Assignment_3_DANA_4800

2024-02-04

```r
#Task 1

#To import the file.
Puebla23 = read.csv(file.choose(),header = T)

#to convert the month column into a categorical with custom levels.
Puebla23$Month = factor(Puebla23$Month, levels = c("Feb", "Mar", "Apr", "May", "Jun", "Jul", "Aug", "Sep

#now we convert other variables into categorical
Puebla23$Year = factor(Puebla23$Year)
Puebla23$Weaather_main = factor(Puebla23$Weaather_main)
Puebla23$Weather_Description = factor(Puebla23$Weather_Description)
Puebla23$Weather_icon = factor(Puebla23$Weather_icon)

#to get summary of our dataset
summary(Puebla23)
```

```
##       DT                Datetime              Month        Year
##  Min.   :1.675e+09   Length:8785        Mar    : 749    2023:8061
##  1st Qu.:1.683e+09   Class :character   May    : 749    2024: 724
##  Median :1.691e+09   Mode  :character   Aug    : 749
##  Mean   :1.691e+09                      Jul    : 748
##  3rd Qu.:1.699e+09                      Oct    : 748
##  Max.   :1.707e+09                      Dec    : 748
##                                         (Other):4294
##     Timezone        City_Name            Latitude        Longitude
##  Min.   :-21600   Length:8785        Min.   :19.04   Min.   :-98.2
##  1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
##  Median :-21600   Mode  :character   Median :19.04   Median :-98.2
##  Mean   :-21600                      Mean   :19.04   Mean   :-98.2
##  3rd Qu.:-21600                      3rd Qu.:19.04   3rd Qu.:-98.2
##  Max.   :-21600                      Max.   :19.04   Max.   :-98.2
##
##      Temp          Feels_like        Temp_Min        Temp_Max         Pressure
##  Min.   : 2.55   Min.   : 0.76   Min.   : 2.55   Min.   : 2.55   Min.   :1005
##  1st Qu.:14.11   1st Qu.:13.44   1st Qu.:14.11   1st Qu.:14.11   1st Qu.:1014
##  Median :16.55   Median :15.99   Median :16.55   Median :16.55   Median :1016
##  Mean   :17.48   Mean   :16.78   Mean   :17.48   Mean   :17.48   Mean   :1016
##  3rd Qu.:20.78   3rd Qu.:20.20   3rd Qu.:20.78   3rd Qu.:20.78   3rd Qu.:1018
##  Max.   :31.55   Max.   :29.97   Max.   :31.55   Max.   :31.55   Max.   :1026
##
##     Humidity        Wind_Speed        Wind_Deg         Wind_Gust        Clouds_all
##  Min.   : 8.0   Min.   :0.030   Min.   : 0.0   Min.   :0.030   Min.   : 0.0
##  1st Qu.:42.0   1st Qu.:1.340   1st Qu.: 19.0   1st Qu.:1.340   1st Qu.: 10.0
```

```
##   Median :57.0    Median :2.200    Median :118.0    Median :2.200    Median : 57.0
##   Mean   :57.1    Mean   :2.472    Mean   :118.8    Mean   :2.472    Mean   : 52.8
##   3rd Qu.:74.0    3rd Qu.:3.260    3rd Qu.:191.0    3rd Qu.:3.260    3rd Qu.: 93.0
##   Max.   :98.0    Max.   :9.160    Max.   :360.0    Max.   :9.160    Max.   :100.0
##
##     Weather_Id     Weaather_main      Weather_Description  Weather_icon
##   Min.   :500.0   Clear :2262   clear sky       :2261   04n     :1961
##   1st Qu.:800.0   Clouds:5238   overcast clouds :2145   04d     :1662
##   Median :802.0   Rain  :1285   broken clouds   :1478   01d     :1281
##   Mean   :757.9                 light rain      :1072   01n     : 981
##   3rd Qu.:803.0                 scattered clouds: 953   10n     : 673
##   Max.   :804.0                 few clouds      : 662   10d     : 612
##                                 (Other)         : 214   (Other) :1615
```

```r
#to view part of our dataset
sum(Puebla23$Temp != Puebla23$Temp_Min)
```

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

```r
sum(Puebla23$Temp != Puebla23$Temp_Max)
```

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

```r
sum(Puebla23$Temp_Max != Puebla23$Temp_Min)
```

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

```r
sum(Puebla23$Wind_Speed != Puebla23$Wind_Gust)
```

```
## [1] 0
```

After importing our dataset, we are having 8785 observations with 22 columns. We are categorizing 'Month' variable into customs levels so that we will have sorted months in our graph. We are also converting 'Weather main', 'Weather Description' and 'Weather Icon' variables to categorical as they only have 3, 9 and 10 categories/levels respectively.

Looking at the summary of our data, we can see different ranges of our continuous variables (i.e. 'Temp' 'Feels like', 'Temp Min', 'Temp Max', 'Pressure', 'Humidity', 'Wind Speed', 'Wind degree', 'Wind Gust', 'Clouds'). However, some of the variables have almost all of the values similar, this is confirmed by using the sum() function above which shows that 'Temp', 'Temp Min' and 'Temp Max' have only 3 out of 8785 observations different from each other while as 'Wind speed' and 'Wind Gust' have all 8785 similar observations.

```r
#Task 2

#To plot monthly graphs of different variables.
boxplot(Puebla23$Temp ~ Puebla23$Month, main = "Boxplot of Temp vs Months", ylim = c(0,35), xlab = "Mont
```
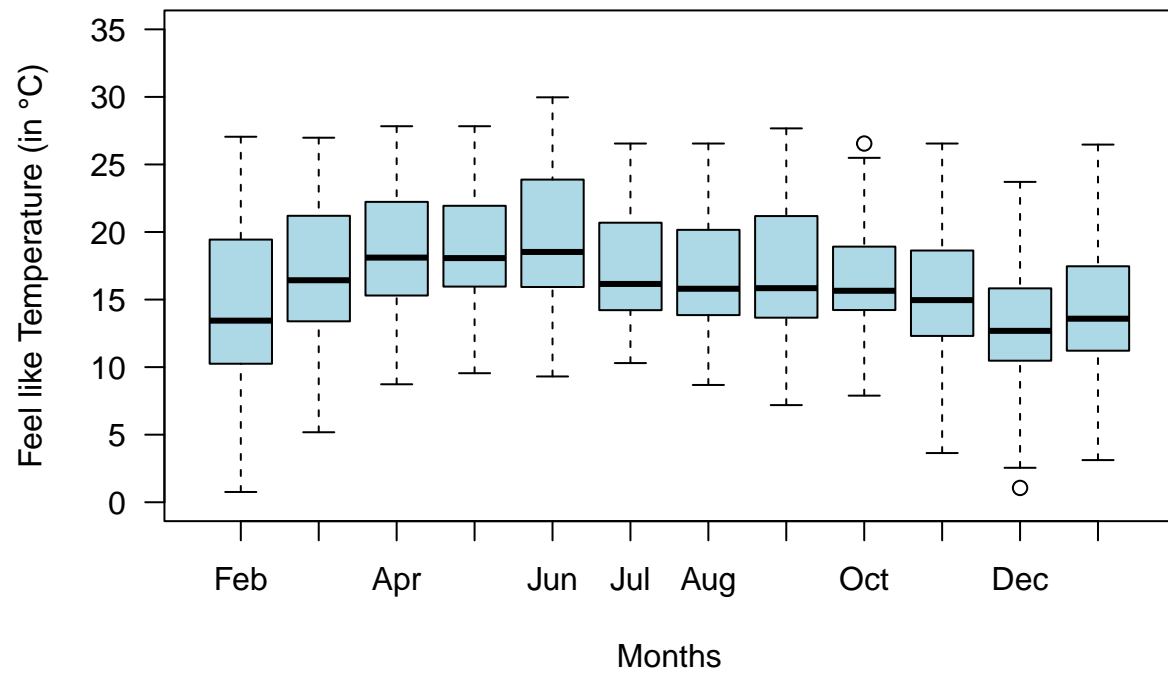
Boxplot of Temp vs Months
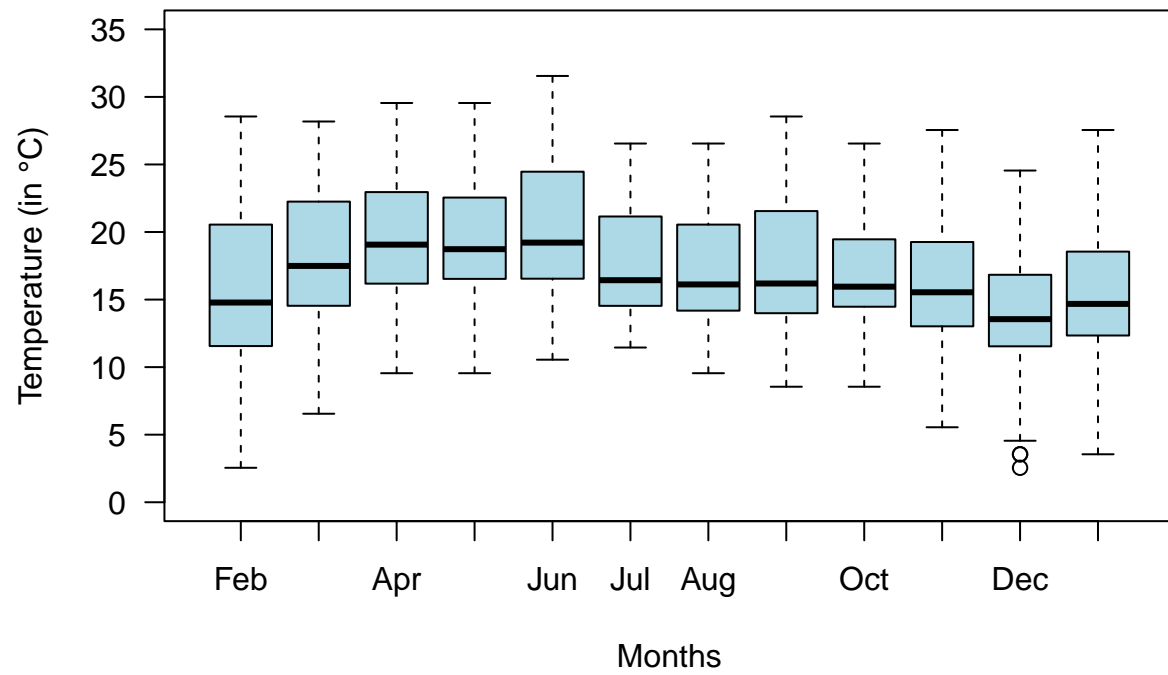

```
boxplot(Puebla23$Feels_like ~ Puebla23$Month, main = "Boxplot of Feel like Temp vs Months", ylim = c(0,3
```

Boxplot of Feel like Temp vs Months


```
boxplot(Puebla23$Pressure ~ Puebla23$Month, main = "Boxplot of Pressure vs Months", xlab = "Months", yla
```

Boxplot of Pressure vs Months
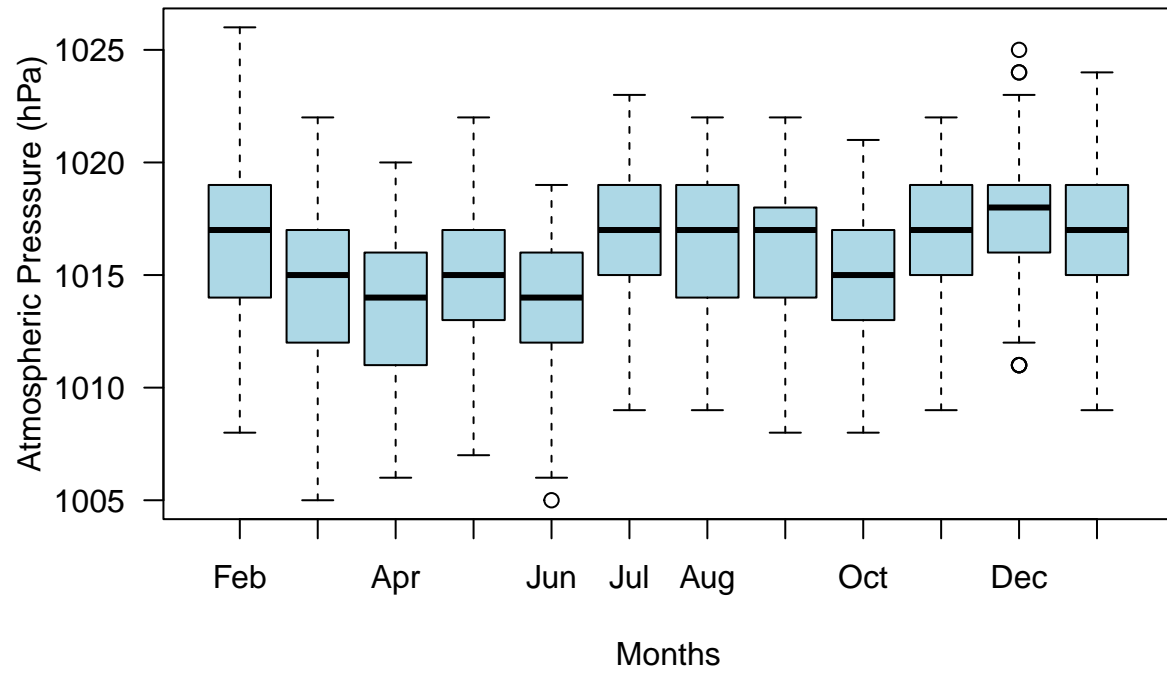

```
boxplot(Puebla23$Humidity ~ Puebla23$Month, main = "Boxplot of Humidity vs Months", xlab = "Months", yla
```

Boxplot of Humidity vs Months
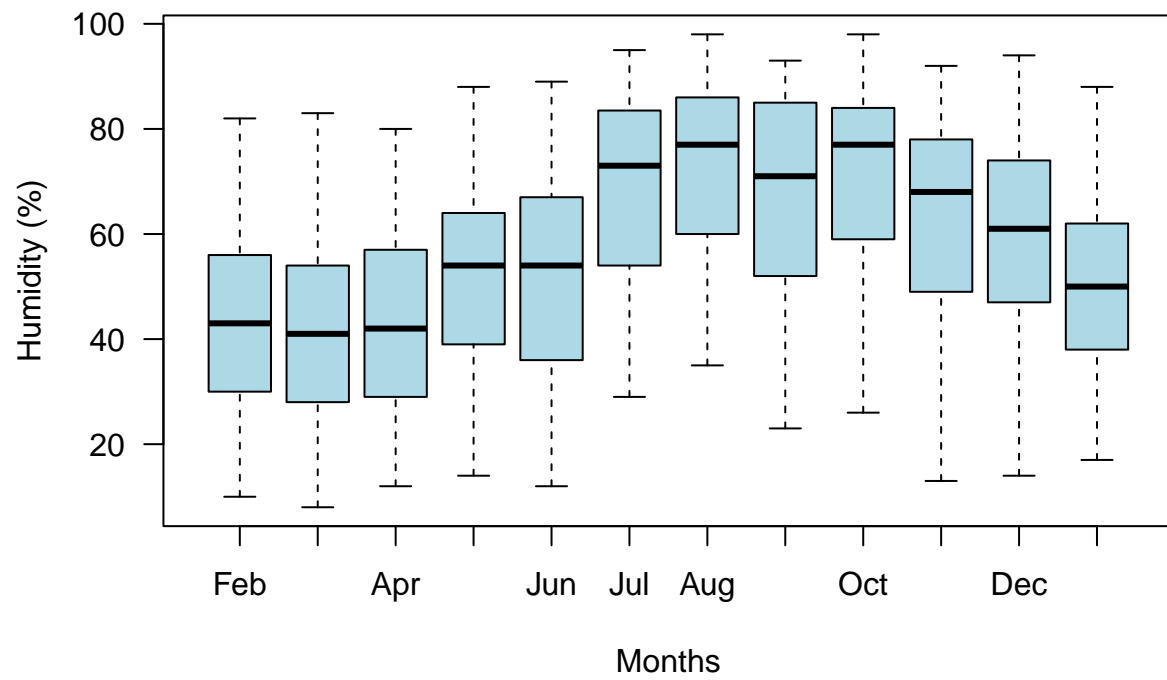

```r
boxplot(Puebla23$Wind_Speed ~ Puebla23$Month, main = "Boxplot of Wind speed vs Months", xlab = "Months"
```

Boxplot of Wind speed vs Months
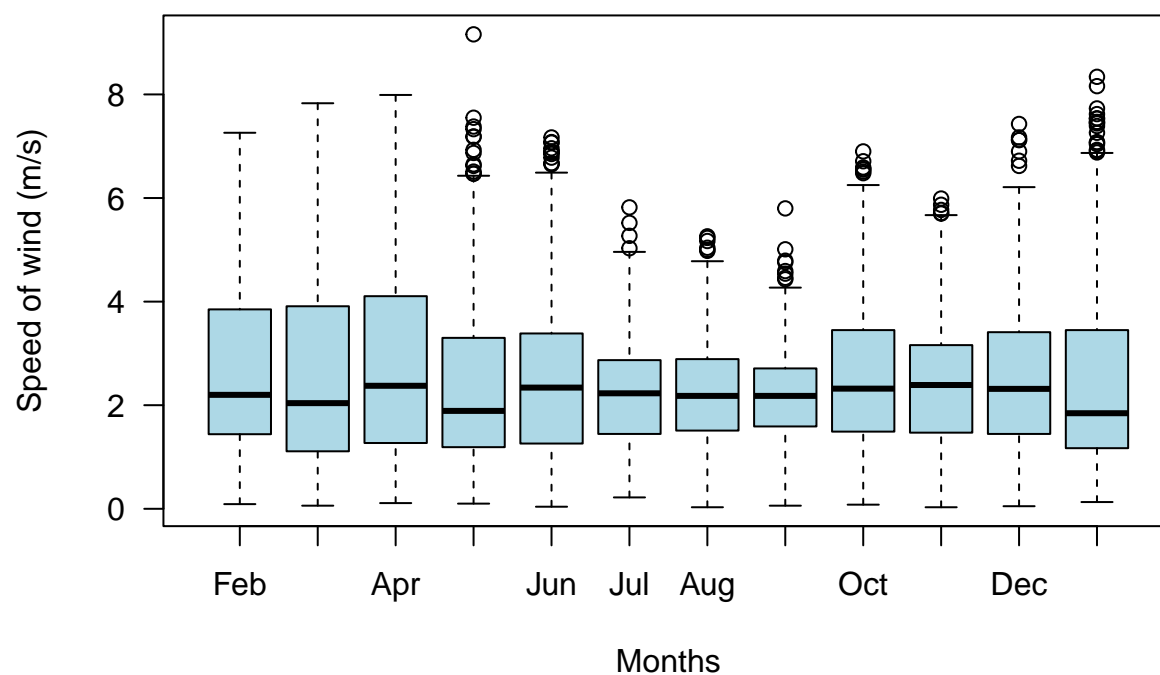

```r
boxplot(Puebla23$Wind_Deg ~ Puebla23$Month, main = "Boxplot of Wind Degree vs Months", ylim = c(0,360),
```

Boxplot of Wind Degree vs Months
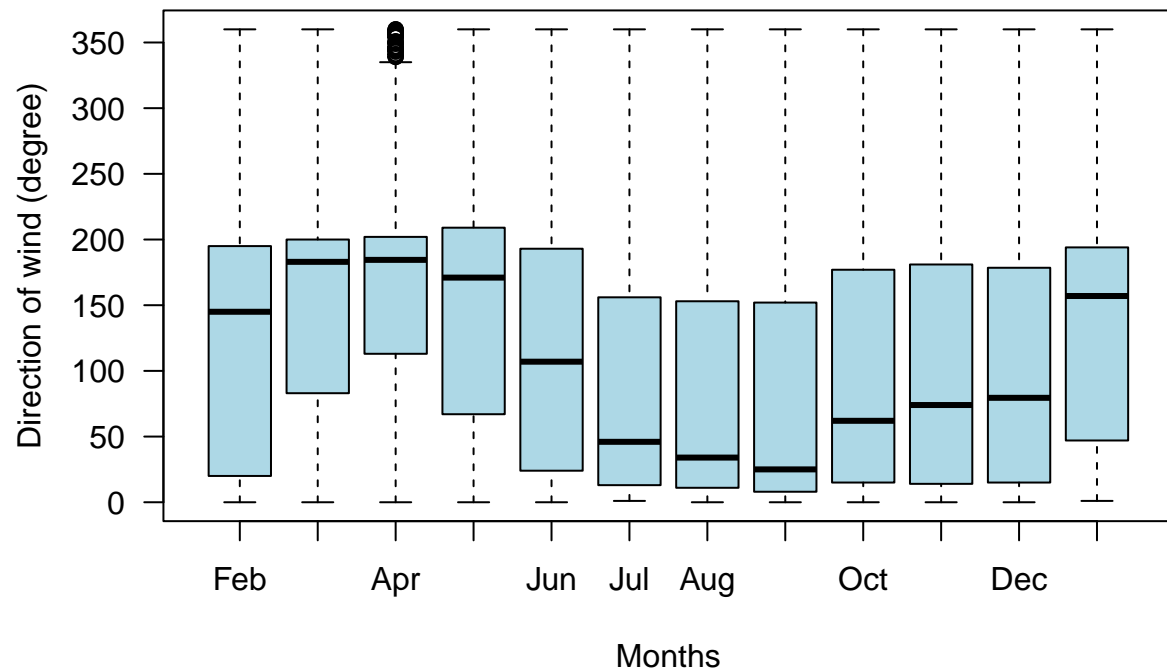

```
boxplot(Puebla23$Clouds_all ~ Puebla23$Month, main = "Boxplot of Cloudiness vs Months", xlab = "Months"

#to plot barplots
library(ggplot2)
```

Boxplot of Cloudiness vs Months
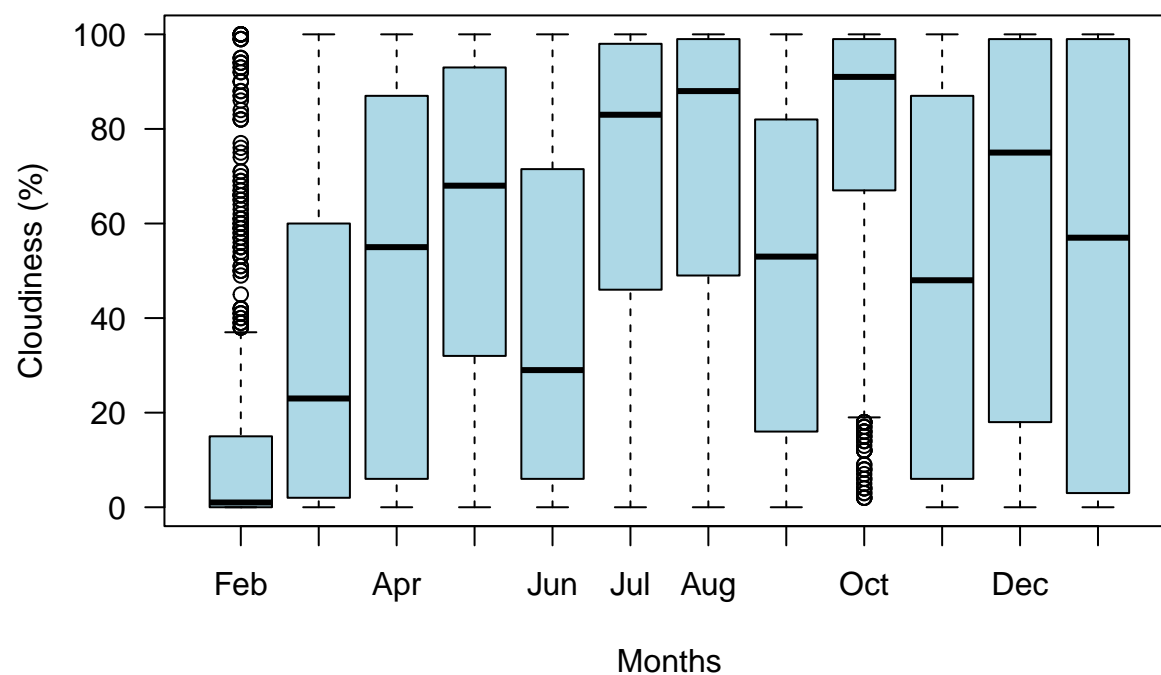

```
#barplot of monthly weather type
ggplot(Puebla23, aes(x = Month, fill = Weaather_main)) +
  geom_bar(position = "dodge", stat = "count") +
  labs(title = "Bar Plot of Month with Weather", x = "Month", y = "Count")
```

Bar Plot of Month with Weather
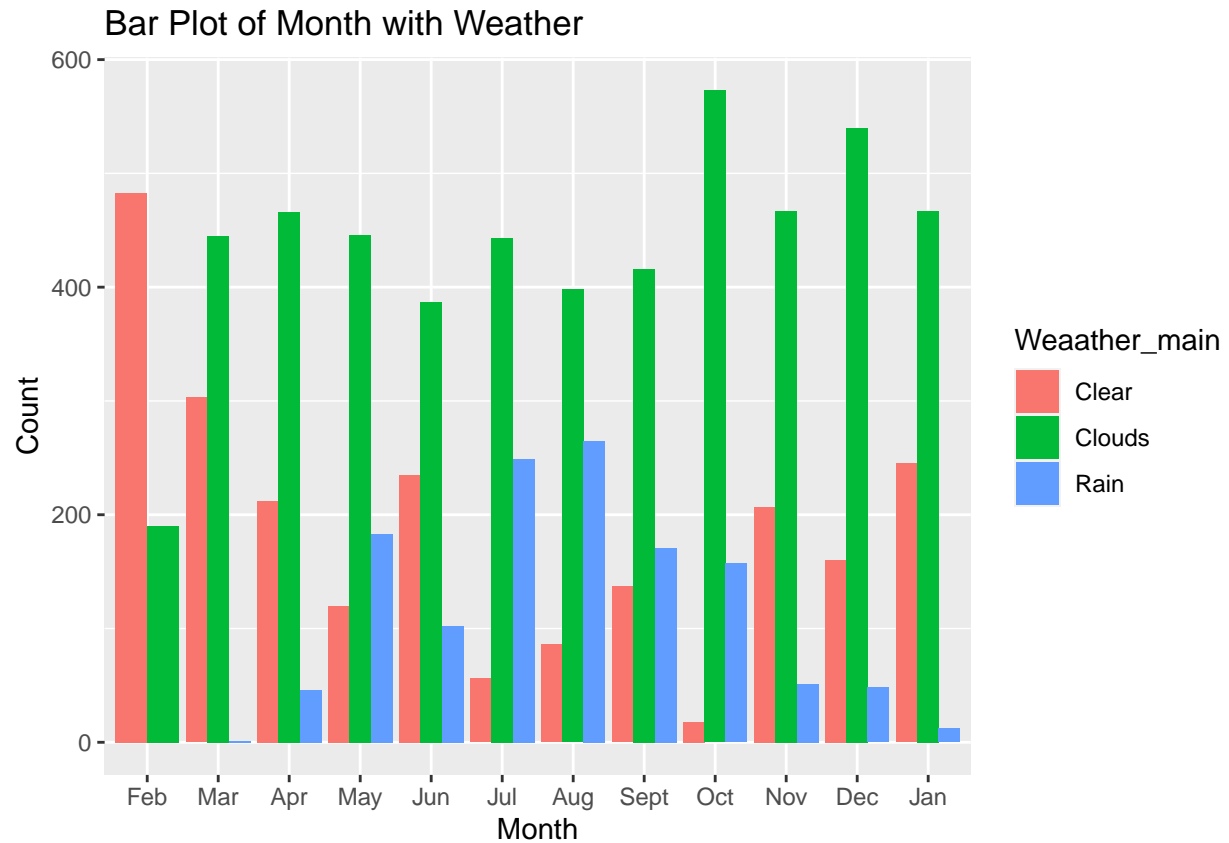

```r
#barplot of cloud vs weather description
ggplot(Puebla23, aes(x = Weather_Description, y = Clouds_all)) +
  geom_bar(stat = "summary") +
  labs(title = "Bar Plot of Clouds by Weather Description", x = "Weather Description", y = "Clouds (%)")
```

```
## No summary function supplied, defaulting to 'mean_se()'
```

Bar Plot of Clouds by Weather Description
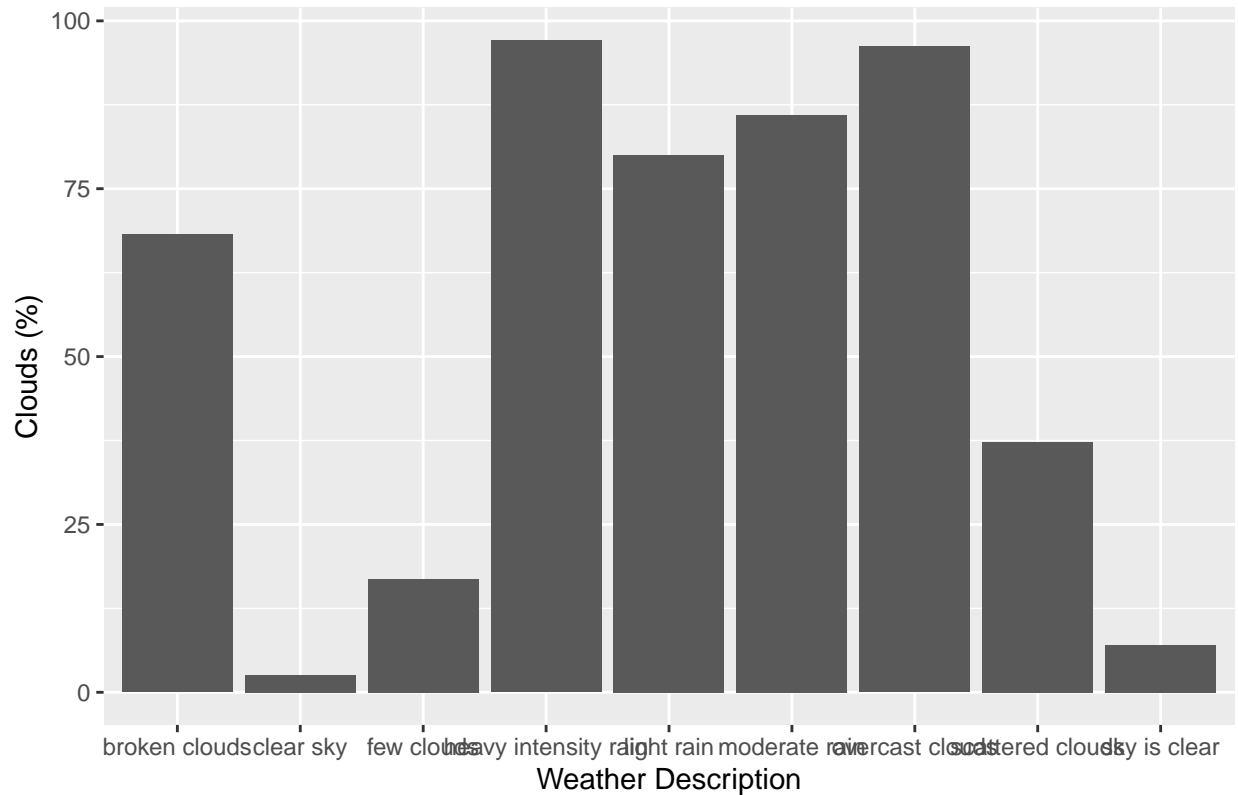

```
#to find correlation
cor(Puebla23[,9:18])
```

```
##                      Temp   Feels_like     Temp_Min     Temp_Max     Pressure
## Temp         1.00000000   0.99618080   0.99998805   0.99999321 -0.75273060
## Feels_like   0.99618080   1.00000000   0.99617067   0.99617020 -0.74992142
## Temp_Min     0.99998805   0.99617067   1.00000000   0.99996575 -0.75271590
## Temp_Max     0.99999321   0.99617020   0.99996575   1.00000000 -0.75269818
## Pressure    -0.75273060  -0.74992142  -0.75271590  -0.75269818   1.00000000
## Humidity    -0.69383849  -0.63691548  -0.69384375  -0.69382698   0.54368372
## Wind_Speed   0.40552089   0.39440702   0.40551614   0.40552708  -0.36853048
## Wind_Deg     0.33887832   0.32910420   0.33877360   0.33893202  -0.41171581
## Wind_Gust    0.40552089   0.39440702   0.40551614   0.40552708  -0.36853048
## Clouds_all  -0.07534363  -0.04004304  -0.07531184  -0.07536871   0.07453807
##               Humidity  Wind_Speed    Wind_Deg    Wind_Gust   Clouds_all
## Temp        -0.6938385   0.40552089  0.33887832   0.40552089  -0.07534363
## Feels_like  -0.6369155   0.39440702  0.32910420   0.39440702  -0.04004304
## Temp_Min    -0.6938437   0.40551614  0.33877360   0.40551614  -0.07531184
## Temp_Max    -0.6938270   0.40552708  0.33893202   0.40552708  -0.07536871
## Pressure     0.5436837  -0.36853048 -0.41171581  -0.36853048   0.07453807
## Humidity     1.0000000  -0.36147563 -0.34307389  -0.36147563   0.37290277
## Wind_Speed  -0.3614756   1.00000000  0.10214123   1.00000000   0.00310066
## Wind_Deg    -0.3430739   0.10214123  1.00000000   0.10214123  -0.08544505
## Wind_Gust   -0.3614756   1.00000000  0.10214123   1.00000000   0.00310066
## Clouds_all   0.3729028   0.00310066 -0.08544505   0.00310066   1.00000000
```
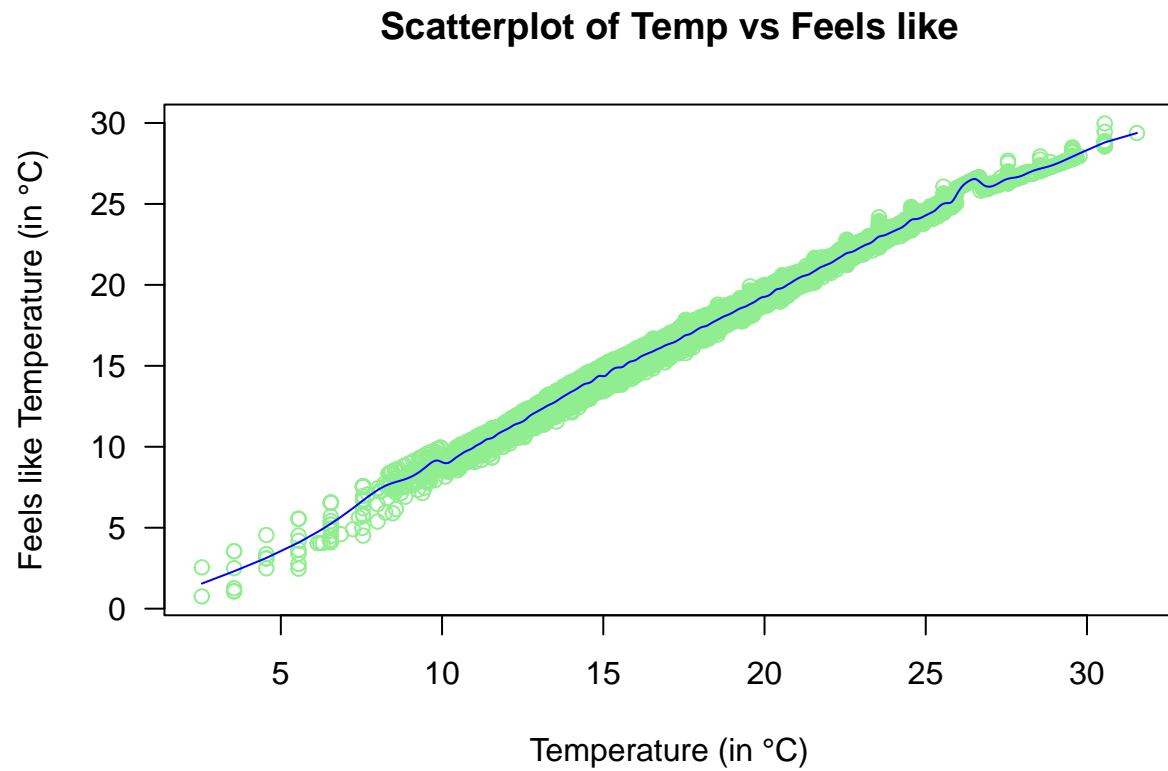
```
#to scatterplots of numerical variables
plot(Puebla23$Temp, Puebla23$Feels_like, main = "Scatterplot of Temp vs Feels like", xlab = "Temperature
```

Scatterplot of Temp vs Feels like


```
## integer(0)
```

```
plot(Puebla23$Temp, Puebla23$Pressure, main = "Scatterplot of Temp vs Pressure", xlab = "Temperature (in
```

Scatterplot of Temp vs Pressure


```
## integer(0)
```
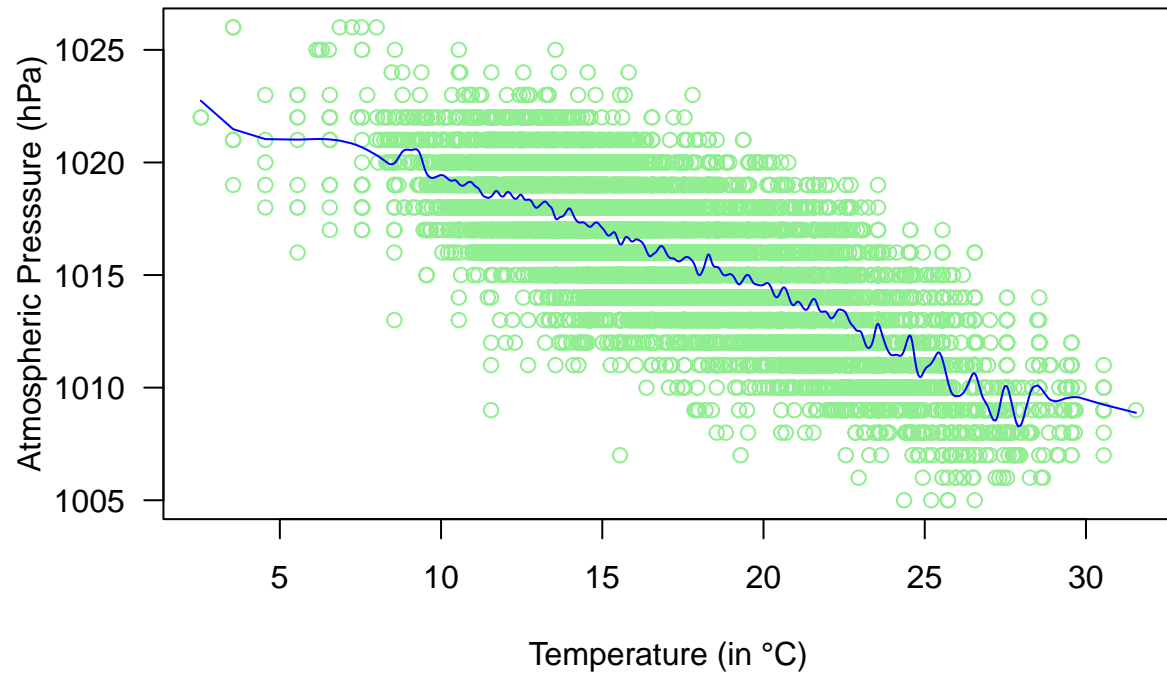
```
plot(Puebla23$Temp, Puebla23$Humidity, main = "Scatterplot of Temp vs Humidity", xlab = "Temperature (in
```

Scatterplot of Temp vs Humidity

Temperature (in °C)
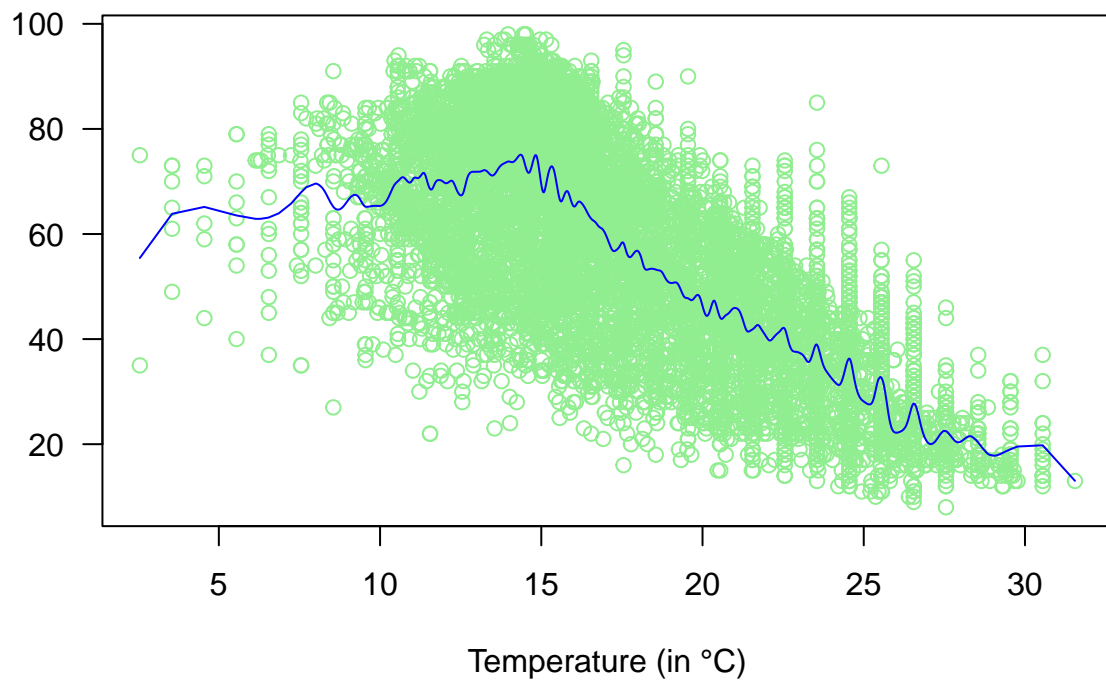
```
## integer(0)
```

```
plot(Puebla23$Pressure, Puebla23$Humidity, main = "Scatterplot of Pressure vs Humidity", xlab = "Atmospl
```

Scatterplot of Pressure vs Humidity
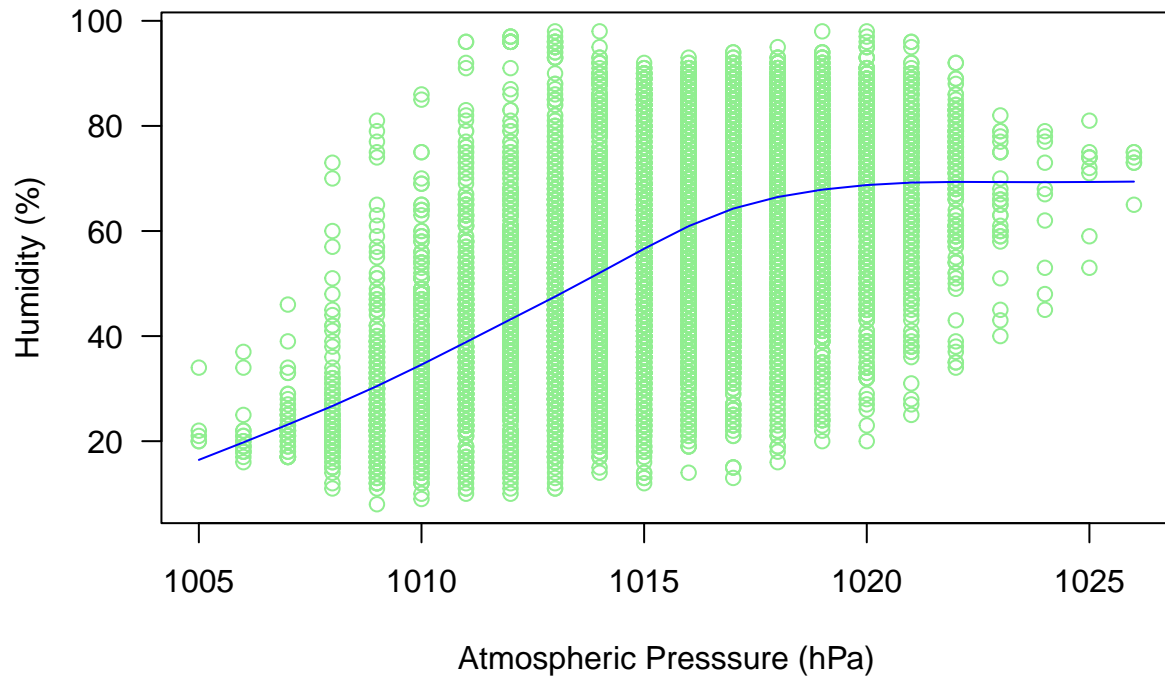

```
## integer(0)
```

We are first plotting boxplot to see monthly trends and patterns of our continuous variables. Then we are using barplot to find the frequency of hours for different weather types and percentage of clouds with respect to different weather conditions. Finally we are plotting scatterplots between different continuous variables, which have strong correlation, to find relationship between them.

```
#Task3
#to find missing values
colSums(is.na(Puebla23))
```

```
##                  DT            Datetime               Month                Year
##                   0                   0                   0                   0
##            Timezone           City_Name            Latitude           Longitude
##                   0                   0                   0                   0
##                Temp          Feels_like            Temp_Min            Temp_Max
##                   0                   0                   0                   0
##            Pressure            Humidity          Wind_Speed            Wind_Deg
##                   0                   0                   0                   0
##           Wind_Gust          Clouds_all          Weather_Id        Weaather_main
##                   0                   0                   0                   0
## Weather_Description        Weather_icon
##                   0                   0
```

By using colSums() function we can see that we don't have any missing values in any variables of our dataset therefore, nothing needs to be fixed.

```r
#Task4
#Outliers
#Refer to the previous montly boxplots

#summary of each month
summary(Puebla23[Puebla23$Month == "Feb",])
```

```
##       DT                Datetime             Month         Year
## Min.   :1.675e+09   Length:673         Feb    :673   2023:673
## 1st Qu.:1.676e+09   Class :character   Mar    :  0   2024:  0
## Median :1.676e+09   Mode  :character   Apr    :  0
## Mean   :1.676e+09                      May    :  0
## 3rd Qu.:1.677e+09                      Jun    :  0
## Max.   :1.678e+09                      Jul    :  0
##                                        (Other):  0
##    Timezone        City_Name            Latitude        Longitude
## Min.   :-21600   Length:673         Min.   :19.04   Min.   :-98.2
## 1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
## Median :-21600   Mode  :character   Median :19.04   Median :-98.2
## Mean   :-21600                      Mean   :19.04   Mean   :-98.2
## 3rd Qu.:-21600                      3rd Qu.:19.04   3rd Qu.:-98.2
## Max.   :-21600                      Max.   :19.04   Max.   :-98.2
##
##      Temp         Feels_like       Temp_Min        Temp_Max        Pressure
## Min.   : 2.55   Min.   : 0.76   Min.   : 2.55   Min.   : 2.55   Min.   :1008
## 1st Qu.:11.56   1st Qu.:10.25   1st Qu.:11.56   1st Qu.:11.56   1st Qu.:1014
## Median :14.78   Median :13.44   Median :14.78   Median :14.78   Median :1017
## Mean   :15.84   Mean   :14.64   Mean   :15.84   Mean   :15.84   Mean   :1017
## 3rd Qu.:20.55   3rd Qu.:19.44   3rd Qu.:20.55   3rd Qu.:20.55   3rd Qu.:1019
## Max.   :28.55   Max.   :27.05   Max.   :28.55   Max.   :28.55   Max.   :1026
##
##    Humidity       Wind_Speed       Wind_Deg       Wind_Gust
## Min.   :10.00   Min.   :0.090   Min.   :  0.0   Min.   :0.090
## 1st Qu.:30.00   1st Qu.:1.440   1st Qu.: 20.0   1st Qu.:1.440
## Median :43.00   Median :2.200   Median :145.0   Median :2.200
## Mean   :43.43   Mean   :2.688   Mean   :126.9   Mean   :2.688
## 3rd Qu.:56.00   3rd Qu.:3.850   3rd Qu.:195.0   3rd Qu.:3.850
## Max.   :82.00   Max.   :7.260   Max.   :360.0   Max.   :7.260
##
##    Clouds_all       Weather_Id     Weaather_main      Weather_Description
## Min.   :  0.00   Min.   :800.0   Clear :483    clear sky          :483
## 1st Qu.:  0.00   1st Qu.:800.0   Clouds:190    scattered clouds   : 60
## Median :  1.00   Median :800.0   Rain  :  0    broken clouds      : 53
## Mean   : 14.66   Mean   :800.7                 few clouds         : 46
## 3rd Qu.: 15.00   3rd Qu.:801.0                 overcast clouds    : 31
## Max.   :100.00   Max.   :804.0                 heavy intensity rain:  0
##                                                (Other)            :  0
##   Weather_icon
## 01n    :248
## 01d    :235
## 04d    : 45
## 04n    : 39
## 03n    : 38
```

16

```
## 02n    : 24
## (Other): 44
```

```r
summary(Puebla23[Puebla23$Month == "Mar",])
```

```
##        DT              Datetime            Month          Year
## Min.   :1.678e+09   Length:749         Mar   :749    2023:749
## 1st Qu.:1.678e+09   Class :character   Feb   :  0    2024:  0
## Median :1.679e+09   Mode  :character   Apr   :  0
## Mean   :1.679e+09                      May   :  0
## 3rd Qu.:1.680e+09                      Jun   :  0
## Max.   :1.680e+09                      Jul   :  0
##                                        (Other): 0
##     Timezone         City_Name           Latitude         Longitude
## Min.   :-21600    Length:749         Min.   :19.04    Min.   :-98.2
## 1st Qu.:-21600    Class :character   1st Qu.:19.04    1st Qu.:-98.2
## Median :-21600    Mode  :character   Median :19.04    Median :-98.2
## Mean   :-21600                       Mean   :19.04    Mean   :-98.2
## 3rd Qu.:-21600                       3rd Qu.:19.04    3rd Qu.:-98.2
## Max.   :-21600                       Max.   :19.04    Max.   :-98.2
##
##      Temp           Feels_like         Temp_Min         Temp_Max          Pressure
## Min.   : 6.55    Min.   : 5.18     Min.   : 6.55    Min.   : 6.55    Min.   :1005
## 1st Qu.:14.54    1st Qu.:13.39     1st Qu.:14.54    1st Qu.:14.54    1st Qu.:1012
## Median :17.49    Median :16.43     Median :17.49    Median :17.49    Median :1015
## Mean   :18.30    Mean   :17.32     Mean   :18.30    Mean   :18.30    Mean   :1015
## 3rd Qu.:22.25    3rd Qu.:21.20     3rd Qu.:22.25    3rd Qu.:22.25    3rd Qu.:1017
## Max.   :28.18    Max.   :26.98     Max.   :28.18    Max.   :28.18    Max.   :1022
##
##     Humidity        Wind_Speed         Wind_Deg         Wind_Gust         Clouds_all
## Min.   : 8.00    Min.   :0.060     Min.   :  0     Min.   :0.060    Min.   :  0.00
## 1st Qu.:28.00    1st Qu.:1.110     1st Qu.: 83     1st Qu.:1.110    1st Qu.:  2.00
## Median :41.00    Median :2.040     Median :183     Median :2.040    Median : 23.00
## Mean   :41.71    Mean   :2.661     Mean   :159     Mean   :2.661    Mean   : 34.17
## 3rd Qu.:54.00    3rd Qu.:3.910     3rd Qu.:200     3rd Qu.:3.910    3rd Qu.: 60.00
## Max.   :83.00    Max.   :7.830     Max.   :360     Max.   :7.830    Max.   :100.00
##
##    Weather_Id      Weaather_main       Weather_Description   Weather_icon
## Min.   :500.0    Clear :303        clear sky       :303      01d    :169
## 1st Qu.:800.0    Clouds:445        broken clouds   :138      01n    :134
## Median :801.0    Rain  :  1        scattered clouds:119      04n    :127
## Mean   :801.1                      overcast clouds :106      04d    :117
## 3rd Qu.:803.0                      few clouds      : 82      03n    : 68
## Max.   :804.0                      light rain      :  1      03d    : 51
##                                    (Other)         :  0      (Other): 83
```

```r
summary(Puebla23[Puebla23$Month == "Apr",])
```

```
##        DT              Datetime            Month          Year
## Min.   :1.680e+09   Length:724         Apr   :724    2023:724
## 1st Qu.:1.681e+09   Class :character   Feb   :  0    2024:  0
## Median :1.682e+09   Mode  :character   Mar   :  0
## Mean   :1.682e+09                      May   :  0
```

```
##   3rd Qu.:1.682e+09                          Jun    :  0
##   Max.   :1.683e+09                          Jul    :  0
##                                              (Other):  0
##     Timezone         City_Name            Latitude        Longitude
##   Min.   :-21600   Length:724         Min.   :19.04   Min.   :-98.2
##   1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
##   Median :-21600   Mode  :character   Median :19.04   Median :-98.2
##   Mean   :-21600                       Mean   :19.04   Mean   :-98.2
##   3rd Qu.:-21600                       3rd Qu.:19.04   3rd Qu.:-98.2
##   Max.   :-21600                       Max.   :19.04   Max.   :-98.2
##
##      Temp          Feels_like       Temp_Min        Temp_Max        Pressure
##   Min.   : 9.55   Min.   : 8.73   Min.   : 9.55   Min.   : 9.55   Min.   :1006
##   1st Qu.:16.18   1st Qu.:15.30   1st Qu.:16.18   1st Qu.:16.18   1st Qu.:1011
##   Median :19.07   Median :18.11   Median :19.07   Median :19.07   Median :1014
##   Mean   :19.71   Mean   :18.88   Mean   :19.71   Mean   :19.71   Mean   :1013
##   3rd Qu.:22.95   3rd Qu.:22.21   3rd Qu.:22.95   3rd Qu.:22.95   3rd Qu.:1016
##   Max.   :29.55   Max.   :27.83   Max.   :29.55   Max.   :29.55   Max.   :1020
##
##     Humidity       Wind_Speed       Wind_Deg        Wind_Gust
##   Min.   :12.00   Min.   :0.110   Min.   :  0.0   Min.   :0.110
##   1st Qu.:29.00   1st Qu.:1.270   1st Qu.:113.0   1st Qu.:1.270
##   Median :42.00   Median :2.375   Median :184.5   Median :2.375
##   Mean   :43.62   Mean   :2.854   Mean   :162.2   Mean   :2.854
##   3rd Qu.:57.00   3rd Qu.:4.093   3rd Qu.:202.0   3rd Qu.:4.093
##   Max.   :80.00   Max.   :7.990   Max.   :360.0   Max.   :7.990
##
##    Clouds_all       Weather_Id     Weaather_main      Weather_Description
##   Min.   :  0.00   Min.   :500.0   Clear :212     clear sky        :212
##   1st Qu.:  6.00   1st Qu.:800.0   Clouds:466     overcast clouds  :176
##   Median : 55.00   Median :802.0   Rain  : 46     broken clouds    :159
##   Mean   : 50.19   Mean   :782.9                  scattered clouds : 91
##   3rd Qu.: 87.00   3rd Qu.:803.0                  light rain       : 43
##   Max.   :100.00   Max.   :804.0                  few clouds       : 40
##                                                   (Other)          :  3
##   Weather_icon
##   04n    :173
##   04d    :162
##   01d    :122
##   01n    : 90
##   03n    : 53
##   03d    : 38
##   (Other): 86
```

```r
summary(Puebla23[Puebla23$Month == "May",])
```

```
##        DT               Datetime            Month         Year
##   Min.   :1.683e+09   Length:749         May    :749   2023:749
##   1st Qu.:1.684e+09   Class :character   Feb    :  0   2024:  0
##   Median :1.684e+09   Mode  :character   Mar    :  0
##   Mean   :1.684e+09                      Apr    :  0
##   3rd Qu.:1.685e+09                      Jun    :  0
##   Max.   :1.686e+09                      Jul    :  0
##                                          (Other):  0
```

18

```
##      Timezone         City_Name            Latitude        Longitude
##  Min.   :-21600   Length:749         Min.   :19.04   Min.   :-98.2
##  1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
##  Median :-21600   Mode  :character   Median :19.04   Median :-98.2
##  Mean   :-21600                      Mean   :19.04   Mean   :-98.2
##  3rd Qu.:-21600                      3rd Qu.:19.04   3rd Qu.:-98.2
##  Max.   :-21600                      Max.   :19.04   Max.   :-98.2
##
##       Temp         Feels_like        Temp_Min         Temp_Max         Pressure
##  Min.   : 9.55   Min.   : 9.55   Min.   : 9.55   Min.   : 9.55   Min.   :1007
##  1st Qu.:16.53   1st Qu.:15.96   1st Qu.:16.53   1st Qu.:16.53   1st Qu.:1013
##  Median :18.73   Median :18.07   Median :18.73   Median :18.73   Median :1015
##  Mean   :19.59   Mean   :18.94   Mean   :19.59   Mean   :19.59   Mean   :1015
##  3rd Qu.:22.55   3rd Qu.:21.94   3rd Qu.:22.55   3rd Qu.:22.55   3rd Qu.:1017
##  Max.   :29.55   Max.   :27.83   Max.   :29.55   Max.   :29.55   Max.   :1022
##
##     Humidity        Wind_Speed       Wind_Deg        Wind_Gust
##  Min.   :14.00   Min.   :0.100   Min.   :  0.0   Min.   :0.100
##  1st Qu.:39.00   1st Qu.:1.190   1st Qu.: 67.0   1st Qu.:1.190
##  Median :54.00   Median :1.890   Median :171.0   Median :1.890
##  Mean   :51.35   Mean   :2.374   Mean   :156.8   Mean   :2.374
##  3rd Qu.:64.00   3rd Qu.:3.300   3rd Qu.:209.0   3rd Qu.:3.300
##  Max.   :88.00   Max.   :9.160   Max.   :360.0   Max.   :9.160
##
##    Clouds_all       Weather_Id     Weaather_main      Weather_Description
##  Min.   :  0.00   Min.   :500.0   Clear :120    overcast clouds :180
##  1st Qu.: 32.00   1st Qu.:800.0   Clouds:446    light rain      :147
##  Median : 68.00   Median :802.0   Rain  :183    broken clouds   :140
##  Mean   : 60.26   Mean   :728.6                 clear sky       :120
##  3rd Qu.: 93.00   3rd Qu.:803.0                 scattered clouds: 82
##  Max.   :100.00   Max.   :804.0                 few clouds      : 44
##                                                 (Other)         : 36
##   Weather_icon
##  04n    :169
##  04d    :151
##  10n    :101
##  01d    :100
##  10d    : 82
##  03d    : 53
##  (Other): 93
```

```r
summary(Puebla23[Puebla23$Month == "Jun",])
```

```
##        DT              Datetime            Month        Year
##  Min.   :1.686e+09   Length:724         Jun    :724   2023:724
##  1st Qu.:1.686e+09   Class :character   Feb    :  0   2024:  0
##  Median :1.687e+09   Mode  :character   Mar    :  0
##  Mean   :1.687e+09                      Apr    :  0
##  3rd Qu.:1.688e+09                      May    :  0
##  Max.   :1.688e+09                      Jul    :  0
##                                         (Other):  0
##      Timezone         City_Name            Latitude        Longitude
##  Min.   :-21600   Length:724         Min.   :19.04   Min.   :-98.2
##  1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
```

```
## Median  :-21600    Mode  :character    Median :19.04    Median :-98.2
## Mean    :-21600                        Mean   :19.04    Mean   :-98.2
## 3rd Qu.:-21600                         3rd Qu.:19.04    3rd Qu.:-98.2
## Max.    :-21600                        Max.   :19.04    Max.   :-98.2
##
##       Temp          Feels_like       Temp_Min        Temp_Max         Pressure
## Min.   :10.55   Min.   : 9.31    Min.   : 9.55   Min.   :10.55    Min.   :1005
## 1st Qu.:16.55   1st Qu.:15.93    1st Qu.:16.55   1st Qu.:16.55    1st Qu.:1012
## Median :19.21   Median :18.52    Median :19.21   Median :19.21    Median :1014
## Mean   :20.42   Mean   :19.76    Mean   :20.42   Mean   :20.43    Mean   :1014
## 3rd Qu.:24.45   3rd Qu.:23.87    3rd Qu.:24.45   3rd Qu.:24.45    3rd Qu.:1016
## Max.   :31.55   Max.   :29.97    Max.   :31.55   Max.   :31.55    Max.   :1019
##
##     Humidity        Wind_Speed        Wind_Deg        Wind_Gust        Clouds_all
## Min.   :12.00   Min.   :0.040    Min.   :  0     Min.   :0.040    Min.   :  0.00
## 1st Qu.:36.00   1st Qu.:1.260    1st Qu.: 24     1st Qu.:1.260    1st Qu.:  6.00
## Median :54.00   Median :2.340    Median :107     Median :2.340    Median : 29.00
## Mean   :51.61   Mean   :2.499    Mean   :122     Mean   :2.499    Mean   : 39.05
## 3rd Qu.:67.00   3rd Qu.:3.382    3rd Qu.:193     3rd Qu.:3.382    3rd Qu.: 71.25
## Max.   :89.00   Max.   :7.170    Max.   :360     Max.   :7.170    Max.   :100.00
##
##    Weather_Id     Weaather_main       Weather_Description  Weather_icon
## Min.   :500.0   Clear :235     clear sky        :234       01d    :148
## 1st Qu.:800.0   Clouds:387     scattered clouds :104       04n    :101
## Median :801.0   Rain  :102     overcast clouds  :103       04d    : 90
## Mean   :759.1                  few clouds       : 92       01n    : 87
## 3rd Qu.:803.0                  light rain       : 90       03d    : 68
## Max.   :804.0                  broken clouds    : 88       10d    : 59
##                                (Other)          : 13       (Other):171
```

```r
summary(Puebla23[Puebla23$Month == "Jul",])
```

```
##        DT                Datetime              Month        Year
## Min.   :1.688e+09   Length:748         Jul    :748    2023:748
## 1st Qu.:1.689e+09   Class :character   Feb    :  0    2024:  0
## Median :1.690e+09   Mode  :character   Mar    :  0
## Mean   :1.690e+09                      Apr    :  0
## 3rd Qu.:1.690e+09                      May    :  0
## Max.   :1.691e+09                      Jun    :  0
##                                        (Other):  0
##     Timezone         City_Name           Latitude        Longitude
## Min.   :-21600   Length:748         Min.   :19.04    Min.   :-98.2
## 1st Qu.:-21600   Class :character   1st Qu.:19.04    1st Qu.:-98.2
## Median :-21600   Mode  :character   Median :19.04    Median :-98.2
## Mean   :-21600                      Mean   :19.04    Mean   :-98.2
## 3rd Qu.:-21600                      3rd Qu.:19.04    3rd Qu.:-98.2
## Max.   :-21600                      Max.   :19.04    Max.   :-98.2
##
##       Temp          Feels_like       Temp_Min        Temp_Max         Pressure
## Min.   :11.45   Min.   :10.30    Min.   :11.45   Min.   :11.45    Min.   :1009
## 1st Qu.:14.54   1st Qu.:14.22    1st Qu.:14.54   1st Qu.:14.54    1st Qu.:1015
## Median :16.43   Median :16.16    Median :16.43   Median :16.43    Median :1017
## Mean   :17.77   Mean   :17.40    Mean   :17.77   Mean   :17.77    Mean   :1017
## 3rd Qu.:21.15   3rd Qu.:20.68    3rd Qu.:21.15   3rd Qu.:21.15    3rd Qu.:1019
```

```
## Max.   :26.55   Max.   :26.55   Max.   :26.55   Max.   :26.55   Max.   :1023
##
##    Humidity      Wind_Speed       Wind_Deg        Wind_Gust
## Min.   :29.00   Min.   :0.220   Min.   :  1.0   Min.   :0.220
## 1st Qu.:54.00   1st Qu.:1.448   1st Qu.: 13.0   1st Qu.:1.448
## Median :73.00   Median :2.230   Median : 46.0   Median :2.230
## Mean   :68.36   Mean   :2.219   Mean   : 92.2   Mean   :2.219
## 3rd Qu.:83.25   3rd Qu.:2.870   3rd Qu.:156.0   3rd Qu.:2.870
## Max.   :95.00   Max.   :5.820   Max.   :360.0   Max.   :5.820
##
##    Clouds_all       Weather_Id   Weaather_main      Weather_Description
## Min.   :  0.00   Min.   :500   Clear : 56    light rain      :209
## 1st Qu.: 46.00   1st Qu.:500   Clouds:443    overcast clouds :197
## Median : 83.00   Median :802   Rain  :249    broken clouds   :119
## Mean   : 69.62   Mean   :702                 scattered clouds: 81
## 3rd Qu.: 98.00   3rd Qu.:804                 clear sky       : 56
## Max.   :100.00   Max.   :804                 few clouds      : 46
##                                              (Other)         : 40
##
##    Weather_icon
## 04n    :172
## 04d    :144
## 10d    :144
## 10n    :105
## 01d    : 52
## 03d    : 49
## (Other): 82
```

```r
summary(Puebla23[Puebla23$Month == "Aug",])
```

```
##        DT              Datetime            Month         Year
## Min.   :1.691e+09   Length:749         Aug    :749   2023:749
## 1st Qu.:1.692e+09   Class :character   Feb    :  0   2024:  0
## Median :1.692e+09   Mode  :character   Mar    :  0
## Mean   :1.692e+09                      Apr    :  0
## 3rd Qu.:1.693e+09                      May    :  0
## Max.   :1.694e+09                      Jun    :  0
##                                        (Other):  0
##    Timezone        City_Name           Latitude        Longitude
## Min.   :-21600   Length:749         Min.   :19.04   Min.   :-98.2
## 1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
## Median :-21600   Mode  :character   Median :19.04   Median :-98.2
## Mean   :-21600                      Mean   :19.04   Mean   :-98.2
## 3rd Qu.:-21600                      3rd Qu.:19.04   3rd Qu.:-98.2
## Max.   :-21600                      Max.   :19.04   Max.   :-98.2
##
##      Temp          Feels_like       Temp_Min        Temp_Max        Pressure
## Min.   : 9.55   Min.   : 8.68   Min.   : 9.55   Min.   : 9.55   Min.   :1009
## 1st Qu.:14.18   1st Qu.:13.85   1st Qu.:14.18   1st Qu.:14.18   1st Qu.:1014
## Median :16.12   Median :15.80   Median :16.12   Median :16.12   Median :1017
## Mean   :17.27   Mean   :16.94   Mean   :17.27   Mean   :17.27   Mean   :1016
## 3rd Qu.:20.55   3rd Qu.:20.16   3rd Qu.:20.55   3rd Qu.:20.55   3rd Qu.:1019
## Max.   :26.55   Max.   :26.55   Max.   :26.55   Max.   :26.55   Max.   :1022
##
##    Humidity      Wind_Speed       Wind_Deg        Wind_Gust
```

```
## Min.   :35.00   Min.   :0.030   Min.   :  0.00   Min.   :0.030
## 1st Qu.:60.00   1st Qu.:1.510   1st Qu.: 11.00   1st Qu.:1.510
## Median :77.00   Median :2.180   Median : 34.00   Median :2.180
## Mean   :72.43   Mean   :2.233   Mean   : 85.28   Mean   :2.233
## 3rd Qu.:86.00   3rd Qu.:2.890   3rd Qu.:153.00   3rd Qu.:2.890
## Max.   :98.00   Max.   :5.260   Max.   :360.00   Max.   :5.260
##
##    Clouds_all        Weather_Id     Weaather_main     Weather_Description
## Min.   :  0.00   Min.   :500.0   Clear : 86    overcast clouds:226
## 1st Qu.: 49.00   1st Qu.:500.0   Clouds:398    light rain     :205
## Median : 88.00   Median :801.0   Rain  :265    broken clouds  : 90
## Mean   : 71.03   Mean   :695.7                 clear sky      : 86
## 3rd Qu.: 99.00   3rd Qu.:804.0                 moderate rain  : 57
## Max.   :100.00   Max.   :804.0                 few clouds     : 44
##                                                (Other)        : 41
##   Weather_icon
## 04n    :191
## 10d    :145
## 04d    :125
## 10n    :120
## 01d    : 54
## 02d    : 37
## (Other): 77
```

```r
summary(Puebla23[Puebla23$Month == "Sept",])
```

```
##        DT              Datetime            Month        Year
## Min.   :1.694e+09   Length:724         Sept   :724   2023:724
## 1st Qu.:1.694e+09   Class :character   Feb    :  0   2024:  0
## Median :1.695e+09   Mode  :character   Mar    :  0
## Mean   :1.695e+09                      Apr    :  0
## 3rd Qu.:1.695e+09                      May    :  0
## Max.   :1.696e+09                      Jun    :  0
##                                        (Other):  0
##    Timezone        City_Name            Latitude        Longitude
## Min.   :-21600   Length:724         Min.   :19.04   Min.   :-98.2
## 1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
## Median :-21600   Mode  :character   Median :19.04   Median :-98.2
## Mean   :-21600                      Mean   :19.04   Mean   :-98.2
## 3rd Qu.:-21600                      3rd Qu.:19.04   3rd Qu.:-98.2
## Max.   :-21600                      Max.   :19.04   Max.   :-98.2
##
##      Temp          Feels_like       Temp_Min         Temp_Max         Pressure
## Min.   : 8.55   Min.   : 7.19   Min.   : 8.55   Min.   : 8.55   Min.   :1008
## 1st Qu.:13.99   1st Qu.:13.66   1st Qu.:13.99   1st Qu.:13.99   1st Qu.:1014
## Median :16.19   Median :15.85   Median :16.19   Median :16.19   Median :1017
## Mean   :17.65   Mean   :17.23   Mean   :17.65   Mean   :17.65   Mean   :1016
## 3rd Qu.:21.55   3rd Qu.:21.18   3rd Qu.:21.55   3rd Qu.:21.55   3rd Qu.:1018
## Max.   :28.55   Max.   :27.67   Max.   :28.55   Max.   :28.55   Max.   :1022
##
##    Humidity        Wind_Speed        Wind_Deg        Wind_Gust
## Min.   :23.00   Min.   :0.060   Min.   :  0.00   Min.   :0.060
## 1st Qu.:52.00   1st Qu.:1.590   1st Qu.:  8.00   1st Qu.:1.590
## Median :71.00   Median :2.180   Median : 25.00   Median :2.180
```

```
##   Mean   :67.55   Mean   :2.171   Mean   : 76.57   Mean   :2.171
##   3rd Qu.:85.00   3rd Qu.:2.710   3rd Qu.:151.50   3rd Qu.:2.710
##   Max.   :93.00   Max.   :5.800   Max.   :360.00   Max.   :5.800
##
##    Clouds_all      Weather_Id      Weaather_main       Weather_Description
##   Min.   :  0.00   Min.   :500.0   Clear :137   broken clouds   :157
##   1st Qu.: 16.00   1st Qu.:800.0   Clouds:416   light rain      :142
##   Median : 53.00   Median :801.0   Rain  :171   clear sky       :137
##   Mean   : 50.44   Mean   :730.6                scattered clouds:101
##   3rd Qu.: 82.00   3rd Qu.:803.0                few clouds      : 87
##   Max.   :100.00   Max.   :804.0                overcast clouds : 71
##                                                 (Other)         : 29
##    Weather_icon
##   04n    :149
##   10n    :102
##   01d    : 95
##   04d    : 79
##   10d    : 69
##   02d    : 67
##   (Other):163
```

```r
summary(Puebla23[Puebla23$Month == "Oct",])
```

```
##        DT               Datetime             Month         Year
##   Min.   :1.696e+09   Length:748         Oct    :748   2023:748
##   1st Qu.:1.697e+09   Class :character   Feb    :  0   2024:  0
##   Median :1.697e+09   Mode  :character   Mar    :  0
##   Mean   :1.697e+09                      Apr    :  0
##   3rd Qu.:1.698e+09                      May    :  0
##   Max.   :1.699e+09                      Jun    :  0
##                                          (Other):  0
##     Timezone        City_Name            Latitude        Longitude
##   Min.   :-21600   Length:748         Min.   :19.04   Min.   :-98.2
##   1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
##   Median :-21600   Mode  :character   Median :19.04   Median :-98.2
##   Mean   :-21600                      Mean   :19.04   Mean   :-98.2
##   3rd Qu.:-21600                      3rd Qu.:19.04   3rd Qu.:-98.2
##   Max.   :-21600                      Max.   :19.04   Max.   :-98.2
##
##        Temp          Feels_like        Temp_Min        Temp_Max         Pressure
##   Min.   : 8.55   Min.   : 7.89   Min.   : 8.55   Min.   : 8.55   Min.   :1008
##   1st Qu.:14.47   1st Qu.:14.23   1st Qu.:14.47   1st Qu.:14.47   1st Qu.:1013
##   Median :15.96   Median :15.65   Median :15.96   Median :15.96   Median :1015
##   Mean   :17.02   Mean   :16.63   Mean   :17.02   Mean   :17.02   Mean   :1015
##   3rd Qu.:19.45   3rd Qu.:18.92   3rd Qu.:19.45   3rd Qu.:19.45   3rd Qu.:1017
##   Max.   :26.55   Max.   :26.55   Max.   :26.55   Max.   :26.55   Max.   :1021
##
##     Humidity        Wind_Speed       Wind_Deg         Wind_Gust
##   Min.   :26.00   Min.   :0.080   Min.   :  0.00   Min.   :0.080
##   1st Qu.:59.00   1st Qu.:1.490   1st Qu.: 15.00   1st Qu.:1.490
##   Median :77.00   Median :2.320   Median : 62.00   Median :2.320
##   Mean   :71.14   Mean   :2.579   Mean   : 98.48   Mean   :2.579
##   3rd Qu.:84.00   3rd Qu.:3.450   3rd Qu.:177.00   3rd Qu.:3.450
##   Max.   :98.00   Max.   :6.900   Max.   :360.00   Max.   :6.900
```

```
##
##     Clouds_all        Weather_Id      Weaather_main       Weather_Description
##   Min.   :  2.00   Min.   :500.0   Clear : 18     overcast clouds :313
##   1st Qu.: 67.00   1st Qu.:801.0   Clouds:573     broken clouds   :168
##   Median : 91.00   Median :803.0   Rain  :157     light rain      :134
##   Mean   : 79.09   Mean   :739.6                  scattered clouds: 53
##   3rd Qu.: 99.00   3rd Qu.:804.0                  few clouds      : 39
##   Max.   :100.00   Max.   :804.0                  moderate rain   : 23
##                                                   (Other)         : 18
##    Weather_icon
##   04n    :241
##   04d    :240
##   10n    : 92
##   10d    : 65
##   03d    : 33
##   02d    : 21
##   (Other): 56
```

```r
summary(Puebla23[Puebla23$Month == "Nov",])
```

```
##        DT                Datetime             Month         Year
##   Min.   :1.699e+09   Length:725          Nov    :725   2023:725
##   1st Qu.:1.699e+09   Class :character    Feb    :  0   2024:  0
##   Median :1.700e+09   Mode  :character    Mar    :  0
##   Mean   :1.700e+09                       Apr    :  0
##   3rd Qu.:1.701e+09                       May    :  0
##   Max.   :1.701e+09                       Jun    :  0
##                                           (Other):  0
##     Timezone        City_Name            Latitude        Longitude
##   Min.   :-21600   Length:725          Min.   :19.04   Min.   :-98.2
##   1st Qu.:-21600   Class :character    1st Qu.:19.04   1st Qu.:-98.2
##   Median :-21600   Mode  :character    Median :19.04   Median :-98.2
##   Mean   :-21600                       Mean   :19.04   Mean   :-98.2
##   3rd Qu.:-21600                       3rd Qu.:19.04   3rd Qu.:-98.2
##   Max.   :-21600                       Max.   :19.04   Max.   :-98.2
##
##       Temp          Feels_like        Temp_Min        Temp_Max         Pressure
##   Min.   : 5.55   Min.   : 3.64   Min.   : 5.55   Min.   : 5.55   Min.   :1009
##   1st Qu.:13.02   1st Qu.:12.31   1st Qu.:13.02   1st Qu.:13.02   1st Qu.:1015
##   Median :15.54   Median :14.96   Median :15.54   Median :15.54   Median :1017
##   Mean   :16.34   Mean   :15.68   Mean   :16.34   Mean   :16.34   Mean   :1017
##   3rd Qu.:19.26   3rd Qu.:18.63   3rd Qu.:19.26   3rd Qu.:19.26   3rd Qu.:1019
##   Max.   :27.55   Max.   :26.55   Max.   :27.55   Max.   :27.55   Max.   :1022
##
##      Humidity        Wind_Speed        Wind_Deg        Wind_Gust
##   Min.   :13.00   Min.   :0.030   Min.   :  0.0   Min.   :0.030
##   1st Qu.:49.00   1st Qu.:1.470   1st Qu.: 14.0   1st Qu.:1.470
##   Median :68.00   Median :2.390   Median : 74.0   Median :2.390
##   Mean   :63.19   Mean   :2.402   Mean   :105.5   Mean   :2.402
##   3rd Qu.:78.00   3rd Qu.:3.160   3rd Qu.:181.0   3rd Qu.:3.160
##   Max.   :92.00   Max.   :5.990   Max.   :360.0   Max.   :5.990
##
##     Clouds_all        Weather_Id      Weaather_main       Weather_Description
##   Min.   :  0.00   Min.   :500.0   Clear :207     clear sky       :207
```

```
##  1st Qu.:  6.00   1st Qu.:800.0   Clouds:467   overcast clouds :176
##  Median : 48.00   Median :802.0   Rain  : 51   broken clouds   :147
##  Mean   : 48.24   Mean   :780.8                scattered clouds: 92
##  3rd Qu.: 87.00   3rd Qu.:803.0                few clouds      : 52
##  Max.   :100.00   Max.   :804.0                light rain      : 45
##                                                (Other)         :  6
##   Weather_icon
##  04n    :180
##  04d    :143
##  01d    :106
##  01n    :101
##  03d    : 49
##  03n    : 43
##  (Other):103
```

```r
summary(Puebla23[Puebla23$Month == "Dec",])
```

```
##        DT               Datetime            Month         Year
##  Min.   :1.701e+09   Length:748         Dec    :748   2023:748
##  1st Qu.:1.702e+09   Class :character   Feb    :  0   2024:  0
##  Median :1.703e+09   Mode  :character   Mar    :  0
##  Mean   :1.703e+09                      Apr    :  0
##  3rd Qu.:1.703e+09                      May    :  0
##  Max.   :1.704e+09                      Jun    :  0
##                                         (Other):  0
##     Timezone        City_Name            Latitude        Longitude
##  Min.   :-21600   Length:748         Min.   :19.04   Min.   :-98.2
##  1st Qu.:-21600   Class :character   1st Qu.:19.04   1st Qu.:-98.2
##  Median :-21600   Mode  :character   Median :19.04   Median :-98.2
##  Mean   :-21600                      Mean   :19.04   Mean   :-98.2
##  3rd Qu.:-21600                      3rd Qu.:19.04   3rd Qu.:-98.2
##  Max.   :-21600                      Max.   :19.04   Max.   :-98.2
##
##       Temp         Feels_like        Temp_Min        Temp_Max         Pressure
##  Min.   : 2.55   Min.   : 1.06   Min.   : 2.55   Min.   : 2.55   Min.   :1011
##  1st Qu.:11.54   1st Qu.:10.48   1st Qu.:11.54   1st Qu.:11.54   1st Qu.:1016
##  Median :13.55   Median :12.69   Median :13.55   Median :13.55   Median :1018
##  Mean   :14.28   Mean   :13.37   Mean   :14.28   Mean   :14.28   Mean   :1018
##  3rd Qu.:16.81   3rd Qu.:15.83   3rd Qu.:16.81   3rd Qu.:16.81   3rd Qu.:1019
##  Max.   :24.55   Max.   :23.71   Max.   :24.55   Max.   :24.55   Max.   :1025
##
##     Humidity       Wind_Speed       Wind_Deg        Wind_Gust
##  Min.   :14.00   Min.   :0.050   Min.   :  0.0   Min.   :0.050
##  1st Qu.:47.00   1st Qu.:1.448   1st Qu.: 15.0   1st Qu.:1.448
##  Median :61.00   Median :2.315   Median : 79.5   Median :2.315
##  Mean   :59.16   Mean   :2.527   Mean   :102.1   Mean   :2.527
##  3rd Qu.:74.00   3rd Qu.:3.410   3rd Qu.:178.2   3rd Qu.:3.410
##  Max.   :94.00   Max.   :7.430   Max.   :360.0   Max.   :7.430
##
##    Clouds_all       Weather_Id    Weaather_main     Weather_Description
##  Min.   :  0.00   Min.   :500.0   Clear :160    overcast clouds :287
##  1st Qu.: 18.00   1st Qu.:800.0   Clouds:540    clear sky       :160
##  Median : 75.00   Median :803.0   Rain  : 48    broken clouds   :127
##  Mean   : 60.35   Mean   :783.1                 scattered clouds: 83
```

```
## 3rd Qu.: 99.00   3rd Qu.:804.0                    light rain     : 47
## Max.   :100.00   Max.   :804.0                    few clouds     : 43
##                                                   (Other)        :  1
##    Weather_icon
## 04n    :217
## 04d    :197
## 01n    : 87
## 01d    : 73
## 03n    : 43
## 03d    : 40
## (Other): 91
```

```r
summary(Puebla23[Puebla23$Month == "Jan",])
```

```
##       DT              Datetime             Month        Year
## Min.   :1.704e+09   Length:724          Jan    :724   2023:  0
## 1st Qu.:1.705e+09   Class :character    Feb    :  0   2024:724
## Median :1.705e+09   Mode  :character    Mar    :  0
## Mean   :1.705e+09                       Apr    :  0
## 3rd Qu.:1.706e+09                       May    :  0
## Max.   :1.707e+09                       Jun    :  0
##                                         (Other):  0
##     Timezone         City_Name            Latitude        Longitude
## Min.   :-21600     Length:724          Min.   :19.04   Min.   :-98.2
## 1st Qu.:-21600     Class :character    1st Qu.:19.04   1st Qu.:-98.2
## Median :-21600     Mode  :character    Median :19.04   Median :-98.2
## Mean   :-21600                         Mean   :19.04   Mean   :-98.2
## 3rd Qu.:-21600                         3rd Qu.:19.04   3rd Qu.:-98.2
## Max.   :-21600                         Max.   :19.04   Max.   :-98.2
##
##      Temp          Feels_like        Temp_Min        Temp_Max        Pressure
## Min.   : 3.55   Min.   : 3.12    Min.   : 3.55   Min.   : 3.55   Min.   :1009
## 1st Qu.:12.35   1st Qu.:11.22    1st Qu.:12.35   1st Qu.:12.35   1st Qu.:1015
## Median :14.68   Median :13.59    Median :14.68   Median :14.68   Median :1017
## Mean   :15.45   Mean   :14.39    Mean   :15.45   Mean   :15.45   Mean   :1017
## 3rd Qu.:18.55   3rd Qu.:17.46    3rd Qu.:18.55   3rd Qu.:18.55   3rd Qu.:1019
## Max.   :27.55   Max.   :26.47    Max.   :27.55   Max.   :27.55   Max.   :1024
##
##     Humidity       Wind_Speed       Wind_Deg        Wind_Gust
## Min.   :17.00   Min.   :0.130   Min.   :  1.0   Min.   :0.130
## 1st Qu.:38.00   1st Qu.:1.170   1st Qu.: 47.0   1st Qu.:1.170
## Median :50.00   Median :1.845   Median :157.0   Median :1.845
## Mean   :49.98   Mean   :2.479   Mean   :139.7   Mean   :2.479
## 3rd Qu.:62.00   3rd Qu.:3.445   3rd Qu.:194.0   3rd Qu.:3.445
## Max.   :88.00   Max.   :8.340   Max.   :360.0   Max.   :8.340
##
##    Clouds_all        Weather_Id     Weaather_main      Weather_Description
## Min.   :  0.00   Min.   :500.0   Clear :245      overcast clouds :279
## 1st Qu.:  3.00   1st Qu.:800.0   Clouds:467      clear sky       :245
## Median : 57.00   Median :803.0   Rain  : 12      broken clouds   : 92
## Mean   : 51.85   Mean   :797.2                   scattered clouds: 49
## 3rd Qu.: 99.00   3rd Qu.:804.0                   few clouds      : 47
## Max.   :100.00   Max.   :804.0                   light rain      :  9
##                                                  (Other)         :  3
```

```
##    Weather_icon
##  04n    :202
##  04d    :169
##  01n    :127
##  01d    :118
##  02n    : 32
##  03n    : 26
##  (Other): 50
```

```r
#to get number of outliers for wind speed
sum(Puebla23$Month == "May" & Puebla23$Wind_Speed > 6.46)
```

```
## [1] 13
```

```r
sum(Puebla23$Month == "Jun" & Puebla23$Wind_Speed > 6.56)
```

```
## [1] 12
```

```r
sum(Puebla23$Month == "Jul" & Puebla23$Wind_Speed > 5.00)
```

```
## [1] 4
```

```r
sum(Puebla23$Month == "Aug" & Puebla23$Wind_Speed > 4.96)
```

```
## [1] 6
```

```r
sum(Puebla23$Month == "Sept" & Puebla23$Wind_Speed > 4.39)
```

```
## [1] 8
```

```r
sum(Puebla23$Month == "Oct" & Puebla23$Wind_Speed > 6.39)
```

```
## [1] 7
```

```r
sum(Puebla23$Month == "Nov" & Puebla23$Wind_Speed > 5.69)
```

```
## [1] 5
```

```r
sum(Puebla23$Month == "Dec" & Puebla23$Wind_Speed > 6.63)
```

```
## [1] 6
```

```r
sum(Puebla23$Month == "Jan" & Puebla23$Wind_Speed > 6.84)
```

```
## [1] 19
```

```r
#to get number of outliers for wind degree
sum(Puebla23$Month == "Apr" & Puebla23$Wind_Deg > 335.5)
```

```
## [1] 26
```

```r
#to get number of outliers for cloudiness
sum(Puebla23$Month == "Feb" & Puebla23$Clouds_all > 37.5)
```

```
## [1] 105
```

```r
sum(Puebla23$Month == "Oct" & Puebla23$Clouds_all < 19)
```

```
## [1] 45
```

By looking at the boxplots of our monthly data we can see many outliers for different numerical variables. We can find the number of outliers by using the formula for calculating outliers. After getting the LL and UL we substitute the values in the sum() function t get the number of outliers in a variable.

```r
#Task5

#to get mean and medians to put inside our histogram
mean_temp = mean(Puebla23$Temp)
median_temp = median(Puebla23$Temp)


mean_feel_temp = mean(Puebla23$Feels_like)
median_feel_temp = median(Puebla23$Feels_like)

mean_pressure = mean(Puebla23$Pressure)
median_pressure = median(Puebla23$Pressure)

mean_humidity = mean(Puebla23$Humidity)
median_humidity = median(Puebla23$Humidity)

mean_wind_speed = mean(Puebla23$Wind_Speed)
median_wind_speed = median(Puebla23$Wind_Speed)


mean_wind_deg = mean(Puebla23$Wind_Deg)
median_wind_deg = median(Puebla23$Wind_Deg)

mean_clouds = mean(Puebla23$Clouds_all)
median_clouds = median(Puebla23$Clouds_all)

#to plot histograms
hist(Puebla23$Temp, breaks = 45, xlim = c(0,35), ylim = c(0,500), main = "Histogram of Temperature", xla
abline(v = mean_temp, col = "red", lwd = 2, lty = 1)
abline(v = median_temp, col = "blue", lwd = 2, lty = 1)
```
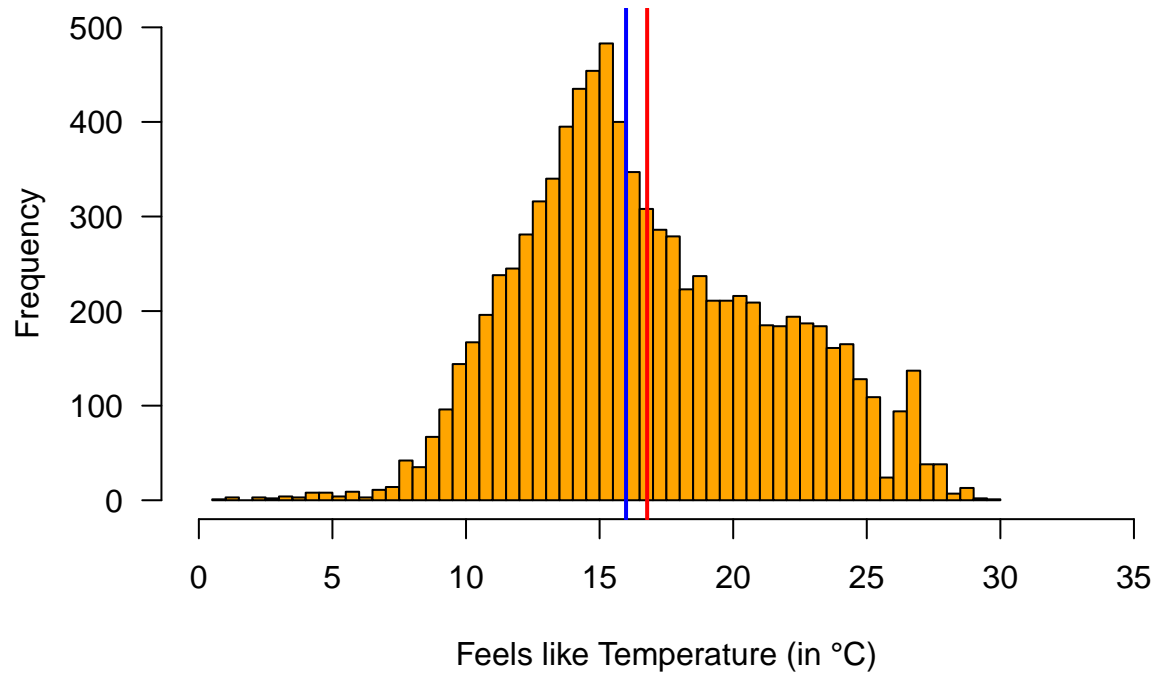
Histogram of Temperature
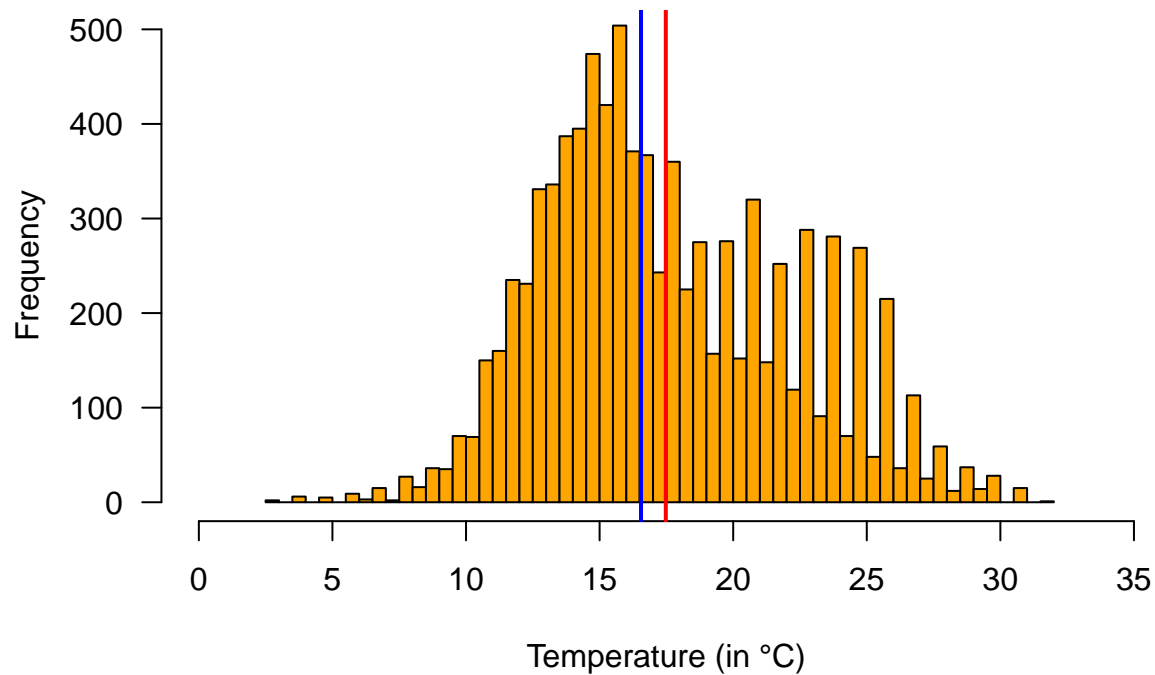

```r
hist(Puebla23$Feels_like, breaks = 45, xlim = c(0,35), ylim = c(0,500), main = "Histogram of Feels like
abline(v = mean_feel_temp, col = "red", lwd = 2, lty = 1)
abline(v = median_feel_temp, col = "blue", lwd = 2, lty = 1)
```

Histogram of Feels like Temperature


```
hist(Puebla23$Pressure, breaks = 20, xlim = c(1005,1030), ylim = c(0,1200), main = "Histogram of Pressu
abline(v = mean_pressure, col = "red", lwd = 2, lty = 1)
abline(v = median_pressure, col = "blue", lwd = 2, lty = 1)
```

Histogram of Pressure
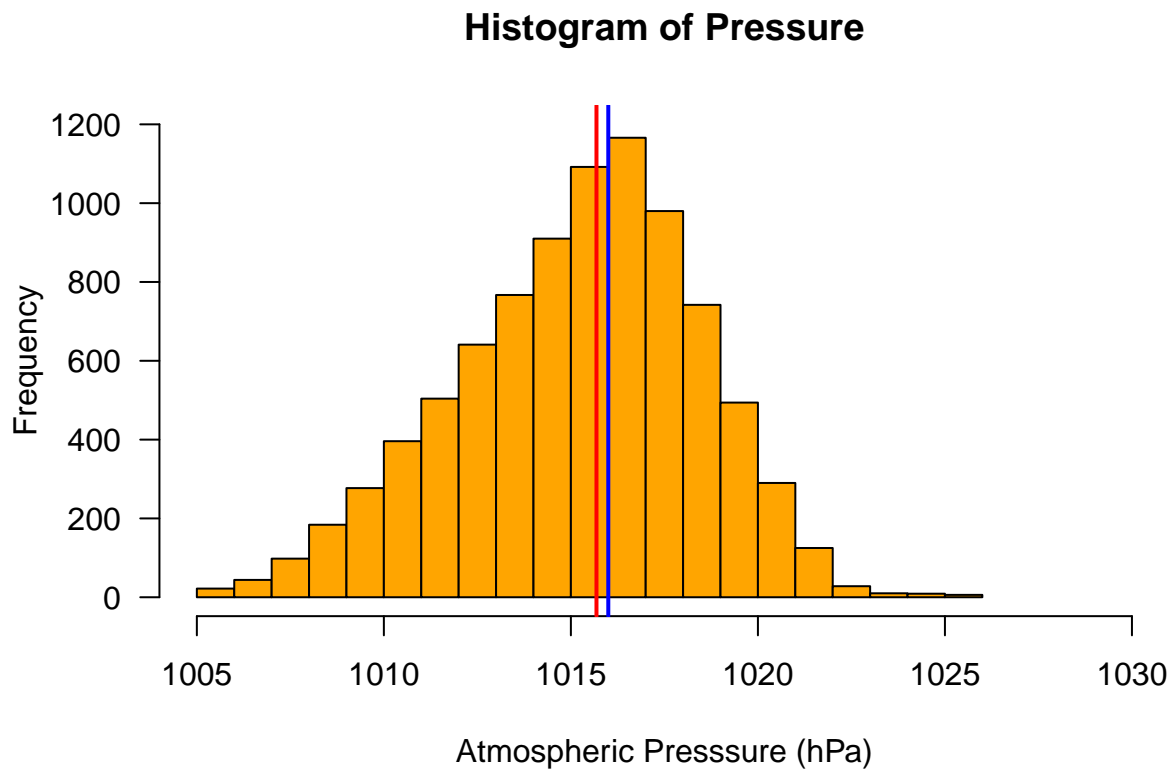

```
hist(Puebla23$Humidity, breaks = 60, xlim = c(0,100), ylim = c(0,300), main = "Histogram of Humidity", :
abline(v = mean_humidity, col = "red", lwd = 2, lty = 1)
abline(v = median_humidity, col = "blue", lwd = 2, lty = 1)
```

Histogram of Humidity
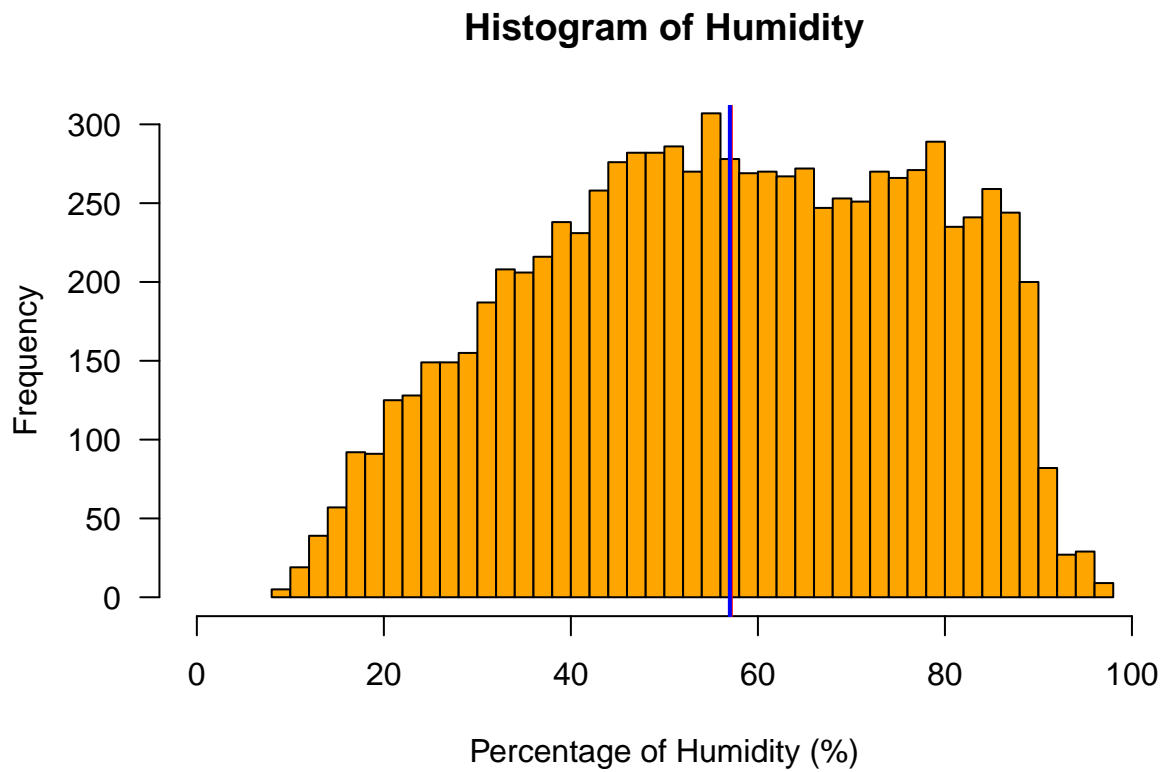

```
hist(Puebla23$Wind_Speed, breaks = 60, xlim = c(0,10), ylim = c(0,600), main = "Histogram of Wind_Speed
abline(v = mean_wind_speed, col = "red", lwd = 2, lty = 1)
abline(v = median_wind_speed, col = "blue", lwd = 2, lty = 1)
```

Histogram of Wind_Speed
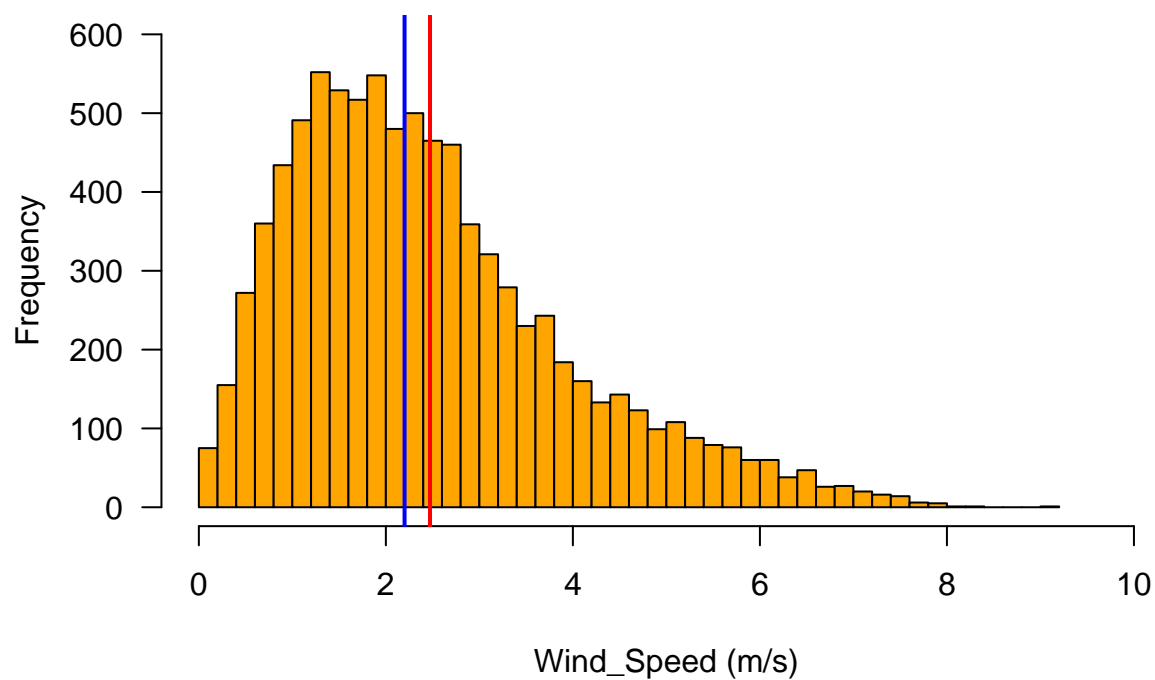

```
hist(Puebla23$Wind_Deg, breaks = 55, xlim = c(0,360), ylim = c(0,800), main = "Histogram of Wind_Deg",
abline(v = mean_wind_deg, col = "red", lwd = 2, lty = 1)
abline(v = median_wind_deg, col = "blue", lwd = 2, lty = 1)
```

Histogram of Wind_Deg

Direction of Wind (degree)
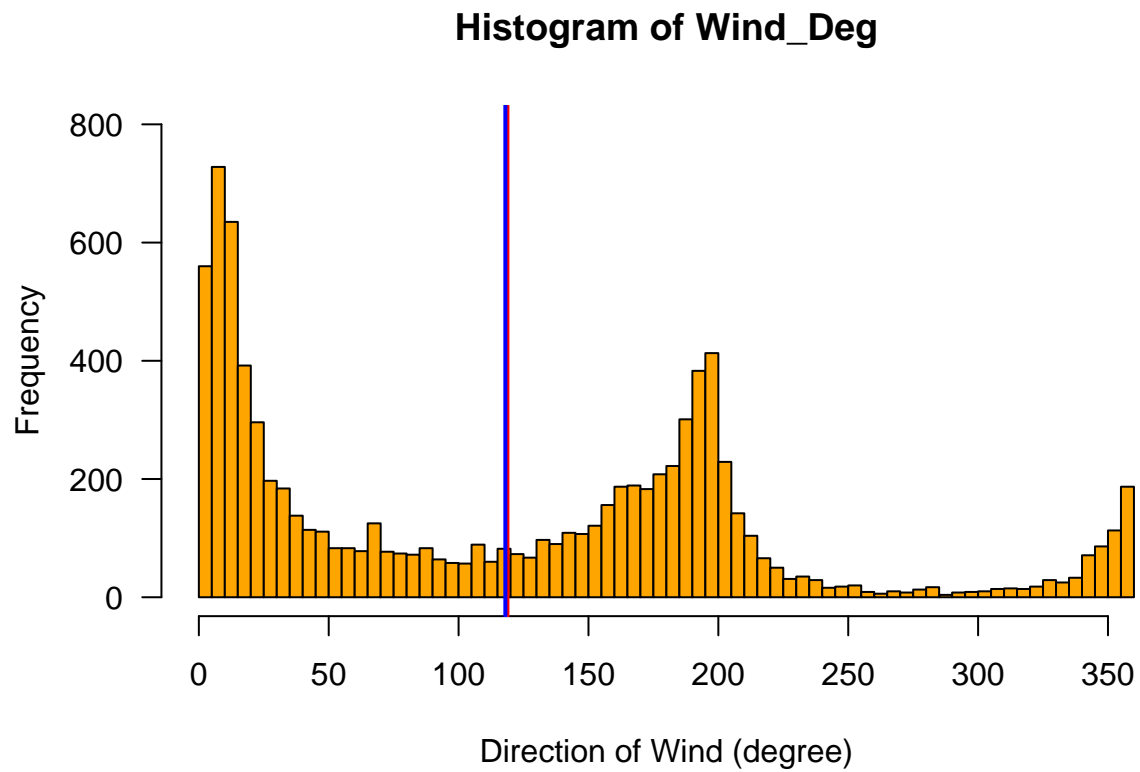
```r
hist(Puebla23$Clouds_all, breaks = 50, xlim = c(0,100), ylim = c(0,2000), main = "Histogram of Clouds",
abline(v = mean_clouds, col = "red", lwd = 2, lty = 1)
abline(v = median_clouds, col = "blue", lwd = 2, lty = 1)
```

Histogram of Clouds
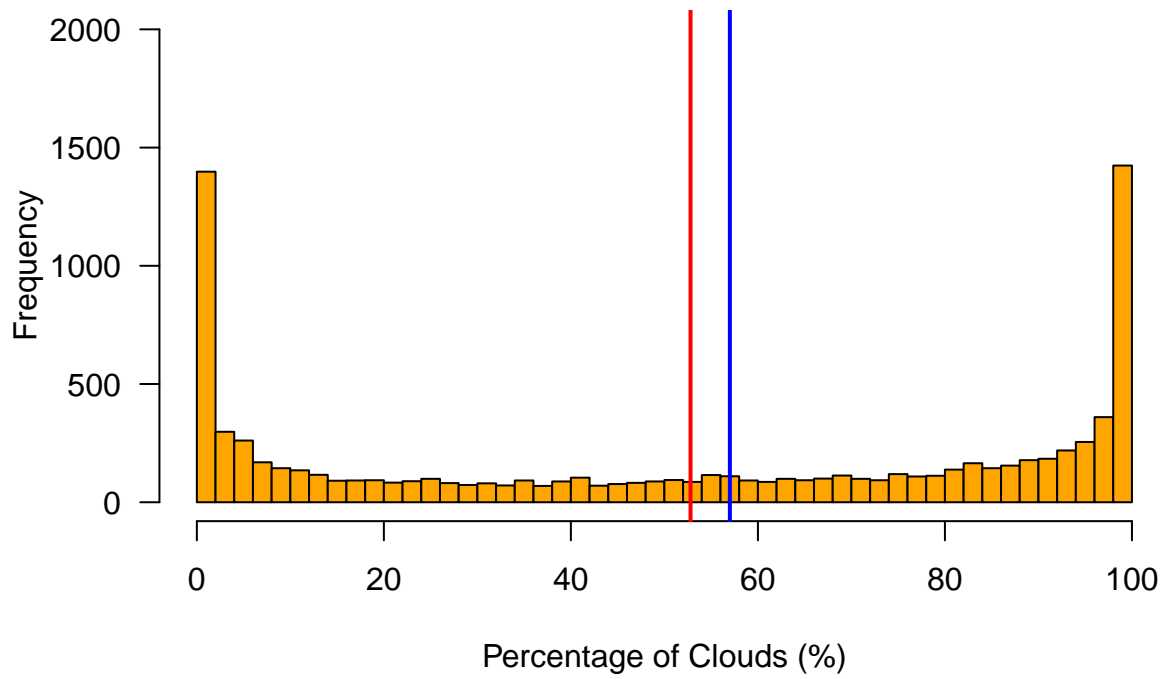
Using the hist() function on various continuous variables of our dataset, we can see the shape and spread of histograms of these variables.