# 해양자료 그래프1

*송태윤*

*2016년 5월 3일*

## 관할해역 자료 가시화

- 테이블
- 자료차트
- 통계그래프

## 그래프 분류

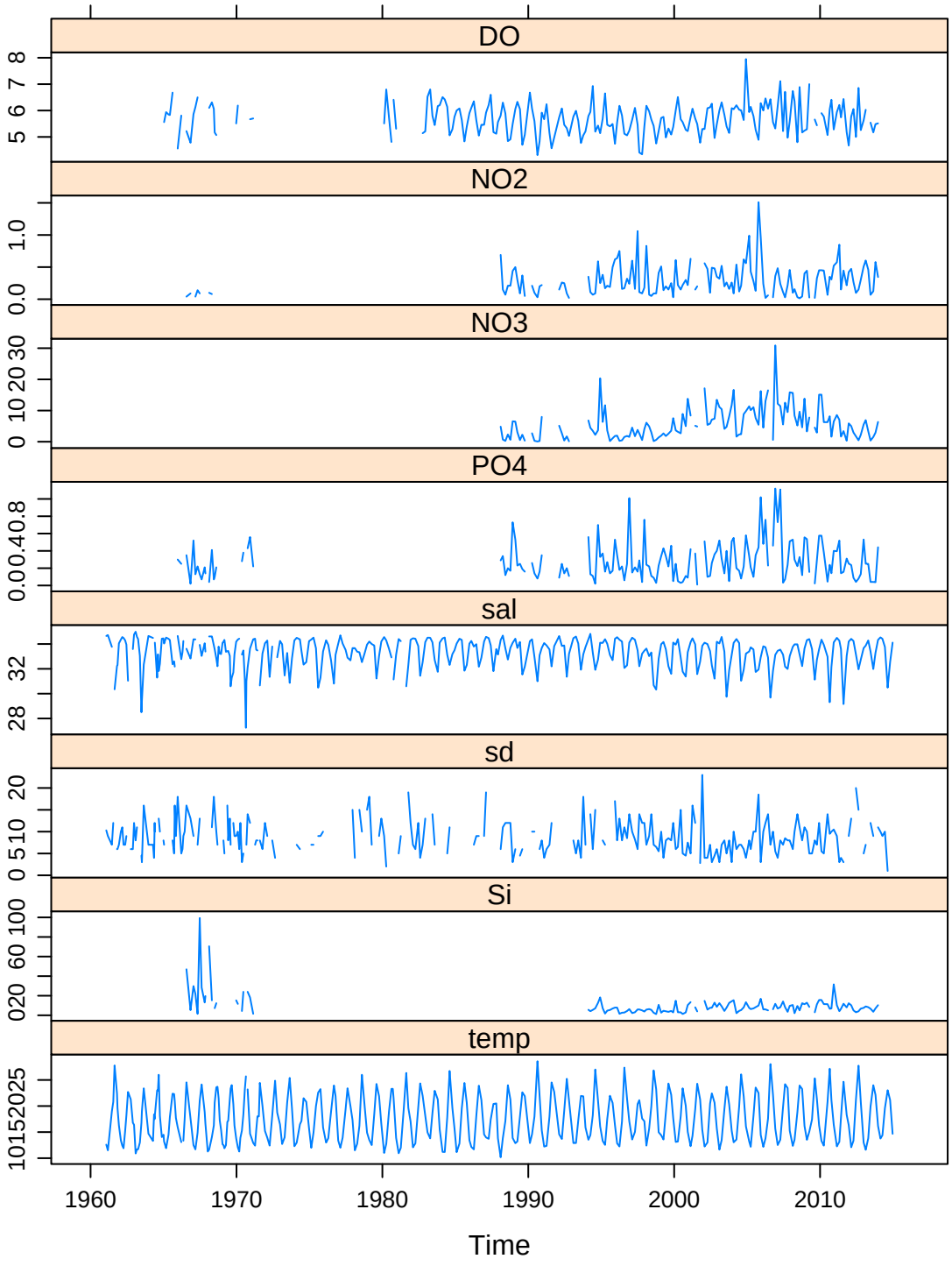
| 그래프 | 자료차트 | 통계그래프 | 공간분석 | 단변량 | 다변량 | 관련자료특징 | 적용 |
|---|---|---|---|---|---|---|---|
| 단변수시간및 정점별 그래프 | V | v | | V | | | V |
| 분산표시형 X-Y그래프(산포도) | v | v | | | V | | V |
| 수심기준X-Y 그래프 | V | | | V | | | V |
| T-S 다이어그램 | V | | | | V | | V |
| 시계열 그래프(선,막대) | V | | | V | | | V |
| 시계열 그래프(타일형) | V | | | | | | V |
| 시계열-수직프로파일 그래프 | v | | | V | | | |
| 시계열벡터 그래프 | v | | | V | | | |
| 수직프로파일벡터 그래프 | v | | | V | | | |
| 수평벡터도 | v | | V | | | | |
| 수평분포도 컬러맵 | v | v | V | V | | | |
| 수평분포도 컨투어맵 | v | | V | V | | | |
| 기호형분포도 | v | | V | V | | | |
| 영역표시형 분포도 | v | v | V | V | | | |
| 풍속그래프 | v | v | | V | | | |
| 입도삼각다이어그램 | v | | | V | | | V |
| 누적막대그래프 | | v | | V | | | V |
| 파이챠트 | | v | | V | | | |
| 꺽은선 그래프 | v | v | | V | | | V |
| 다변수분포형 그래프 | v | | | | V | | |
| 히스토그램형 분포도 | | v | | V | | | V |
| 상관분석 그래프 | | v | | | V | | |

| 그래프 | 자료차트 | 통계그래프 | 공간분석 | 단변량 | 다변량 | 관련자료특징 | 적용 |
|---|---|---|---|---|---|---|---|
| Spectrum, FFT분석 | | v | | V | | | |
| PCA 분석 | | v | | | V | | |
| 군집분석 | | v | | | v | | |

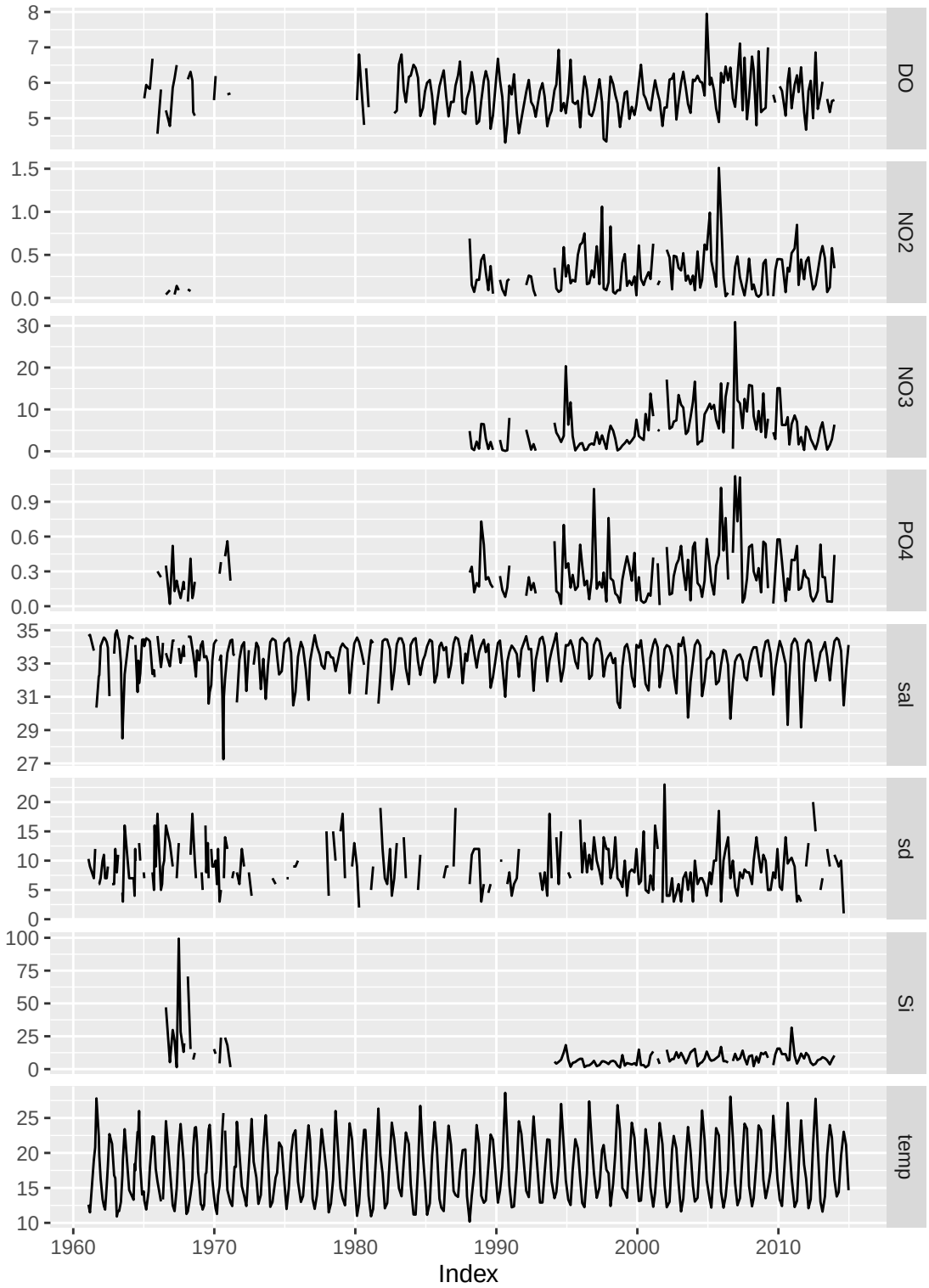
```
require(ggplot2)
require(marelac)
require(lattice)
require(latticeExtra)
require(zoo)
require(dplyr)
# 자료불러오기
load("nfrdi_wq01.RData", verbose=T) # 정선관측 질검증자료
```

```
## Loading objects:
##   nfrdi.wq01
```

```
#================================================================================
#
# 정점선택, 다중변수 시계열 자료
#  (패키지 zoo)
#--------------------------------------------------------------------------------
nfrdi_20701 <- filter(nfrdi.wq01, point_name=="207-01" & obs_depth == 0) # 정점 207-01 & 표층
nfrdi_20701.zoo <- zoo(nfrdi_20701[, 4:11], nfrdi_20701$obsTime)
xyplot(nfrdi_20701.zoo, layout=c(1, ncol(nfrdi_20701.zoo)))
```

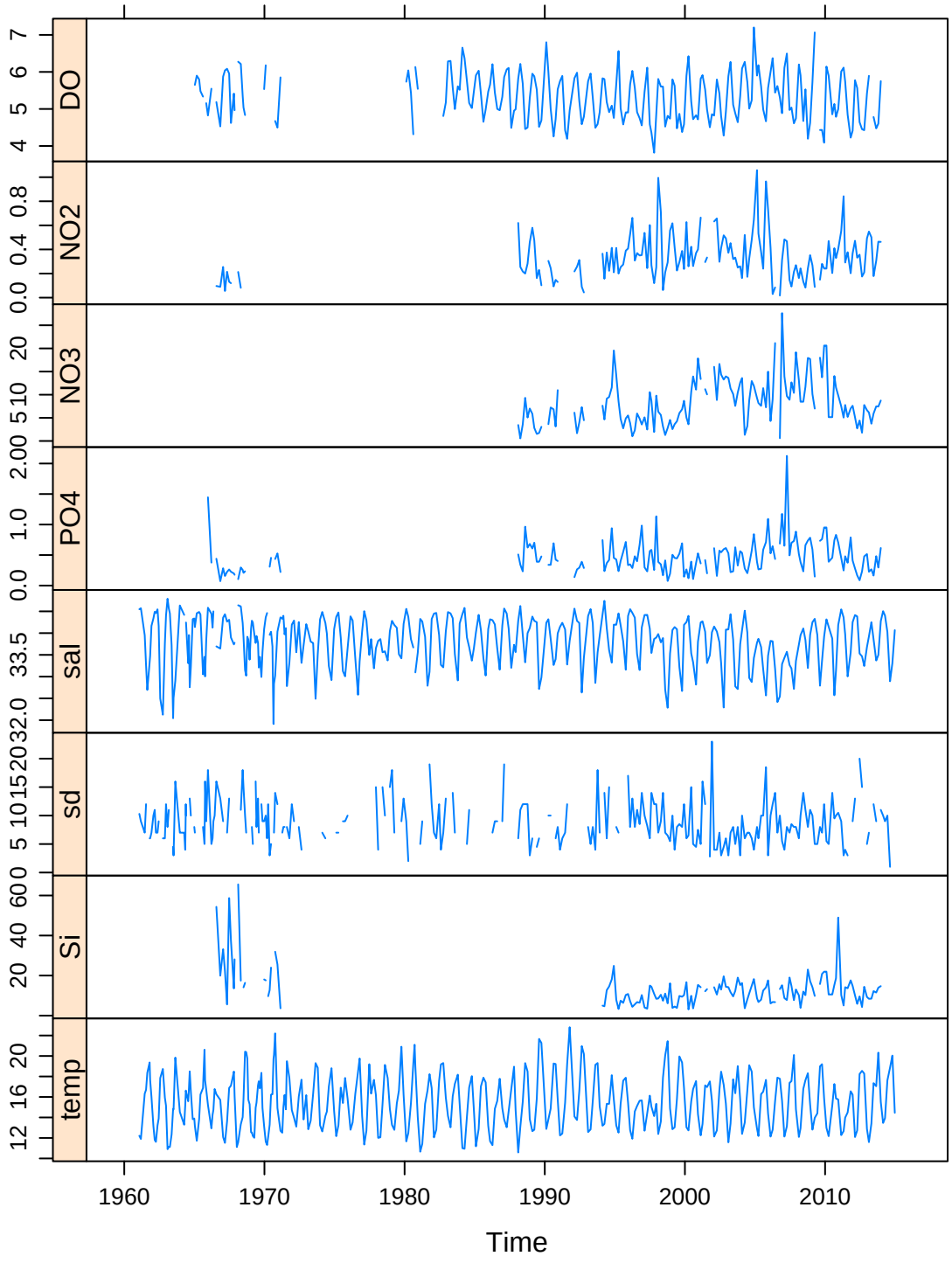



```
# ggplot
autoplot(nfrdi_20701.zoo) + facet_free()
```



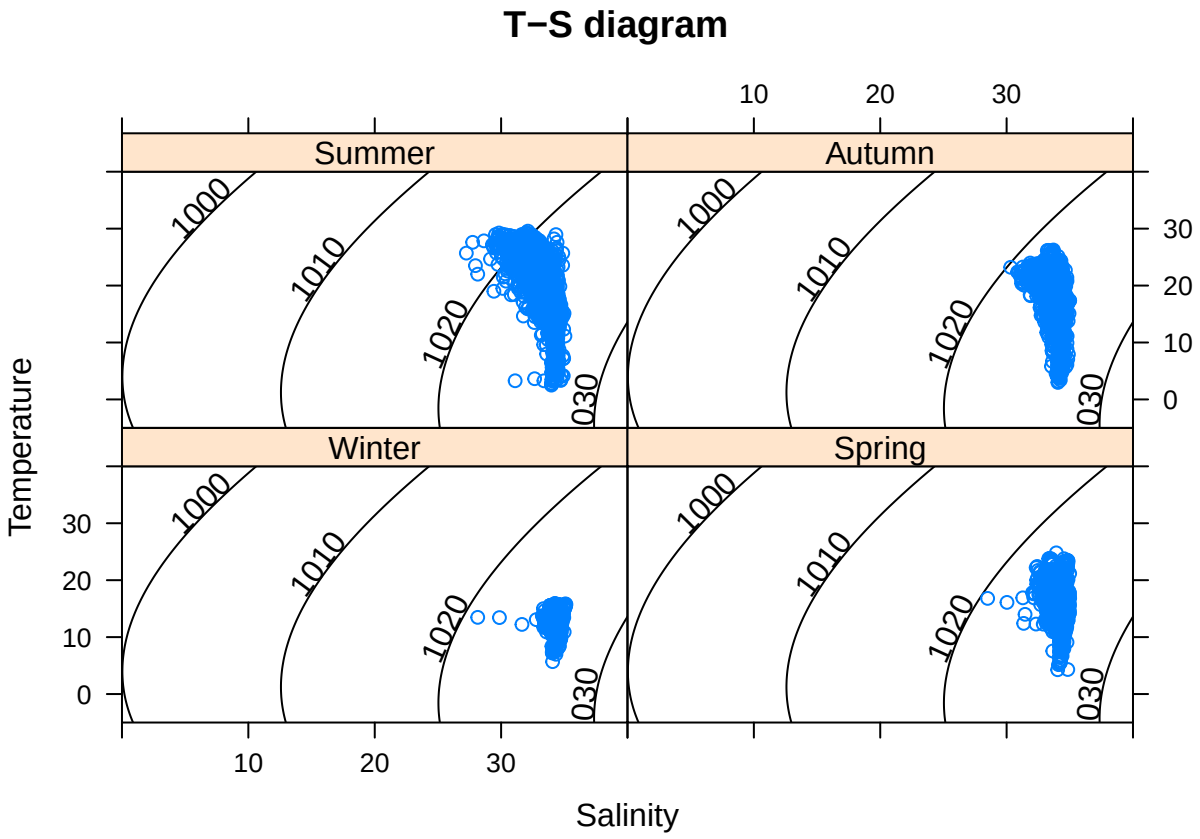

```
require(dplyr)
require(plyr)
```

```r
# 정점 207-01에 대한 다중변수들의 수심평균 시계열
nfrdi_20701_mdepth <- nfrdi.wq01 %>% filter(point_name=="207-01") %>%
  group_by(obsTime) %>% select(DO, NO2, NO3, PO4, sal, sd, Si, temp) %>% summarise_each(funs(mean(.,na.
nfrdi_20701_mdepth.zoo <- zoo(nfrdi_20701_mdepth[, -1], nfrdi_20701_mdepth$obsTime)
xyplot(nfrdi_20701_mdepth.zoo, layout=c(1, ncol(nfrdi_20701_mdepth.zoo)), strip=FALSE, strip.left=TRUE)
```

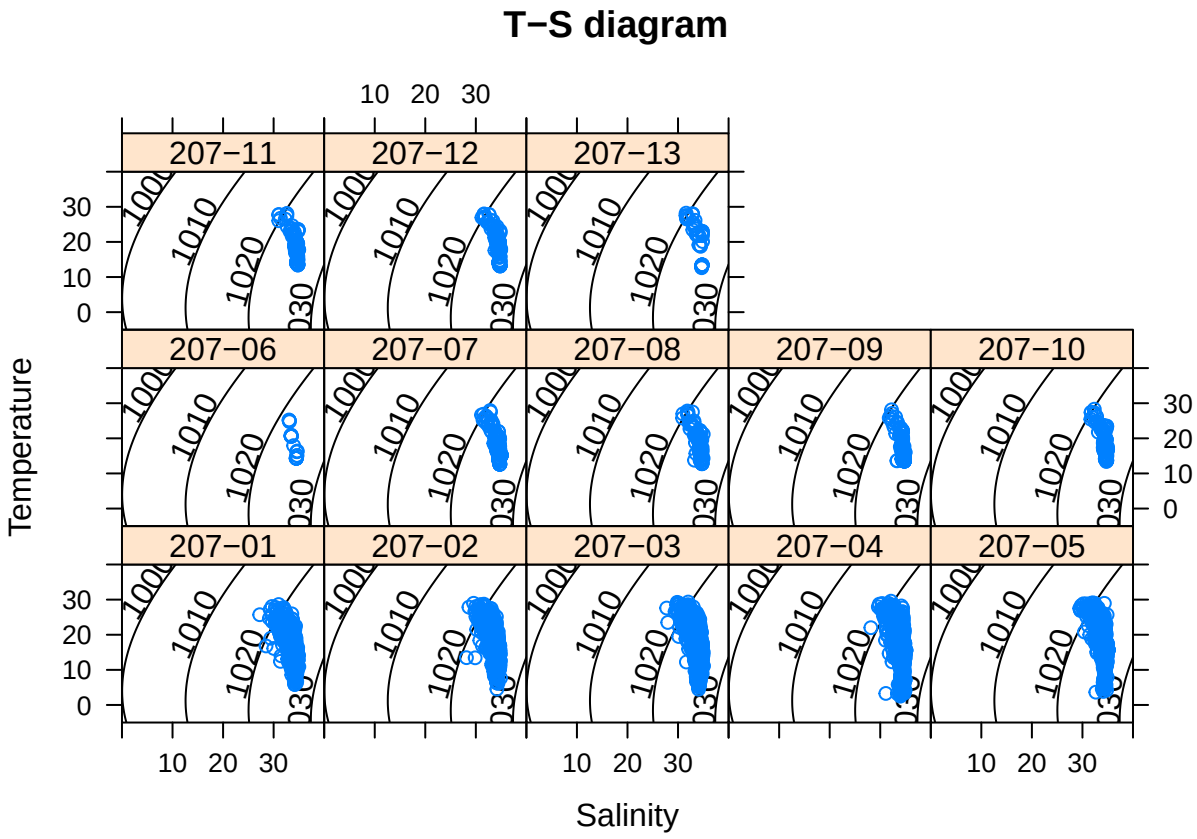

DO
NO2
NO3
PO4
sal
sd
Si
temp
Time
1960
1970
1980
1990
2000
2010

```
#-------------------------------------------------------------------------------
#  T-S diagram
#-------------------------------------------------------------------------------
```

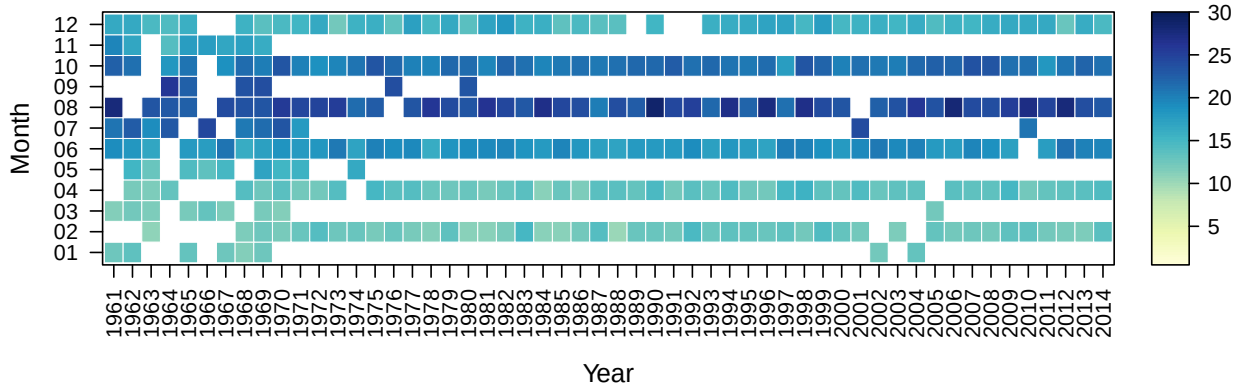
```r
nfrdi_sline <- nfrdi.wq01 %>% filter(sline=="207") # 정점간 비교

library(marelac)
library(lattice)
library(latticeExtra)
library(dplyr)
library(reshape2)
Seasons.f <-factor(nfrdi_sline$Seasons,levels=c(1,2,3,4),
                   labels=c("Winter", "Spring", "Summer", "Autumn")) # 계절별

Sal <- seq(0, 40, by=0.5)   # x축 염분범위
Temp <- seq(-5, 40, by=0.5) # y축 수온범위
Val <- outer(X=Sal, Y=Temp, FUN= function(X, Y) sw_dens(S = X, t = Y))  # 염분, 수온을 이용한 밀도자료 생성
Val3d <- melt(Val)
Temp.x <- rep(seq(-5, 40, by=0.5), each= length(Sal))
Sal.x <- rep(seq(0, 40, by=0.5), length(Temp))
Val3d1 <- data.frame(x=Sal.x, y=Temp.x, z=Val3d$value)

p1 <- xyplot(temp~sal|Seasons.f, data=nfrdi_sline, xlim=c(0,40), ylim=c(-5,40),
             xlab="Salinity", ylab="Temperature", main="T-S diagram")
p1+layer_(panel.contourplot(x = x, y = y, z = z,
   contour = T, subscripts = T, region=F, labels=T), data = Val3d1)
```




```
# 정점별 point_name

Sal <- seq(0, 40, by=0.5)   # x축 염분범위
Temp <- seq(-5, 40, by=0.5) # y축 수온범위
Val <- outer(X=Sal, Y=Temp, FUN= function(X, Y) sw_dens(S = X, t = Y))  # 염분, 수온을 이용한 밀도자료 생성
Val3d <- melt(Val)
Temp.x <- rep(seq(-5, 40, by=0.5), each= length(Sal))
Sal.x <- rep(seq(0, 40, by=0.5), length(Temp))
Val3d1 <- data.frame(x=Sal.x, y=Temp.x, z=Val3d$value)

p1 <- xyplot(temp~sal|point_name, data=nfrdi_sline, xlim=c(0,40), ylim=c(-5,40),
             xlab="Salinity", ylab="Temperature", main="T-S diagram")
p1+layer_(panel.contourplot(x = x, y = y, z = z,
   contour = T, subscripts = T, region=F, labels=T), data = Val3d1)
```

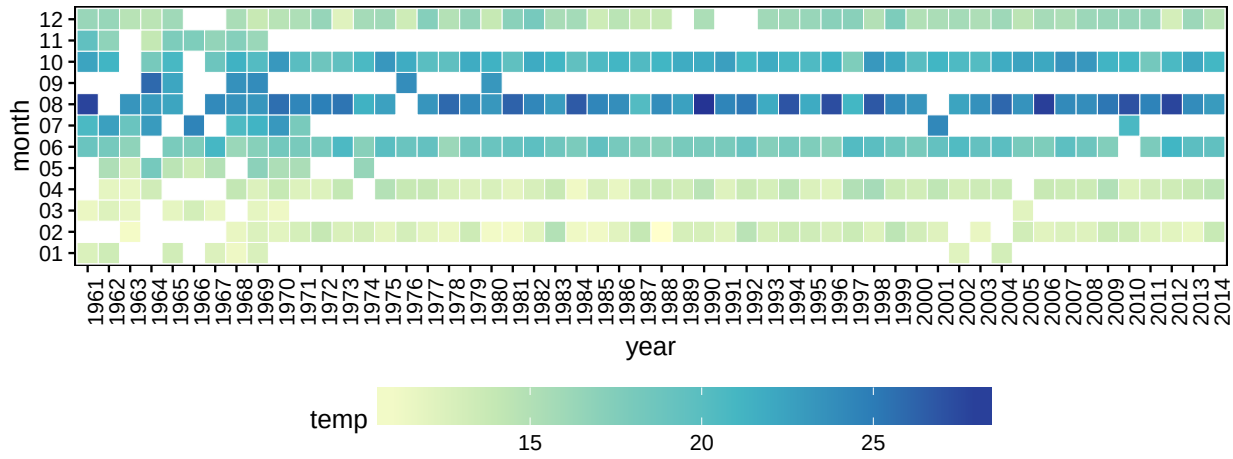



```
library(lattice)
library(RColorBrewer)
levelplot(xtabs(temp~year + month, nfrdi_20701),
          aspect='iso', xlab='Year', ylab='Month',
          col.regions=colorRampPalette(brewer.pal(9, 'YlGnBu')),
          at=seq(0.5, 30, length=100), # specify breaks for the colour ramp
          scales=list(alternating=FALSE, tck=1:0, x=list(rot=90), y=list(rot=0)),border='white')
```

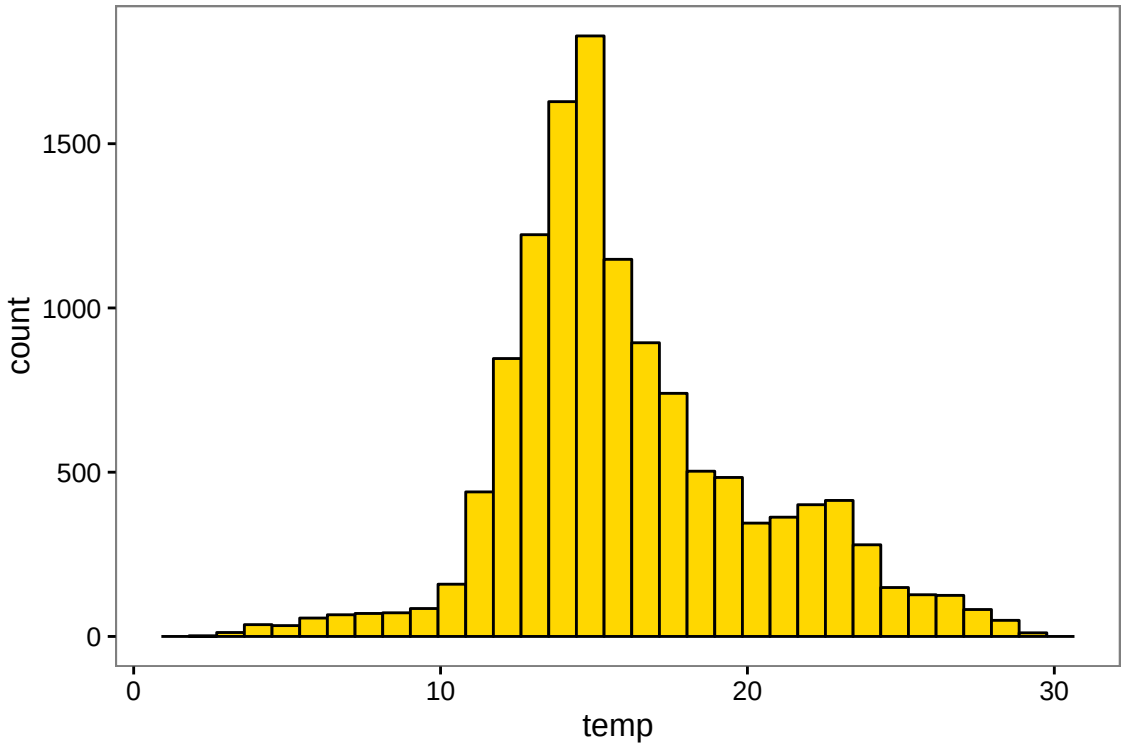



```
#==============================================================================
#
# 한 정점에 대한 월-연도 시계열 (옵션: 정점, 월, 연도, 색깔)
```

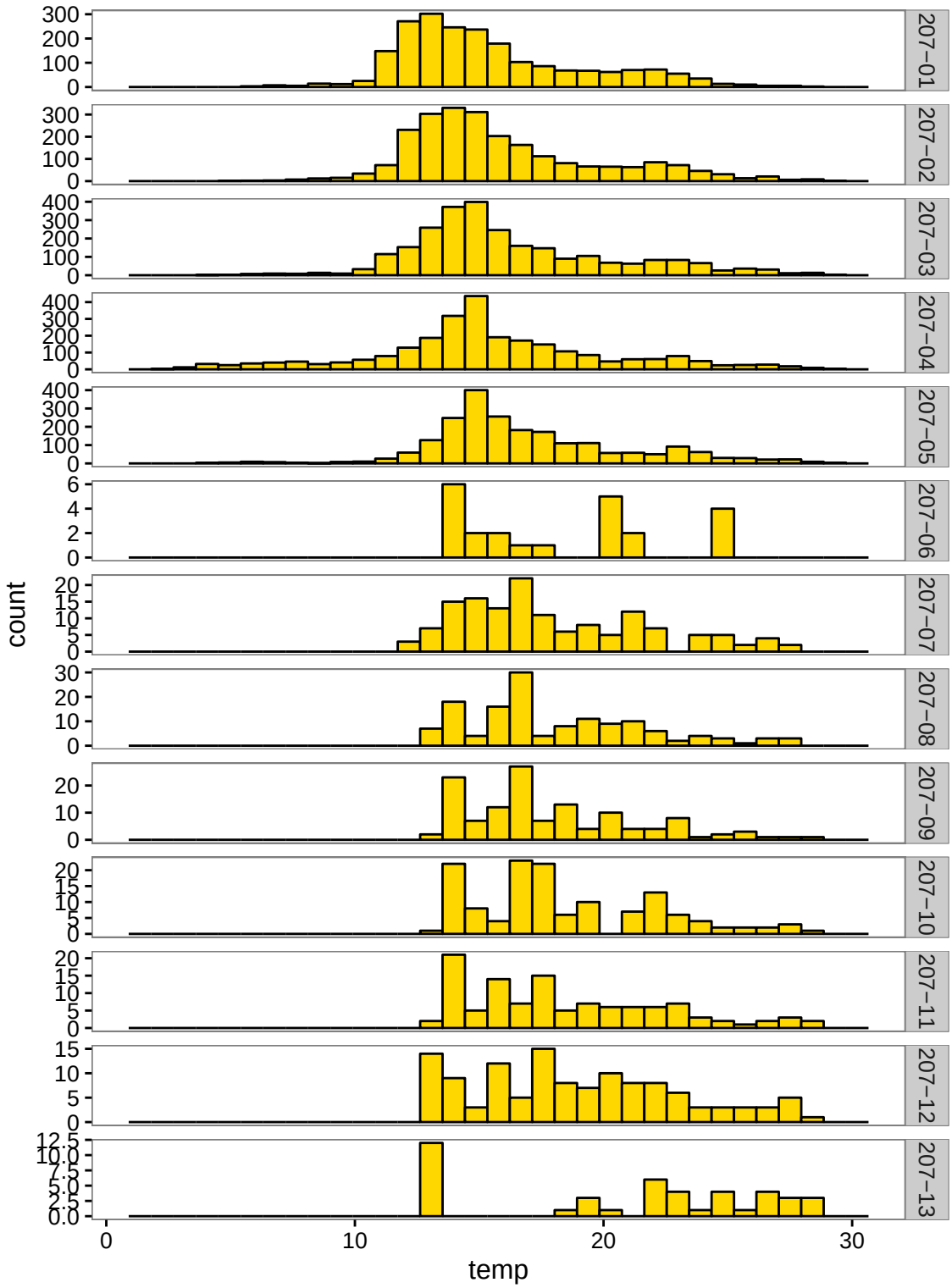
```
#
#-----------------------------------------------------------------------------------------

ggplot(nfrdi_20701, aes(year, month)) +
  #geom_tile(aes(fill = temp), colour = "white") +
  geom_tile(data = subset(nfrdi_20701, !is.na(temp)), aes(fill = temp), colour="white") +
  scale_fill_distiller(palette = "YlGnBu", direction = 1) +
  theme_bw() +
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank()) +
  theme(axis.text.x = element_text(angle = 90, hjust = 1)) +
  theme(panel.border = element_rect(linetype = "solid", colour = "black")) +
  theme(legend.position = "bottom", legend.key.width = unit(2, "cm"),
        panel.grid = element_blank()) +
  coord_equal()
```




```
#=============================================================================================
#  histogram
#---------------------------------------------------------------------------------------------
ggplot(nfrdi_sline, aes(x= temp)) + geom_histogram(fill="gold", colour="black") +
  theme_bw() +
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank())
```

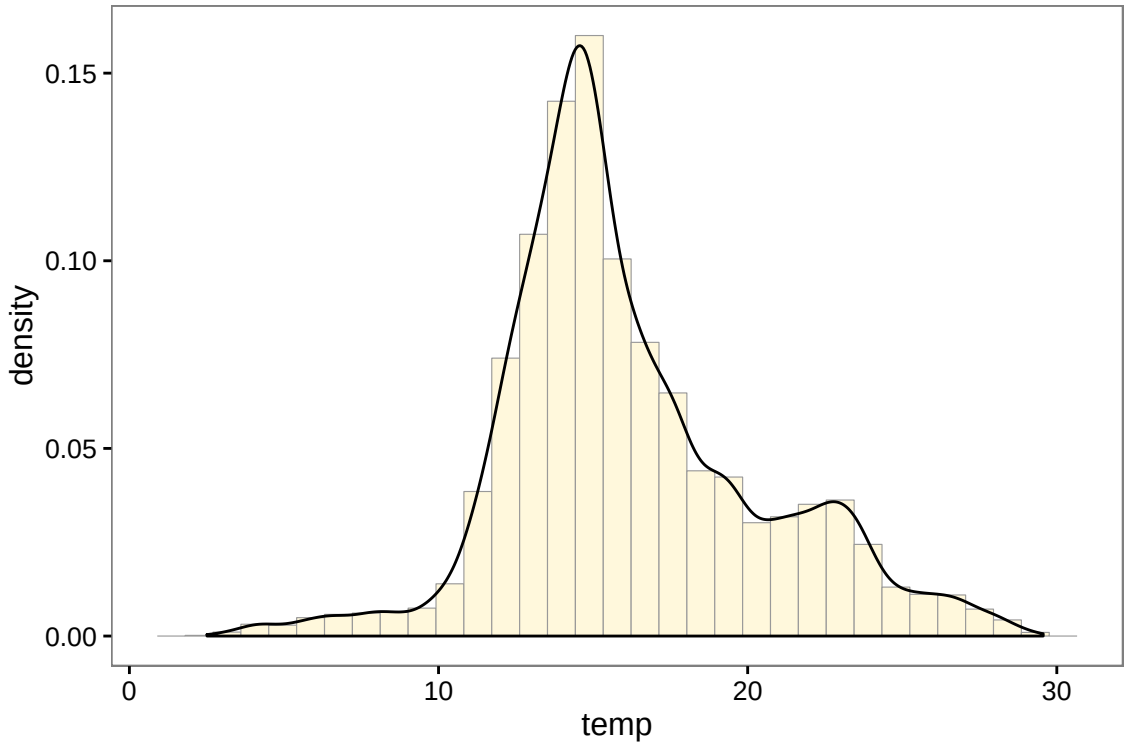



```
# facet 타입: 정점별
ggplot(nfrdi_sline, aes(x= temp)) + geom_histogram(fill="gold", colour="black") +
  theme_bw() +
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank()) +
  facet_grid(point_name ~ ., scales="free")
```

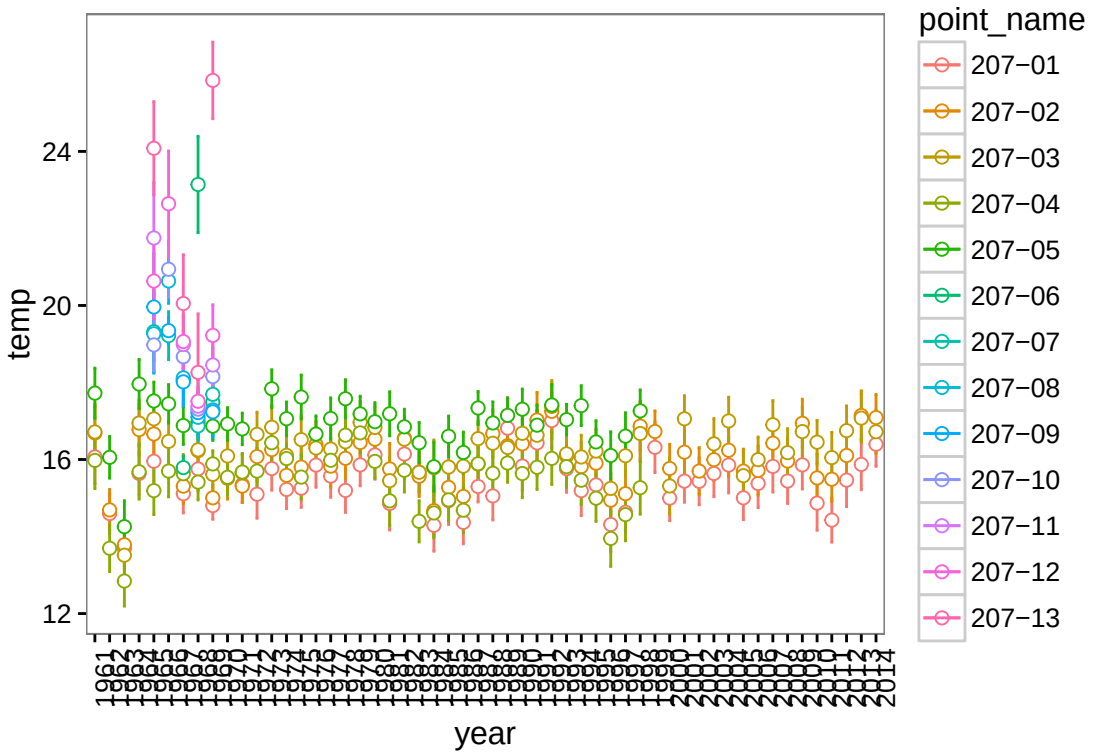



```
# density
ggplot(nfrdi_sline, aes(x=temp, y=..density..)) +
  geom_histogram(fill="cornsilk", colour="grey60", size=.2) +
```

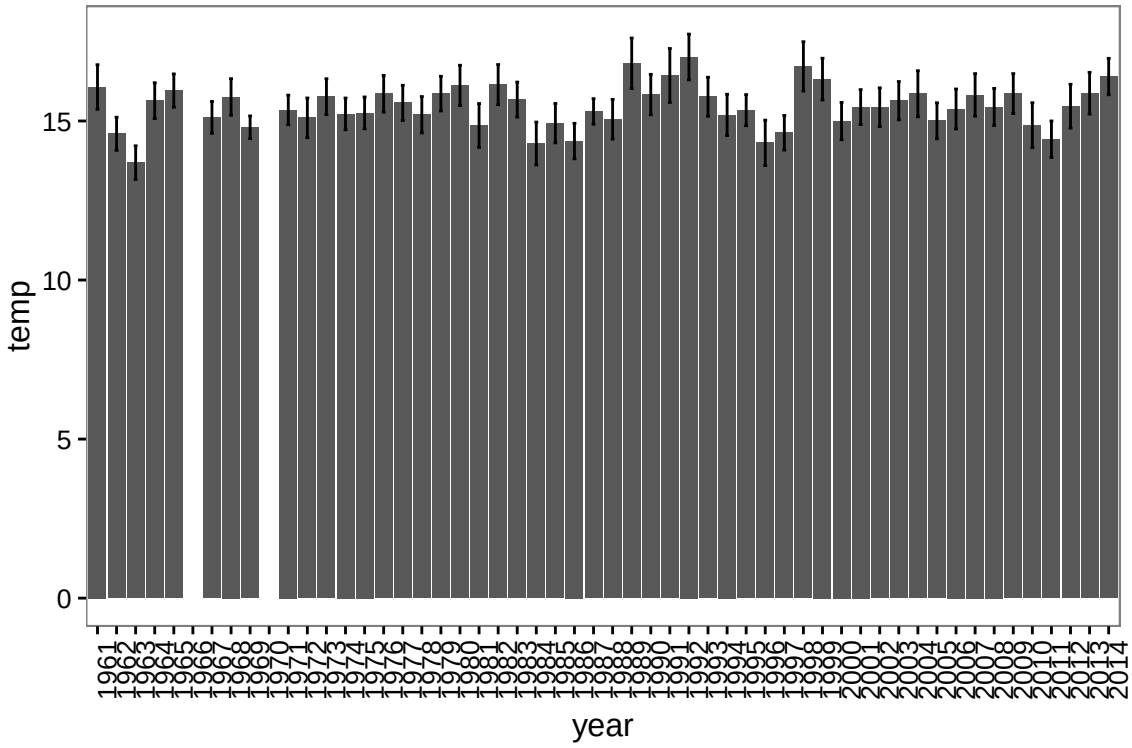
```
  geom_density() +
  theme_bw() +
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank())
```




```
#=============================================================================
# 오차막대
#-----------------------------------------------------------------------------
# line and error Bars
source("./summarySE.R")
pd <- position_dodge(.9)
nfrdi_sline_se <- summarySE(nfrdi_sline, measurevar="temp", groupvars=c("point_name", "year"))
ggplot(nfrdi_sline_se, aes(x=year, y= temp, colour=point_name)) +
  geom_errorbar(aes(ymin=temp-se, ymax=temp+se), width=.2) +
  geom_point(size=2, shape=21, fill="white") +
  geom_line(position=pd) +
  theme_bw() +
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank()) +
   theme(axis.text.x = element_text(angle=90))
```




```
# bar and error bars : 정점선택 예) "207-01"
ggplot(filter(nfrdi_sline_se, point_name=="207-01"), aes(x=year, y= temp)) +
  geom_bar(stat="identity") +
  geom_errorbar(aes(ymin=temp-se, ymax=temp+se), width=.2) +
  theme_bw() +
  theme(panel.grid.major = element_blank(),
        panel.grid.minor = element_blank()) +
  theme(axis.text.x = element_text(angle=90))
```


temp
15
10
5
0
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
year