0.0131747  0.0064554 -0.0006943
##   season42   season43   season44   season45   season46   season47
## 0.0003004 -0.0057324  0.0171976  0.0105407 -0.0081395  0.0026749
##   season48   season49   season50   season51   season52
## 0.0012681  0.0024788  0.0121054  0.0091062 -0.0034408
##
## Error measures:
##               ME        RMSE       MAE       MPE       MAPE
## Training set -1.104657e-17 0.08640738 0.06927462 -0.01155372 0.8610721
```

```

##                               MASE      ACF1
## Training set 0.8953634 0.6478792
##
## Forecasts:
##           Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      8.150967 8.034804 8.267129 7.973222 8.328711
## 2021.115      8.158797 8.042635 8.274960 7.981053 8.336542
## 2021.135      8.174858 8.058696 8.291021 7.997114 8.352603
## 2021.154      8.115035 7.998873 8.231198 7.937291 8.292780
## 2021.173      8.124301 8.008139 8.240464 7.946557 8.302046
## 2021.192      8.128639 8.012477 8.244802 7.950895 8.306384
## 2021.212      8.105430 7.989268 8.221593 7.927686 8.283175
## 2021.231      8.104659 7.988496 8.220821 7.926914 8.282403
## 2021.250      8.099254 7.983092 8.215417 7.921510 8.276999
## 2021.269      8.118779 8.002617 8.234942 7.941035 8.296524
## 2021.288      8.104518 7.988355 8.220680 7.926773 8.282262
## 2021.308      8.058426 7.942264 8.174589 7.880682 8.236171
## 2021.327      8.088605 7.972442 8.204767 7.910860 8.266349
## 2021.346      8.107510 7.991347 8.223672 7.929765 8.285254
## 2021.365      8.119174 8.003011 8.235336 7.941429 8.296918
## 2021.385      8.102420 7.986257 8.218582 7.924675 8.280164
## 2021.404      8.130639 8.014476 8.246801 7.952894 8.308383
## 2021.423      8.102903 7.986740 8.219065 7.925158 8.280647
## 2021.442      8.131596 8.015433 8.247758 7.953851 8.309340
## 2021.462      8.134702 8.018540 8.250865 7.956958 8.312447
## 2021.481      8.129282 8.013120 8.245445 7.951538 8.307027
## 2021.500      8.127939 8.011776 8.244101 7.950194 8.305683
## 2021.519      8.146308 8.030146 8.262470 7.968563 8.324052
## 2021.538      8.138693 8.022530 8.254855 7.960948 8.316437
## 2021.558      8.146851 8.030688 8.263013 7.969106 8.324595
## 2021.577      8.172710 8.056547 8.288872 7.994965 8.350454
## 2021.596      8.185252 8.069090 8.301415 8.007508 8.362997
## 2021.615      8.177830 8.061668 8.293993 8.000086 8.355575
## 2021.635      8.158597 8.042434 8.274759 7.980852 8.336341
## 2021.654      8.190133 8.073970 8.306295 8.012388 8.367877
## 2021.673      8.144030 8.027868 8.260192 7.966285 8.321774
## 2021.692      8.157621 8.041458 8.273783 7.979876 8.335365
## 2021.712      8.169602 8.053439 8.285764 7.991857 8.347346
## 2021.731      8.164819 8.048657 8.280982 7.987075 8.342564
## 2021.750      8.158244 8.042082 8.274406 7.980500 8.335989
## 2021.769      8.151238 8.035076 8.267401 7.973494 8.328983
## 2021.788      8.152377 8.036215 8.268540 7.974633 8.330122
## 2021.808      8.146488 8.030326 8.262651 7.968744 8.324233
## 2021.827      8.169563 8.053400 8.285725 7.991818 8.347307
## 2021.846      8.163050 8.046887 8.279212 7.985305 8.340794
## 2021.865      8.144514 8.028351 8.260676 7.966769 8.322258
## 2021.885      8.155472 8.039310 8.271634 7.977727 8.333216
## 2021.904      8.154209 8.038047 8.270372 7.976465 8.331954
## 2021.923      8.155564 8.039402 8.271726 7.977820 8.333309
## 2021.942      8.165335 8.049172 8.281497 7.987590 8.343079
## 2021.962      8.162480 8.046317 8.278642 7.984735 8.340224
## 2021.981      8.150077 8.033914 8.266239 7.972332 8.327821
## 2022.000      8.153662 8.037499 8.269824 7.975917 8.331406
## 2022.019      8.142154 8.025991 8.258316 7.964409 8.319898

```

```

## 2022.038      8.154161 8.038094 8.270227 7.976562 8.331759
## 2022.058      8.138294 8.022227 8.254361 7.960695 8.315892
## 2022.077      8.147688 8.031621 8.263755 7.970089 8.325286

```

SBOO All: Imputed - Excluding External Variables (Forecasting PH)

```

# SBOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly03_train_tb03
# SBOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly03_test_tb03

owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    PH)

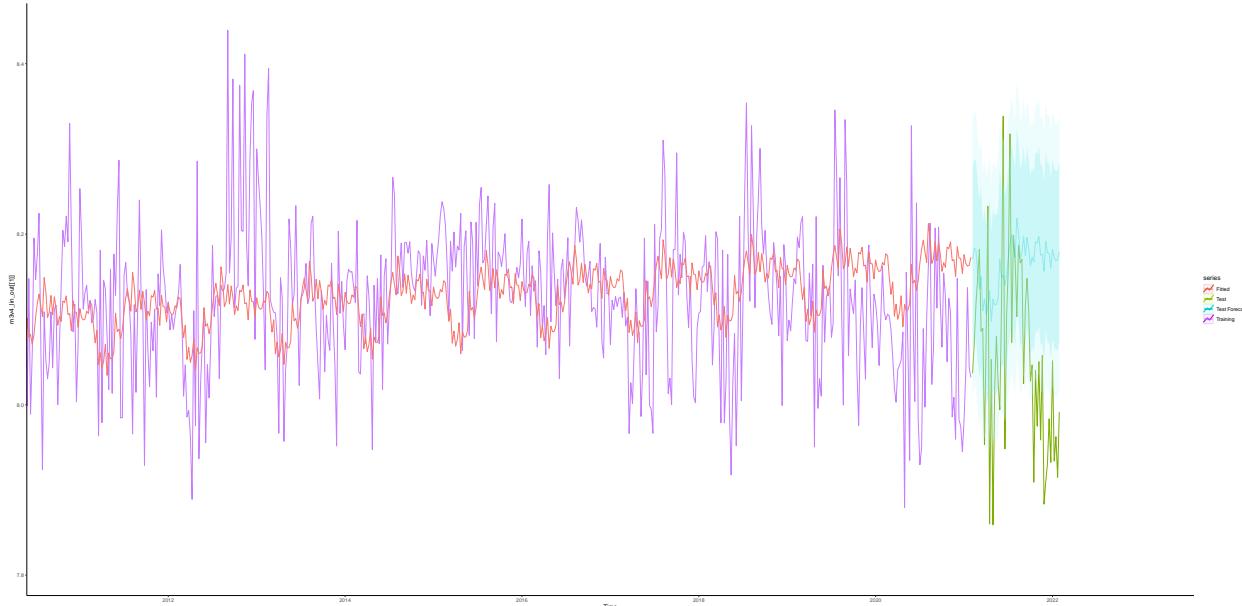
owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        PH,
                        .frequency = "auto",
                        .trend = "auto")

m3v4_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly03_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly03_test_tb03,
                            date = "date_sample",
                            param = "PH",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "PH ~ trend + season")

##               ME        RMSE       MAE       MPE       MAPE
## Training set 7.593386e-17 0.07816866 0.06033009 -0.009313191 0.7453154
## Test set     -1.079938e-01 0.15322399 0.12694409 -1.358164499 1.5867912
##               MASE       ACF1
## Training set 0.9956236 0.4193761
## Test set     2.0949500       NA

autoplot(m3v4_lin_out[[1]], series = 'Training') +
  autolayer(m3v4_lin_out[[2]], series = 'Test') +
  autolayer(m3v4_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m3v4_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m3v4_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 8.0368835  0.0001217 -0.0103065 -0.0136633 -0.0129479 -0.0035307
##   season6    season7    season8    season9    season10   season11
## -0.0063173  0.0066232  0.0039769 -0.0213799 -0.0413630 -0.0270645
##   season12   season13   season14   season15   season16   season17
## -0.0672929 -0.0532560 -0.0710262 -0.0631263 -0.0438243 -0.0801844
##   season18   season19   season20   season21   season22   season23
## -0.0543537 -0.0611338 -0.0606209 -0.0535703 -0.0078879 -0.0297383
##   season24   season25   season26   season27   season28   season29
## -0.0269168 -0.0386381 -0.0276928 -0.0067797  0.0094032  0.0198705
##   season30   season31   season32   season33   season34   season35
## 0.0058349 -0.0066782  0.0388753  0.0223285 -0.0080427 -0.0024534
##   season36   season37   season38   season39   season40   season41
## 0.0173590 -0.0054138  0.0155995  0.0023678 -0.0180221 -0.0080228
##   season42   season43   season44   season45   season46   season47
## -0.0136630  0.0099554  0.0081485  0.0158650 -0.0061413 -0.0052233
##   season48   season49   season50   season51   season52
## -0.0253460  0.0096940 -0.0036287 -0.0043141 -0.0220040
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE
## Training set 7.593386e-17 0.07816866 0.06033009 -0.009313191 0.7453154
```

```

##          MASE      ACF1
## Training set 0.7376559 0.4193761
##
## Forecasts:
##           Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      8.170310 8.065223 8.275397 8.009513 8.331107
## 2021.115      8.183372 8.078286 8.288459 8.022575 8.344169
## 2021.135      8.180848 8.075761 8.285934 8.020051 8.341645
## 2021.154      8.155613 8.050526 8.260699 7.994815 8.316410
## 2021.173      8.135751 8.030664 8.240838 7.974954 8.296548
## 2021.192      8.150171 8.045085 8.255258 7.989374 8.310968
## 2021.212      8.110065 8.004978 8.215151 7.949268 8.270862
## 2021.231      8.124223 8.019137 8.229310 7.963426 8.285020
## 2021.250      8.106575 8.001488 8.211662 7.945778 8.267372
## 2021.269      8.114596 8.009510 8.219683 7.953799 8.275393
## 2021.288      8.134020 8.028934 8.239107 7.973223 8.294817
## 2021.308      8.097782 7.992695 8.202869 7.936985 8.258579
## 2021.327      8.123734 8.018648 8.228821 7.962937 8.284531
## 2021.346      8.117076 8.011989 8.222163 7.956279 8.277873
## 2021.365      8.117711 8.012624 8.222797 7.956914 8.278508
## 2021.385      8.124883 8.019796 8.229969 7.964086 8.285680
## 2021.404      8.170687 8.065600 8.275774 8.009890 8.331484
## 2021.423      8.148958 8.043872 8.254045 7.988161 8.309755
## 2021.442      8.151902 8.046815 8.256988 7.991104 8.312699
## 2021.462      8.140302 8.035215 8.245389 7.979505 8.301099
## 2021.481      8.151369 8.046282 8.256456 7.990572 8.312166
## 2021.500      8.172404 8.067317 8.277490 8.011607 8.333201
## 2021.519      8.188708 8.083622 8.293795 8.027911 8.349505
## 2021.538      8.199297 8.094211 8.304384 8.038500 8.360094
## 2021.558      8.185384 8.080297 8.290470 8.024587 8.346181
## 2021.577      8.172992 8.067906 8.278079 8.012195 8.333789
## 2021.596      8.218667 8.113581 8.323754 8.057870 8.379464
## 2021.615      8.202242 8.097156 8.307329 8.041445 8.363039
## 2021.635      8.171993 8.066906 8.277080 8.011196 8.332790
## 2021.654      8.177704 8.072617 8.282791 8.016907 8.338501
## 2021.673      8.197638 8.092551 8.302725 8.036841 8.358435
## 2021.692      8.174987 8.069900 8.280074 8.014190 8.335784
## 2021.712      8.196122 8.091035 8.301209 8.035325 8.356919
## 2021.731      8.183012 8.077925 8.288099 8.022215 8.343809
## 2021.750      8.162744 8.057657 8.267831 8.001947 8.323541
## 2021.769      8.172865 8.067778 8.277952 8.012068 8.333662
## 2021.788      8.167346 8.062260 8.272433 8.006549 8.328143
## 2021.808      8.191087 8.086000 8.296173 8.030290 8.351884
## 2021.827      8.189401 8.084315 8.294488 8.028604 8.350198
## 2021.846      8.197240 8.092153 8.302326 8.036443 8.358037
## 2021.865      8.175355 8.070268 8.280442 8.014558 8.336152
## 2021.885      8.176395 8.071308 8.281481 8.015598 8.337192
## 2021.904      8.156394 8.051307 8.261480 7.995597 8.317191
## 2021.923      8.191555 8.086469 8.296642 8.030758 8.352353
## 2021.942      8.178355 8.073268 8.283441 8.017558 8.339152
## 2021.962      8.177791 8.072704 8.282878 8.016994 8.338588
## 2021.981      8.160223 8.055136 8.265309 7.999426 8.321020
## 2022.000      8.182348 8.077262 8.287435 8.021551 8.343145
## 2022.019      8.172164 8.067077 8.277250 8.011367 8.332961

```

```

## 2022.038      8.168929 8.063928 8.273929 8.008264 8.329593
## 2022.058      8.169766 8.064765 8.274766 8.009101 8.330431
## 2022.077      8.179305 8.074304 8.284305 8.018640 8.339969

```

SBOO Excluding Outliers: Imputed - Excluding External Variables (Forecasting PH)

```

# SBOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly02_train_tb03
# SBOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly02_test_tb03

owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
    PH)

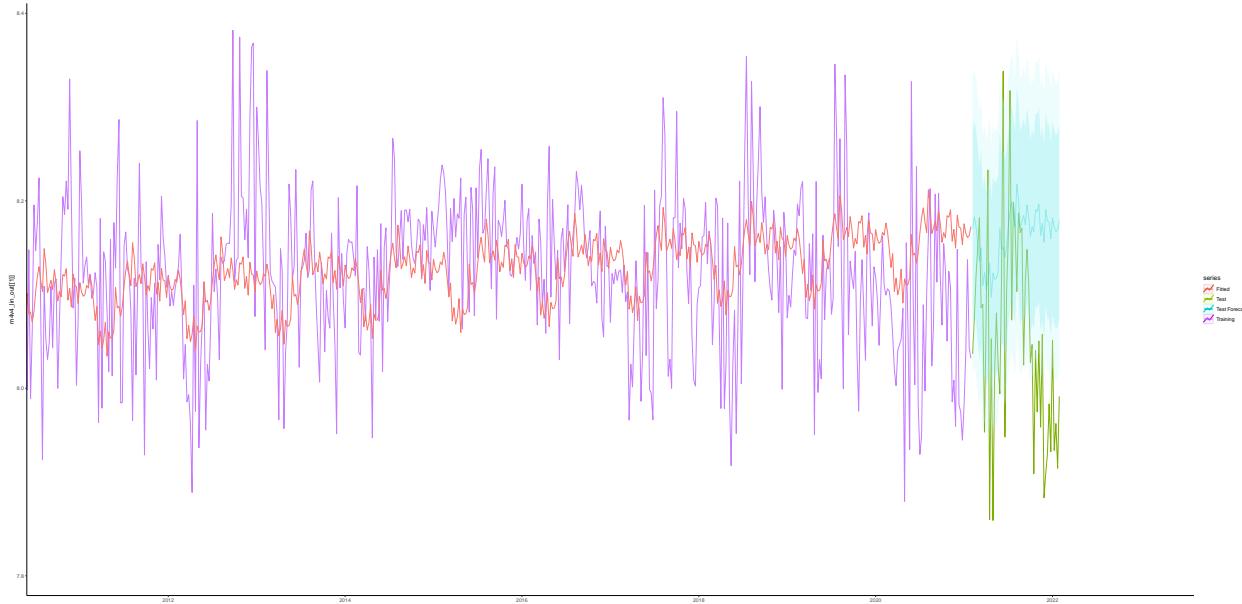
owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
    PH,
    .frequency = "auto",
    .trend = "auto")

m4v4_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "PH",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "PH ~ trend + season")

##               ME        RMSE       MAE       MPE       MAPE
## Training set 5.344694e-17 0.07678678 0.05975517 -0.008998726 0.7384776
## Test set     -1.067714e-01 0.15220261 0.12592061 -1.342966486 1.5740041
##                   MASE       ACF1
## Training set 1.002478 0.4212881
## Test set     2.112497       NA

autoplot(m4v4_lin_out[[1]], series = 'Training') +
  autolayer(m4v4_lin_out[[2]], series = 'Test') +
  autolayer(m4v4_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m4v4_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m4v4_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 8.0374475  0.0001208 -0.0103021 -0.0147150 -0.0130777 -0.0034082
##   season6    season7    season8    season9    season10   season11
## -0.0063599  0.0064637 -0.0035562 -0.0212836 -0.0413245 -0.0267645
##   season12   season13   season14   season15   season16   season17
## -0.0671798 -0.0532200 -0.0709409 -0.0631672 -0.0439279 -0.0801473
##   season18   season19   season20   season21   season22   season23
## -0.0544994 -0.0612175 -0.0606101 -0.0535892 -0.0078435 -0.0296446
##   season24   season25   season26   season27   season28   season29
## -0.0278384 -0.0385905 -0.0276332 -0.0067601  0.0094043  0.0198998
##   season30   season31   season32   season33   season34   season35
## 0.0043485 -0.0067627  0.0387892  0.0223371 -0.0080748 -0.0023578
##   season36   season37   season38   season39   season40   season41
## 0.0045422 -0.0053459  0.0156831  0.0024328 -0.0180544 -0.0080202
##   season42   season43   season44   season45   season46   season47
## -0.0136544  0.0098567  0.0081359  0.0158884 -0.0177065 -0.0052211
##   season48   season49   season50   season51   season52
## -0.0252353  0.0095988 -0.0030570 -0.0042321 -0.0220436
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE
## Training 5.344694e-17 0.07678678 0.05975517 -0.008998726 0.7384776
```

```

##          MASE      ACF1
## Training set 0.7410219 0.4212881
##
## Forecasts:
##           Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      8.169729 8.066500 8.272958 8.011775 8.327684
## 2021.115      8.182674 8.079445 8.285903 8.024719 8.340628
## 2021.135      8.172775 8.069546 8.276003 8.014820 8.330729
## 2021.154      8.155168 8.051939 8.258397 7.997214 8.313122
## 2021.173      8.135248 8.032019 8.238477 7.977293 8.293202
## 2021.192      8.149929 8.046700 8.253157 7.991974 8.307883
## 2021.212      8.109634 8.006405 8.212863 7.951680 8.267588
## 2021.231      8.123715 8.020486 8.226944 7.965760 8.281669
## 2021.250      8.106115 8.002886 8.209343 7.948160 8.264069
## 2021.269      8.114009 8.010780 8.217238 7.956054 8.271963
## 2021.288      8.133369 8.030140 8.236598 7.975415 8.291323
## 2021.308      8.097270 7.994041 8.200499 7.939316 8.255225
## 2021.327      8.123039 8.019810 8.226268 7.965085 8.280993
## 2021.346      8.116442 8.013213 8.219671 7.958487 8.274396
## 2021.365      8.117170 8.013941 8.220399 7.959215 8.275124
## 2021.385      8.124312 8.021083 8.227540 7.966357 8.282266
## 2021.404      8.170178 8.066949 8.273407 8.012224 8.328132
## 2021.423      8.148498 8.045269 8.251727 7.990543 8.306452
## 2021.442      8.150425 8.047196 8.253654 7.992470 8.308379
## 2021.462      8.139793 8.036564 8.243022 7.981839 8.297748
## 2021.481      8.150871 8.047642 8.254100 7.992917 8.308826
## 2021.500      8.171865 8.068636 8.275094 8.013911 8.329820
## 2021.519      8.188150 8.084922 8.291379 8.030196 8.346105
## 2021.538      8.198767 8.095538 8.301996 8.040812 8.356721
## 2021.558      8.183336 8.080107 8.286565 8.025382 8.341291
## 2021.577      8.172346 8.069117 8.275575 8.014391 8.330300
## 2021.596      8.218018 8.114790 8.321247 8.060064 8.375973
## 2021.615      8.201687 8.098458 8.304916 8.043733 8.359641
## 2021.635      8.171396 8.068167 8.274625 8.013442 8.329350
## 2021.654      8.177234 8.074005 8.280463 8.019279 8.335188
## 2021.673      8.184254 8.081026 8.287483 8.026300 8.342209
## 2021.692      8.174487 8.071258 8.277716 8.016533 8.332442
## 2021.712      8.195637 8.092408 8.298866 8.037682 8.353591
## 2021.731      8.182507 8.079279 8.285736 8.024553 8.340462
## 2021.750      8.162141 8.058912 8.265370 8.004186 8.320095
## 2021.769      8.172296 8.069067 8.275525 8.014342 8.330250
## 2021.788      8.166782 8.063554 8.270011 8.008828 8.324737
## 2021.808      8.190414 8.087185 8.293643 8.032460 8.348369
## 2021.827      8.188814 8.085585 8.292043 8.030860 8.346769
## 2021.846      8.196688 8.093459 8.299917 8.038733 8.354642
## 2021.865      8.163214 8.059985 8.266442 8.005259 8.321168
## 2021.885      8.175820 8.072591 8.279049 8.017865 8.333774
## 2021.904      8.155926 8.052697 8.259155 7.997972 8.313881
## 2021.923      8.190881 8.087652 8.294110 8.032927 8.348835
## 2021.942      8.178346 8.075117 8.281575 8.020392 8.336301
## 2021.962      8.177292 8.074063 8.280521 8.019337 8.335246
## 2021.981      8.159601 8.056372 8.262830 8.001647 8.317555
## 2022.000      8.181765 8.078536 8.284994 8.023811 8.339720
## 2022.019      8.171584 8.068355 8.274813 8.013630 8.329538

```

```

## 2022.038      8.167292 8.064148 8.270436 8.009467 8.325116
## 2022.058      8.169050 8.065906 8.272194 8.011225 8.326875
## 2022.077      8.178840 8.075696 8.281984 8.021016 8.336665

```

PLOO All: Imputed - Excluding External Variables (Forecasting SALINITY)

```

# PLOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly03_train_tb03
# PLOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly03_test_tb03

owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    SALINITY)

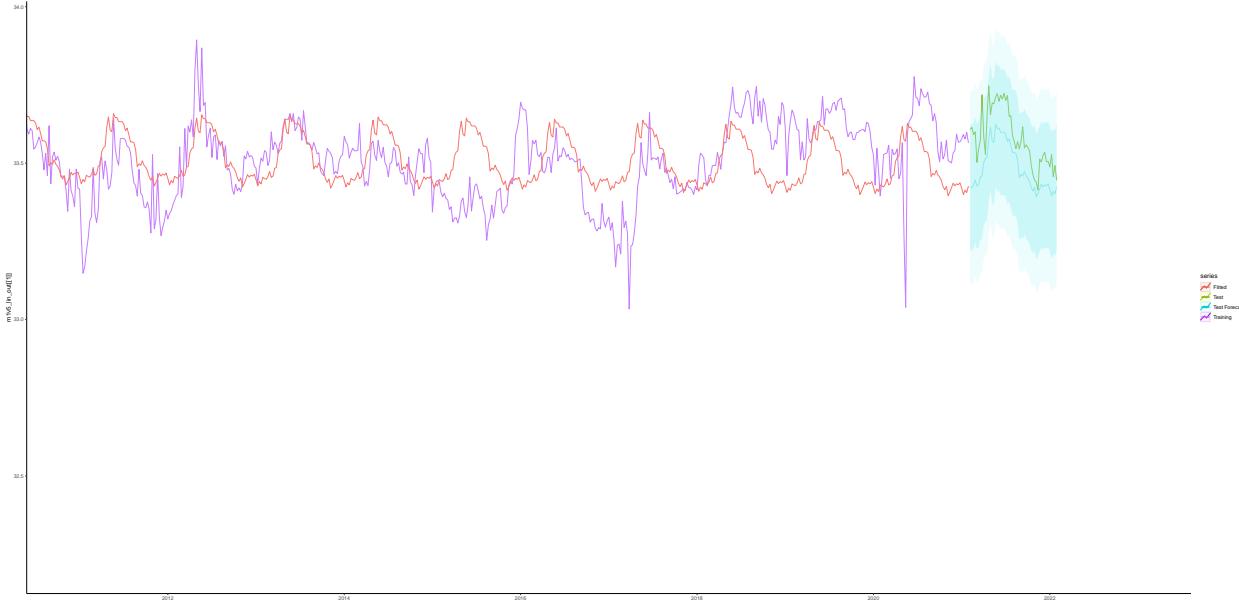
owt_df02_gb09_ploo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        SALINITY,
                        .frequency = "auto",
                        .trend = "auto")

m1v5_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly03_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly03_test_tb03,
                            date = "date_sample",
                            param = "SALINITY",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "SALINITY ~ trend + season")

##               ME        RMSE        MAE        MPE        MAPE        MASE
## Training set -1.858927e-17 0.1494234 0.11208469 -0.002000979 0.3348794 2.384824
## Test set      9.563622e-02 0.1072698 0.09563622  0.284563198 0.2845632 2.034850
##               ACF1
## Training set 0.852831
## Test set     NA

autoplot(m1v5_lin_out[[1]], series = 'Training') +
  autolayer(m1v5_lin_out[[2]], series = 'Test') +
  autolayer(m1v5_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m1v5_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m1v5_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 3.350e+01 -6.594e-05 -2.002e-02 -6.261e-03 -1.336e-02 7.450e-03
##   season6    season7    season8    season9    season10   season11
## 3.597e-03 1.405e-03 1.015e-02 2.636e-02 7.719e-03 1.171e-02
##   season12   season13   season14   season15   season16   season17
## 3.727e-02 3.966e-02 8.288e-02 9.583e-02 9.990e-02 1.622e-01
##   season18   season19   season20   season21   season22   season23
## 1.949e-01 1.530e-01 1.478e-01 2.052e-01 1.929e-01 1.929e-01
##   season24   season25   season26   season27   season28   season29
## 1.803e-01 1.799e-01 1.803e-01 1.726e-01 1.514e-01 1.596e-01
##   season30   season31   season32   season33   season34   season35
## 1.395e-01 1.156e-01 1.160e-01 1.130e-01 9.126e-02 3.638e-02
##   season36   season37   season38   season39   season40   season41
## 4.601e-02 4.128e-02 5.585e-02 4.119e-02 3.530e-02 2.417e-02
##   season42   season43   season44   season45   season46   season47
## 4.865e-03 -5.698e-03 4.897e-03 -2.422e-02 -1.326e-02 8.850e-04
##   season48   season49   season50   season51   season52
## 1.571e-02 7.648e-03 1.407e-02 1.089e-02 1.741e-02
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE        MASE
## Training set -1.858927e-17 0.1494234 0.1120847 -0.002000979 0.3348794 0.9109584
```

```

##          ACF1
## Training set 0.852831
##
## Forecasts:
##           Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      33.42302 33.22214 33.62390 33.11565 33.73039
## 2021.115      33.42077 33.21989 33.62164 33.11339 33.72814
## 2021.135      33.42944 33.22856 33.63032 33.12207 33.73681
## 2021.154      33.44559 33.24471 33.64647 33.13822 33.75296
## 2021.173      33.42688 33.22600 33.62776 33.11951 33.73425
## 2021.192      33.43081 33.22993 33.63169 33.12344 33.73818
## 2021.212      33.45630 33.25542 33.65718 33.14893 33.76367
## 2021.231      33.45863 33.25775 33.65951 33.15126 33.76600
## 2021.250      33.50178 33.30090 33.70266 33.19441 33.80915
## 2021.269      33.51466 33.31378 33.71554 33.20729 33.82203
## 2021.288      33.51867 33.31779 33.71955 33.21130 33.82604
## 2021.308      33.58090 33.38002 33.78178 33.27353 33.88827
## 2021.327      33.61351 33.41264 33.81439 33.30614 33.92089
## 2021.346      33.57152 33.37064 33.77240 33.26415 33.87889
## 2021.365      33.56633 33.36545 33.76721 33.25896 33.87370
## 2021.385      33.62365 33.42277 33.82453 33.31627 33.93102
## 2021.404      33.61126 33.41038 33.81214 33.30389 33.91863
## 2021.423      33.61125 33.41037 33.81213 33.30388 33.91862
## 2021.442      33.59852 33.39764 33.79940 33.29115 33.90589
## 2021.462      33.59807 33.39719 33.79894 33.29069 33.90544
## 2021.481      33.59845 33.39757 33.79933 33.29108 33.90582
## 2021.500      33.59068 33.38980 33.79156 33.28331 33.89805
## 2021.519      33.56942 33.36854 33.77030 33.26204 33.87679
## 2021.538      33.57752 33.37665 33.77840 33.27015 33.88490
## 2021.558      33.55736 33.35648 33.75823 33.24998 33.86473
## 2021.577      33.53334 33.33246 33.73422 33.22597 33.84071
## 2021.596      33.53376 33.33288 33.73464 33.22639 33.84113
## 2021.615      33.53062 33.32974 33.73150 33.22325 33.83799
## 2021.635      33.50884 33.30796 33.70972 33.20147 33.81621
## 2021.654      33.45389 33.25302 33.65477 33.14652 33.76127
## 2021.673      33.46346 33.26258 33.66434 33.15609 33.77083
## 2021.692      33.45866 33.25779 33.65954 33.15129 33.76604
## 2021.712      33.47316 33.27229 33.67404 33.16579 33.78054
## 2021.731      33.45844 33.25756 33.65932 33.15107 33.76581
## 2021.750      33.45248 33.25160 33.65336 33.14511 33.75985
## 2021.769      33.44129 33.24041 33.64217 33.13392 33.74866
## 2021.788      33.42192 33.22104 33.62280 33.11455 33.72929
## 2021.808      33.41129 33.21041 33.61217 33.10392 33.71866
## 2021.827      33.42182 33.22094 33.62270 33.11445 33.72919
## 2021.846      33.39264 33.19176 33.59352 33.08527 33.70001
## 2021.865      33.40353 33.20265 33.60441 33.09616 33.71090
## 2021.885      33.41761 33.21673 33.61849 33.11024 33.72498
## 2021.904      33.43236 33.23149 33.63324 33.12499 33.73974
## 2021.923      33.42424 33.22336 33.62512 33.11687 33.73161
## 2021.942      33.43060 33.22972 33.63148 33.12323 33.73797
## 2021.962      33.42735 33.22647 33.62823 33.11998 33.73472
## 2021.981      33.43381 33.23293 33.63468 33.12643 33.74118
## 2022.000      33.41633 33.21545 33.61721 33.10895 33.72370
## 2022.019      33.39624 33.19537 33.59712 33.08887 33.70362

```

```

## 2022.038      33.40993 33.20922 33.61065 33.10281 33.71705
## 2022.058      33.40277 33.20206 33.60348 33.09565 33.70989
## 2022.077      33.42351 33.22280 33.62423 33.11639 33.73063

```

PLOO Excluding Outliers: Imputed - Excluding External Variables (Forecasting SALINITY)

```

# PLOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_ploo_wkly02_train_tb03
# PLOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_ploo_wkly02_test_tb03

owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
                    SALINITY)

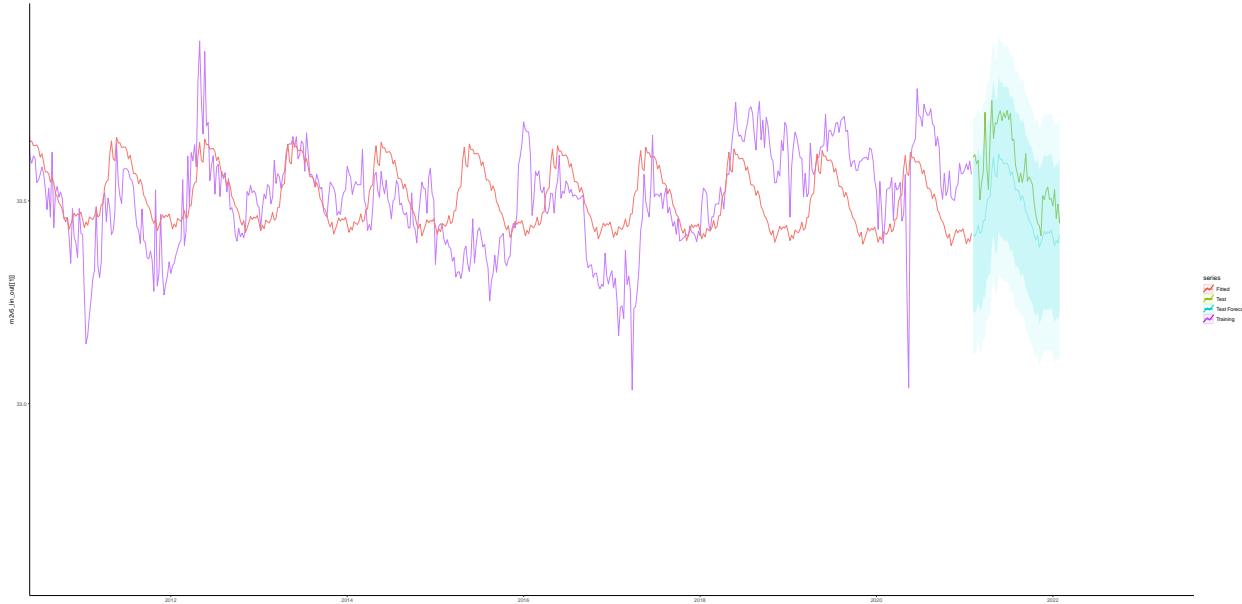
owt_df02_gb09_ploo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        SALINITY,
                        .frequency = "auto",
                        .trend = "auto")

m2v5_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_ploo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_ploo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "SALINITY",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "SALINITY ~ trend + season")

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -6.123497e-18 0.1411693 0.1097105 -0.001780718 0.3276193 2.457331
## Test set       1.001722e-01 0.1115920 0.1001722  0.298067126 0.2980671 2.243689
##               ACF1
## Training set 0.895257
## Test set     NA

autoplot(m2v5_lin_out[[1]], series = 'Training') +
  autolayer(m2v5_lin_out[[2]], series = 'Test') +
  autolayer(m2v5_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m2v5_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m2v5_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 3.350e+01 -7.796e-05 -1.979e-02 -6.683e-03 -1.418e-02 6.508e-03
##   season6    season7    season8    season9    season10   season11
## 2.798e-03 -2.054e-05 8.974e-03 2.623e-02 6.913e-03 1.128e-02
##   season12   season13   season14   season15   season16   season17
## 3.781e-02 3.921e-02 8.166e-02 9.437e-02 9.800e-02 1.613e-01
##   season18   season19   season20   season21   season22   season23
## 1.951e-01 1.515e-01 1.466e-01 2.036e-01 1.900e-01 1.907e-01
##   season24   season25   season26   season27   season28   season29
## 1.791e-01 1.803e-01 1.811e-01 1.730e-01 1.513e-01 1.601e-01
##   season30   season31   season32   season33   season34   season35
## 1.393e-01 1.156e-01 1.160e-01 1.112e-01 9.031e-02 1.015e-01
##   season36   season37   season38   season39   season40   season41
## 8.887e-02 6.267e-02 5.520e-02 3.976e-02 3.454e-02 2.305e-02
##   season42   season43   season44   season45   season46   season47
## 3.562e-03 -6.290e-03 4.220e-03 -2.456e-02 -1.323e-02 2.904e-04
##   season48   season49   season50   season51   season52
## 1.502e-02 7.585e-03 1.373e-02 1.081e-02 1.744e-02
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE        MASE
## Training set -6.123497e-18 0.1411693 0.1097105 -0.001780718 0.3276193 0.9324258
```

```

##          ACF1
## Training set 0.895257
##
## Forecasts:
##      Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      33.41613 33.22635 33.60591 33.12574 33.70652
## 2021.115      33.41323 33.22345 33.60301 33.12284 33.70362
## 2021.135      33.42215 33.23237 33.61193 33.13176 33.71254
## 2021.154      33.43933 33.24954 33.62911 33.14893 33.72972
## 2021.173      33.41993 33.23015 33.60971 33.12954 33.71032
## 2021.192      33.42422 33.23444 33.61400 33.13383 33.71461
## 2021.212      33.45068 33.26090 33.64046 33.16028 33.74107
## 2021.231      33.45199 33.26221 33.64178 33.16160 33.74239
## 2021.250      33.49437 33.30459 33.68415 33.20398 33.78476
## 2021.269      33.50700 33.31721 33.69678 33.21660 33.79739
## 2021.288      33.51055 33.32077 33.70033 33.22016 33.80094
## 2021.308      33.57382 33.38403 33.76360 33.28342 33.86421
## 2021.327      33.60745 33.41767 33.79723 33.31706 33.89784
## 2021.346      33.56377 33.37399 33.75355 33.27338 33.85416
## 2021.365      33.55882 33.36904 33.74860 33.26843 33.84921
## 2021.385      33.61577 33.42598 33.80555 33.32537 33.90616
## 2021.404      33.60206 33.41227 33.79184 33.31166 33.89245
## 2021.423      33.60268 33.41290 33.79246 33.31229 33.89307
## 2021.442      33.59103 33.40125 33.78081 33.30064 33.88142
## 2021.462      33.59210 33.40232 33.78188 33.30171 33.88249
## 2021.481      33.59292 33.40314 33.78270 33.30253 33.88331
## 2021.500      33.58473 33.39495 33.77451 33.29434 33.87512
## 2021.519      33.56291 33.37313 33.75270 33.27252 33.85331
## 2021.538      33.57159 33.38181 33.76138 33.28120 33.86199
## 2021.558      33.55072 33.36094 33.74050 33.26033 33.84111
## 2021.577      33.52700 33.33722 33.71678 33.23661 33.81739
## 2021.596      33.52729 33.33751 33.71707 33.23690 33.81768
## 2021.615      33.52239 33.33260 33.71217 33.23199 33.81278
## 2021.635      33.50146 33.31167 33.69124 33.21106 33.79185
## 2021.654      33.51262 33.32284 33.70240 33.22223 33.80301
## 2021.673      33.49987 33.31008 33.68965 33.20947 33.79026
## 2021.692      33.47358 33.28380 33.66336 33.18319 33.76397
## 2021.712      33.46603 33.27625 33.65582 33.17564 33.75643
## 2021.731      33.45051 33.26073 33.64029 33.16012 33.74091
## 2021.750      33.44522 33.25543 33.63500 33.15482 33.73561
## 2021.769      33.43365 33.24387 33.62343 33.14326 33.72404
## 2021.788      33.41409 33.22430 33.60387 33.12369 33.70448
## 2021.808      33.40416 33.21437 33.59394 33.11376 33.69455
## 2021.827      33.41459 33.22481 33.60437 33.12419 33.70498
## 2021.846      33.38573 33.19595 33.57551 33.09534 33.67612
## 2021.865      33.39698 33.20719 33.58676 33.10658 33.68737
## 2021.885      33.41042 33.22064 33.60021 33.12003 33.70082
## 2021.904      33.42508 33.23529 33.61486 33.13468 33.71547
## 2021.923      33.41756 33.22778 33.60734 33.12717 33.70796
## 2021.942      33.42363 33.23385 33.61342 33.13324 33.71403
## 2021.962      33.42063 33.23085 33.61041 33.13024 33.71102
## 2021.981      33.42718 33.23740 33.61696 33.13679 33.71757
## 2022.000      33.40967 33.21988 33.59945 33.11927 33.70006
## 2022.019      33.38980 33.20002 33.57958 33.09941 33.68019

```

```

## 2022.038      33.40283 33.21320 33.59245 33.11267 33.69298
## 2022.058      33.39525 33.20563 33.58488 33.10510 33.68541
## 2022.077      33.41586 33.22624 33.60549 33.12571 33.70602

```

SBOO All: Imputed - Excluding External Variables (Forecasting SALINITY)

```

# SBOO All: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly03_train_tb03
# SBOO All: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly03_test_tb03

owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_time_series(date_sample,
                    SALINITY)

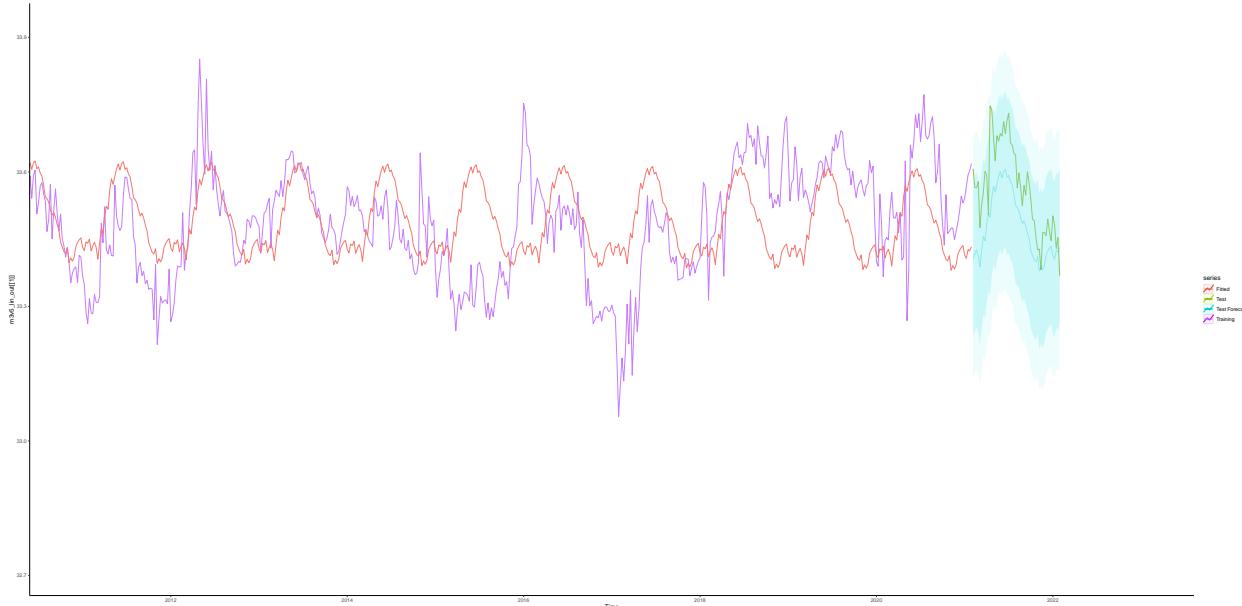
owt_df02_gb09_sboo_wkly03_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        SALINITY,
                        .frequency = "auto",
                        .trend = "auto")

m3v5_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly03_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly03_test_tb03,
                            date = "date_sample",
                            param = "SALINITY",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "SALINITY ~ trend + season")

##               ME        RMSE       MAE        MPE       MAPE       MASE
## Training set -6.205923e-18 0.1289931 0.10160558 -0.001487309 0.3036048 2.764791
## Test set      8.702422e-02 0.1024643 0.08977283  0.258952595 0.2671888 2.442810
##               ACF1
## Training set 0.9099218
## Test set     NA

autoplot(m3v5_lin_out[[1]], series = 'Training') +
  autolayer(m3v5_lin_out[[2]], series = 'Test') +
  autolayer(m3v5_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m3v5_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m3v5_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 3.345e+01 -3.326e-05 -7.255e-03 1.245e-02 9.157e-03 1.868e-02
##   season6    season7    season8    season9    season10   season11
## -7.978e-03 3.660e-03 1.141e-02 -4.467e-04 -2.599e-02 9.562e-03
##   season12   season13   season14   season15   season16   season17
## 4.175e-02 3.204e-02 7.053e-02 9.237e-02 8.538e-02 1.287e-01
##   season18   season19   season20   season21   season22   season23
## 1.536e-01 1.412e-01 1.592e-01 1.764e-01 1.867e-01 1.731e-01
##   season24   season25   season26   season27   season28   season29
## 1.875e-01 1.918e-01 1.747e-01 1.784e-01 1.647e-01 1.580e-01
##   season30   season31   season32   season33   season34   season35
## 1.375e-01 1.119e-01 1.076e-01 1.002e-01 8.406e-02 7.094e-02
##   season36   season37   season38   season39   season40   season41
## 7.706e-02 6.638e-02 5.009e-02 3.819e-02 1.112e-02 4.170e-04
##   season42   season43   season44   season45   season46   season47
## -9.674e-03 -1.335e-02 -1.778e-03 -3.414e-02 -2.373e-02 -3.116e-02
##   season48   season49   season50   season51   season52
## -2.158e-02 1.842e-03 1.049e-02 1.712e-02 2.109e-02
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE        MASE
## Training set -6.205923e-18 0.1289931 0.1016056 -0.001487309 0.3036048 0.8655685
```

```

##          ACF1
## Training set 0.9099218
##
## Forecasts:
##      Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      33.40632 33.23291 33.57974 33.14098 33.67167
## 2021.115      33.41793 33.24452 33.59134 33.15258 33.68327
## 2021.135      33.42565 33.25223 33.59906 33.16030 33.69099
## 2021.154      33.41375 33.24034 33.58717 33.14841 33.67910
## 2021.173      33.38818 33.21477 33.56159 33.12283 33.65353
## 2021.192      33.42370 33.25028 33.59711 33.15835 33.68904
## 2021.212      33.45586 33.28244 33.62927 33.19051 33.72120
## 2021.231      33.44611 33.27270 33.61952 33.18076 33.71145
## 2021.250      33.48456 33.31115 33.65798 33.21922 33.74991
## 2021.269      33.50638 33.33296 33.67979 33.24103 33.77172
## 2021.288      33.49935 33.32594 33.67276 33.23400 33.76469
## 2021.308      33.54267 33.36925 33.71608 33.27732 33.80801
## 2021.327      33.56751 33.39410 33.74092 33.30216 33.83286
## 2021.346      33.55503 33.38162 33.72844 33.28968 33.82037
## 2021.365      33.57301 33.39960 33.74643 33.30767 33.83836
## 2021.385      33.59018 33.41676 33.76359 33.32483 33.85552
## 2021.404      33.60043 33.42702 33.77384 33.33508 33.86577
## 2021.423      33.58688 33.41347 33.76029 33.32153 33.85223
## 2021.442      33.60118 33.42776 33.77459 33.33583 33.86652
## 2021.462      33.60542 33.43201 33.77884 33.34008 33.87077
## 2021.481      33.58835 33.41493 33.76176 33.32300 33.85369
## 2021.500      33.59204 33.41862 33.76545 33.32669 33.85738
## 2021.519      33.57832 33.40490 33.75173 33.31297 33.84366
## 2021.538      33.57157 33.39816 33.74498 33.30623 33.83692
## 2021.558      33.55098 33.37757 33.72439 33.28564 33.81633
## 2021.577      33.52537 33.35196 33.69879 33.26003 33.79072
## 2021.596      33.52099 33.34757 33.69440 33.25564 33.78633
## 2021.615      33.51361 33.34020 33.68702 33.24827 33.77896
## 2021.635      33.49743 33.32401 33.67084 33.23208 33.76277
## 2021.654      33.48427 33.31086 33.65769 33.21893 33.74962
## 2021.673      33.49036 33.31695 33.66378 33.22502 33.75571
## 2021.692      33.47965 33.30623 33.65306 33.21430 33.74499
## 2021.712      33.46333 33.28992 33.63674 33.19798 33.72868
## 2021.731      33.45140 33.27798 33.62481 33.18605 33.71674
## 2021.750      33.42429 33.25088 33.59771 33.15895 33.68964
## 2021.769      33.41355 33.24014 33.58697 33.14821 33.67890
## 2021.788      33.40343 33.23002 33.57684 33.13808 33.66878
## 2021.808      33.39972 33.22631 33.57313 33.13437 33.66506
## 2021.827      33.41126 33.23785 33.58467 33.14591 33.67660
## 2021.846      33.37886 33.20545 33.55227 33.11352 33.64421
## 2021.865      33.38924 33.21582 33.56265 33.12389 33.65458
## 2021.885      33.38178 33.20837 33.55519 33.11643 33.64712
## 2021.904      33.39132 33.21791 33.56474 33.12598 33.65667
## 2021.923      33.41471 33.24130 33.58813 33.14937 33.68006
## 2021.942      33.42333 33.24991 33.59674 33.15798 33.68867
## 2021.962      33.42993 33.25651 33.60334 33.16458 33.69527
## 2021.981      33.43387 33.26045 33.60728 33.16852 33.69921
## 2022.000      33.41274 33.23932 33.58615 33.14739 33.67808
## 2022.019      33.40545 33.23204 33.57886 33.14010 33.67079

```

```

## 2022.038      33.42512 33.25185 33.59839 33.15999 33.69025
## 2022.058      33.42180 33.24852 33.59507 33.15667 33.68692
## 2022.077      33.43128 33.25801 33.60455 33.16615 33.69641

```

SBOO Excluding Outliers: Imputed - Excluding External Variables (Forecasting SALINITY)

```

# SBOO Excluding Outliers: Imputed - Training partition (01/18/1999-01/04/2021)
#owt_df02_gb09_sboo_wkly02_train_tb03
# SBOO Excluding Outliers: Imputed - Test partition (01/11/2021-01/03/2022)
#owt_df02_gb09_sboo_wkly02_test_tb03

owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_time_series(date_sample,
                    SALINITY)

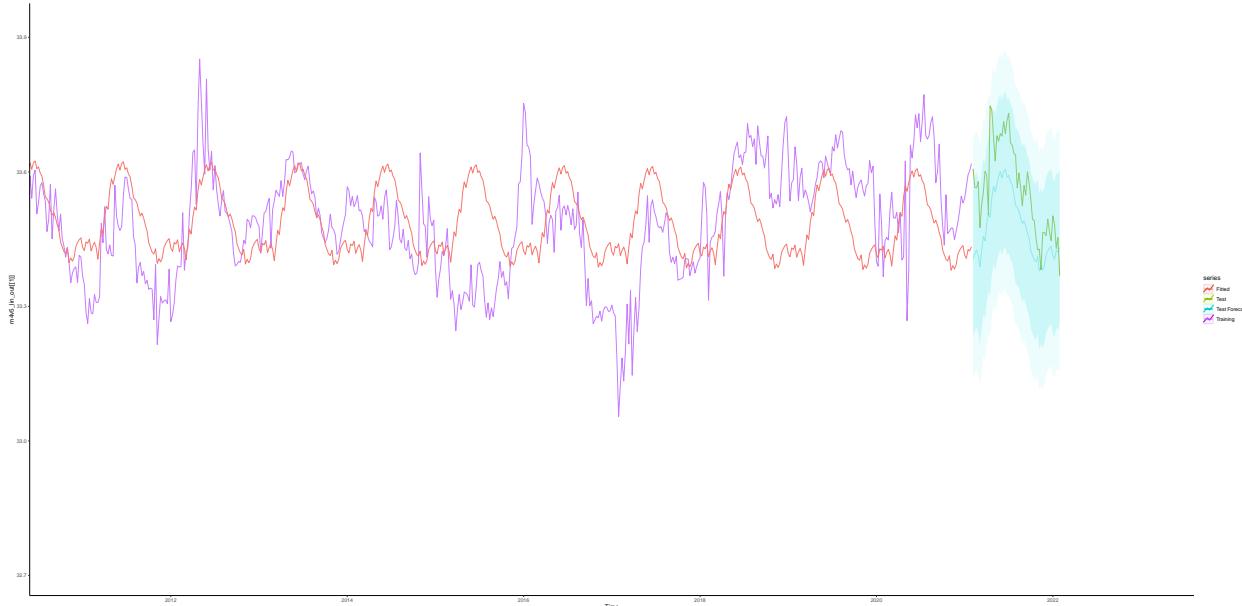
owt_df02_gb09_sboo_wkly02_train_tb03 %>%
  plot_stl_diagnostics(date_sample,
                        SALINITY,
                        .frequency = "auto",
                        .trend = "auto")

m4v5_lin_out <- lr_ts_mod(tb_train = owt_df02_gb09_sboo_wkly02_train_tb03,
                            tb_test = owt_df02_gb09_sboo_wkly02_test_tb03,
                            date = "date_sample",
                            param = "SALINITY",
                            ext_pred = c(),
                            train_start = c(1999, lubridate::isoweek(ymd(train_start))),
                            test_start = c(2021, 6),
                            freq = 52,
                            h = 52,
                            formula = "SALINITY ~ trend + season")

##               ME        RMSE       MAE        MPE       MAPE       MASE
## Training set -6.205923e-18 0.1289931 0.10160558 -0.001487309 0.3036048 2.764791
## Test set      8.702422e-02 0.1024643 0.08977283  0.258952595 0.2671888 2.442810
##               ACF1
## Training set 0.9099218
## Test set     NA

autoplot(m4v5_lin_out[[1]], series = 'Training') +
  autolayer(m4v5_lin_out[[2]], series = 'Test') +
  autolayer(m4v5_lin_out[[3]], series = 'Test Forecast', alpha = .3) +
  autolayer(m4v5_lin_out[[3]]$fitted, series = 'Fitted') +
  theme_classic() +
  coord_cartesian(#ylim = c(-50, 400),
                 xlim = c(2011, 2023))

```



```
summary(m4v5_lin_out[[3]])
```

```
##
## Forecast method: Linear regression model
##
## Model Information:
##
## Call:
## tslm(formula = as.formula(formula), data = train_ts01)
##
## Coefficients:
## (Intercept)      trend    season2    season3    season4    season5
## 3.345e+01 -3.326e-05 -7.255e-03 1.245e-02 9.157e-03 1.868e-02
##   season6    season7    season8    season9    season10   season11
## -7.978e-03 3.660e-03 1.141e-02 -4.467e-04 -2.599e-02 9.562e-03
##   season12   season13   season14   season15   season16   season17
## 4.175e-02 3.204e-02 7.053e-02 9.237e-02 8.538e-02 1.287e-01
##   season18   season19   season20   season21   season22   season23
## 1.536e-01 1.412e-01 1.592e-01 1.764e-01 1.867e-01 1.731e-01
##   season24   season25   season26   season27   season28   season29
## 1.875e-01 1.918e-01 1.747e-01 1.784e-01 1.647e-01 1.580e-01
##   season30   season31   season32   season33   season34   season35
## 1.375e-01 1.119e-01 1.076e-01 1.002e-01 8.406e-02 7.094e-02
##   season36   season37   season38   season39   season40   season41
## 7.706e-02 6.638e-02 5.009e-02 3.819e-02 1.112e-02 4.170e-04
##   season42   season43   season44   season45   season46   season47
## -9.674e-03 -1.335e-02 -1.778e-03 -3.414e-02 -2.373e-02 -3.116e-02
##   season48   season49   season50   season51   season52
## -2.158e-02 1.842e-03 1.049e-02 1.712e-02 2.109e-02
##
## Error measures:
##               ME        RMSE        MAE        MPE        MAPE        MASE
## Training set -6.205923e-18 0.1289931 0.1016056 -0.001487309 0.3036048 0.8655685
```

```

##          ACF1
## Training set 0.9099218
##
## Forecasts:
##           Point Forecast    Lo 80     Hi 80     Lo 95     Hi 95
## 2021.096      33.40632 33.23291 33.57974 33.14098 33.67167
## 2021.115      33.41793 33.24452 33.59134 33.15258 33.68327
## 2021.135      33.42565 33.25223 33.59906 33.16030 33.69099
## 2021.154      33.41375 33.24034 33.58717 33.14841 33.67910
## 2021.173      33.38818 33.21477 33.56159 33.12283 33.65353
## 2021.192      33.42370 33.25028 33.59711 33.15835 33.68904
## 2021.212      33.45586 33.28244 33.62927 33.19051 33.72120
## 2021.231      33.44611 33.27270 33.61952 33.18076 33.71145
## 2021.250      33.48456 33.31115 33.65798 33.21922 33.74991
## 2021.269      33.50638 33.33296 33.67979 33.24103 33.77172
## 2021.288      33.49935 33.32594 33.67276 33.23400 33.76469
## 2021.308      33.54267 33.36925 33.71608 33.27732 33.80801
## 2021.327      33.56751 33.39410 33.74092 33.30216 33.83286
## 2021.346      33.55503 33.38162 33.72844 33.28968 33.82037
## 2021.365      33.57301 33.39960 33.74643 33.30767 33.83836
## 2021.385      33.59018 33.41676 33.76359 33.32483 33.85552
## 2021.404      33.60043 33.42702 33.77384 33.33508 33.86577
## 2021.423      33.58688 33.41347 33.76029 33.32153 33.85223
## 2021.442      33.60118 33.42776 33.77459 33.33583 33.86652
## 2021.462      33.60542 33.43201 33.77884 33.34008 33.87077
## 2021.481      33.58835 33.41493 33.76176 33.32300 33.85369
## 2021.500      33.59204 33.41862 33.76545 33.32669 33.85738
## 2021.519      33.57832 33.40490 33.75173 33.31297 33.84366
## 2021.538      33.57157 33.39816 33.74498 33.30623 33.83692
## 2021.558      33.55098 33.37757 33.72439 33.28564 33.81633
## 2021.577      33.52537 33.35196 33.69879 33.26003 33.79072
## 2021.596      33.52099 33.34757 33.69440 33.25564 33.78633
## 2021.615      33.51361 33.34020 33.68702 33.24827 33.77896
## 2021.635      33.49743 33.32401 33.67084 33.23208 33.76277
## 2021.654      33.48427 33.31086 33.65769 33.21893 33.74962
## 2021.673      33.49036 33.31695 33.66378 33.22502 33.75571
## 2021.692      33.47965 33.30623 33.65306 33.21430 33.74499
## 2021.712      33.46333 33.28992 33.63674 33.19798 33.72868
## 2021.731      33.45140 33.27798 33.62481 33.18605 33.71674
## 2021.750      33.42429 33.25088 33.59771 33.15895 33.68964
## 2021.769      33.41355 33.24014 33.58697 33.14821 33.67890
## 2021.788      33.40343 33.23002 33.57684 33.13808 33.66878
## 2021.808      33.39972 33.22631 33.57313 33.13437 33.66506
## 2021.827      33.41126 33.23785 33.58467 33.14591 33.67660
## 2021.846      33.37886 33.20545 33.55227 33.11352 33.64421
## 2021.865      33.38924 33.21582 33.56265 33.12389 33.65458
## 2021.885      33.38178 33.20837 33.55519 33.11643 33.64712
## 2021.904      33.39132 33.21791 33.56474 33.12598 33.65667
## 2021.923      33.41471 33.24130 33.58813 33.14937 33.68006
## 2021.942      33.42333 33.24991 33.59674 33.15798 33.68867
## 2021.962      33.42993 33.25651 33.60334 33.16458 33.69527
## 2021.981      33.43387 33.26045 33.60728 33.16852 33.69921
## 2022.000      33.41274 33.23932 33.58615 33.14739 33.67808
## 2022.019      33.40545 33.23204 33.57886 33.14010 33.67079

```

```

## 2022.038      33.42512 33.25185 33.59839 33.15999 33.69025
## 2022.058      33.42180 33.24852 33.59507 33.15667 33.68692
## 2022.077      33.43128 33.25801 33.60455 33.16615 33.69641

```

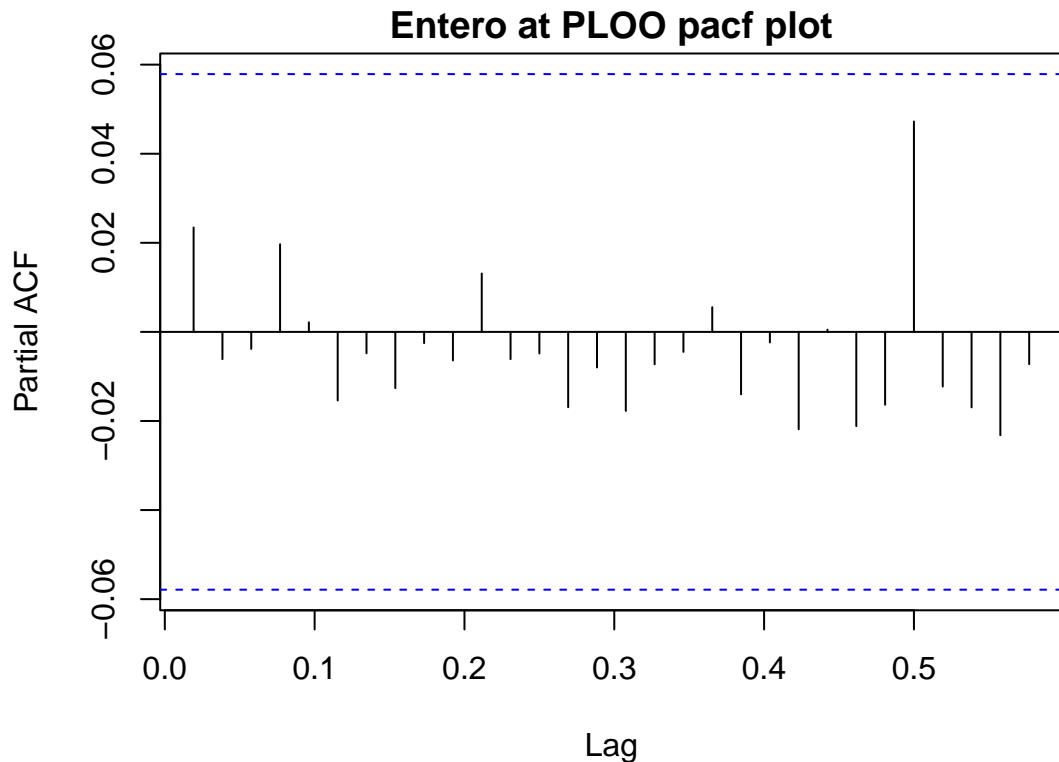
ARIMA Modeling

```

# PLOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
# owt_df02_gb09_ploo_wkly02_train_tb03 (imputed w/out outliers set)
gb09_ploo_wkly02_train_ts01_ent01 <- ts(owt_df02_gb09_ploo_wkly02_train_tb03$ENTERO,
                                         start = c(1999, 3),
                                         freq = 52)
# PLOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
# owt_df02_gb09_ploo_wkly02_test_tb03$ENTERO

# pacf plot of entero (ploo)
par(mar=c(5, 4, 0, 2)+1.5)
pacf(gb09_ploo_wkly02_train_ts01_ent01)
title("Enter at PLOO pacf plot")

```



ARIMA of only entero on PLOO data

```

# The plot shows no lines exceeding the boundaries so ar=p=0
# we aren't doing any differences so d=0
# From acf PLOO plot previously done, there are 3 or 4 leaving boundary so q= 3 or 4
# No seasonality (previous PLOO time series graph)

```

```

gb09_ploo_wkly03_train_ts01_ent01 <- ts(owt_df02_gb09_ploo_wkly03_train_tb02$ENTERO,
                                         start = c(1999, 3),
                                         freq = 52)
# calling arima function
arima_entero_ploo_q3 <- arima(gb09_ploo_wkly03_train_ts01_ent01, order= c(0, 0, 3))
summary(arima_entero_ploo_q3)

##
## Call:
## arima(x = gb09_ploo_wkly03_train_ts01_ent01, order = c(0, 0, 3))
##
## Coefficients:
##             ma1      ma2      ma3  intercept
##             0.0214 -0.0054 -0.0052    21.4321
## s.e.   0.0296  0.0290  0.0301     3.0887
##
## sigma^2 estimated as 10510:  log likelihood = -6805.09,  aic = 13620.17
##
## Training set error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.003363843 102.5163 27.91931 -424.0505 436.7107 0.8360876
## ACF1
## Training set 0.0002646514

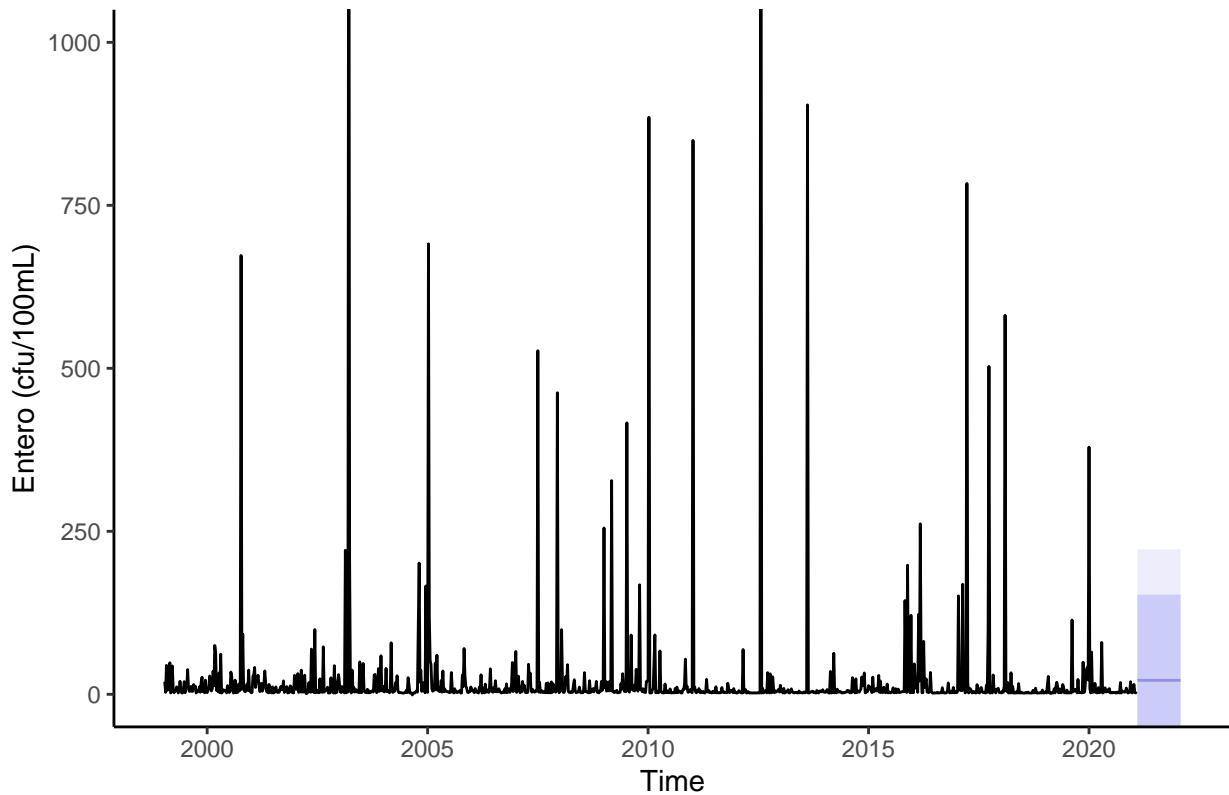
# saving training rmse value
arima_entero_ploo_q3_train_rmse <- 102.5163

# making forecasts and saving them
arima_entero_ploo_q3_forecast <- forecast(arima_entero_ploo_q3, h=52)

#
# getting plot ready
autoplot(gb09_ploo_wkly02_train_ts01_ent01,
         main = "ARIMA(0,0,3) for only Entero at PL00",
         ylab = "Entero (cfu/100mL)") +
  autolayer(arima_entero_ploo_q3_forecast, alpha=.3) +
  coord_cartesian(xlim=c(2015, 2025)) +
  coord_cartesian(ylim=c(0, 1000)) +
  theme_classic()

```

ARIMA(0,0,3) for only Enteroto at PLOO



```
# calling arima function
arima_entero_ploo_q4 <- arima(gb09_ploo_wkly03_train_ts01_ent01, order= c(0, 0, 4))

summary(arima_entero_ploo_q4)

##
## Call:
## arima(x = gb09_ploo_wkly03_train_ts01_ent01, order = c(0, 0, 4))
##
## Coefficients:
##             ma1      ma2      ma3      ma4  intercept
##             0.0211 -0.0048 -0.0044  0.0214    21.4330
## s.e.     0.0296  0.0296  0.0301  0.0308     3.1552
##
## sigma^2 estimated as 10505:  log likelihood = -6804.84,  aic = 13621.69
##
## Training set error measures:
##              ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.005557505 102.4938 27.90147 -422.6641 435.3383 0.8355533
##                  ACF1
## Training set 0.0004429775

# saving training rmse value
arima_entero_ploo_q4_train_rmse <- 102.4938

# making forecasts and saving them
```

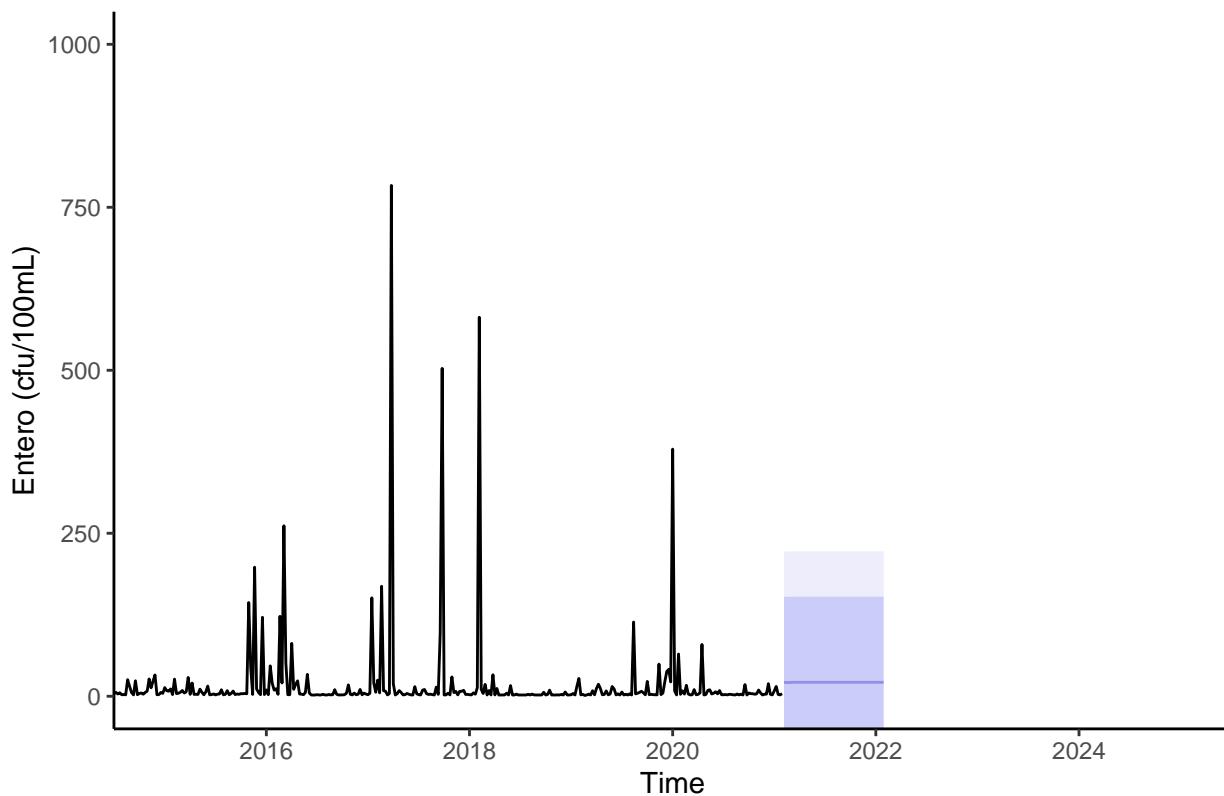
```

arima_entero_ploo_q4_forecast <- forecast(arima_entero_ploo_q4, h=52)

# getting plot ready
autoplot(gb09_ploo_wkly02_train_ts01_ent01,
         main = "ARIMA(0,0,4) for only Entero at PLOO",
         ylab = "Entero (cfu/100mL)") +
  autolayer(arima_entero_ploo_q4_forecast, alpha=.3) +
  coord_cartesian(xlim=c(2015, 2025),
                  ylim=c(0, 1000)) +
  theme_classic()

```

ARIMA(0,0,4) for only Entero at PLOO



```

print(paste("ARIMA(0,0,3) RMSE of ", arima_entero_ploo_q3_train_rmse))

## [1] "ARIMA(0,0,3) RMSE of 102.5163"

print(paste("ARIMA(0,0,4) RMSE of ", arima_entero_ploo_q4_train_rmse))

## [1] "ARIMA(0,0,4) RMSE of 102.4938"

# the RMSE values are very close (they both round to 102.5) so going with simpler one
# (q=3)

# looking at performance of the better (lower RMSE train) or ARIMA(0,0,3)
arima_entero_ploo_acc <- accuracy(arima_entero_ploo_q3_forecast,
                                    owt_df02_gb09_ploo_wkly02_test_tb03$ENTERO)

```

```
arima_entero_ploo_acc
```

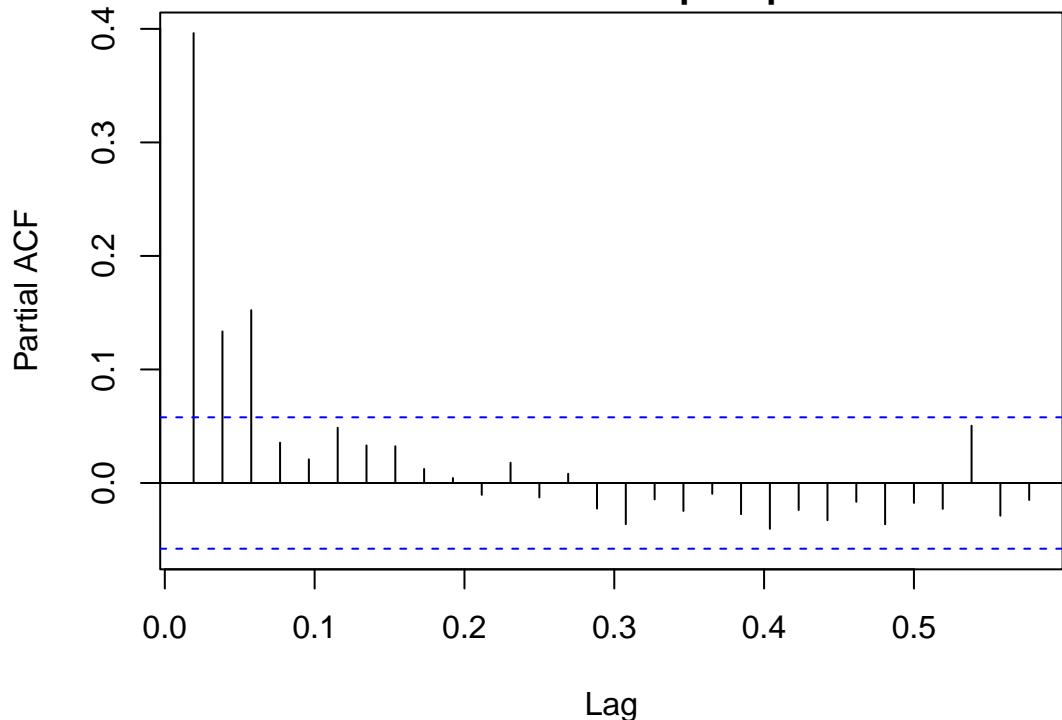
```
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.003363843 102.51625 27.91931 -424.0505 436.7107 0.8360876
## Test set     -14.377836809 19.72948 18.07501 -569.9495 576.5190 0.5412846
##                   ACF1
## Training set 0.0002646514
## Test set      NA
```

ARIMA of only entero on SBOO data

```
# SBOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
# owt_df02_gb09_sboo_wkly02_train_tb03
gb09_sboo_wkly02_train_ts01_ent01 <- ts(owt_df02_gb09_sboo_wkly02_train_tb03$ENTERO,
                                         start = c(1999, 3),
                                         freq = 52)
# SBOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
# owt_df02_gb09_sboo_wkly02_test_tb03

# pacf plot of entero (ploo)
par(mar=c(5, 4, 0, 2)+1.5)
pacf(gb09_sboo_wkly02_train_ts01_ent01)
title("Enter at SBOO pacf plot")
```

Enter at SBOO pacf plot



```

# based on pacf plot with 1 set out of bounds, p=1
# no differencing done so d=0
# based on the acf plot with 2 or 3 sets out of bound, q=2 or 3
# seasonality in time series plot so need second set
# P= seasonal AR= 0 since only out of bounds at beginning
# D=0 (still no differencing)
# Q= Seasonal MA (looking at year points on acf): repeated spikes corresponding to year
# ahead
# therefore Q=1

# calling arima model for sboo
arima_entero_sboo_q2 <- arima(gb09_sboo_wkly02_train_ts01_ent01,
                               order = c(1, 0, 2),
                               seasonal = c(0, 0, 1))
summary(arima_entero_sboo_q2)

##
## Call:
## arima(x = gb09_sboo_wkly02_train_ts01_ent01, order = c(1, 0, 2), seasonal = c(0,
##       0, 1))
##
## Coefficients:
##             ar1      ma1      ma2      sma1  intercept
##             0.8706 -0.5585 -0.0937  0.0577   141.4872
## s.e.    0.0344  0.0460  0.0365  0.0311   25.3017
##
## sigma^2 estimated as 92009:  log likelihood = -8182.65,  aic = 16377.31
##
## Training set error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.05817302 303.3306 160.5064 -1082.045 1104.841 0.993147
##               ACF1
## Training set -0.002314864

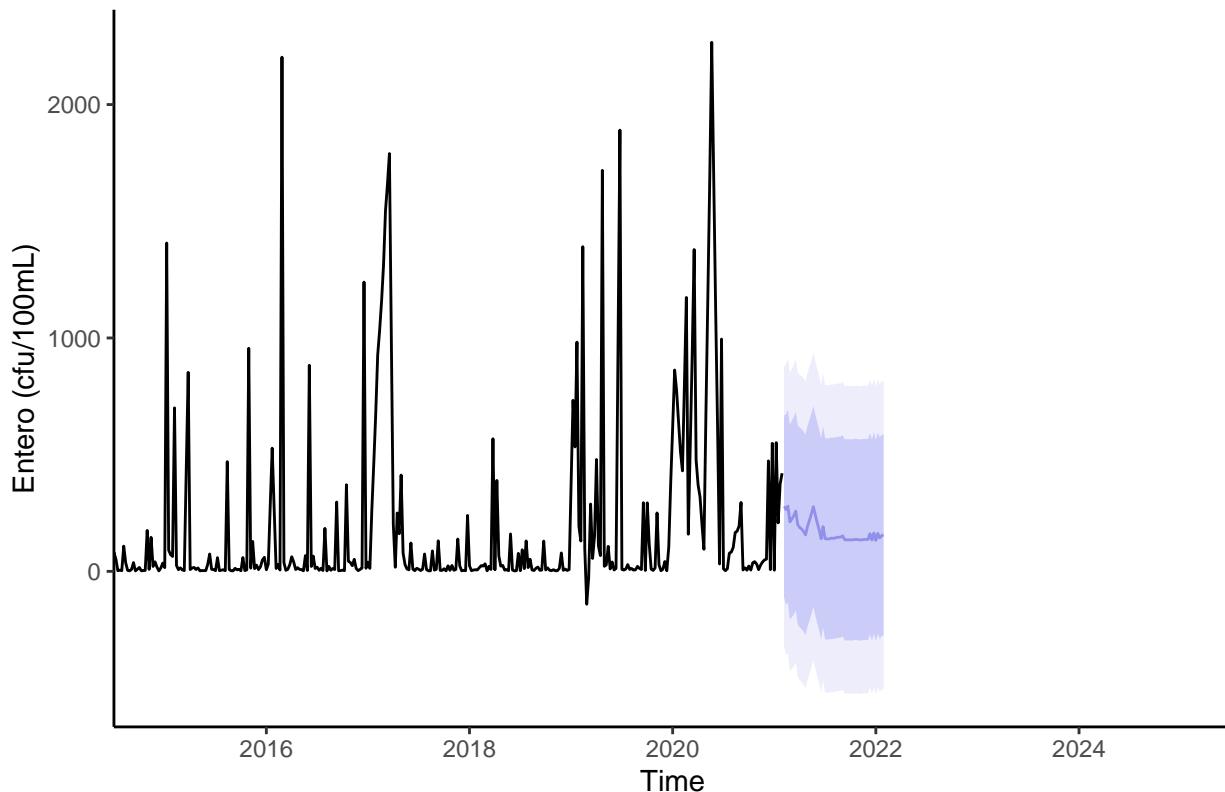
# saving training rmse value
arima_entero_sboo_q2_train_rmse <- sqrt(mean(arima_entero_sboo_q2$residuals^2))

# making forecasts and saving them
arima_entero_sboo_q2_forecast <- forecast(arima_entero_sboo_q2, h=52)

# getting plot ready
autoplot(gb09_sboo_wkly02_train_ts01_ent01,
          main = "ARIMA(1,0,2)(0,0,1) for only Entero at SBOO",
          ylab = "Enter (cfu/100mL)") +
  autolayer(arima_entero_sboo_q2_forecast, alpha=.3) +
  coord_cartesian(xlim=c(2015, 2025)) +
  theme_classic()

```

ARIMA(1,0,2)(0,0,1) for only Enteroto at SBOO



```
# calling arima model for sboo with q=3
arima_entero_sboo_q3 <- arima(gb09_sboo_wkly02_train_ts01_ent01,
                               order = c(1, 0, 3),
                               seasonal = c(0, 0, 1))
summary(arima_entero_sboo_q3)

##
## Call:
## arima(x = gb09_sboo_wkly02_train_ts01_ent01, order = c(1, 0, 3), seasonal = c(0,
##       0, 1))
##
## Coefficients:
##             ar1      ma1      ma2      ma3     sma1  intercept
##             0.8487 -0.5364 -0.1022  0.0339  0.0539   141.7728
## s.e.    0.0482  0.0574  0.0387  0.0330  0.0315    24.5176
##
## sigma^2 estimated as 91923:  log likelihood = -8182.11,  aic = 16378.22
##
## Training set error measures:
##                  ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.0849465 303.1888 160.6197 -1082.38 1105.38 0.993848
##                  ACF1
## Training set -0.001032968

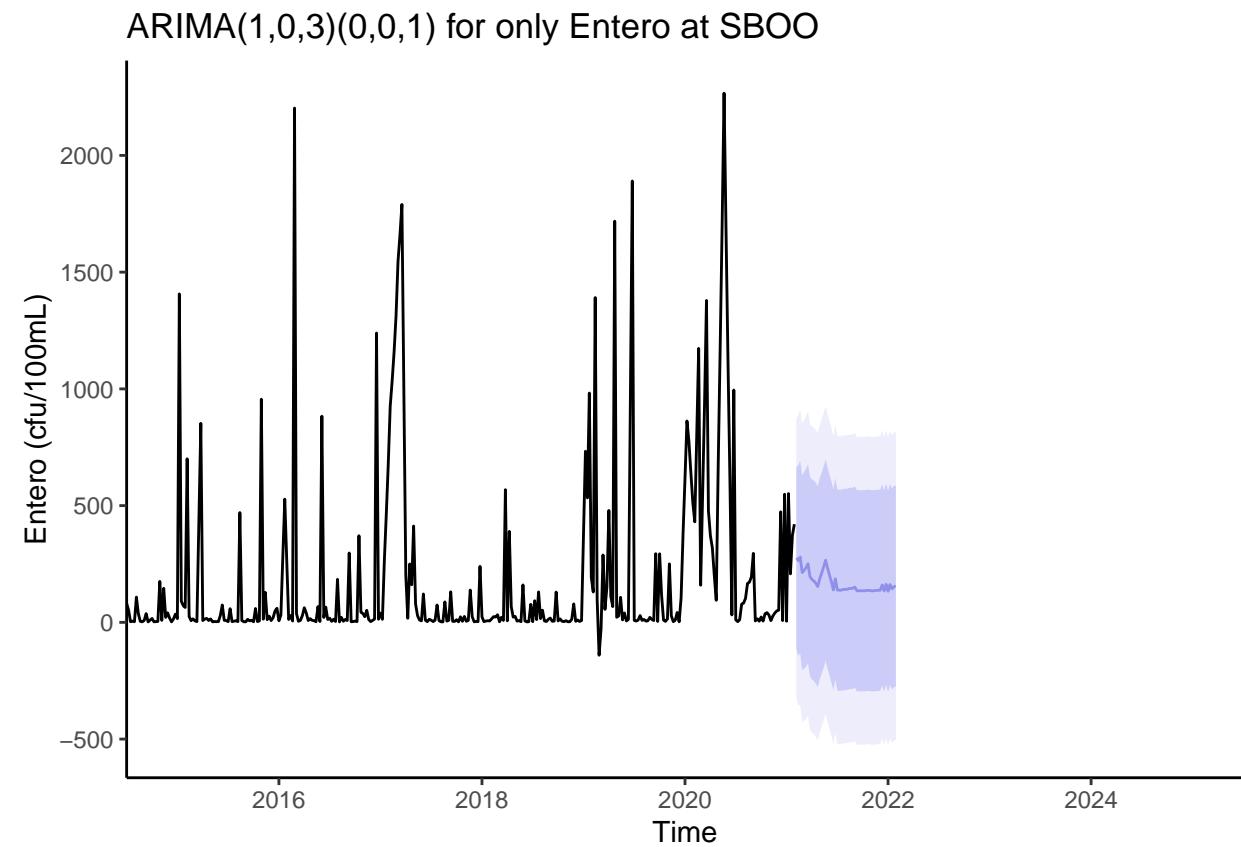
# saving training rmse value
arima_entero_sboo_q3_train_rmse <- sqrt(mean(arima_entero_sboo_q3$residuals^2))
```

```

# making forecasts and saving them
arima_entero_sboo_q3_forecast <- forecast(arima_entero_sboo_q3, h=52)

# getting plot ready
autoplot(gb09_sboo_wkly02_train_ts01_ent01,
         main = "ARIMA(1,0,3)(0,0,1) for only Entero at SBOO",
         ylab = "Entero (cfu/100mL)") +
  autolayer(arima_entero_sboo_q3_forecast, alpha=.3) +
  coord_cartesian(xlim=c(2015, 2025)) +
  theme_classic()

```



```

print(paste("ARIMA(1,0,2)(0,0,1) RMSE of ", arima_entero_sboo_q2_train_rmse))

## [1] "ARIMA(1,0,2)(0,0,1) RMSE of 303.330637745971"

print(paste("ARIMA(1,0,3)(0,0,1) RMSE of ", arima_entero_sboo_q3_train_rmse))

## [1] "ARIMA(1,0,3)(0,0,1) RMSE of 303.188753331435"

# q=2 RMSE of 303.3 vs. q=3 RMSE of 303.2; going with q=3 since lower.

# looking at performance of the better (lower RMSE train) or ARIMA(1,0,3)(0,0,1).
arima_entero_sboo_acc <- accuracy(arima_entero_sboo_q3_forecast,
                                    owt_df02_gb09_sboo_wkly02_test_tb03$ENTERO)

```

```
arima_entero_sboo_acc
```

```
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.0849465 303.1888 160.6197 -1082.3797 1105.3801 0.993848
## Test set     142.0636657 465.5062 293.9374 -838.8908 884.7925 1.818763
##                   ACF1
## Training set -0.001032968
## Test set       NA
```

ARIMA Regression Models:

ARIMA Regression 1-PLOO: Using all but SUSO and OG from PLOO

Use: chlorophyll, fecal, ph, salinity, temp, density, DO, XMS) to get: Enter

```
# set up ARIMA regression
# PLOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)

# training set: all predictors (minus the OG and SUSO) from PLOO
ploo_arima_train <- owt_df02_gb09_ploo_wkly02_train_tb03 %>% select(-date_sample)
# test set: all predictors (minus the OG and SUSO) from PLOO
ploo_arima_test <- owt_df02_gb09_ploo_wkly02_test_tb03 %>% select(-date_sample)

# predictors as matrix
# predictors as matrix (1-9 columns)
ploo_arima_predictors_train_df <- ploo_arima_train %>% select(-ENTERO)
ploo_arima_predictors_train <- as.matrix(ploo_arima_predictors_train_df)

ploo_arima_predictors_test_df <- ploo_arima_test %>% select(-ENTERO)
ploo_arima_predictors_test <- as.matrix(ploo_arima_predictors_test_df)

# outcome
ploo_arima_train_outcome <- ploo_arima_train$ENTERO
ploo_arima_test_outcome <- ploo_arima_test$ENTERO

# using the same model set up PLOO-entero only: ARIMA(0,0,3)
ploo_arimaReg <- Arima(ploo_arima_train_outcome, order = c(0,0,3), xreg =
  ploo_arima_predictors_train)

summary(ploo_arimaReg)

## Series: ploo_arima_train_outcome
## Regression with ARIMA(0,0,3) errors
##
## Coefficients:
##             ma1      ma2      ma3  intercept CHLOROPHYLL   DENSITY      DO      FECAL
##             0.0103  -0.0133 -0.0019    353.0589    -2.3532  37.9092  3.6846  0.4184
## s.e.      0.0297   0.0295   0.0297   750.2709     1.1970  17.3877  4.6965  0.0229
##             PH  SALINITY    TEMP      XMS
##             72.7709 -57.9220  7.4265  -0.7637
## s.e.      41.9715   23.0405  3.6873   0.5800
##             sigma^2 = 8011: log likelihood = -6776.44
## AIC=13578.88  AICc=13579.2  BIC=13644.46
##
```

```

## Training set error measures:
##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -4.273099e-06 89.03495 25.55855 -191.1968 295.9924 0.7858751
##                   ACF1
## Training set -1.932063e-06

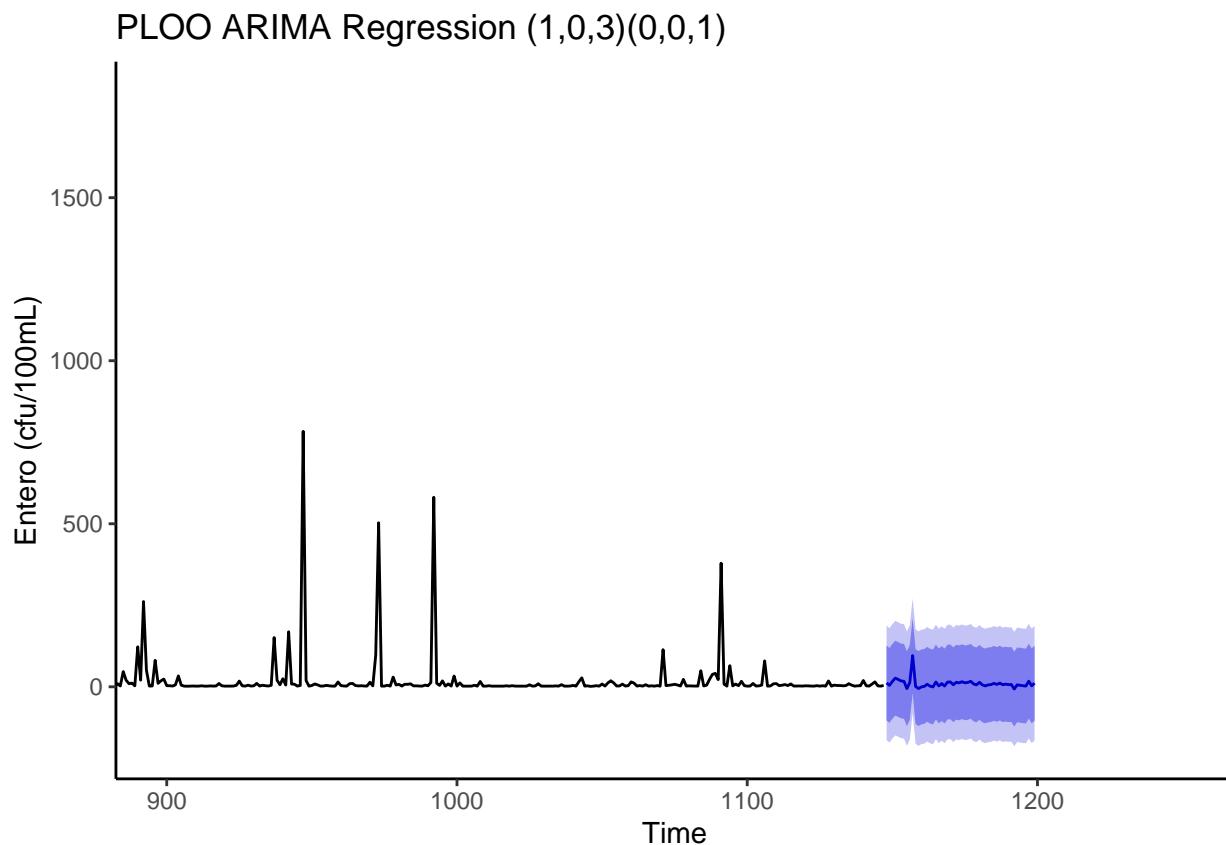
ploo_arimaReg_train_rmse <- sqrt(mean(ploo_arimaReg$residuals^2))
print(paste("PLOO ARIMA Regression RMSE: ", ploo_arimaReg_train_rmse))

## [1] "PLOO ARIMA Regression RMSE: 89.0349452478337"

# saving forecast using test set
ploo_arimaReg_forecast <- forecast(ploo_arimaReg, xreg= ploo_arima_predictors_test, h=52)

# plotting the forecasts
autoplot(ploo_arimaReg_forecast,
         main = "PLOO ARIMA Regression (1,0,3)(0,0,1)",
         ylab = "Enterobacter (cfu/100mL)" +
         coord_cartesian(xlim = c(900, 1250))+
         theme_classic()

```



```

ploo_arimaReg_coefs <- as.data.frame(round(ploo_arimaReg$coef, 3))
colnames(ploo_arimaReg_coefs)[colnames(ploo_arimaReg_coefs) == "round(ploo_arimaReg$coef,
← 3)"] <- "coef_value"
ploo_arimaReg_coefs

##           coef_value

```

```

## ma1          0.010
## ma2         -0.013
## ma3        -0.002
## intercept   353.059
## CHLOROPHYLL -2.353
## DENSITY     37.909
## DO           3.685
## FECAL        0.418
## PH           72.771
## SALINITY    -57.922
## TEMP         7.427
## XMS         -0.764

# the three strongest absolute coeffecients (most important) at PLOO are:
# pH (.73), density (.38), temp (.7.43)
# the next are DO (.69), chlorophyll (2.35), XMS (.764), and fecal (.418)

# looking at performance of PLOO ARima Regression.
arimaReg_entero_ploo_acc <- accuracy(ploo_arimaReg_forecast,
                                         owt_df02_gb09_ploo_wkly02_test_tb03$ENTERO)

arimaReg_entero_ploo_acc

```

```

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -4.273099e-06 89.03495 25.55855 -191.1968 295.9924 0.7858751
## Test set      -2.978892e+00 19.60083 11.46303 -198.9662 250.0864 0.3524655
##                      ACF1
## Training set -1.932063e-06
## Test set       NA

```

ARIMA Regression 1-SBOO: Using all but SUSO and OG from SBOO

Use: chlorophyll, fecal, ph, salinity, temp, density, DO, XMS) to get: Entero

```

# set up ARIMA regression for SBOO

# training set: all predictors (minus the OG and SUSO) from SBOO
sboo_arima_train <- owt_df02_gb09_sboo_wkly02_train_tb03 %>% select(-date_sample)
# test set: all predictors (minus the OG and SUSO) from SBOO
sboo_arima_test <- owt_df02_gb09_sboo_wkly02_test_tb03 %>% select(-date_sample)

# predictors as matrix
sboo_arima_predictors_train_df <- sboo_arima_train %>% select(-ENTERO)
sboo_arima_predictors_train <- as.matrix(sboo_arima_predictors_train_df)

sboo_arima_predictors_test_df <- sboo_arima_test %>% select(-ENTERO)
sboo_arima_predictors_test <- as.matrix(sboo_arima_predictors_test_df)
# outcome
sboo_arima_train_outcome <- sboo_arima_train$ENTERO
sboo_arima_test_outcome <- sboo_arima_test$ENTERO

# using the same model set up SBOO-entero only: ARIMA(1,0,3)(0,0,1)
sboo_arimaReg <- Arima(sboo_arima_train_outcome, order = c(1,0,3), seasonal = c(0,0,1),
                       xreg = sboo_arima_predictors_train)

```

```

summary(sboo_arimaReg)

## Series: sboo_arima_train_outcome
## Regression with ARIMA(1,0,3) errors
##
## Coefficients:
##             ar1      ma1      ma2      ma3  intercept  CHLOROPHYLL  DENSITY
##             0.4531 -0.1253 -0.0761  0.0961   10328.437     -4.5984 -68.1285
## s.e.    0.1607  0.1603  0.0598  0.0339    2879.752      3.4067  68.4621
##             D0    FECAL          PH  SALINITY      TEMP       XMS
##             22.1975  0.3890 -223.7577 -181.5957   -16.9649   -7.7588
## s.e.    14.2382  0.0175  135.1713   93.5847   14.4394   1.2690
##
## sigma^2 = 60253: log likelihood = -7933.17
## AIC=15894.35  AICc=15894.72  BIC=15964.98
##
## Training set error measures:
##             ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.02501764 244.069 121.7442 -362.0654 647.8616 0.7533024
##             ACF1
## Training set 0.001202772

sboo_arimaReg_train_rmse <- sqrt(mean(sboo_arimaReg$residuals^2))
print(paste("SBOO ARIMA Regression RMSE: ", sboo_arimaReg_train_rmse))

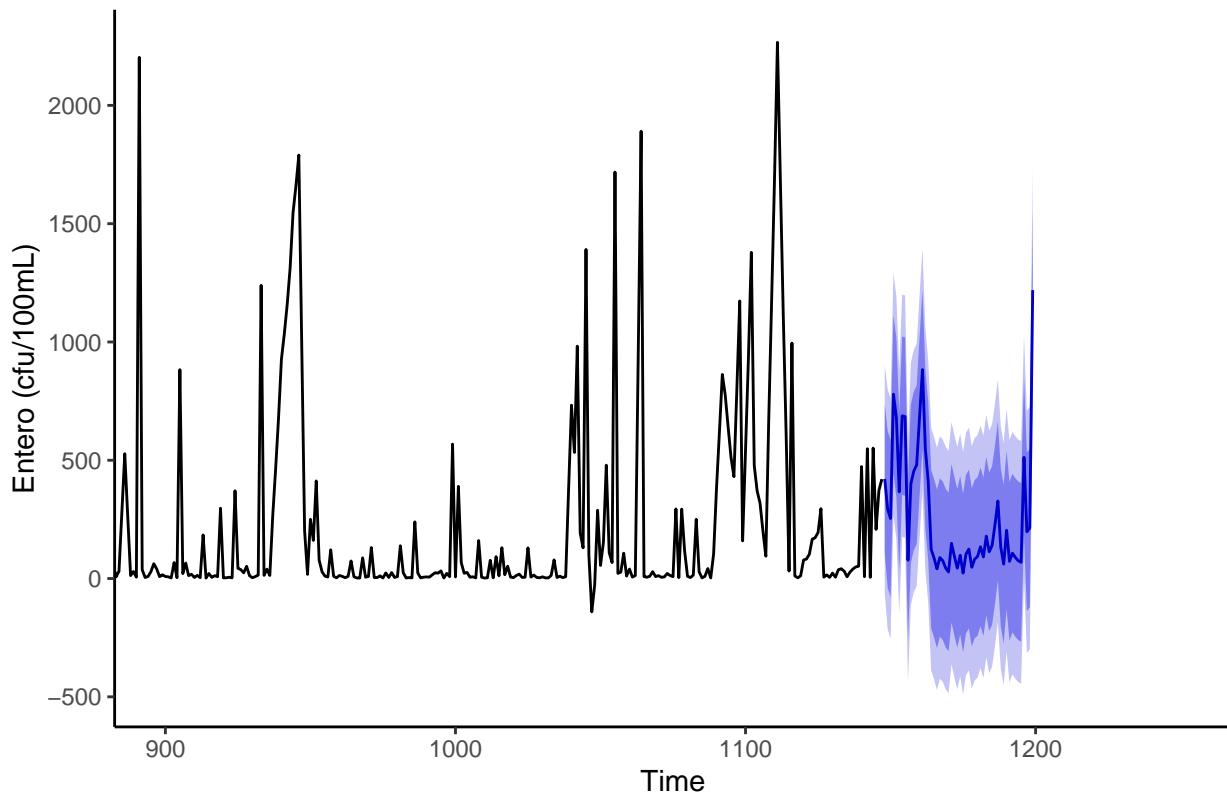
## [1] "SBOO ARIMA Regression RMSE: 244.068957667935"

# saving forecast using test set
sboo_arimaReg_forecast <- forecast(sboo_arimaReg, xreg= sboo_arima_predictors_test)

# plotting the forecasts
autoplot(sboo_arimaReg_forecast,
         main = "SBOO ARIMA Regression (1,0,3)(0,0,1)",
         ylab = "Enterobacter (cfu/100mL)" +
coord_cartesian(xlim = c(900, 1250))+theme_classic()

```

SBOO ARIMA Regression (1,0,3)(0,0,1)



```

sboo_arimaReg_coefs <- as.data.frame(round(sboo_arimaReg$coef, 3))
colnames(sboo_arimaReg_coefs)[colnames(sboo_arimaReg_coefs) == "round(sboo_arimaReg$coef,
  ↪ 3)"] <- "coef_value"
sboo_arimaReg_coefs

##           coef_value
## ar1          0.453
## ma1         -0.125
## ma2         -0.076
## ma3          0.096
## intercept   10328.437
## CHLOROPHYLL -4.598
## DENSITY     -68.129
## DO           22.198
## FECAL        0.389
## PH          -223.758
## SALINITY    -181.596
## TEMP        -16.965
## XMS          -7.759

# three strongest absolute coefficients (most important) at SBOO are:
# pH (224), salinity (182), density (68),
# then it drops to DO (22), temp (17), xms (7.76), chlorophyll (4.60), fecal (.389)

# looking at performance of the ARIMA Regression at SBOO.
arimaReg_entero_sboo_acc <- accuracy(sboo_arimaReg_forecast,

```

```

        owt_df02_gb09_sboo_wkly02_test_tb03$ENTERO)

arimaReg_entero_sboo_acc

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.02501764 244.069 121.7442 -362.0654 647.8616 0.7533024
## Test set      50.51999458 230.856 150.8782 -421.8009 445.9124 0.9335716
##               ACF1
## Training set 0.001202772
## Test set      NA

```

ARIMA models of the top coeffecients of the regression models

ARIMA at PLOO

```

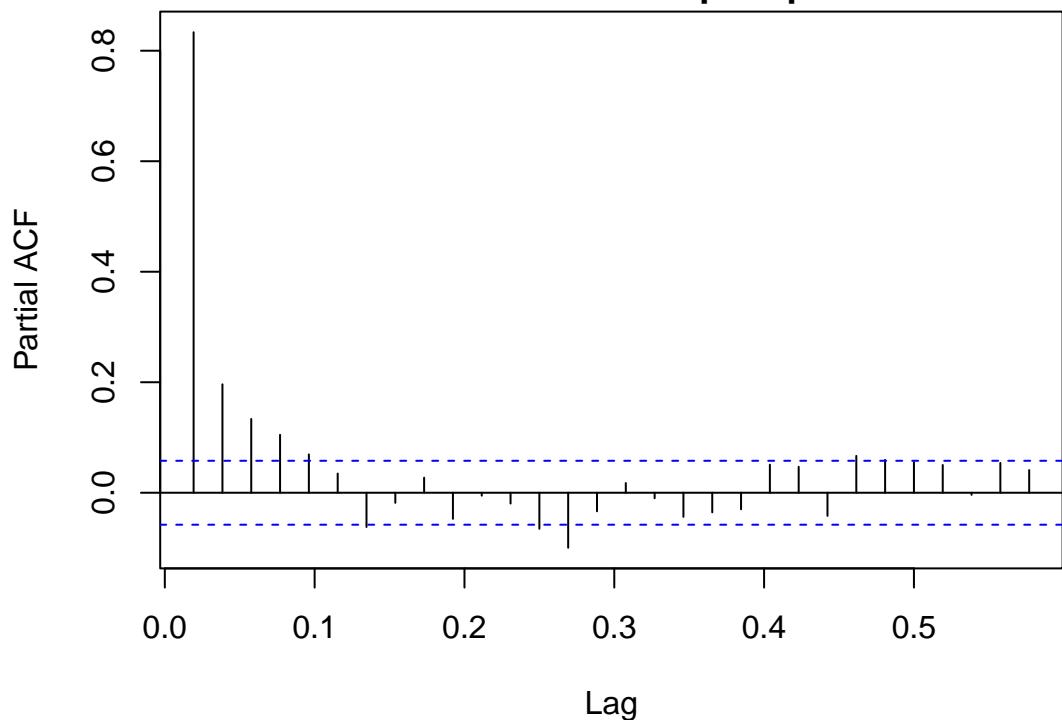
# PLOO Excluding Outliers – Training partition (01/18/1999-01/04/2021)
# owt_df02_gb09_ploo_wkly02_train_tb03 (imputed w/out outliers set)

# DENSITY
ploo_arima_train_density <- ts(owt_df02_gb09_ploo_wkly02_train_tb03$DENSITY,
                               start = c(1999, 3),
                               freq = 52)
# PLOO Excluding Outliers – Test partition (01/11/2021-01/03/2022)
ploo_arima_test_density <- owt_df02_gb09_ploo_wkly02_test_tb03$DENSITY

# pacf plot of density (ploo)
par(mar=c(5, 4, 0, 2)+1.5)
pacf(ploo_arima_train_density)
title("DENSITY at PLOO pacf plot")

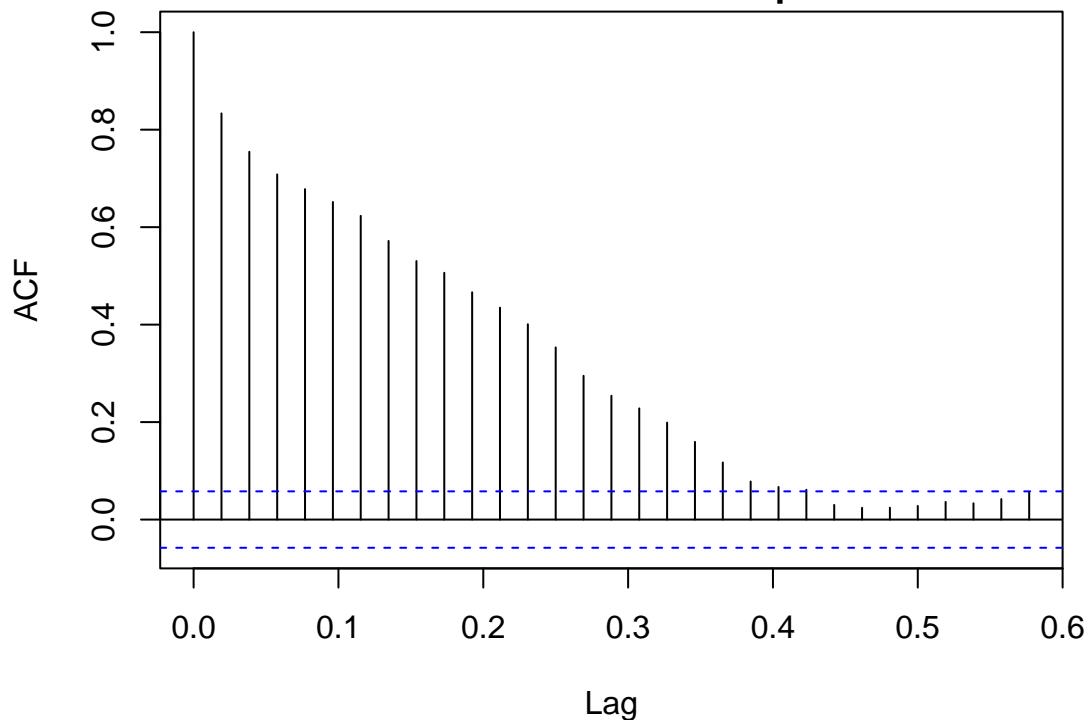
```

DENSITY at PLOO pacf plot



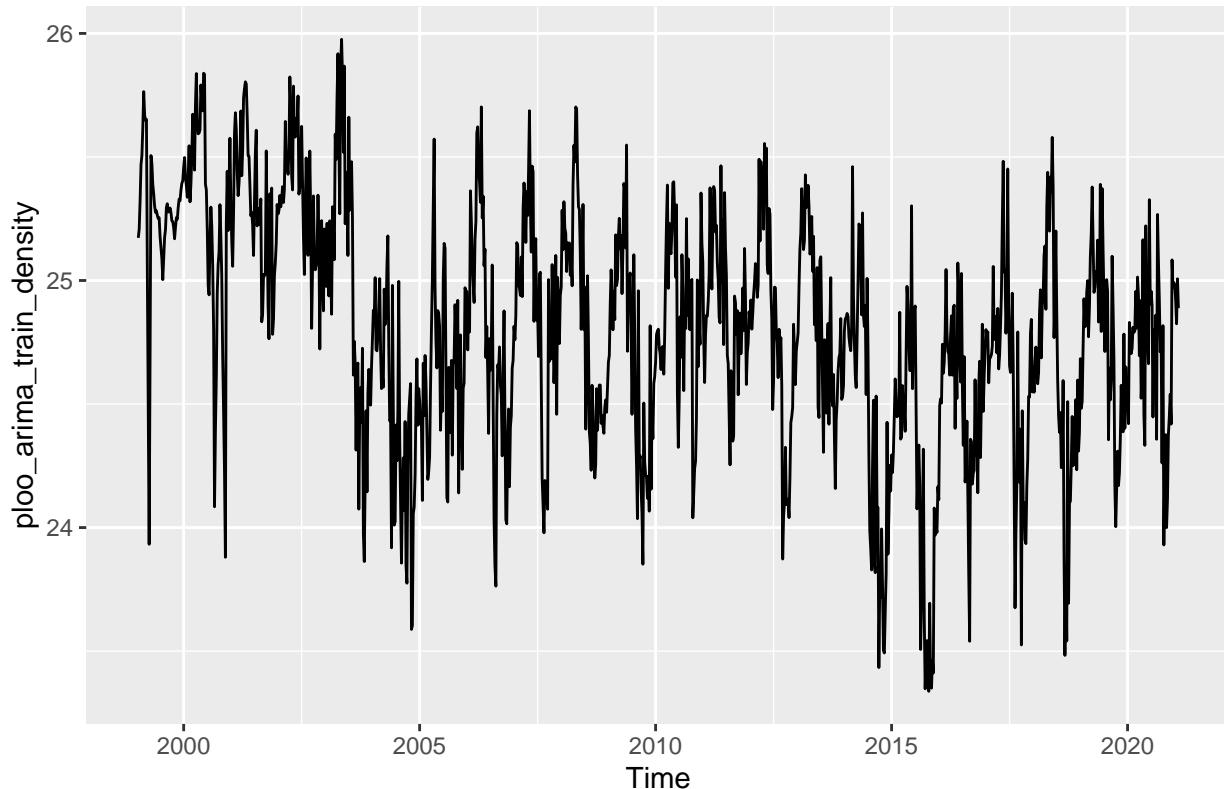
```
# p=2  
  
# acf plot of density (ploo)  
acf(ploo_arima_train_density)  
title("DENSITY at PLOO acf plot")
```

DENSITY at PLOO acf plot



```
# q value at least 1  
  
# ts plot of density (ploo)  
autoplot(ploo_arima_train_density,  
         main = "DENSITY at PLOO ts plot")
```

DENSITY at PLOO ts plot



```

# definite seasonality so 2nd part needed
# d and D = 0
# P= 1 (pacf plot out of bounds at more than beginning, barely)
# Q (acf): Q= 0 since acf had no repeating patterns of out of bounds

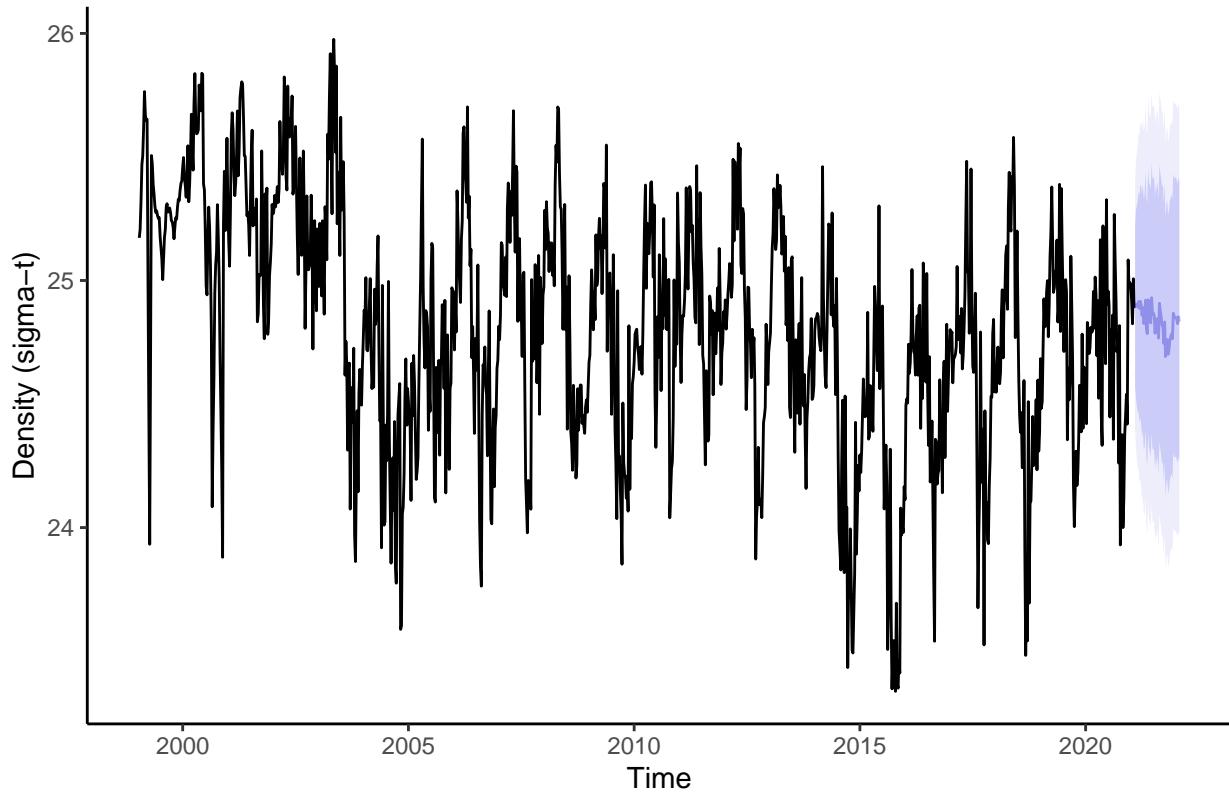
ploo_arima_density <- arima(ploo_arima_train_density,
                             order=c(2, 0, 1), seasonal = c(1, 0, 0))

# saving forecast using test set
ploo_arima_density_forecast <- forecast(ploo_arima_density, h=52)

# plotting the forecasts
autoplot(ploo_arima_train_density,
         main = "PLOO ARIMA Density",
         ylab = "Density (sigma-t)") +
  autolayer(ploo_arima_density_forecast, alpha=.3) +
  theme_classic()

```

PLOO ARIMA Density



```
# looking at performance of the ARIMA Regression at SBOO.
ploo_arima_density_acc <- accuracy(ploo_arima_density_forecast, ploo_arima_test_density)

ploo_arima_density_acc

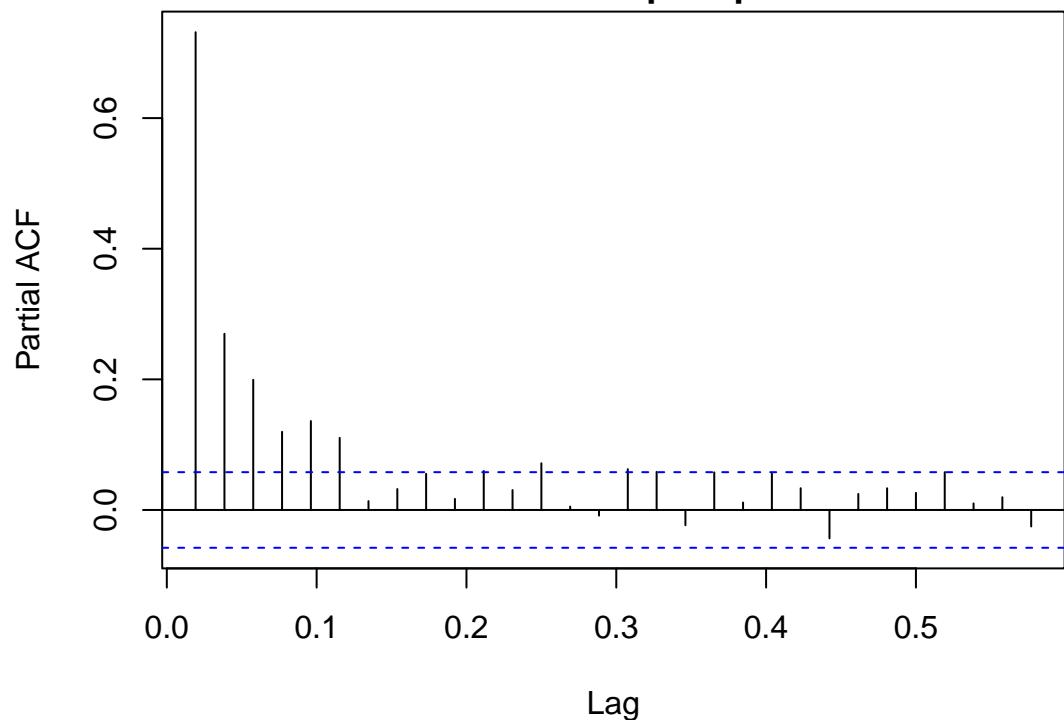
##                               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.001313540 0.2542205 0.1927933 -0.01617478 0.7797282 0.9308101
## Test set       0.002642859 0.2953983 0.2388208 -0.00427795 0.9603224 1.1530320
##                               ACF1
## Training set 0.006691562
## Test set      NA

# PLOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
# owt_df02_gb09_ploo_wkly02_train_tb03 (imputed w/out outliers set)

# PH
ploo_arima_train_ph <- ts(owt_df02_gb09_ploo_wkly02_train_tb03$PH,
                           start = c(1999, 3),
                           freq = 52)
# PLOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
ploo_arima_test_ph <- owt_df02_gb09_ploo_wkly02_test_tb03$PH

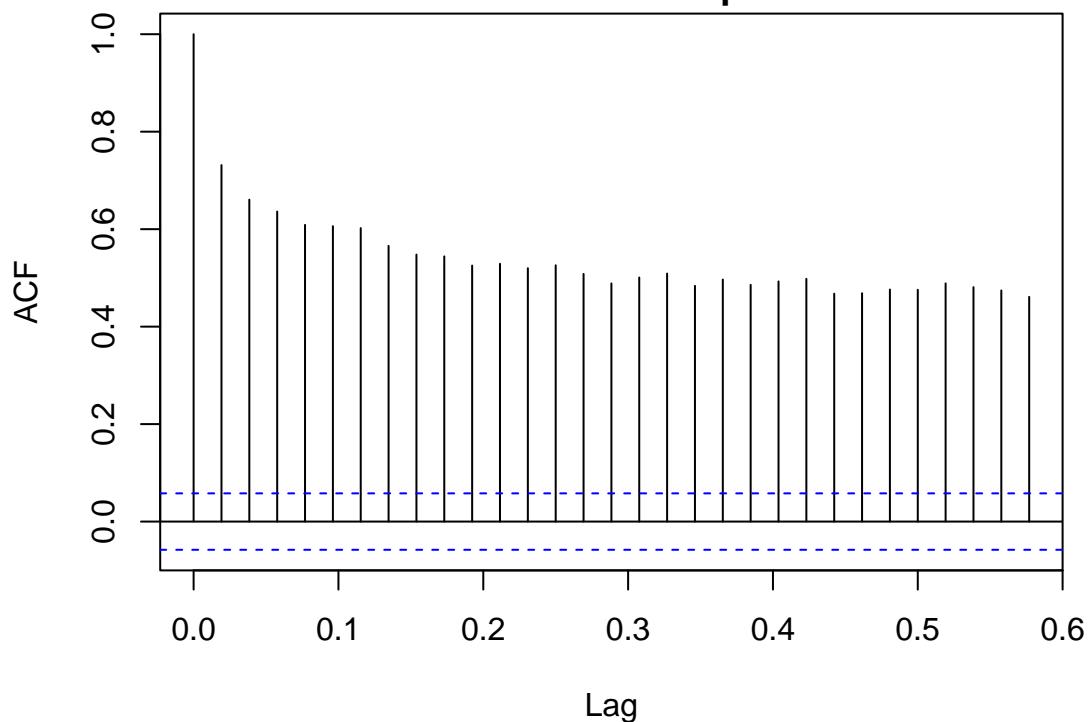
# pacf plot of ph (ploo)
par(mar=c(5, 4, 0, 2)+1.5)
pacf(ploo_arima_train_ph)
title("PH at PLOO pacf plot")
```

PH at PLOO pacf plot



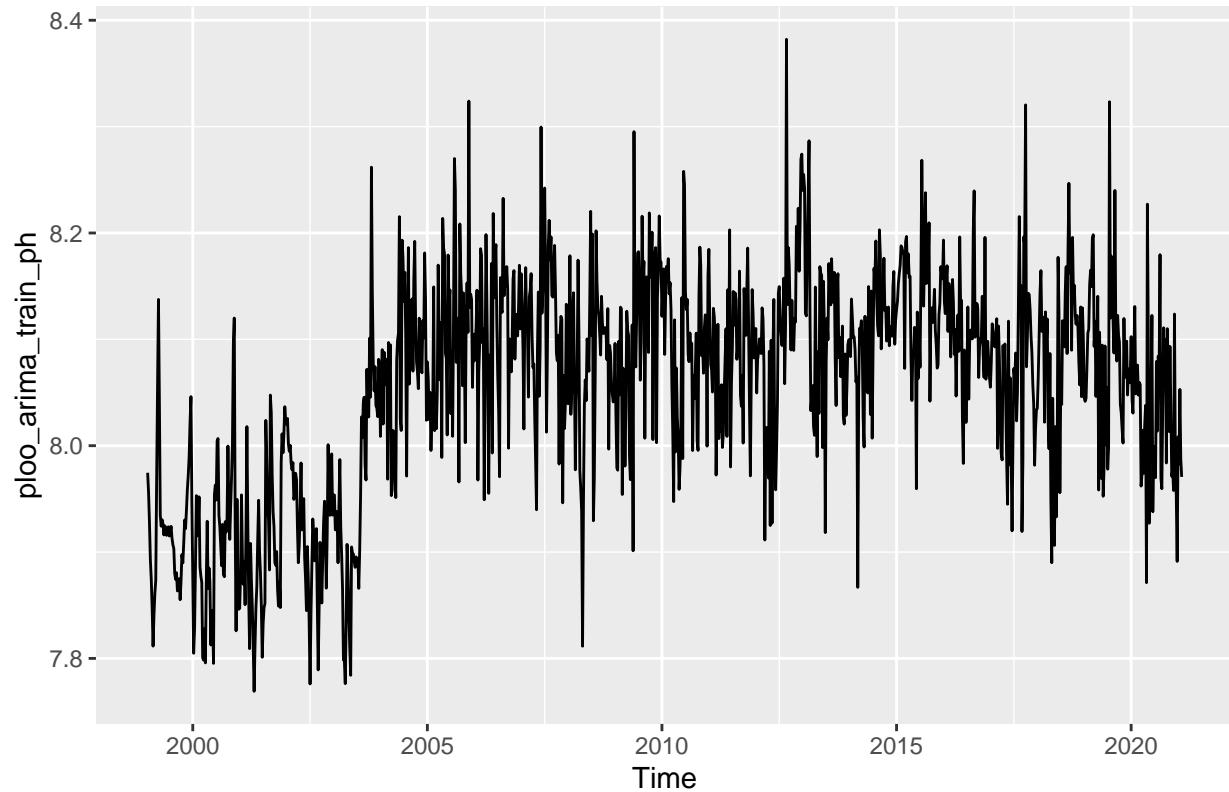
```
# p= 1  
  
# acf plot of density (ploo)  
acf(ploo_arima_train_ph)  
title("PH at PLOO acf plot")
```

PH at PLOO acf plot



```
# q (acf plot) all out of bounds so 1  
  
# ts plot of density (ploo)  
autoplot(ploo_arima_train_ph,  
         main = "PH at PLOO ts plot")
```

PH at PLOO ts plot



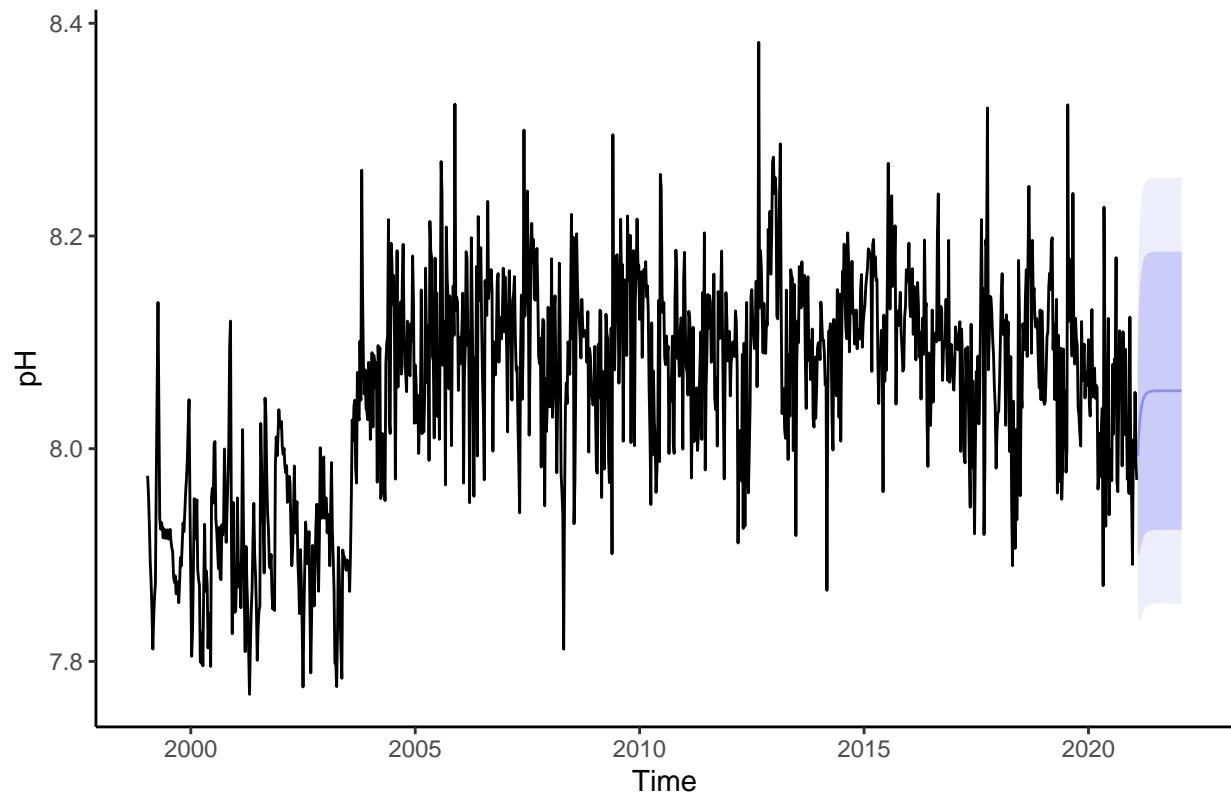
```
# hard to tell on seasonality maybe none

ploo_arima_ph <- arima(ploo_arima_train_ph,
                        order=c(1, 0, 0))

# saving forecast using test set
ploo_arima_ph_forecast <- forecast(ploo_arima_ph, h=52)

# plotting the forecasts
autoplot(ploo_arima_train_ph,
         main = "PLOO ARIMA PH",
         ylab = "pH") +
  autolayer(ploo_arima_ph_forecast, alpha=.3) +
  theme_classic()
```

PLOO ARIMA PH



```
# looking at performance of the ARIMA Regression at SBOO.
ploo_arima_ph_acc <- accuracy(ploo_arima_ph_forecast, ploo_arima_test_ph)

ploo_arima_ph_acc

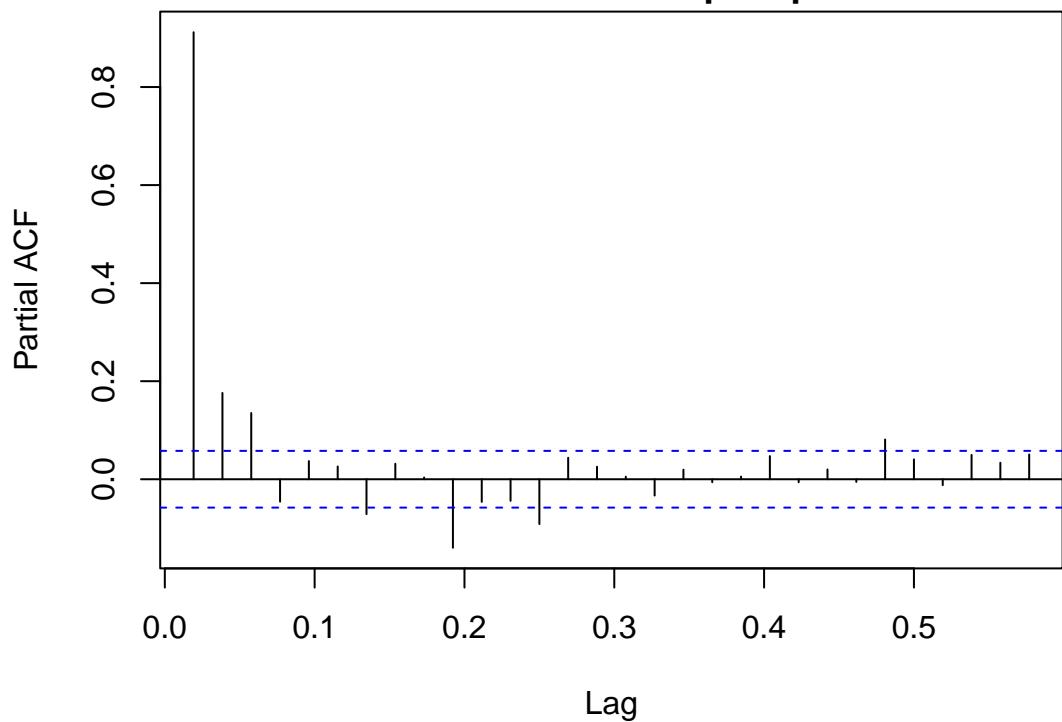
##                               ME      RMSE      MAE      MPE      MAPE
## Training set  3.604196e-05 0.0695939 0.05312883 -0.007032612 0.6595602
## Test set      -3.153926e-02 0.0864575 0.07483995 -0.403072769 0.9360303
##                         MASE      ACF1
## Training set 0.9789913 -0.1976876
## Test set      1.3790567       NA

# PLOO Excluding Outliers - Training partition (01/18/1999-01/04/2021)
# owt_df02_gb09_ploo_wkly02_train_tb03 (imputed w/out outliers set)

# SALINITY
ploo_arima_train_sal <- ts(owt_df02_gb09_ploo_wkly02_train_tb03$SALINITY,
                           start = c(1999, 3),
                           freq = 52)
# PLOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
ploo_arima_test_sal <- owt_df02_gb09_ploo_wkly02_test_tb03$SALINITY

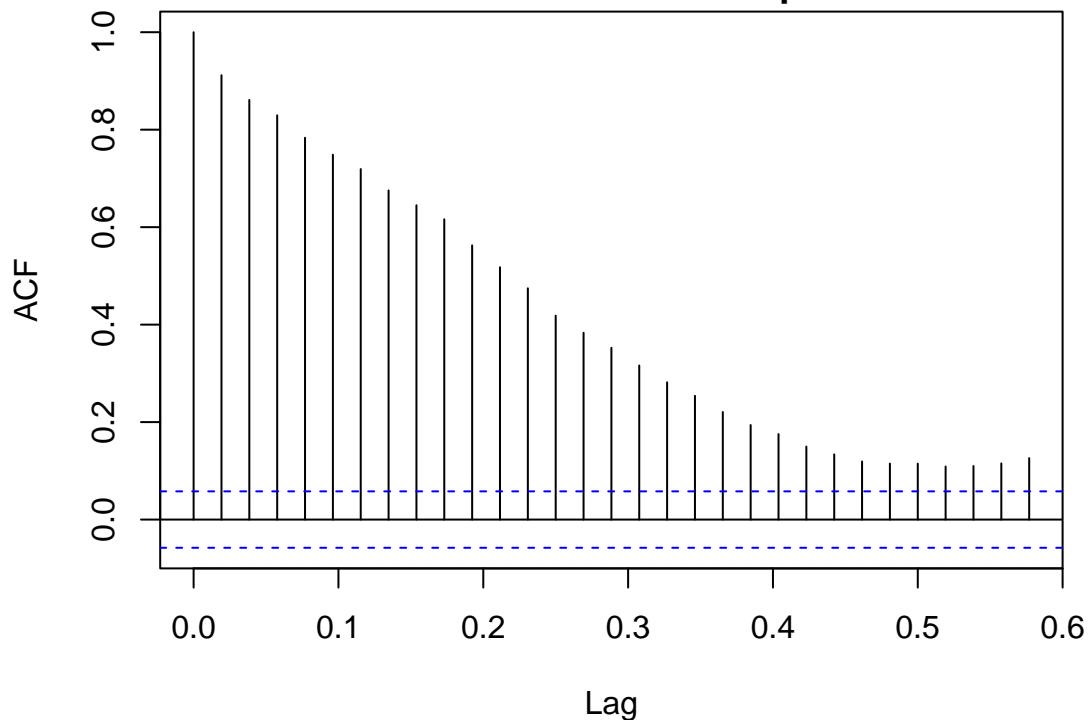
# pacf plot
par(mar=c(5, 4, 0, 2)+1.5)
pacf(ploo_arima_train_sal)
title("SALINITY at PLOO pacf plot")
```

SALINITY at PLOO pacf plot



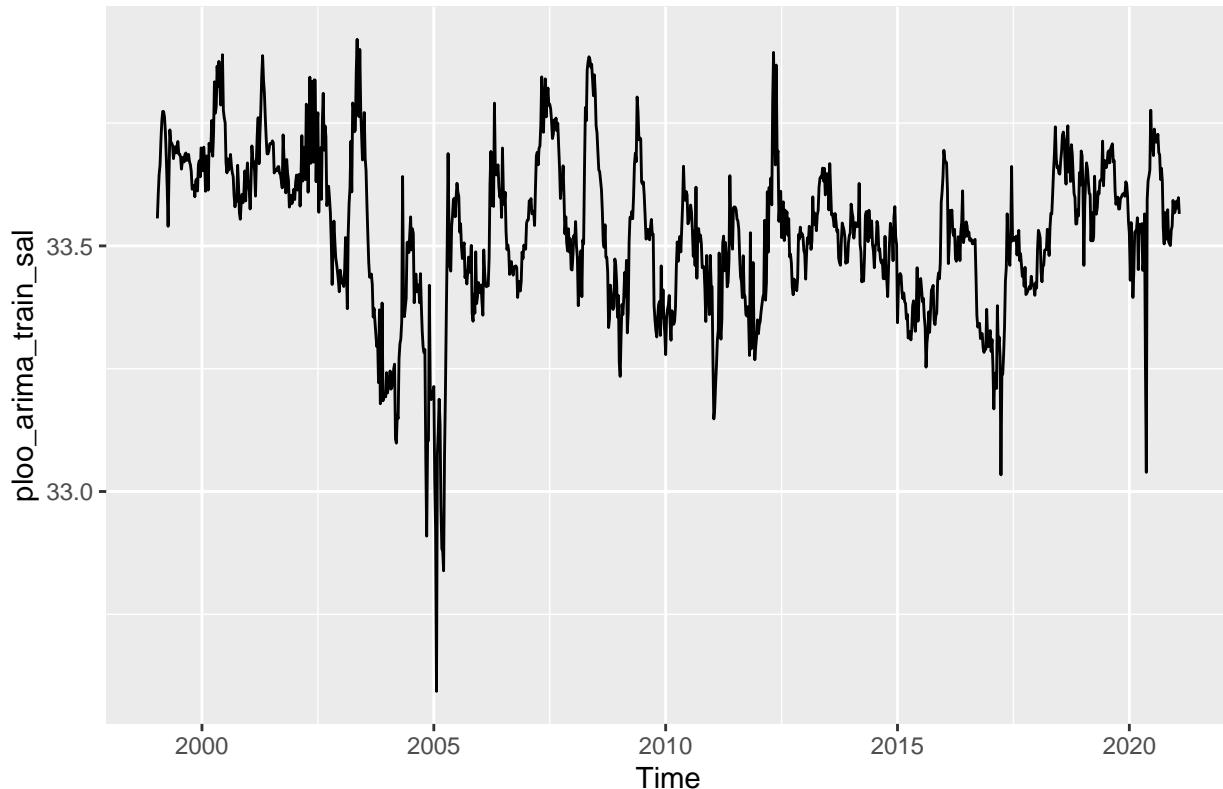
```
# p= 2  
  
# acf plot  
acf(ploo_arima_train_sal)  
title("SALINITY at PLOO acf plot")
```

SALINITY at PLOO acf plot



```
# q (acf plot) all out of bounds so 1  
  
# ts plot  
autoplot(ploo_arima_train_sal,  
         main = "SALINITY at PLOO ts plot")
```

SALINITY at PLOO ts plot



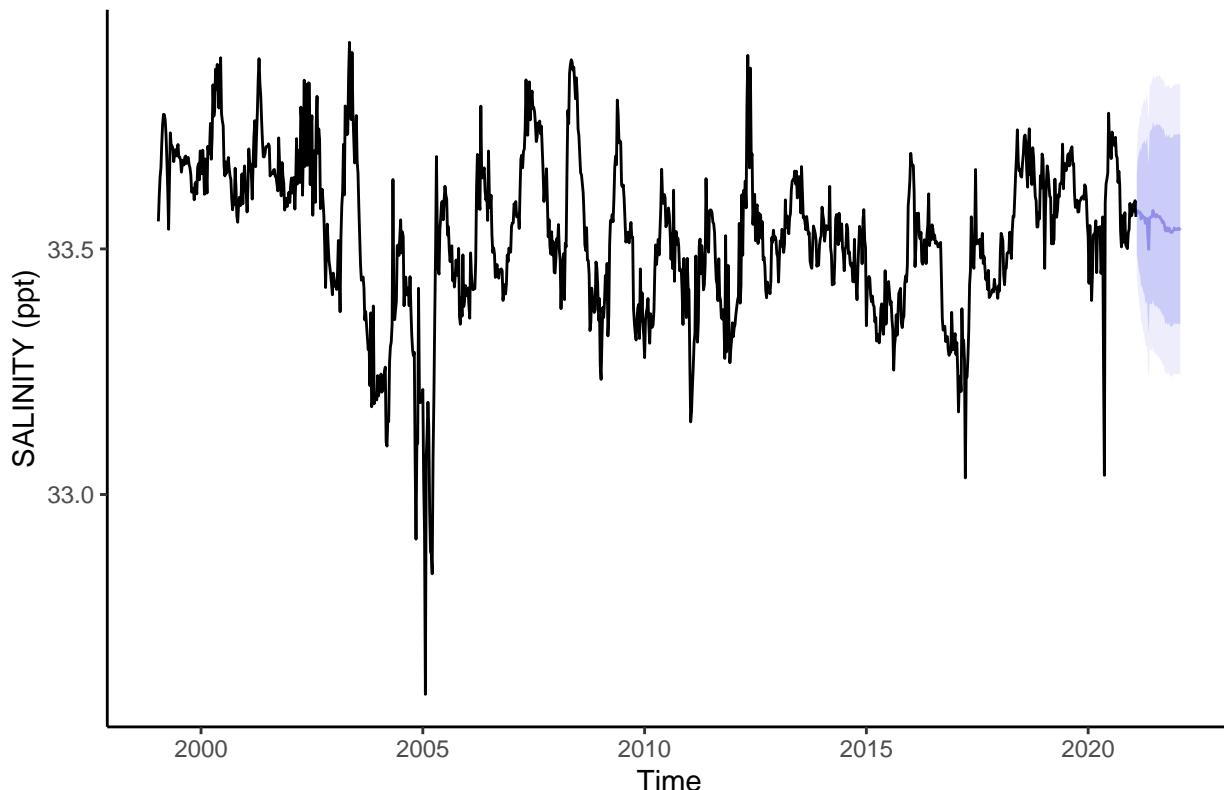
```
# seasonality, need P, D, Q
# P (pacf plot repeat out of bounds): 1
# D, like d, is 0
# Q (acf plot patterns), no pattern so 0

ploo_arima_sal <- arima(ploo_arima_train_sal,
                         order=c(2, 0, 1), seasonal = c(1,0,0))

# saving forecast using test set
ploo_arima_sal_forecast <- forecast(ploo_arima_sal, h=52)

# plotting the forecasts
autoplot(ploo_arima_train_sal,
         main = "PLOO ARIMA SALINITY",
         ylab = "SALINITY (ppt)") +
  autolayer(ploo_arima_sal_forecast, alpha=.3) +
  theme_classic()
```

PLOO ARIMA SALINITY



```
# looking at performance of the ARIMA .
ploo_arima_sal_acc <- accuracy(ploo_arima_sal_forecast, ploo_arima_test_sal)

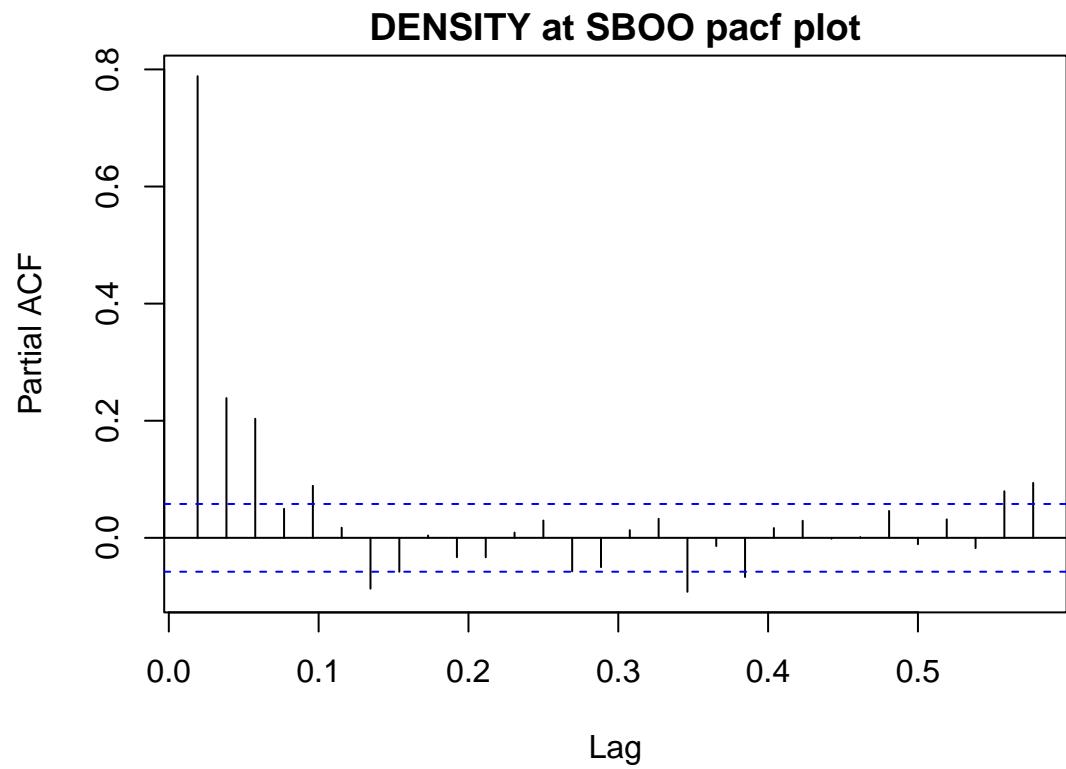
ploo_arima_sal_acc
```

```
##               ME      RMSE      MAE      MPE      MAPE
## Training set -2.878516e-05 0.06417251 0.04354409 -0.000461302 0.1299821
## Test set       2.807745e-02 0.08837713 0.06777939  0.082954959 0.2015667
##             MASE      ACF1
## Training set 0.9753143 0.005495697
## Test set      1.5181441          NA
```

ARIMA at SBOO

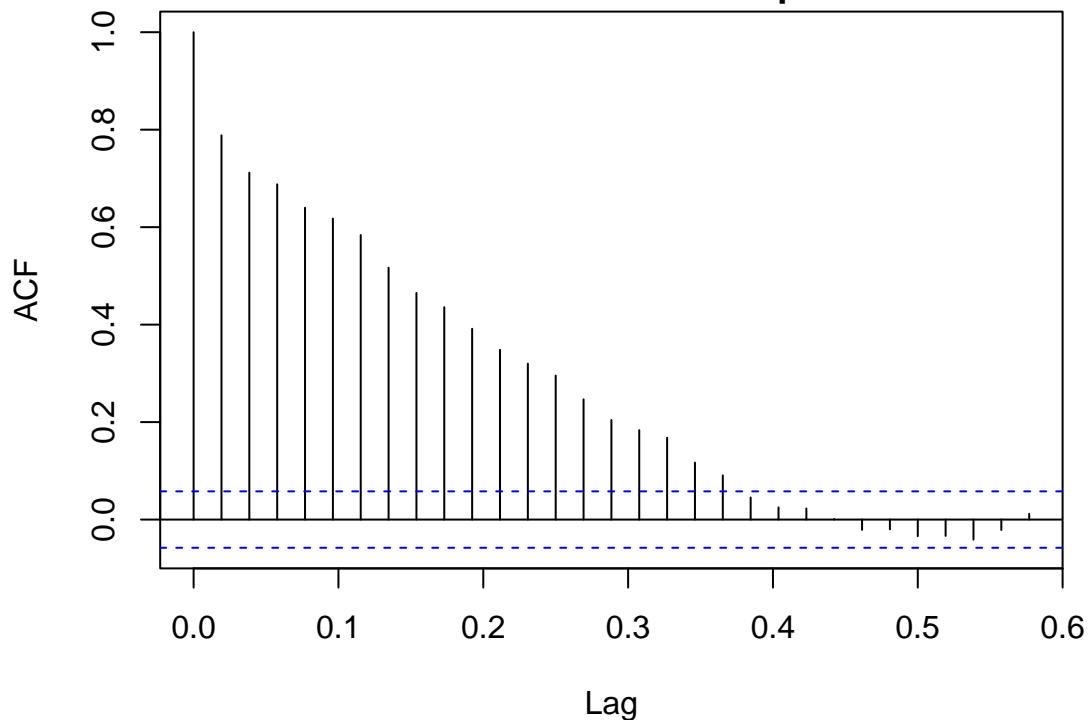
```
# DENSITY
sboo_arima_train_density <- ts(owt_df02_gb09_sboo_wkly02_train_tb03$DENSITY,
                                start = c(1999, 3),
                                freq = 52)
# SBOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
sboo_arima_test_density <- owt_df02_gb09_sboo_wkly02_test_tb03$DENSITY

# pacf plot
par(mar=c(5, 4, 0, 2)+1.5)
pacf(sboo_arima_train_density)
title("DENSITY at SBOO pacf plot")
```



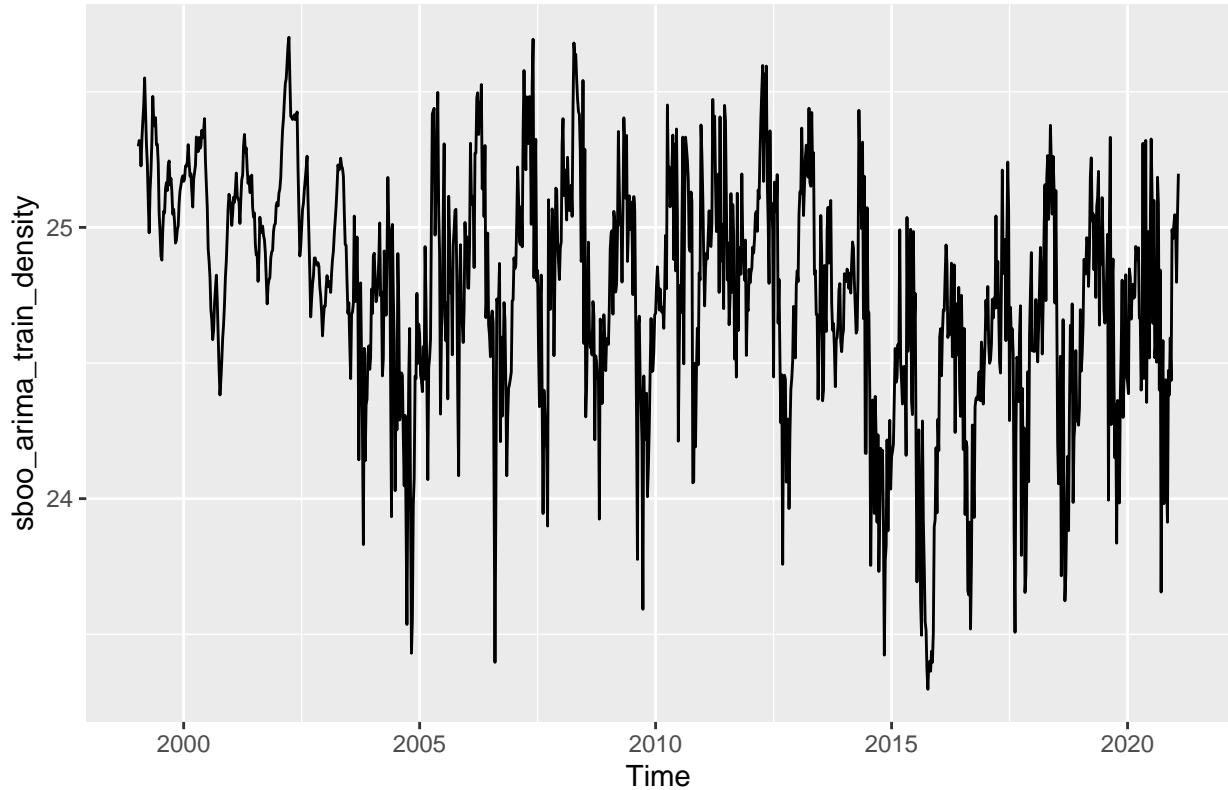
```
# p=2?  
  
# acf plot  
acf(sboo_arima_train_density)  
title("DENSITY at SBOO acf plot")
```

DENSITY at SBOO acf plot



```
# q value 1  
  
# ts plot  
autoplot(sboo_arima_train_density,  
         main = "DENSITY at SBOO ts plot")
```

DENSITY at SBOO ts plot



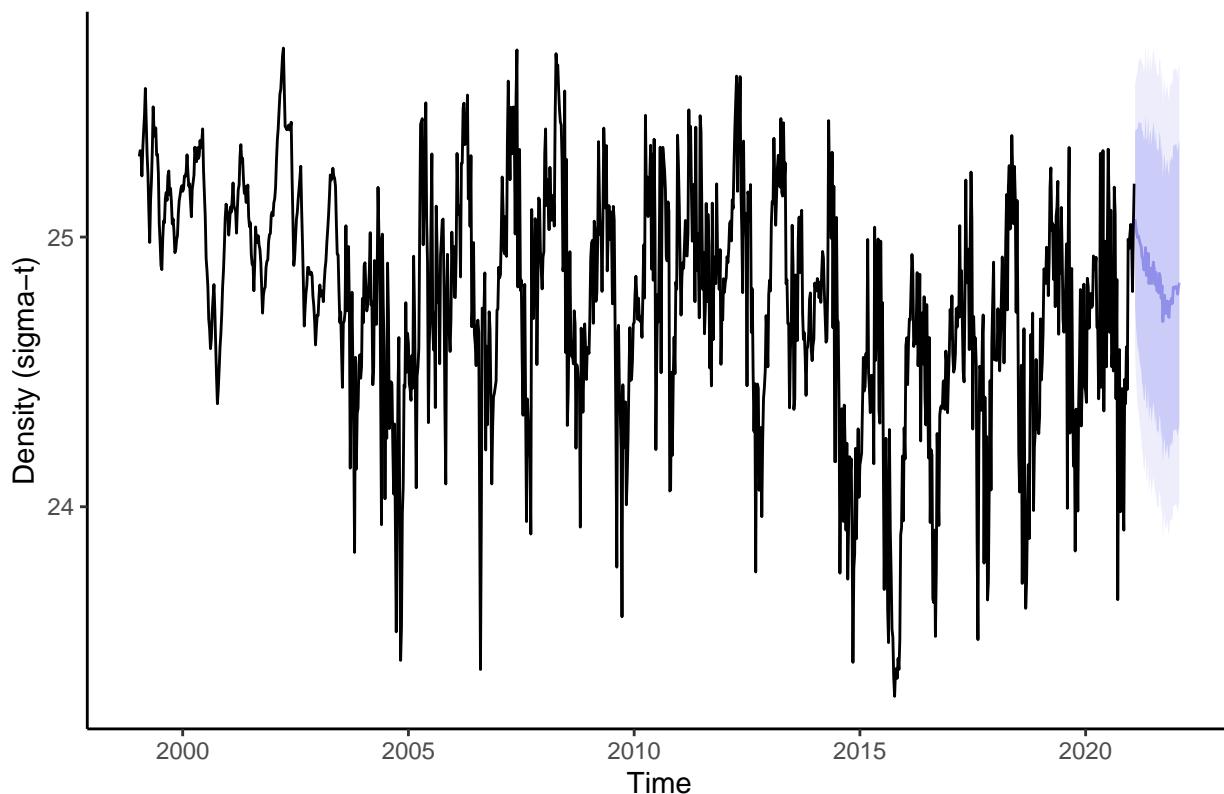
```
# definite seasonality so 2nd part needed
# d and D = 0
# P= 1 (pacf plot out of bounds not only beginning)
# Q (acf): Q= 0

sboo_arima_density <- arima(sboo_arima_train_density,
                             order=c(2, 0, 1), seasonal = c(1, 0, 0))

# saving forecast using test set
sboo_arima_density_forecast <- forecast(sboo_arima_density, h=52)

# plotting the forecasts
autoplot(sboo_arima_train_density,
         main = "SBOO ARIMA Density",
         ylab = "Density (sigma-t)") +
  autolayer(sboo_arima_density_forecast, alpha=.3) +
  theme_classic()
```

SBOO ARIMA Density



```
# looking at performance of the ARIMA
sboo_arima_density_acc <- accuracy(sboo_arima_density_forecast, sboo_arima_test_density)

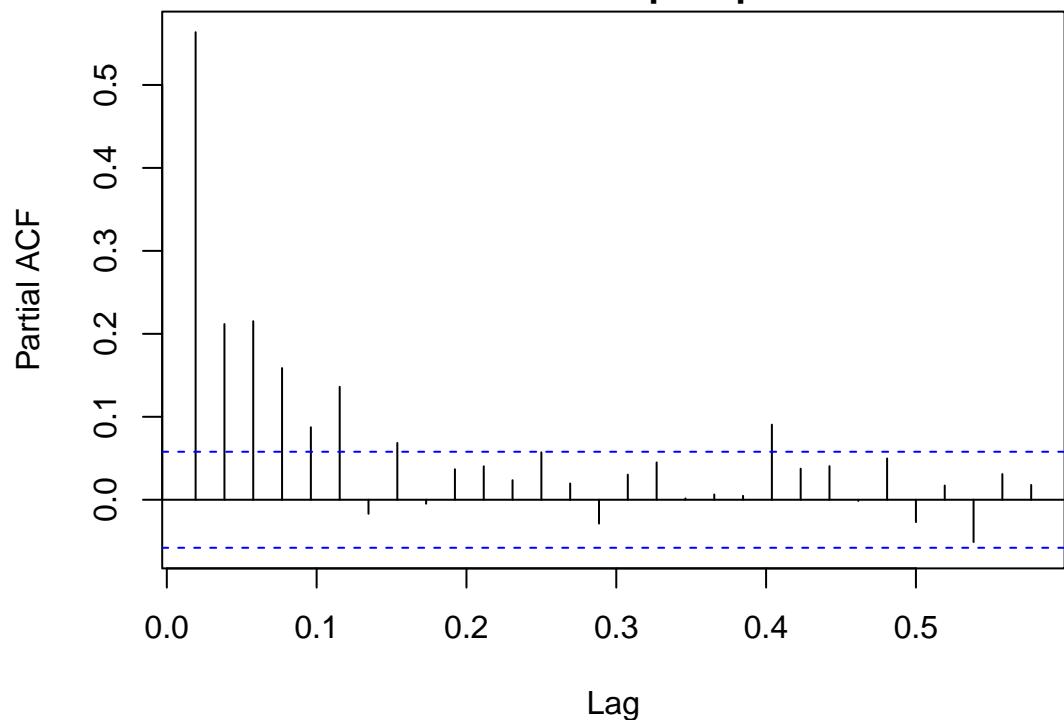
sboo_arima_density_acc

##               ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -0.001087979 0.2519350 0.1829165 -0.01502515 0.7422643 0.9220391
## Test set      -0.054286261 0.3555327 0.2765508 -0.24064085 1.1193129 1.3940275
##                  ACF1
## Training set 0.004775348
## Test set      NA

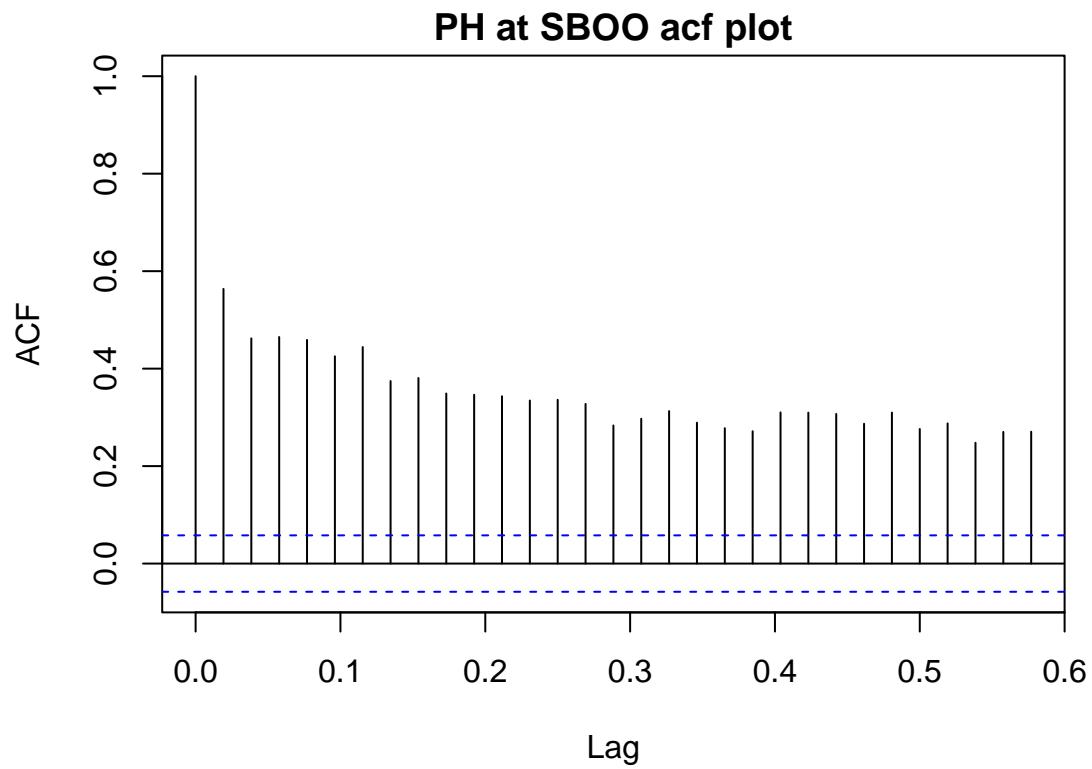
# PH
sboo_arima_train_ph <- ts(owt_df02_gb09_sboo_wkly02_train_tb03$PH,
                           start = c(1999, 3),
                           freq = 52)
# SBOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
sboo_arima_test_ph <- owt_df02_gb09_sboo_wkly02_test_tb03$PH

# pacf plot
par(mar=c(5, 4, 0, 2)+1.5)
pacf(sboo_arima_train_ph)
title("PH at SBOO pacf plot")
```

PH at SBOO pacf plot

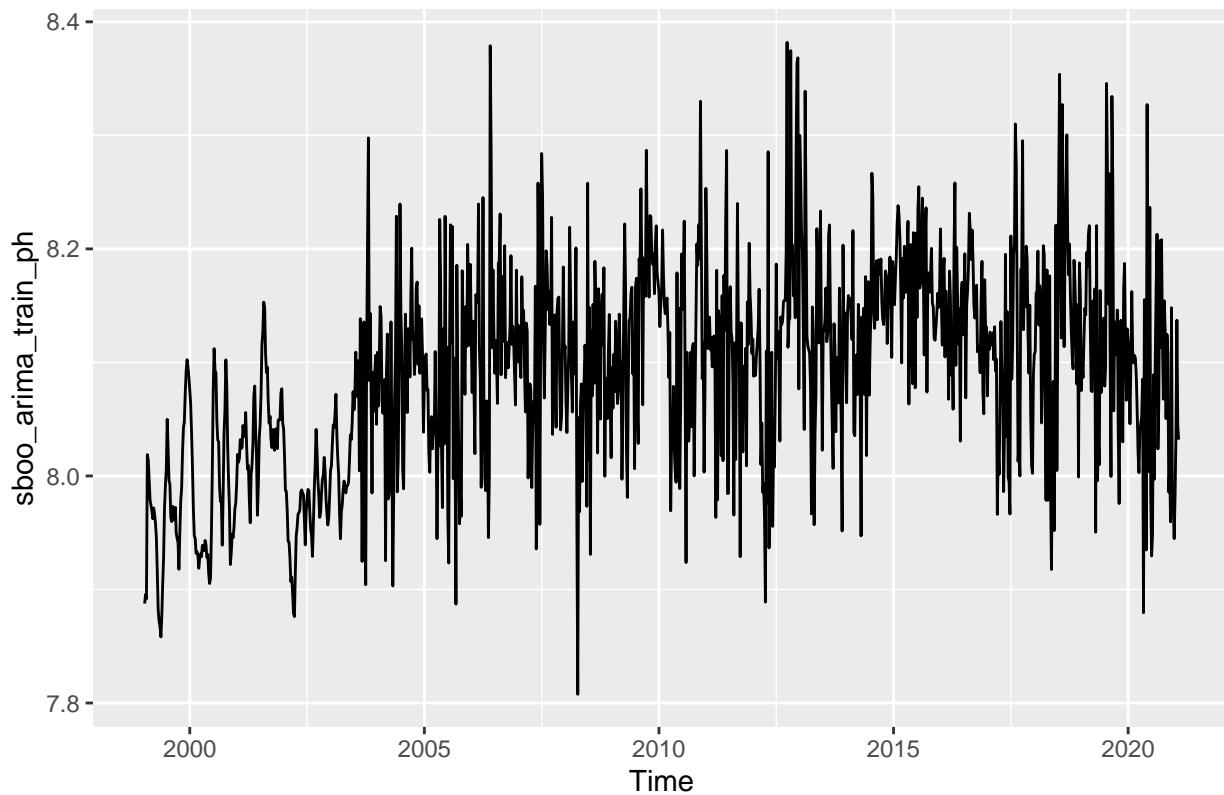


```
# p=2  
  
# acf plot  
acf(sboo_arima_train_ph)  
title("PH at SBOO acf plot")
```



```
# q 1  
  
# ts plot  
autoplot(sboo_arima_train_ph,  
         main = "PH at SBOO ts plot")
```

PH at SBOO ts plot



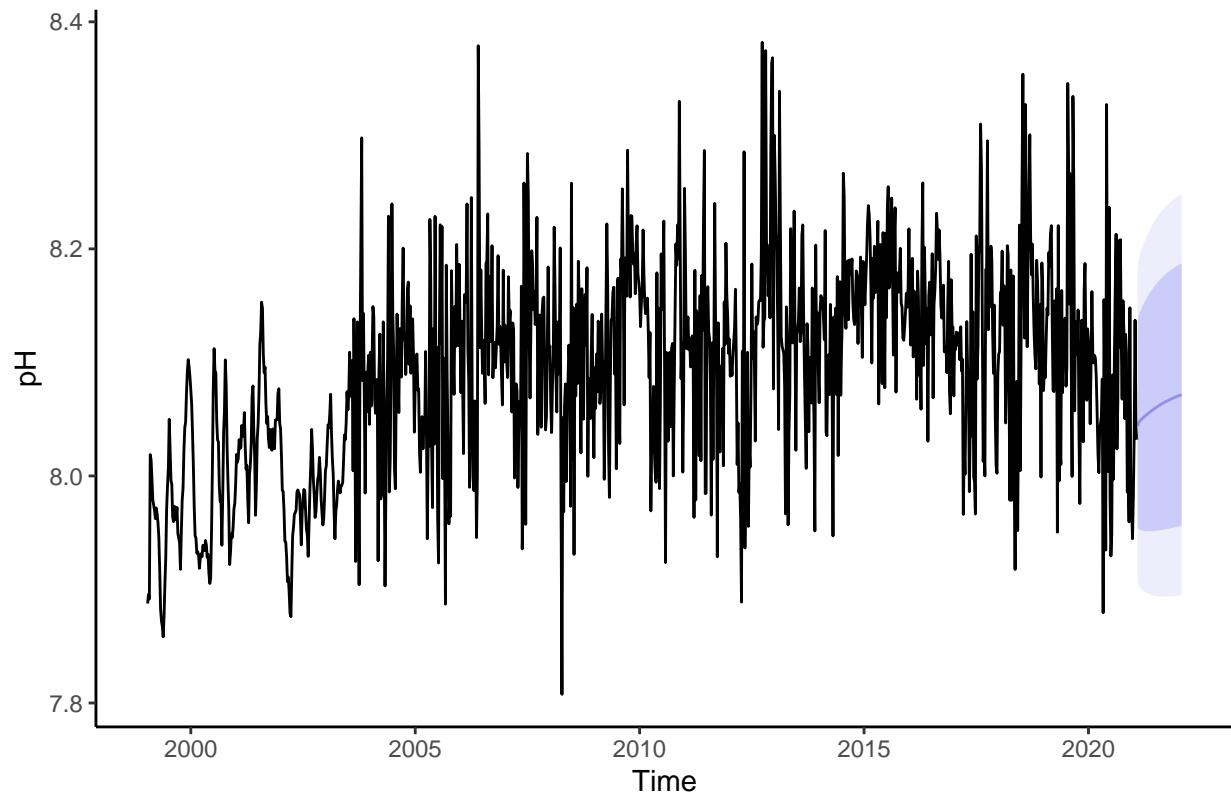
```
# hard to tell on seasonality maybe none
# d and D = 0

sboo_arima_ph <- arima(sboo_arima_train_ph,
                        order=c(2, 0, 1))

# saving forecast using test set
sboo_arima_ph_forecast <- forecast(sboo_arima_ph, h=52)

# plotting the forecasts
autoplot(sboo_arima_train_ph,
         main = "SBOO ARIMA pH",
         ylab = "pH") +
  autolayer(sboo_arima_ph_forecast, alpha=.3) +
  theme_classic()
```

SBOO ARIMA pH



```
# looking at performance of the ARIMA
sboo_arima_ph_acc <- accuracy(sboo_arima_ph_forecast, sboo_arima_test_ph)

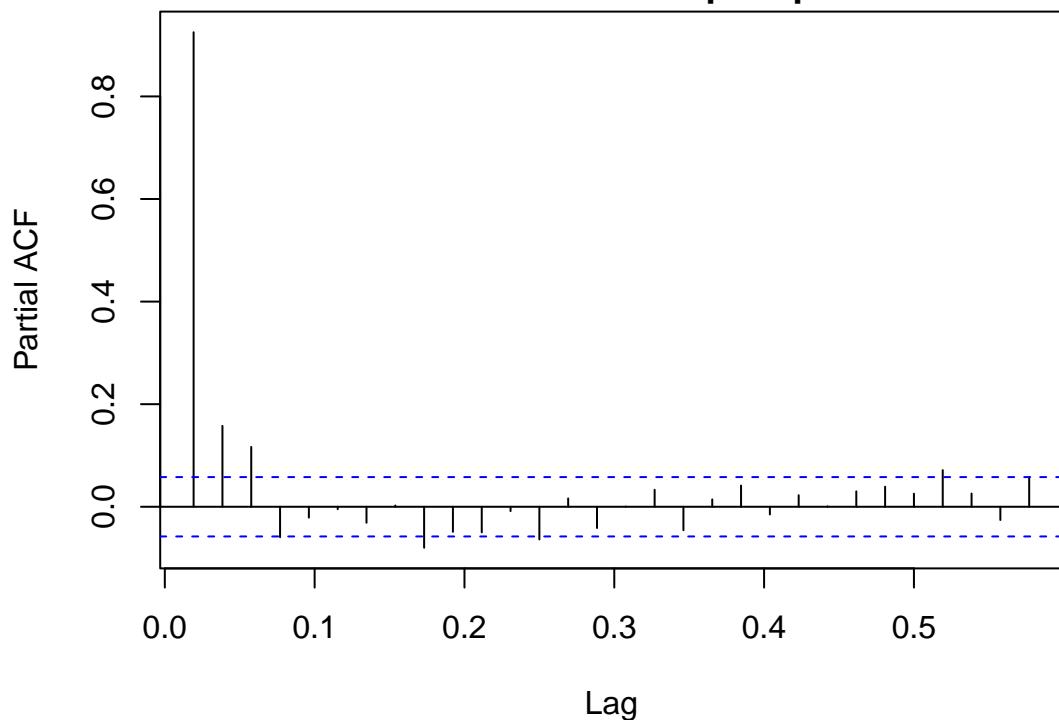
sboo_arima_ph_acc

##               ME        RMSE        MAE        MPE        MAPE
## Training set 0.000807955 0.06957934 0.05169269 0.002683095 0.6382645
## Test set     -0.005279801 0.11030998 0.08935559 -0.083728450 1.1090916
##             MASE        ACF1
## Training set 0.8672183 0.001676008
## Test set     1.4990670          NA

# SALINITY
sboo_arima_train_sal <- ts(owt_df02_gb09_sboo_wkly02_train_tb03$SALINITY,
                           start = c(1999, 3),
                           freq = 52)
# SBOO Excluding Outliers - Test partition (01/11/2021-01/03/2022)
sboo_arima_test_sal <- owt_df02_gb09_sboo_wkly02_test_tb03$SALINITY

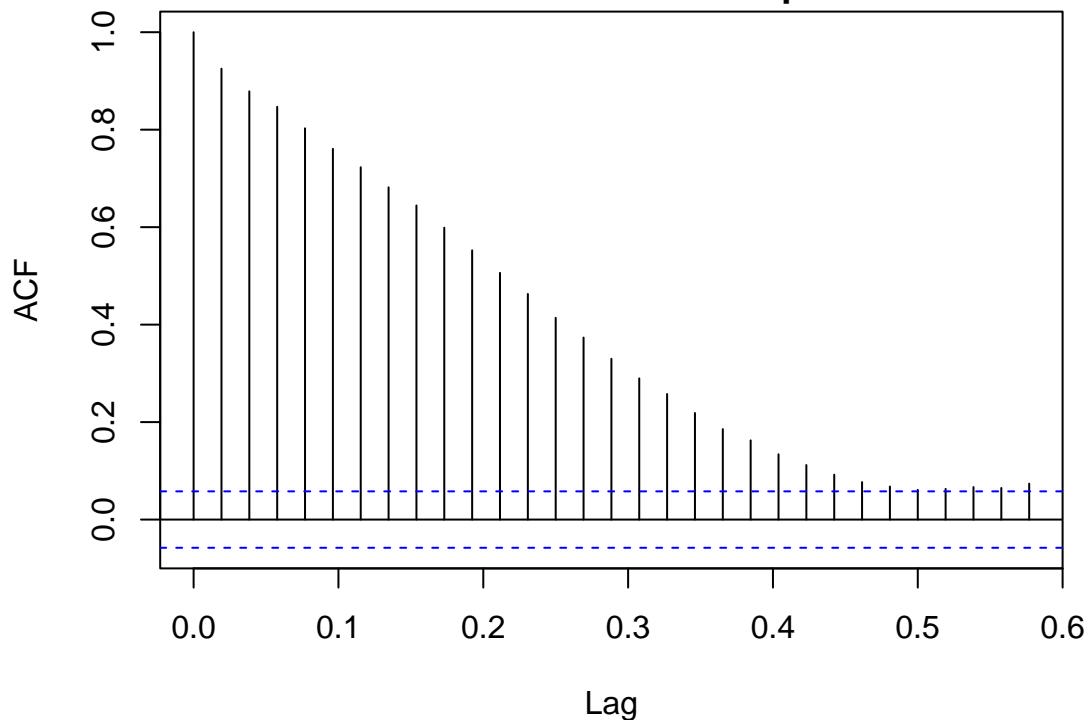
# pacf plot
par(mar=c(5, 4, 0, 2)+1.5)
pacf(sboo_arima_train_sal)
title("SALINITY at SBOO pacf plot")
```

SALINITY at SBOO pacf plot



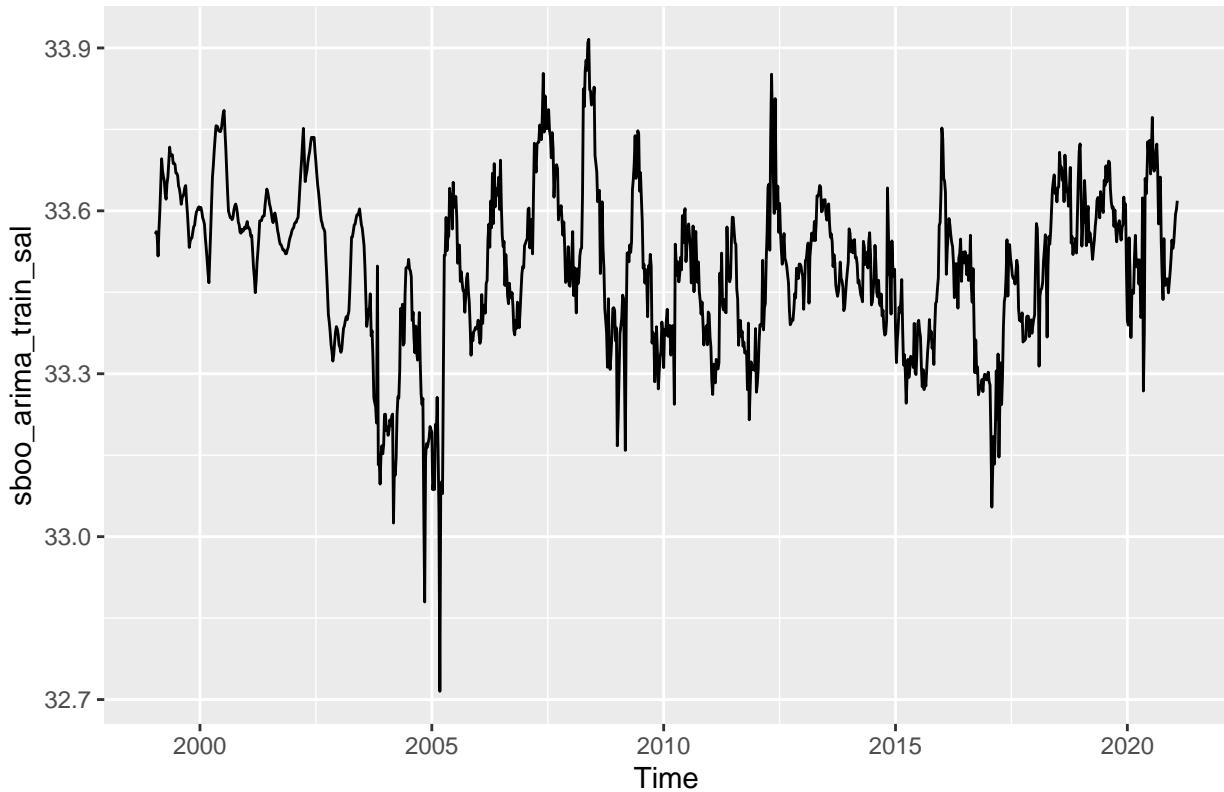
```
# p=1  
  
# acf plot  
acf(sboo_arima_train_sal)  
title("SALINITY at SBOO acf plot")
```

SALINITY at SBOO acf plot



```
# q 1  
  
# ts plot  
autoplot(sboo_arima_train_sal,  
         main = "SALINITY at SBOO ts plot")
```

SALINITY at SBOO ts plot



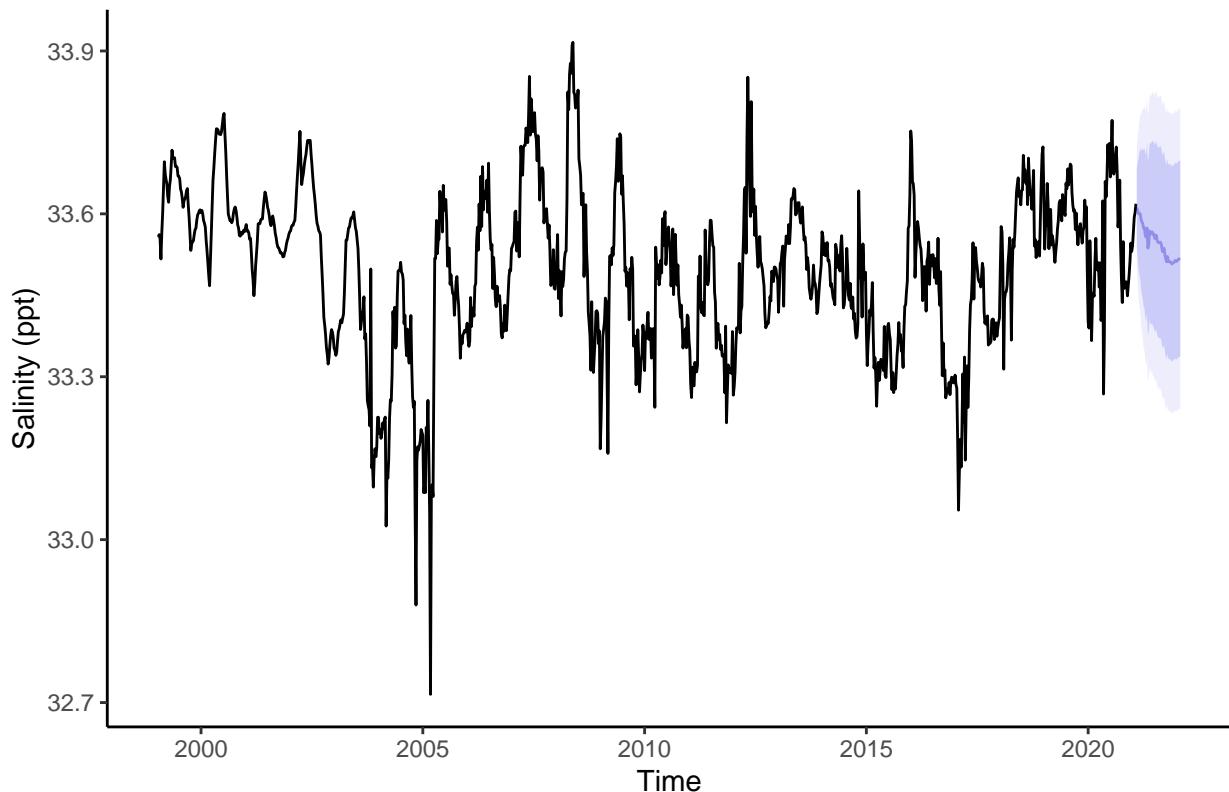
```
# seasonal plot
# P (pacf plot) = 1
# d and D = 0
# Q (acf plot) = 0

sboo_arima_sal <- arima(sboo_arima_train_sal,
                         order=c(1, 0, 1), seasonal = c(1,0,0))

# saving forecast using test set
sboo_arima_sal_forecast <- forecast(sboo_arima_sal, h=52)

# plotting the forecasts
autoplot(sboo_arima_train_sal,
         main = "SBOO ARIMA SALINITY",
         ylab = "Salinity (ppt)") +
  autolayer(sboo_arima_sal_forecast, alpha=.3) +
  theme_classic()
```

SBOO ARIMA SALINITY



```
# looking at performance of the ARIMA
sboo_arima_sal_acc <- accuracy(sboo_arima_sal_forecast, sboo_arima_test_sal)

sboo_arima_sal_acc

##                               ME      RMSE      MAE      MPE      MAPE
## Training set 2.058847e-05 0.05498850 0.03628011 -0.0002137381 0.1084051
## Test set      1.760262e-02 0.08751071 0.07237851  0.0517296153 0.2154528
##                               MASE      ACF1
## Training set 0.9872188 0.01400696
## Test set      1.9694928      NA

z <- get("ENTER0", owt_df02_gb09_ploo_wkly03_train_tb03)
ts_owt_df02_gb09_sboo_wkly02_train_tb03 <- ts(z, start = c(1999, 1), freq = 52)

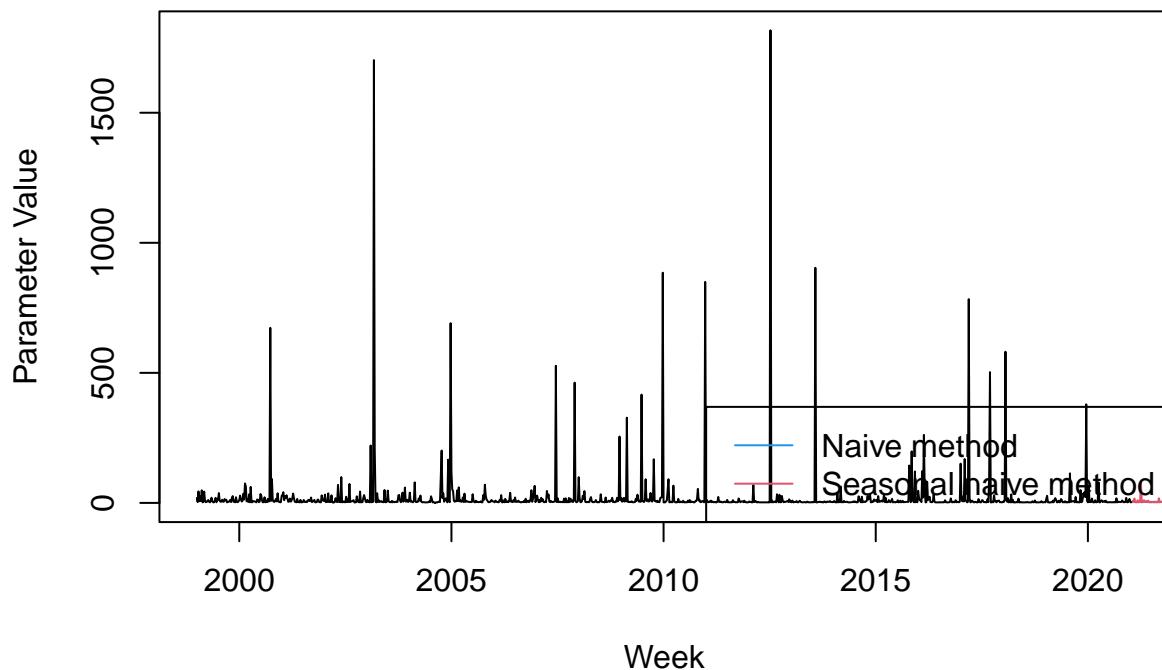
naive.rose <- naive(ts_owt_df02_gb09_sboo_wkly02_train_tb03, h=104)
plot(ts_owt_df02_gb09_sboo_wkly02_train_tb03, main="Forecast for weekly PL00 dataset",
     xlab="Week", ylab="Parameter Value")

snaive.rose <- snaive(ts_owt_df02_gb09_sboo_wkly02_train_tb03, h=104)
plot(ts_owt_df02_gb09_sboo_wkly02_train_tb03, main="Forecast for weekly PL00 dataset",
     xlab="Week", ylab="Parameter Value")

lines(naive.rose$mean, col=4)
lines(snaive.rose$mean, col=2)
```

```
legend("bottomright", lty=1, col=c(4,2),
      legend=c("Naive method", "Seasonal naive method"))
```

Forecast for weekly PLOO dataset



```
print(accuracy(snaive.rose))
```

```
##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set -0.2189141 143.2925 32.63567 -461.2263 511.0516    1 0.02976892
```

DENSITY

```
z_den <- get("DENSITY", owt_df02_gb09_ploo_wkly03_train_tb03)
ts_owt_df02_gb09_sboo_wkly02_train_tb03 <- ts(z_den, start = c(1999, 1), freq = 52)
snaive.den <- snaive(ts_owt_df02_gb09_sboo_wkly02_train_tb03, h=104)
print("DENSITY:")
```

```
## [1] "DENSITY:"
```

```
print(accuracy(snaive.den))
```

```
##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set -0.02520021 0.4384758 0.3346855 -0.1167214 1.35569    1 0.6311523
```

PH

```
z_ph <- get("PH", owt_df02_gb09_ploo_wkly03_train_tb03)
ts_owt_df02_gb09_sboo_wkly02_train_tb03 <- ts(z_ph, start = c(1999, 1), freq = 52)
snaive.ph <- snaive(ts_owt_df02_gb09_sboo_wkly02_train_tb03, h=104)
print("PH:")
```

```

## [1] "PH:"

print(accuracy(snaive.ph))

##               ME      RMSE      MAE      MPE      MAPE MASE
## Training set 0.005067217 0.1020739 0.07956865 0.0554673 0.9879985    1
##               ACF1
## Training set 0.4673687

# SALINITY
z_sal <- get("SALINITY", owt_df02_gb09_ploo_wkly03_train_tb03)
ts_owt_df02_gb09_sboo_wkly02_train_tb03 <- ts(z_sal, start = c(1999, 1), freq = 52)
snaive.sal <- snaive(ts_owt_df02_gb09_sboo_wkly02_train_tb03, h=104)
print("SALINITY:")

## [1] "SALINITY:"

print(accuracy(snaive.sal))

##               ME      RMSE      MAE      MPE      MAPE MASE
## Training set -0.004825046 0.1763696 0.1230404 -0.01577362 0.3677022    1
##               ACF1
## Training set 0.7814462

z <- get("ENTERO", owt_df02_gb09_ploo_wkly03_test_tb03)
ts_owt_df02_gb09_ploo_wkly03_test_tb03 <- ts(z, start = c(2021, 1), freq = 52)

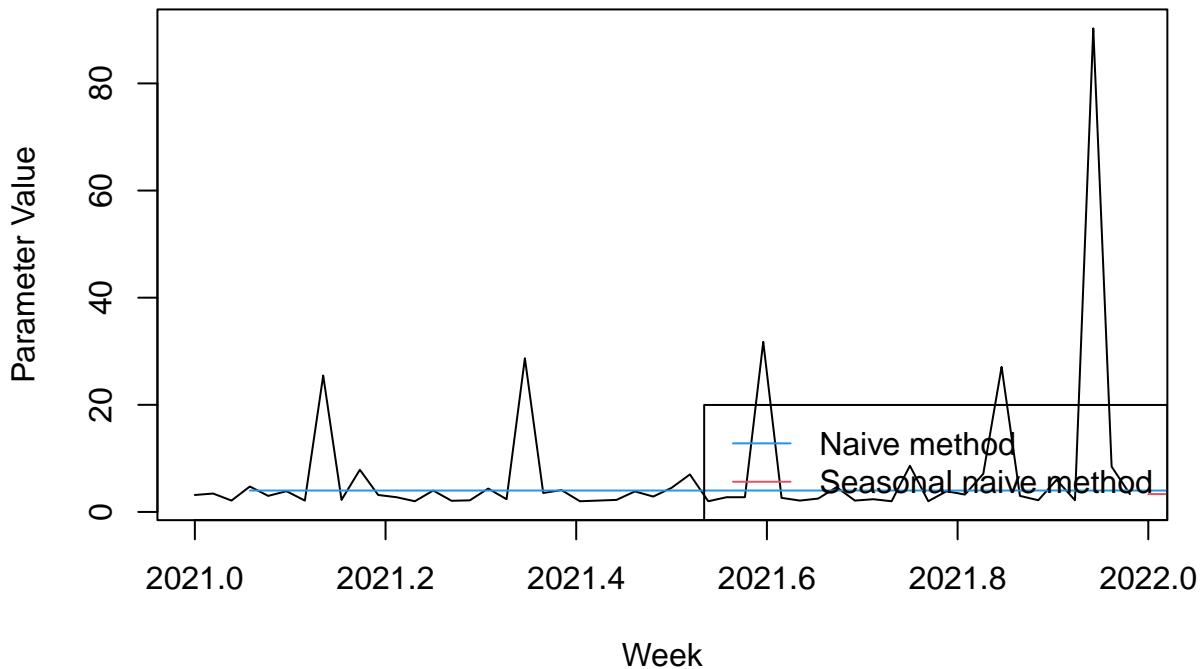
snaive.rose <- naive(ts_owt_df02_gb09_ploo_wkly03_test_tb03, h=104)
plot(ts_owt_df02_gb09_ploo_wkly03_test_tb03, main="Forecast for weekly PL00 dataset",
  xlab="Week", ylab="Parameter Value")

lines(naive.rose$mean, col=4)
lines(snaive.rose$mean, col=2)

legend("bottomright", lty=1, col=c(4,2),
  legend=c("Naive method", "Seasonal naive method"))

```

Forecast for weekly PLOO dataset



```

print(accuracy(snaive.rose))

##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set 0.003267974 19.72166 8.882983 -103.4933 150.049  NaN -0.500478

# DENSITY
z_den <- get("DENSITY", owt_df02_gb09_ploo_wkly03_test_tb03)
ts_owt_df02_gb09_ploo_wkly03_test_tb03 <- ts(z_den, start = c(2021, 1), freq = 52)
snaive.den <- naive(ts_owt_df02_gb09_ploo_wkly03_test_tb03, h=104)
print("DENSITY:")

## [1] "DENSITY:"

print(accuracy(snaive.den))

##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set -0.007789891 0.3026302 0.2493652 -0.03865236 1.004043  NaN
##               ACF1
## Training set -0.4839433

# PH
z_ph <- get("PH", owt_df02_gb09_ploo_wkly03_test_tb03)
ts_owt_df02_gb09_ploo_wkly03_test_tb03 <- ts(z_ph, start = c(2021, 1), freq = 52)
snaive.ph <- naive(ts_owt_df02_gb09_ploo_wkly03_test_tb03, h=104)
print("PH:")

## [1] "PH:"

```

```

print(accuracy(snaive.ph))

##               ME        RMSE       MAE        MPE       MAPE MASE
## Training set -0.0002490054 0.08047558 0.06232518 -0.00815208 0.7769789  NaN
##                  ACF1
## Training set -0.4204429

# SALINITY
z_sal <- get("SALINITY", owt_df02_gb09_ploo_wkly03_test_tb03)
ts_owt_df02_gb09_ploo_wkly03_test_tb03 <- ts(z_sal, start = c(2021, 1), freq = 52)
snaive.sal <- naive(ts_owt_df02_gb09_ploo_wkly03_test_tb03, h=104)
print("SALINITY:")

## [1] "SALINITY:"

print(accuracy(snaive.sal))

##               ME        RMSE       MAE        MPE       MAPE MASE
## Training set -0.003188264 0.05168319 0.03787635 -0.009628083 0.1127649  NaN
##                  ACF1
## Training set -0.2564732

z <- get("ENTERO", owt_df02_gb09_sboo_wkly03_train_tb03)
ts_owt_df02_gb09_sboo_wkly03_train_tb03 <- ts(z, start = c(1999, 1), freq = 52)

naive.rose <- naive(ts_owt_df02_gb09_sboo_wkly03_train_tb03, h=104)
plot(ts_owt_df02_gb09_sboo_wkly03_train_tb03, main="Forecast for weekly PL00 dataset",
  ~ xlab="Week", ylab="Parameter Value")

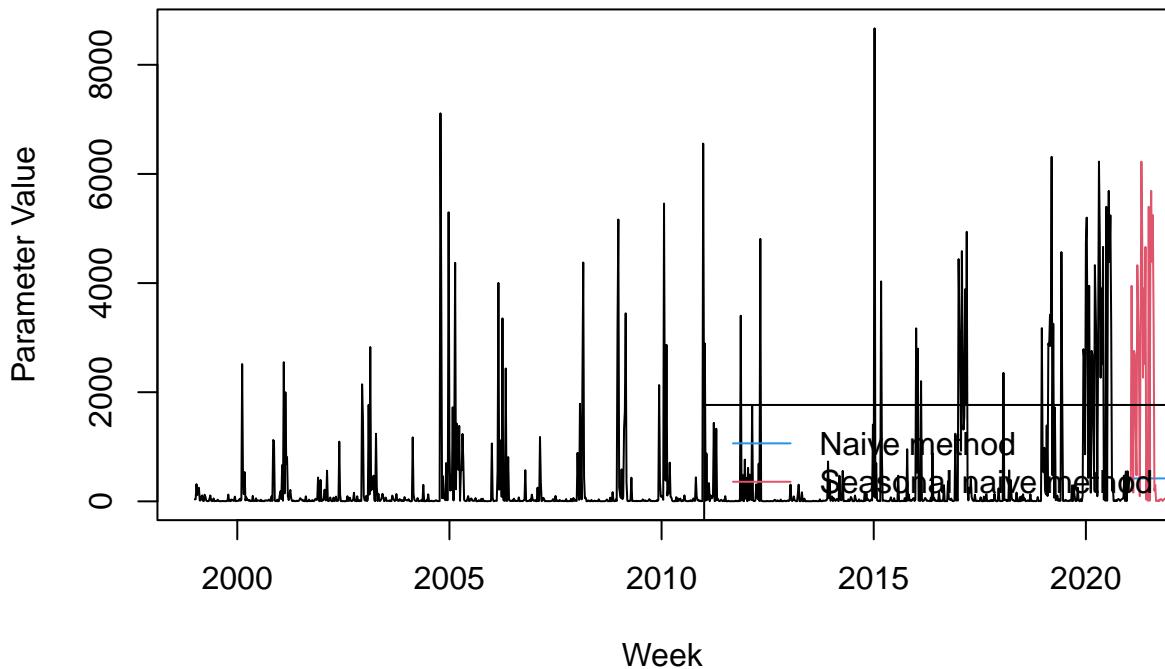
snaive.rose <- snaive(ts_owt_df02_gb09_sboo_wkly03_train_tb03, h=104)
plot(ts_owt_df02_gb09_sboo_wkly03_train_tb03, main="Forecast for weekly PL00 dataset",
  ~ xlab="Week", ylab="Parameter Value")

lines(naive.rose$mean, col=4)
lines(snaive.rose$mean, col=2)

legend("bottomright", lty=1, col=c(4,2),
      legend=c("Naive method", "Seasonal naive method"))

```

Forecast for weekly PLOO dataset



```

print(accuracy(snaive.rose))

##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set 74.85486 1257.591 489.9936 -1843.094 1913.031    1 0.2416428

# DENSITY
z_den <- get("DENSITY", owt_df02_gb09_sboo_wkly03_train_tb03)
ts_owt_df02_gb09_sboo_wkly03_train_tb03 <- ts(z_den, start = c(1999, 1), freq = 52)
snaive.den <- snaive(ts_owt_df02_gb09_sboo_wkly03_train_tb03, h=104)
print("DENSITY:")

## [1] "DENSITY:"
print(accuracy(snaive.den))

##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set -0.02267708 0.4369493 0.3392177 -0.1072116 1.377332    1 0.5948643

# PH
z_ph <- get("PH", owt_df02_gb09_sboo_wkly03_train_tb03)
ts_owt_df02_gb09_sboo_wkly03_train_tb03 <- ts(z_ph, start = c(1999, 1), freq = 52)
snaive.ph <- snaive(ts_owt_df02_gb09_sboo_wkly03_train_tb03, h=104)
print("PH:")

## [1] "PH:"
print(accuracy(snaive.ph))

```

```

##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set 0.004397847 0.1056579 0.08178623 0.04620683 1.009717    1 0.353987

# SALINITY
z_sal <- get("SALINITY", owt_df02_gb09_sboo_wkly03_train_tb03)
ts_owt_df02_gb09_sboo_wkly03_train_tb03 <- ts(z_sal, start = c(1999, 1), freq = 52)
snaive.sal <- snaive(ts_owt_df02_gb09_sboo_wkly03_train_tb03, h=104)
print("SALINITY:")

## [1] "SALINITY:"
print(accuracy(snaive.sal))

##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set -0.003068609 0.1492933 0.117386 -0.01015136 0.3507278    1
##               ACF1
## Training set 0.8635462

z <- get("ENTERO", owt_df02_gb09_sboo_wkly03_test_tb03)
ts_owt_df02_gb09_sboo_wkly03_test_tb03 <- ts(z, start = c(2021, 1), freq = 52)

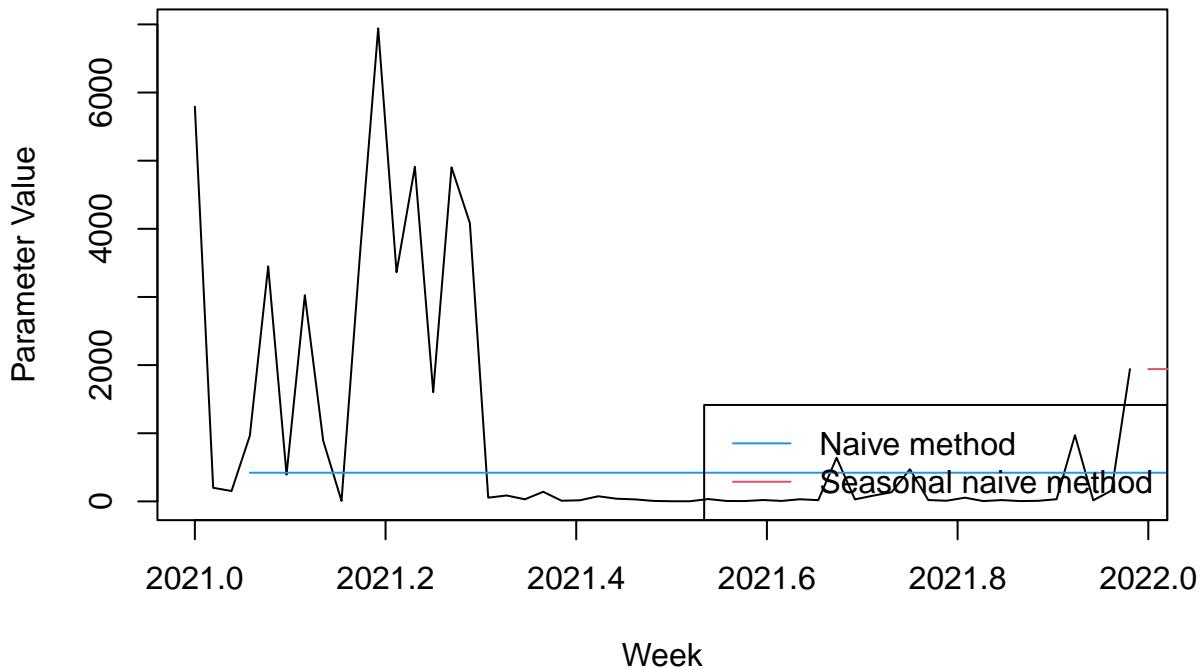
snaive.rose <- naive(ts_owt_df02_gb09_sboo_wkly03_test_tb03, h=104)
plot(ts_owt_df02_gb09_sboo_wkly03_test_tb03, main="Forecast for weekly PL00 dataset",
  ~ xlab="Week", ylab="Parameter Value")

lines(naive.rose$mean, col=4)
lines(snaive.rose$mean, col=2)

legend("bottomright", lty=1, col=c(4,2),
       legend=c("Naive method", "Seasonal naive method"))

```

Forecast for weekly PLOO dataset



```

print(accuracy(snaive.rose))

##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set -75.5289 1679.732 938.639 -757.3371 828.1079  NaN -0.2973567

# DENSITY
z_den <- get("DENSITY", owt_df02_gb09_sboo_wkly03_test_tb03)
ts_owt_df02_gb09_sboo_wkly03_test_tb03 <- ts(z_den, start = c(2021, 1), freq = 52)
snaive.den <- naive(ts_owt_df02_gb09_sboo_wkly03_test_tb03, h=104)
print("DENSITY:")

## [1] "DENSITY:"
print(accuracy(snaive.den))

##               ME      RMSE      MAE      MPE      MAPE MASE      ACF1
## Training set -0.008203548 0.3977213 0.3230145 -0.0458566 1.304932  NaN
##               ACF1
## Training set -0.5195655

# PH
z_ph <- get("PH", owt_df02_gb09_sboo_wkly03_test_tb03)
ts_owt_df02_gb09_sboo_wkly03_test_tb03 <- ts(z_ph, start = c(2021, 1), freq = 52)
snaive.ph <- naive(ts_owt_df02_gb09_sboo_wkly03_test_tb03, h=104)
print("PH:")

## [1] "PH:"

```

```

print(accuracy(snaive.ph))

##               ME      RMSE      MAE      MPE      MAPE MASE
## Training set -0.0008870215 0.1294695 0.1006093 -0.02398872 1.251453  NaN
##                      ACF1
## Training set -0.5671807

# SALINITY
z_sal <- get("SALINITY", owt_df02_gb09_sboo_wkly03_test_tb03)
ts_owt_df02_gb09_sboo_wkly03_test_tb03 <- ts(z_sal, start = c(2021, 1), freq = 52)
snaive.sal <- naive(ts_owt_df02_gb09_sboo_wkly03_test_tb03, h=104)
print("SALINITY:")

## [1] "SALINITY:"

print(accuracy(snaive.sal))

##               ME      RMSE      MAE      MPE      MAPE MASE
## Training set -0.00467507 0.05398767 0.03857742 -0.01408978 0.1149218  NaN
##                      ACF1
## Training set -0.2877513

```