HW1

Melaina Wright

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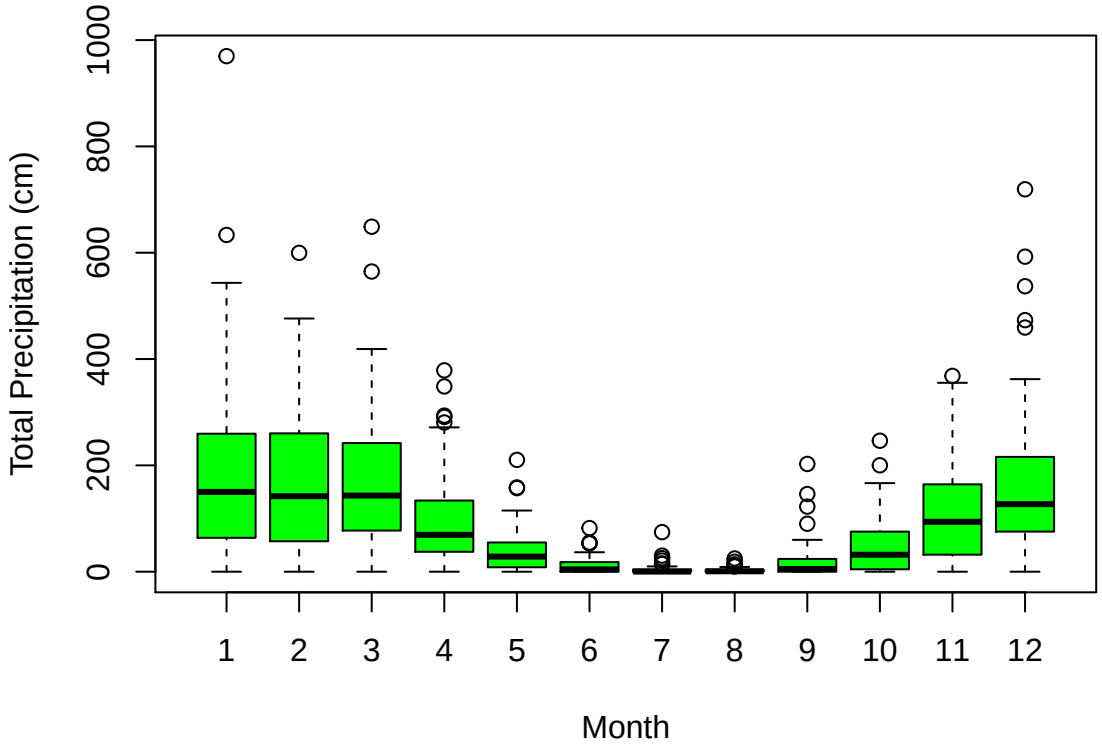
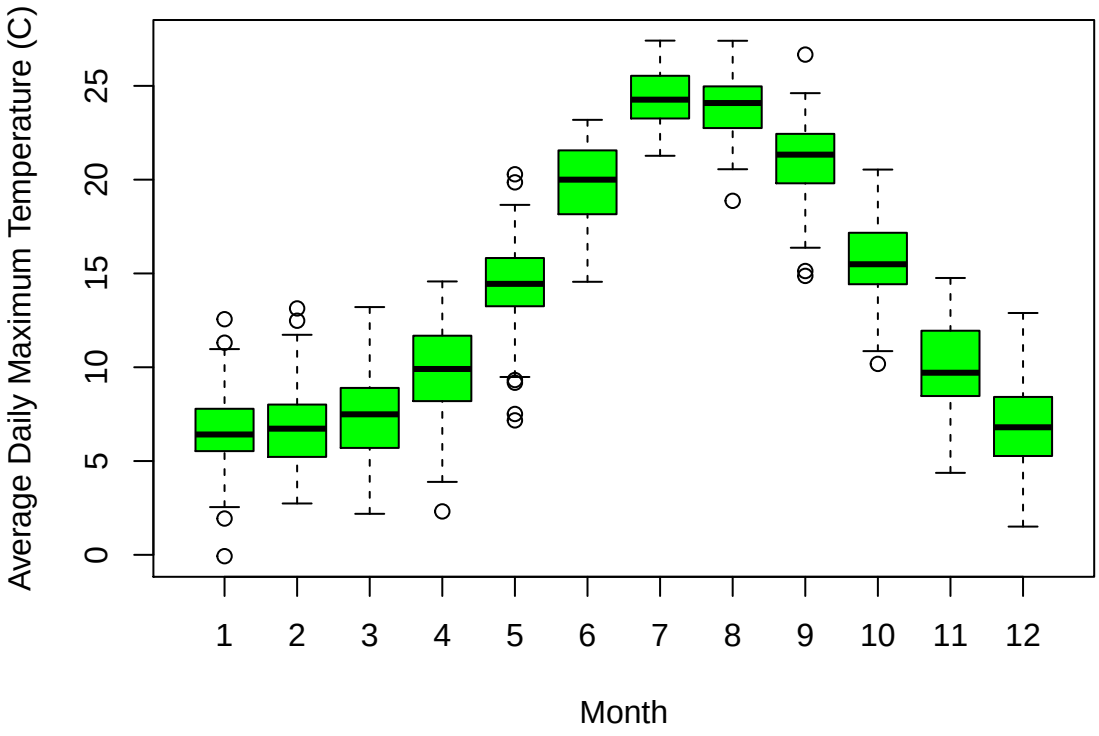
Precipitation by Month

```
clim = read.table("clim.txt", header=TRUE)

clim2 = clim[-c(1:3,8)]

clim.mth = aggregate(clim2, by=list(clim$month, clim$year), sum)

result=which.max(clim.mth$rain)

clim.mth$month=as.integer(clim.mth$Group.1)
clim.mth$year= as.integer(clim.mth$Group.2)

par(mar=c(5,6,3,2))
boxplot(clim.mth$rain ~ clim.mth$month,
        ylab="Total Precipitation (cm)",
        xlab="Month", col="green")
```



Temperature by Month

```
clim3 = clim[-c(1:2,4,8)]

clim.avg = aggregate(clim3, by=list(clim3$month, clim3$year), mean)

par(mar=c(5,6,3,2))
boxplot(clim.avg$tmax ~ clim.avg$month,
        ylab="Average Daily Maximum Temperature (C)",
        xlab="Month", col="green")
```



Wettest and Driest Years

1982 is the wettest year. 2013 is the driest year.

```
clim.mth2 = aggregate(clim2, by=list(clim$year), sum)

maxrain = max(clim.mth2$rain)
rowwithmax = which(clim.mth2$rain==maxrain)
clim.mth2[rowwithmax, 1]
```

```
## [1] 1982
```

```
minrain = min(clim.mth2$rain)
rowwithmin = which(clim.mth2$rain==minrain)
clim.mth2[rowwithmin, 1]
```

```
## [1] 2013
```

Pictures of Wet and Dry Years in Senegal

Figure 1:

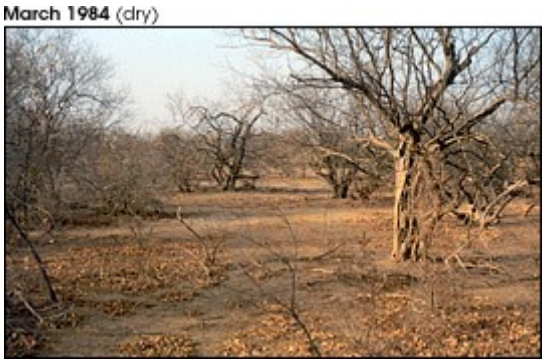


Figure 2:

Creating a New Variable for Seasons

1 is spring, 2 is summer, 3 is fall and 4 is winter

```
clim4 = clim[-c(1:2,8)]

library(dplyr)

clim4quarter = clim4 %>% mutate(Quarter = ceiling(as.numeric(clim4$month) / 3))
```

Wettest and Dryest Seasons

Spring is the wettest season. Fall is the dryest season.

```
clim.mth3 = aggregate(clim4quarter, by=list(clim4quarter$Quarter), sum)

maxrain2 = max(clim.mth3$rain)
rowwithmax2 = which(clim.mth3$rain==maxrain2)
clim.mth3[rowwithmax2, 1]
```

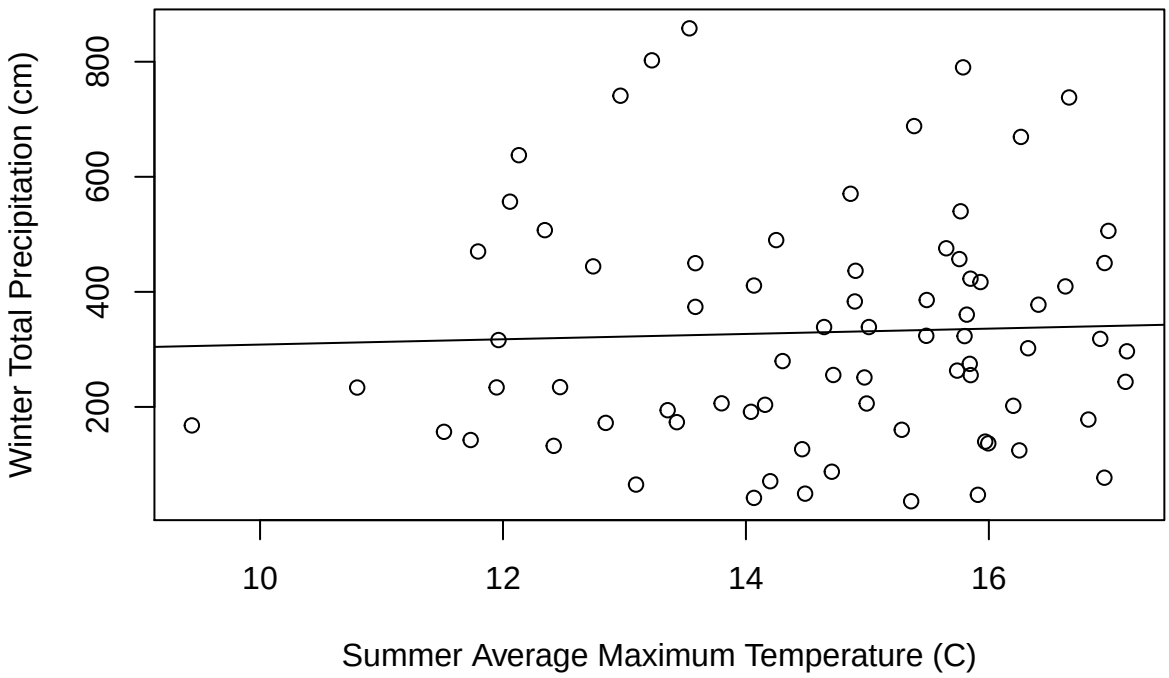
```
## [1] 1
```

```
minrain2 = min(clim.mth3$rain)
rowwithmin2 = which(clim.mth3$rain==minrain2)
clim.mth3[rowwithmin2, 1]
```

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

Winter Precipitation by Summer Temperature

```
Winter = subset(clim4quarter, Quarter==4)
Winter2 = aggregate(Winter, by=list(Winter$year), sum)

Summer = subset(clim4quarter, Quarter==2 & year<2016)
Summer2 = aggregate(Summer, by=list(Summer$year), mean)

fit = lm(Winter2$rain ~ Summer2$tmax)

plot(Winter2$rain ~ Summer2$tmax, xlab="Summer Average Maximum Temperature (C)", ylab="Winter Total Pre
abline(fit)
```



Graph Description

There is a weak, non-sigificant positive relationship between summer average maximum temperature and winter total precipitation. Thus, years with warmer summers are weakly associated with having more precipitation in the winter.