bljj2015_test

bljj2015

2/4/2019

Chapter 1 and 2 of Temperature Trends Lab

## Chapter 1 talks about how to find data

```
## uploading noaa data from csv file
climate_data <- read.csv("~/Climate_Change_Narratives/student_folders/Lai/Lai_castlerock_noaa.csv")
head(climate_data)
```

```
##         STATION                NAME        DATE DAPR DASF MDPR MDSF PRCP SNOW
## 1 USC00051401 CASTLE ROCK, CO US 1893-01-01   NA   NA   NA   NA    0    0
## 2 USC00051401 CASTLE ROCK, CO US 1893-01-02   NA   NA   NA   NA    0    0
## 3 USC00051401 CASTLE ROCK, CO US 1893-01-03   NA   NA   NA   NA    0    0
## 4 USC00051401 CASTLE ROCK, CO US 1893-01-04   NA   NA   NA   NA    0    0
## 5 USC00051401 CASTLE ROCK, CO US 1893-01-05   NA   NA   NA   NA    0    0
## 6 USC00051401 CASTLE ROCK, CO US 1893-01-06   NA   NA   NA   NA    0    0
##   SNWD TMAX TMIN TOBS
## 1   NA  7.8 -5.0   NA
## 2   NA 12.8 -2.2   NA
## 3   NA 12.8 -5.6   NA
## 4   NA 11.1 -7.8   NA
## 5   NA 11.1 -6.1   NA
## 6   NA 10.0 -6.1   NA
```

```
str(climate_data)
```

```
## 'data.frame':    32566 obs. of  13 variables:
##  $ STATION: Factor w/ 1 level "USC00051401": 1 1 1 1 1 1 1 1 1 1 ...
##  $ NAME   : Factor w/ 1 level "CASTLE ROCK, CO US": 1 1 1 1 1 1 1 1 1 1 ...
##  $ DATE   : Factor w/ 32566 levels "1893-01-01","1893-01-02",..: 1 2 3 4 5 6 7 8 9 10 ...
##  $ DAPR   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ DASF   : int  NA NA NA NA NA NA NA NA NA NA ...
##  $ MDPR   : num  NA NA NA NA NA NA NA NA NA NA ...
##  $ MDSF   : num  NA NA NA NA NA NA NA NA NA NA ...
##  $ PRCP   : num  0 0 0 0 0 0 0 0 0 0 ...
##  $ SNOW   : num  0 0 0 0 0 0 0 0 0 0 ...
##  $ SNWD   : num  NA NA NA NA NA NA NA NA NA NA ...
##  $ TMAX   : num  7.8 12.8 12.8 11.1 11.1 10 2.8 12.8 11.1 12.2 ...
##  $ TMIN   : num  -5 -2.2 -5.6 -7.8 -6.1 -6.1 -10.6 -6.1 -5.6 -4.4 ...
##  $ TOBS   : num  NA NA NA NA NA NA NA NA NA NA ...
```

```r
plot(TMAX~DATE, climate_data)
```



```r
min(climate_data$TMAX)
```

```
## [1] NA
```
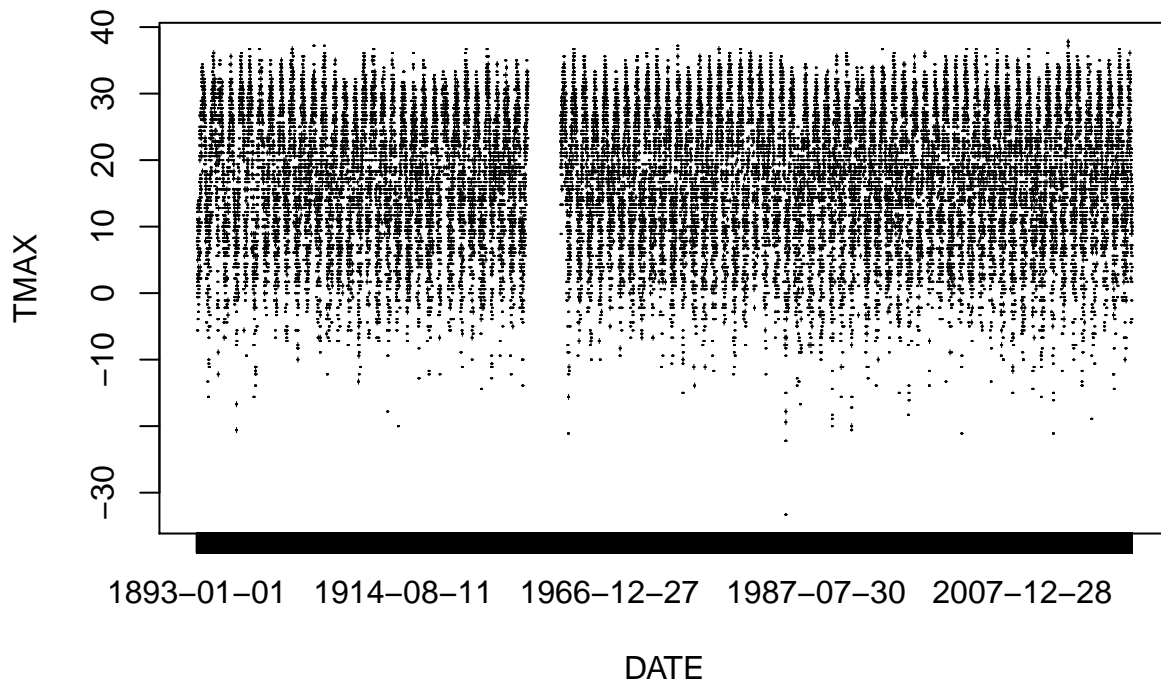
```r
min(climate_data$TMAX, na.rm=T)
```

```
## [1] -33.3
```

```r
max(climate_data$TMAX)
```

```
## [1] NA
```

```r
max(climate_data$TMAX, na.rm=T)
```

```
## [1] 37.8
```

```r
climate_data$TMAX[climate_data$TMAX==-9999] = NA
climate_data$TMIN[climate_data$TMIN==-9999] = NA

## converting dates
strDates <- as.character(climate_data$DATE)
climate_data$NewDate <- as.Date(strDates, "%Y-%m-%d")

lm(TMAX ~ NewDate, data=climate_data)
```

```
##
## Call:
## lm(formula = TMAX ~ NewDate, data = climate_data)
```

```
## 
## Coefficients:
## (Intercept)       NewDate
##    1.763e+01    -1.779e-06
```

```
summary(lm(TMAX~NewDate, data=climate_data))
```

```
## 
## Call:
## lm(formula = TMAX ~ NewDate, data = climate_data)
## 
## Residuals:
##      Min       1Q   Median       3Q      Max
## -50.925   -7.607    0.662    8.465   20.194
## 
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  1.763e+01  5.870e-02 300.410   <2e-16 ***
## NewDate     -1.779e-06  3.817e-06  -0.466    0.641
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 
## Residual standard error: 10.04 on 30664 degrees of freedom
##   (1900 observations deleted due to missingness)
## Multiple R-squared:  7.085e-06,  Adjusted R-squared:  -2.553e-05
## F-statistic: 0.2172 on 1 and 30664 DF,  p-value: 0.6411
```

```
## 12657 is after the missing data from 1951 to 1961
## plot(MonthlyTMAXMean$TMAX[MonthlyTMAXMean$Month==i], ty='l')
```

```
## reformatting the dates to get rid of the dashes, but continues to have dashes afterwards
strDates <- as.character(climate_data$DATE)
climate_data$NewDate <- as.Date(strDates, "%Y-%m-%d")
```

```
plot(TMAX~DATE, climate_data, ty='l')
abline(lm(TMAX ~ NewDate, data=climate_data), col="red")
```
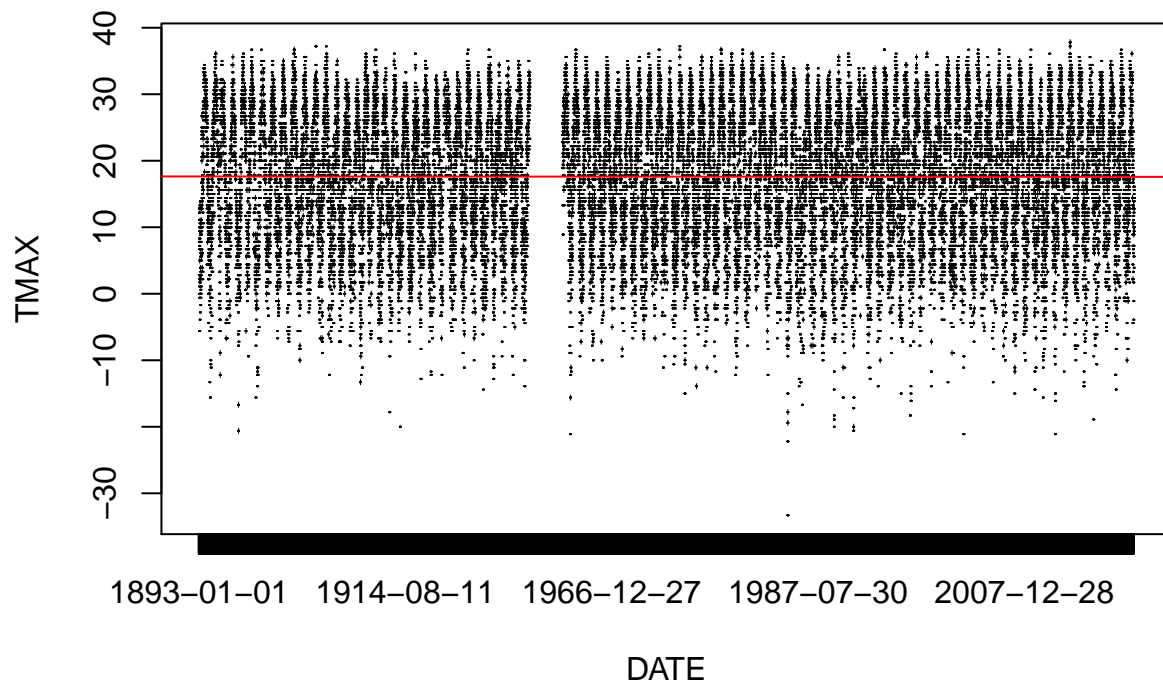
Chapter 3 of R

```r
climate_data$Month = format(as.Date(climate_data$NewDate), format = "%m")
climate_data$Year = format(climate_data$NewDate, format="%Y")

MonthlyTMAXMean = aggregate(TMAX ~ Month + Year, climate_data, mean)
MonthlyTMAXMean$YEAR = as.numeric(MonthlyTMAXMean$Year)
MonthlyTMAXMean$MONTH = as.numeric(MonthlyTMAXMean$Month)
str(MonthlyTMAXMean)

## 'data.frame':    1037 obs. of  5 variables:
##  $ Month: chr  "01" "02" "03" "04" ...
##  $ Year : chr  "1893" "1893" "1893" "1893" ...
##  $ TMAX : num  8.08 5.84 9.48 15.51 21.2 ...
##  $ YEAR : num  1893 1893 1893 1893 1893 ...
##  $ MONTH: num  1 2 3 4 5 6 7 8 9 10 ...

## Plot of Monthly Max Temp
plot(MonthlyTMAXMean$TMAX, ty='l')
```
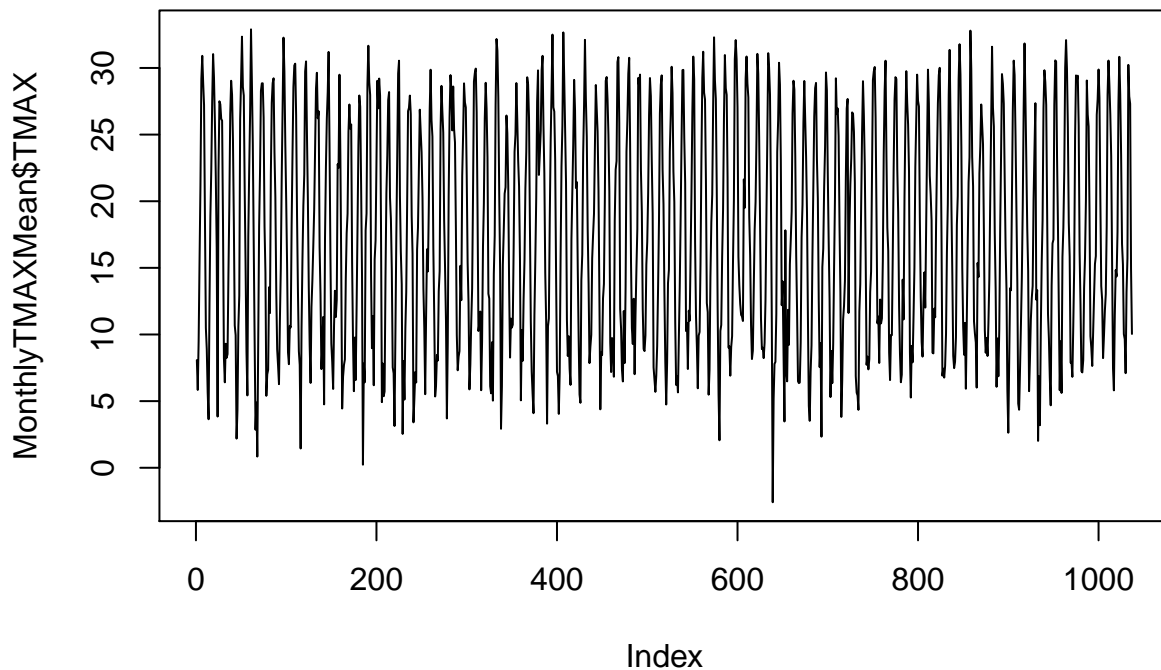
```
plot(TMAX~YEAR, data=MonthlyTMAXMean[MonthlyTMAXMean$Month=="05",],
     ty='l', xlim=c(1890, 2020))
May.lm <- lm(TMAX~YEAR, data=MonthlyTMAXMean[MonthlyTMAXMean$Month=="05",])
summary(May.lm)
```

```
##
## Call:
## lm(formula = TMAX ~ YEAR, data = MonthlyTMAXMean[MonthlyTMAXMean$Month ==
##     "05", ])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -8.1654 -1.1589 -0.0991  1.5962  5.3794
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 27.407834  11.802573   2.322   0.0226 *
## YEAR        -0.003485   0.006021  -0.579   0.5642
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.318 on 86 degrees of freedom
## Multiple R-squared:  0.00388,    Adjusted R-squared:  -0.007703
## F-statistic: 0.335 on 1 and 86 DF,  p-value: 0.5642
```
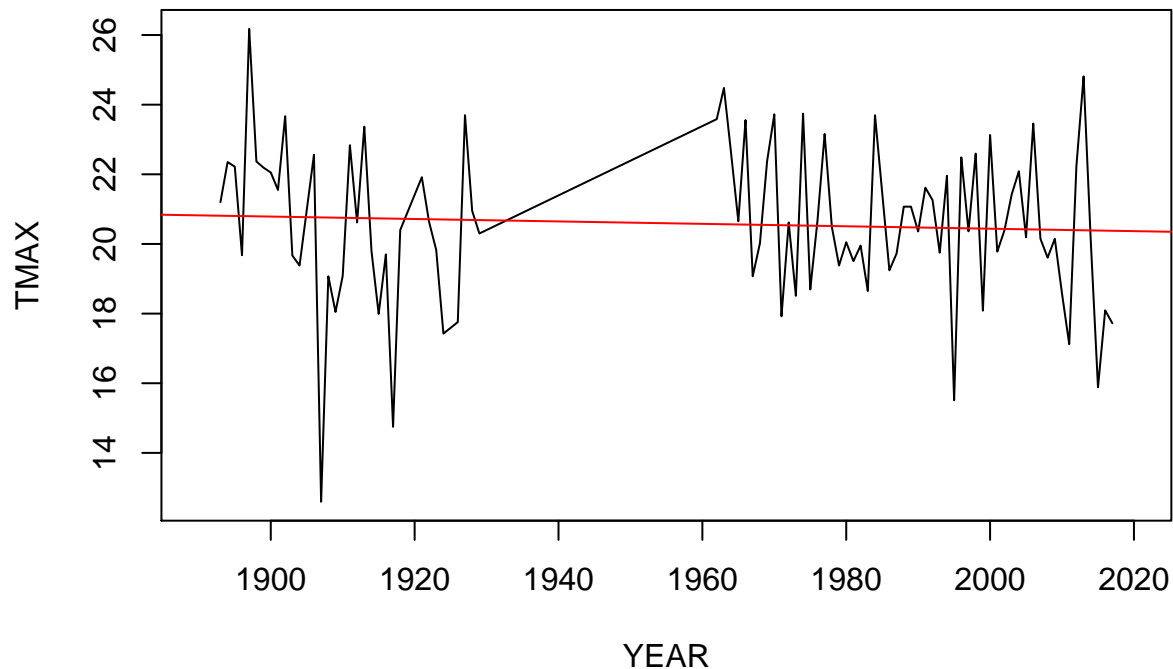
```
abline(coef(May.lm), col="red")
```


"'{r only important if you find a model, include=FALSE}

First I create a vector of months

Months = c("January", "February", "March", "April", "May", "June", "July", "August", "September", "October", "November", "December")

Create a panel so I can see all the figures at once.

par(mfrow = c(4, 3), mar = c(5, 4, 3, 2) + 0.1) TMAXresult <- NA for (i in 1:12) { # plot(MonthlyTMAXMean£TMAX[MonthlyTMAXMean£Month==i], # ty='l') plot(TMAX ~ YEAR, data = MonthlyTMAXMean[MonthlyTMAXMean$MONTH == i,], ty = "l", las = 1, xlim = c(1940,2020), main = Months[i]) Month.lm <- lm(TMAX ~ YEAR, data == MonthlyTMAXMean[MonthlyTMAXMean$MONTH == i,])

summary(Month.lm)

abline(coef(Month.lm), col = "red")

TMAXresult <- rbind(TMAXresult, cbind(Months[i], round(coef(Month.lm)[2], 4), round(summary(Month.lm)$coefficients$[2,_ 3))) } "'