Homework1

Sitian Qian

2/21/2020

设置路径

```
setwd("~/codes/R")
dataPath="rData"
```

读入数据

```
WL <- read.table(paste(dataPath,"AQ_FSPMC_WanLiu.csv",sep="/"),skip = 3,header = TRUE, sep = ",")
USE <- read.table(paste(dataPath,"AQ_FSPMC_USEmbassy.csv",sep="/"),skip = 3,header = TRUE, sep = "
PRE <- read.table(paste(dataPath,"A_PRE.csv",sep = "/"),skip = 3,header = TRUE, sep = ",")
TEMP <- read.table(paste(dataPath,"A_TEMP.csv",sep = "/"),skip = 5,header = TRUE, sep = ",",
                   col.names = c("Date","Time","Height","DegreeCelsius","Source","ErrFlag","Detail
                   colClasses = c("character","character",NA,NA,NA,NA,NA))
RH <- read.table(paste(dataPath,"A_RH.csv",sep = "/"),skip = 3,header = TRUE, sep = ",")
WIND <- read.table(paste(dataPath,"A_WIND.csv",sep = "/"),skip = 3,header = TRUE, sep = ",")
```

绘制 PRE: 气压（按月平均）

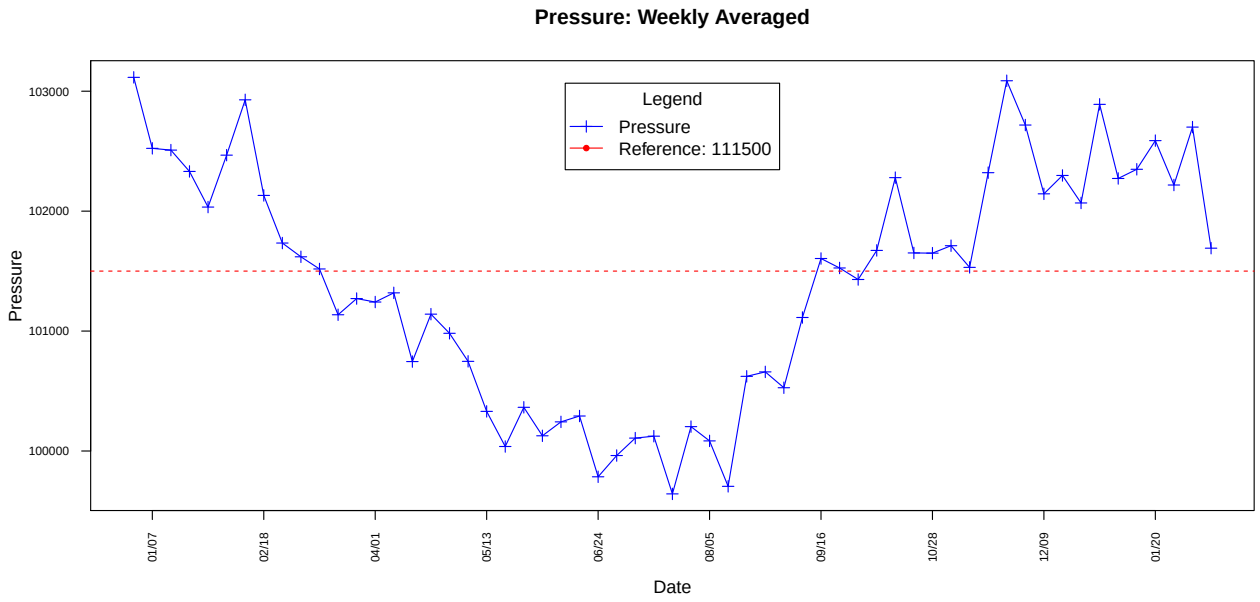
转换时间

```
PRE$TimeST <- strptime(as.character(PRE$Time),format = "%Y/%m/%d %H:%M:%S")
PRE_Weekly_Mean <- aggregate(Pascal ~ cut(TimeST,"1 week"), PRE, mean)
colnames(PRE_Weekly_Mean)[1] <- "WeeklyTime"
PRE_Weekly_Mean$WeeklyTimeST <- strptime(as.character(PRE_Weekly_Mean$WeeklyTime),format = "%Y-%m-
```

绘图

```
plot(PRE_Weekly_Mean$WeeklyTimeST,PRE_Weekly_Mean$Pascal,pch=3,lty=1,xaxt="n",yaxt="n",cex.lab=1,
     main = "Pressure: Weekly Averaged",col="blue")
xpos <- c(1:10)
xpos <- (xpos-1)*6 + 2
labelPRE =  strftime(PRE_Weekly_Mean$WeeklyTimeST
```

```
                    [xpos],"%m/%d")
axis(1, at=as.numeric(PRE_Weekly_Mean$WeeklyTimeST[xpos]), labels=labelPRE, col.axis="black", las=
i <- c(1:6)
ypos <- (i-1)*1000+100000
axis(2, at=ypos, col.axis="black", las=1, cex.axis=0.7, tck=-0.02)
abline(h=c(101500), lty=2, col="red")
legend("top", inset=0.05,c("Pressure","Reference: 111500"),title = "Legend", lty=c(1,1), pch=c(3,2
```



绘制 TEMP: 温度（来自 AAXX：按周平均）

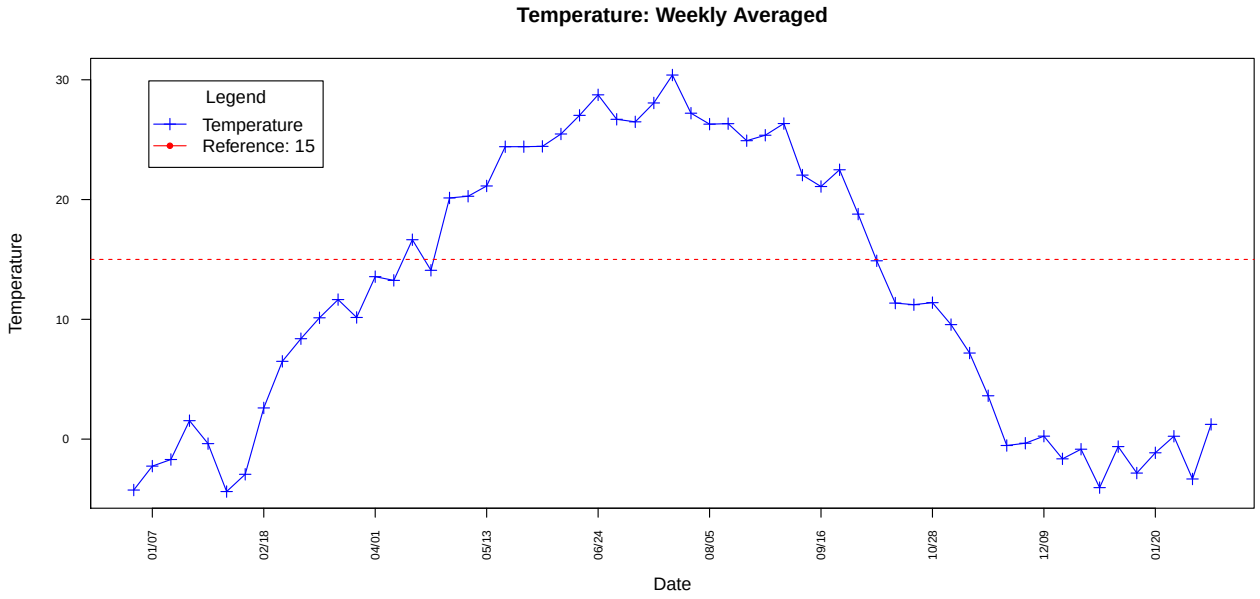
转换时间

```
selTEMP <- subset(TEMP, Source == "GTS_AAXX", select = c(Date,Time,DegreeCelsius , Source) )
selTEMP$FullTime <- paste(selTEMP$Date,selTEMP$Time,sep = " ")
selTEMP$TimeST <- strptime(as.character(selTEMP$FullTime),format = "%Y%m%d %H%M%S")
TEMP_Weekly_Mean <- aggregate(DegreeCelsius ~ cut(TimeST,"1 week"), selTEMP, mean)
colnames(TEMP_Weekly_Mean)[1] <- "WeeklyTime"
TEMP_Weekly_Mean$WeeklyTimeST <- strptime(as.character(TEMP_Weekly_Mean$WeeklyTime),format = "%Y-%
```

绘图

```
plot(TEMP_Weekly_Mean$WeeklyTimeST,TEMP_Weekly_Mean$DegreeCelsius,pch=3,lty=1,xaxt="n",yaxt="n",ce
     main = "Temperature: Weekly Averaged",col="blue")
xpos <- c(1:10)
xpos <- (xpos-1)*6 + 2
```

```
labelTEMP =  strftime(TEMP_Weekly_Mean$WeeklyTimeST
                     [xpos],"%m/%d")
axis(1, at=as.numeric(TEMP_Weekly_Mean$WeeklyTimeST[xpos]), labels=labelTEMP, col.axis="black", la
i <- c(1:6)
ypos <- (i-1)*10 -20
axis(2, at=ypos, col.axis="black", las=1, cex.axis=0.7, tck=-0.02)
abline(h=c(15), lty=2, col="red")
legend("topleft", inset=0.05,c("Temperature","Reference: 15"),title = "Legend", lty=c(1,1), pch=c(
```



绘制 RH: 相对湿度（来自：AAXX，按周平均）

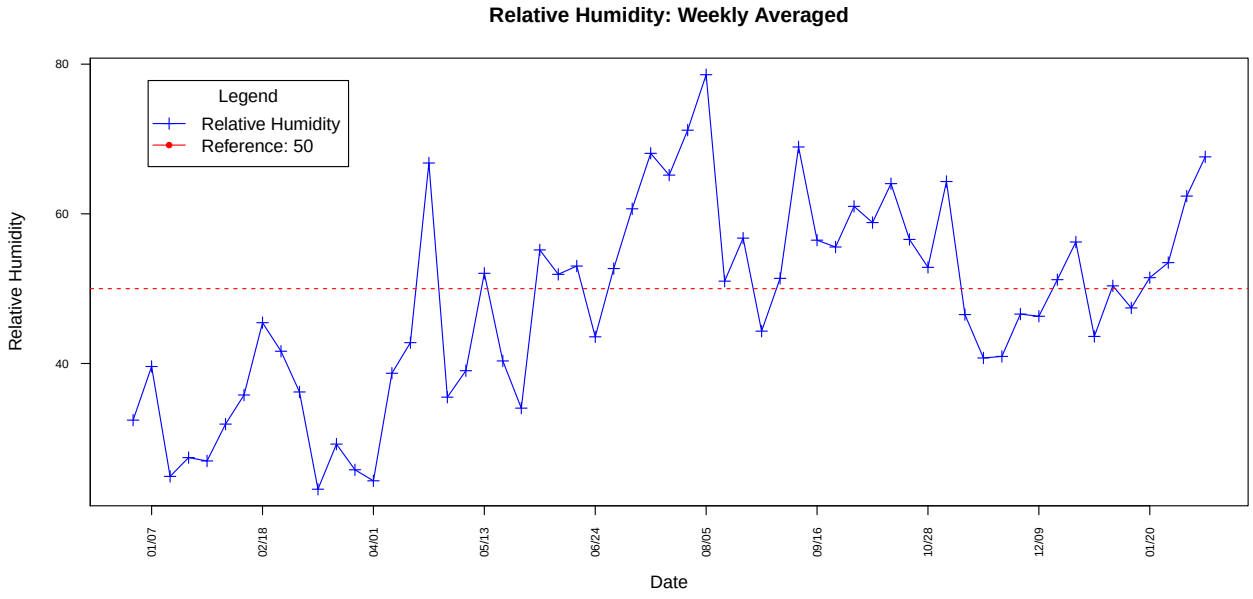
转换时间

```
selRH <- subset(RH, Source == "GTS_AAXX", select = c(Time,X. , Source) )
selRH$TimeST <- strptime(as.character(selRH$Time),format = "%Y/%m/%d %H:%M:%S")
RH_Weekly_Mean <- aggregate(X. ~ cut(TimeST,"1 week"), selRH, mean)
colnames(RH_Weekly_Mean)[1] <- "WeeklyTime"
RH_Weekly_Mean$WeeklyTimeST <- strptime(as.character(RH_Weekly_Mean$WeeklyTime),format = "%Y-%m-%d
```

绘图

```
plot(RH_Weekly_Mean$WeeklyTimeST,RH_Weekly_Mean$X.,pch=3,lty=1,xaxt="n",yaxt="n",cex.lab=1, type =
     main = "Relative Humidity: Weekly Averaged",col="blue")
xpos <- c(1:10)
xpos <- (xpos-1)*6 + 2
```

```
labelRH =  strftime(RH_Weekly_Mean$WeeklyTimeST
                    [xpos],"%m/%d")
axis(1, at=as.numeric(RH_Weekly_Mean$WeeklyTimeST[xpos]), labels=labelRH, col.axis="black", las=2,
i <- c(1:6)
ypos <- (i-1)*20
axis(2, at=ypos, col.axis="black", las=1, cex.axis=0.7, tck=-0.02)
abline(h=c(50), lty=2, col="red")
legend("topleft", inset=0.05,c("Relative Humidity","Reference: 50"),title = "Legend", lty=c(1,1),
```



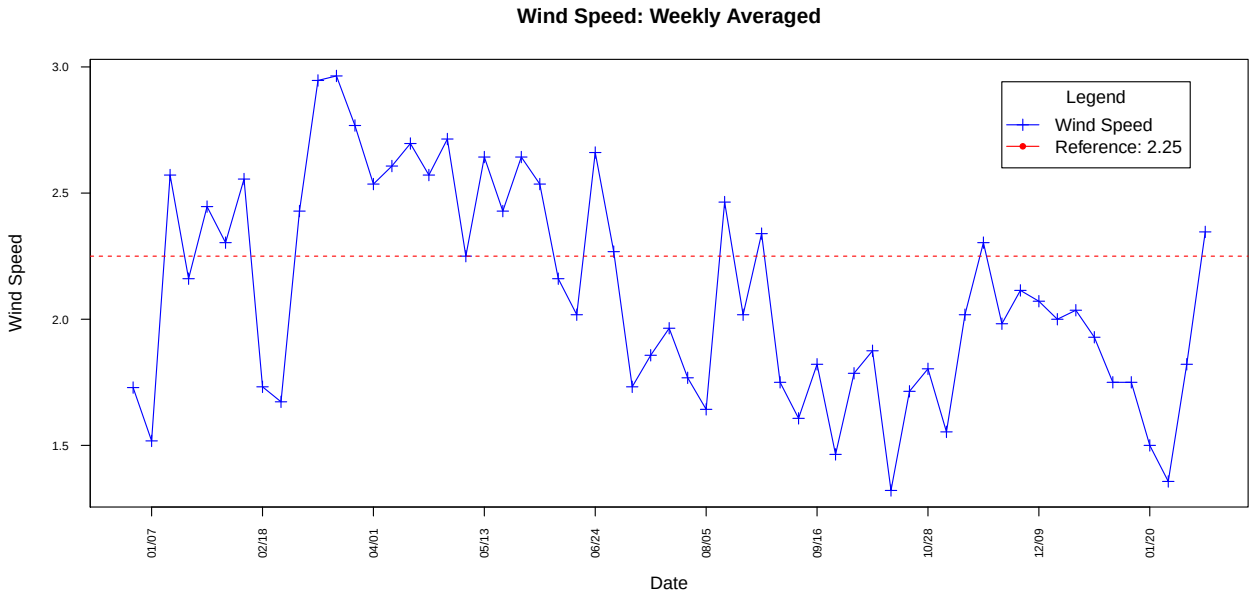
绘制 WIND：风向与风速（来自：AAXX，按周平均）

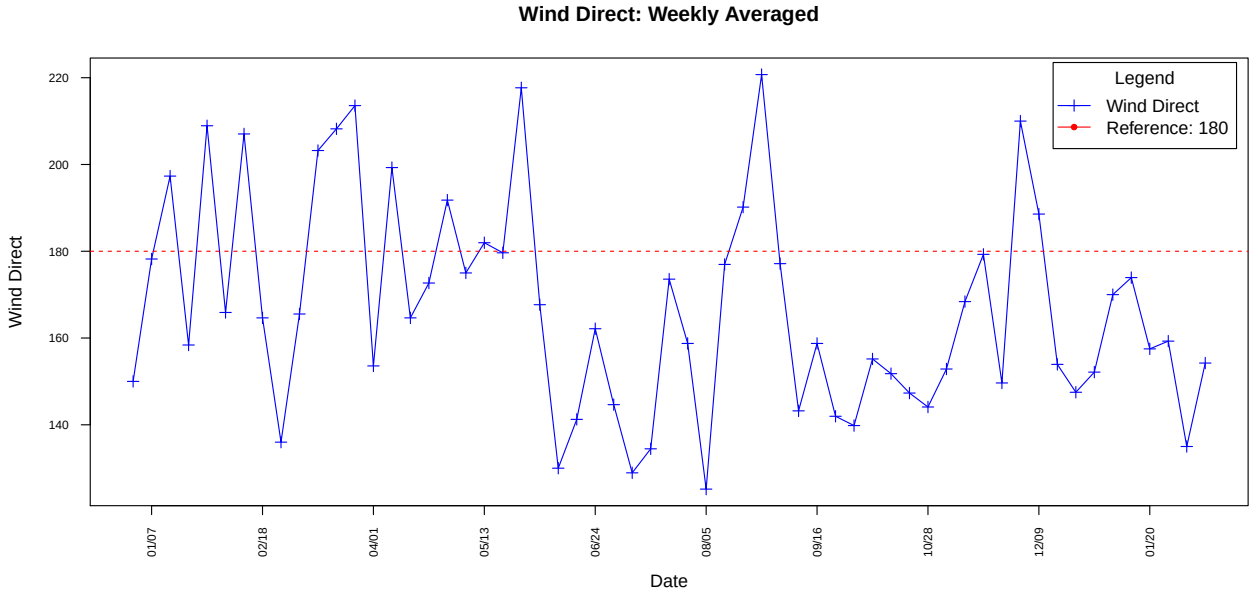
转换时间

```
selWIND <- subset(WIND, Source == "GTS_AAXX", select = c(Time,m.s,Degree , Source) )
selWIND$TimeST <- strptime(as.character(selWIND$Time),format = "%Y/%m/%d %H:%M:%S")
Speed_Weekly <- aggregate(m.s ~ cut(TimeST,"1 week"), selWIND, mean)
colnames(Speed_Weekly)[1] <- "WeeklyTime"
Speed_Weekly$WeeklyTimeST <- strptime(as.character(Speed_Weekly$WeeklyTime),format = "%Y-%m-%d")
Direct_Weekly <- aggregate(Degree ~ cut(TimeST,"1 week"), selWIND, mean)
colnames(Direct_Weekly)[1] <- "WeeklyTime"
Direct_Weekly$WeeklyTimeST <- strptime(as.character(Direct_Weekly$WeeklyTime),format = "%Y-%m-%d")
```

绘图

```
par(mfrow=c(2,1))
plot(Speed_Weekly$WeeklyTimeST,Speed_Weekly$m.s,pch=3,lty=1,xaxt="n",yaxt="n",cex.lab=1, type = "o
     main = "Wind Speed: Weekly Averaged",col="blue")
xpos <- c(1:10)
xpos <- (xpos-1)*6 + 2
labelRH =  strftime(Speed_Weekly$WeeklyTimeST
                    [xpos],"%m/%d")
axis(1, at=as.numeric(Speed_Weekly$WeeklyTimeST[xpos]), labels=labelRH, col.axis="black", las=2, c
i <- c(1:6)
ypos <- (i-1)*0.5+1
axis(2, at=ypos, col.axis="black", las=1, cex.axis=0.7, tck=-0.02)
abline(h=c(2.25), lty=2, col="red")
legend("topright", inset=0.05,c("Wind Speed","Reference: 2.25"),title = "Legend", lty=c(1,1), pch=
plot(Direct_Weekly$WeeklyTimeST,Direct_Weekly$Degree,pch=3,lty=1,xaxt="n",yaxt="n",cex.lab=1, type
     main = "Wind Direct: Weekly Averaged",col="blue")
xpos <- c(1:10)
xpos <- (xpos-1)*6 + 2
labelRH =  strftime(Direct_Weekly$WeeklyTimeST
                    [xpos],"%m/%d")
axis(1, at=as.numeric(Direct_Weekly$WeeklyTimeST[xpos]), labels=labelRH, col.axis="black", las=2,
i <- c(1:5)
ypos <- (i-1)*20+140
axis(2, at=ypos, col.axis="black", las=1, cex.axis=0.7, tck=-0.02)
abline(h=c(180), lty=2, col="red")
legend("topright", inset=0.01,c("Wind Direct","Reference: 180"),title = "Legend", lty=c(1,1), pch=
```





绘制两站 PM2.5：USE & WL（来自：AAXX，按周平均）

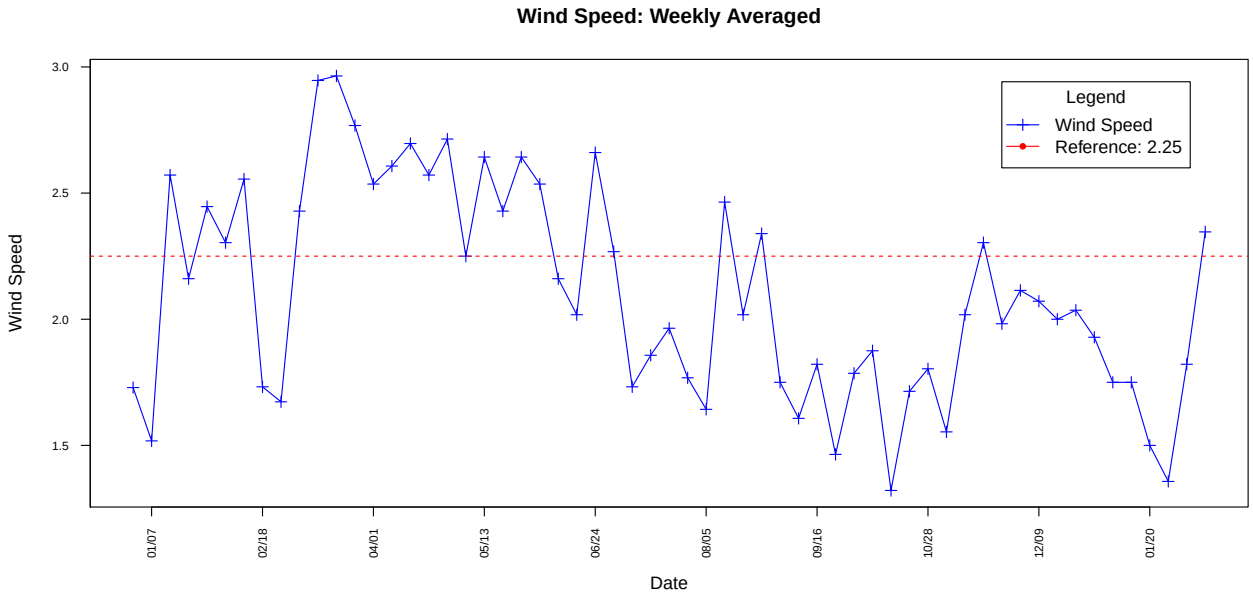
转换时间

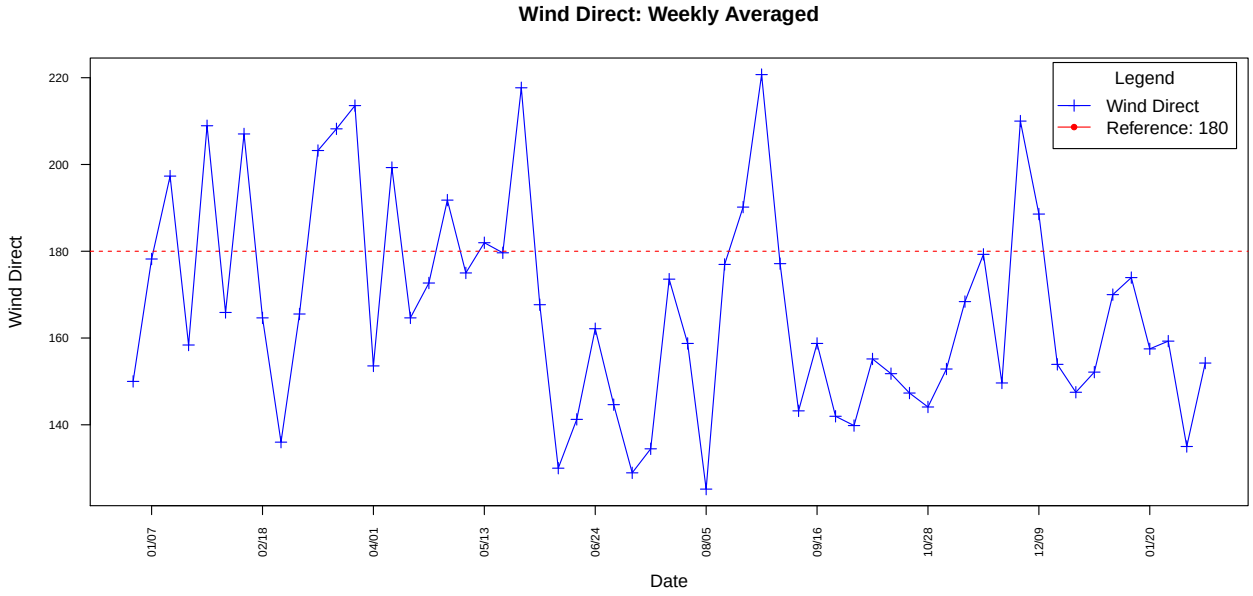
```
selWIND <- subset(WIND, Source == "GTS_AAXX", select = c(Time,m.s,Degree , Source) )
selWIND$TimeST <- strptime(as.character(selWIND$Time),format = "%Y/%m/%d %H:%M:%S")
Speed_Weekly <- aggregate(m.s ~ cut(TimeST,"1 week"), selWIND, mean)
colnames(Speed_Weekly)[1] <- "WeeklyTime"
Speed_Weekly$WeeklyTimeST <- strptime(as.character(Speed_Weekly$WeeklyTime),format = "%Y-%m-%d")
Direct_Weekly <- aggregate(Degree ~ cut(TimeST,"1 week"), selWIND, mean)
```

```
colnames(Direct_Weekly)[1] <- "WeeklyTime"
Direct_Weekly$WeeklyTimeST <- strptime(as.character(Direct_Weekly$WeeklyTime),format = "%Y-%m-%d")
```

绘图

```
par(mfrow=c(2,1))
plot(Speed_Weekly$WeeklyTimeST,Speed_Weekly$m.s,pch=3,lty=1,xaxt="n",yaxt="n",cex.lab=1, type = "o
     main = "Wind Speed: Weekly Averaged",col="blue")
xpos <- c(1:10)
xpos <- (xpos-1)*6 + 2
labelRH =  strftime(Speed_Weekly$WeeklyTimeST
                    [xpos],"%m/%d")
axis(1, at=as.numeric(Speed_Weekly$WeeklyTimeST[xpos]), labels=labelRH, col.axis="black", las=2, c
i <- c(1:6)
ypos <- (i-1)*0.5+1
axis(2, at=ypos, col.axis="black", las=1, cex.axis=0.7, tck=-0.02)
abline(h=c(2.25), lty=2, col="red")
legend("topright", inset=0.05,c("Wind Speed","Reference: 2.25"),title = "Legend", lty=c(1,1), pch=
plot(Direct_Weekly$WeeklyTimeST,Direct_Weekly$Degree,pch=3,lty=1,xaxt="n",yaxt="n",cex.lab=1, type
     main = "Wind Direct: Weekly Averaged",col="blue")
xpos <- c(1:10)
xpos <- (xpos-1)*6 + 2
labelRH =  strftime(Direct_Weekly$WeeklyTimeST
                    [xpos],"%m/%d")
axis(1, at=as.numeric(Direct_Weekly$WeeklyTimeST[xpos]), labels=labelRH, col.axis="black", las=2,
i <- c(1:5)
ypos <- (i-1)*20+140
axis(2, at=ypos, col.axis="black", las=1, cex.axis=0.7, tck=-0.02)
abline(h=c(180), lty=2, col="red")
legend("topright", inset=0.01,c("Wind Direct","Reference: 180"),title = "Legend", lty=c(1,1), pch=
```


Wind Speed: Weekly Averaged
Legend
Wind Speed
Reference: 2.25
Wind Speed
3.0
2.5
2.0
1.5
01/07
02/18
04/01
05/13
06/24
08/05
09/16
10/28
12/09
01/20
Date


Wind Direct: Weekly Averaged
Legend
Wind Direct
Reference: 180
Wind Direct
220
200
180
160
140
01/07
02/18
04/01
05/13
06/24
08/05
09/16
10/28
12/09
01/20
Date