LISTA 6

ANÁLISE DE SÉRIES TEMPORAIS

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Descrição da Atividade

Tente analisar separadamente as seguintes séries temporais mensais encontradas no arquivo `ALGONQUIN_PARK_Ontario_Canada.csv`:

1. “Mean Max Temp (°C)”,
2. “Mean Min Temp (°C)”,
3. “Mean Temp (°C)”,
4. “Extr Max Temp (°C)”,
5. “Extr Min Temp (°C)”,
6. “Total Rain (mm)”,
7. “Total Snow (cm)”,
8. “Total Precip (mm)”.

Respostas

Carregando os pacotes necessários

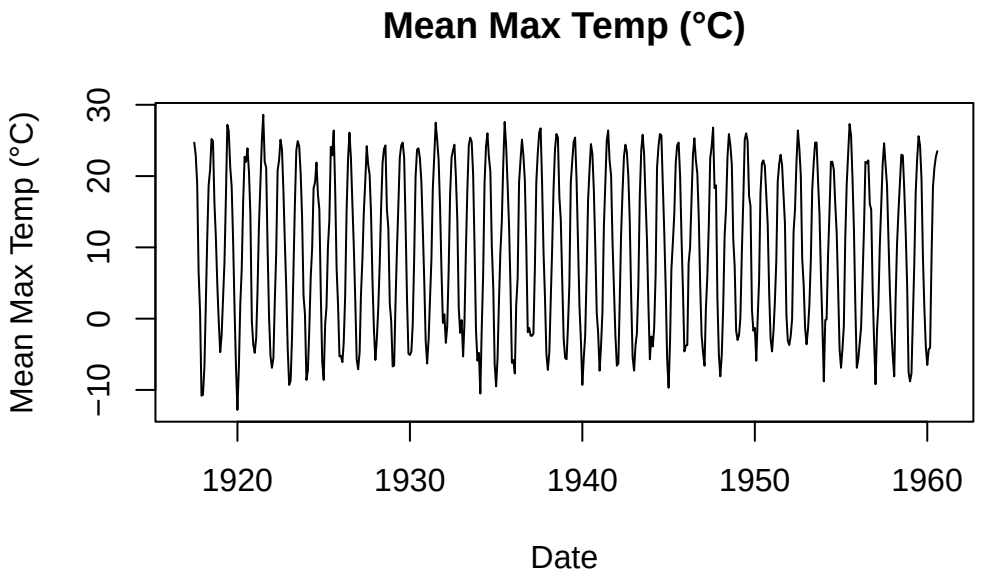
```
if (!require(pacman)) install.packages("pacman")
pacman::p_load(tidyverse,readxl, knitr, aTSA)
options(OutDec = ",")
setwd("C:/Users/User/Documents/GitHub/gradest-1/SERIES/Lista6")
```

Leitura e manipulação dos dados

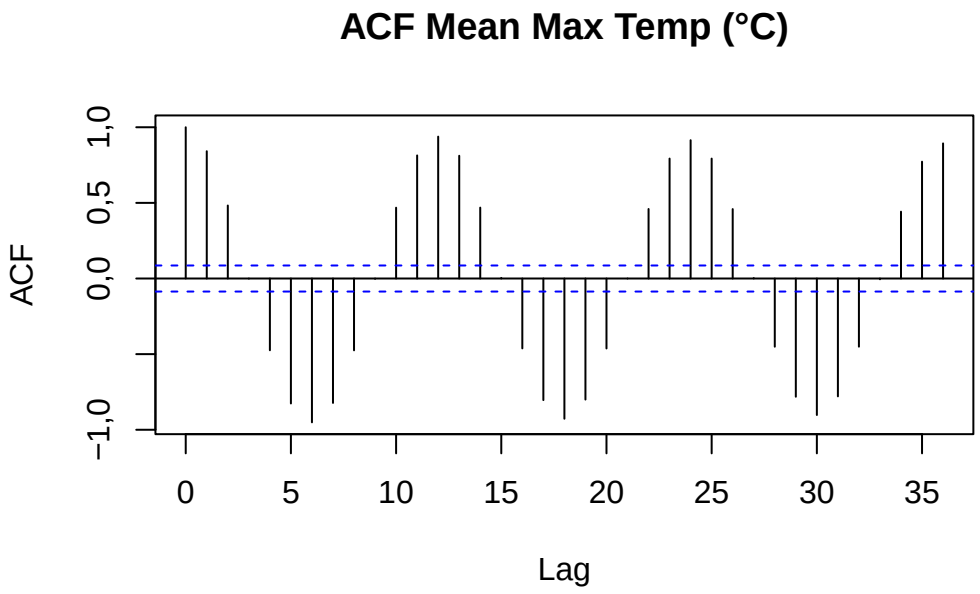
```r
df <- read_csv("ALGONQUIN_PARK_Ontario_Canada.csv")
df$data <- as.Date(paste0(df$`Date/Time`, "-01"), format = "%Y-%m-%d")
```

Análise da série "Mean Max Temp (°C)"

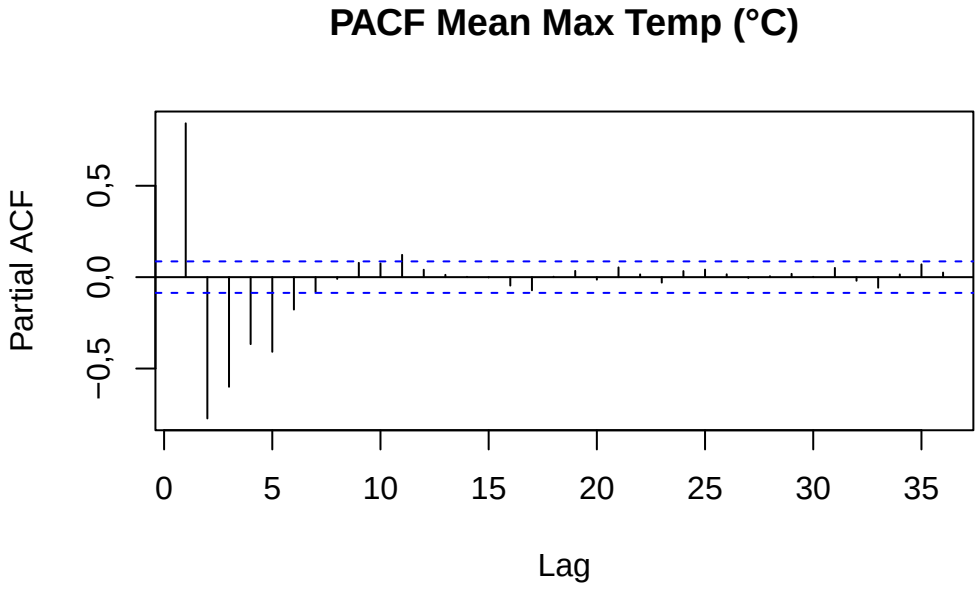
```r
plot(df$data, df$`Mean Max Temp (°C)`, type = "l",
    main = "Mean Max Temp (°C)", xlab = "Date", ylab = "Mean Max Temp (°C)")
```




```r
mmaxt <- na.omit(df$`Mean Max Temp (°C)`)
acf(mmaxt, lag.max = 36, main = "ACF Mean Max Temp (°C)")
```




```r
pacf(mmaxt, lag.max = 36, main = "PACF Mean Max Temp (°C)")
```

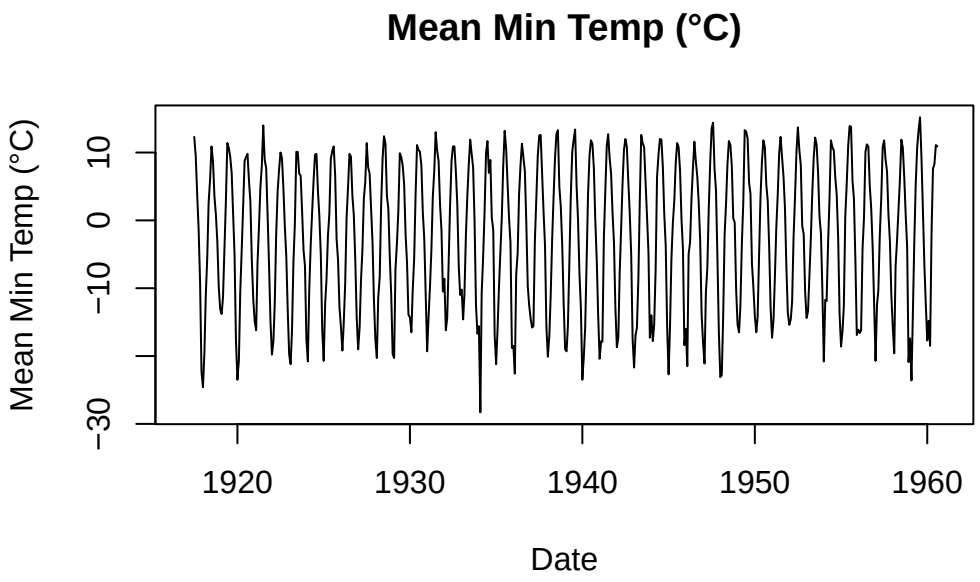


```r
adf.test(mmaxt)
```

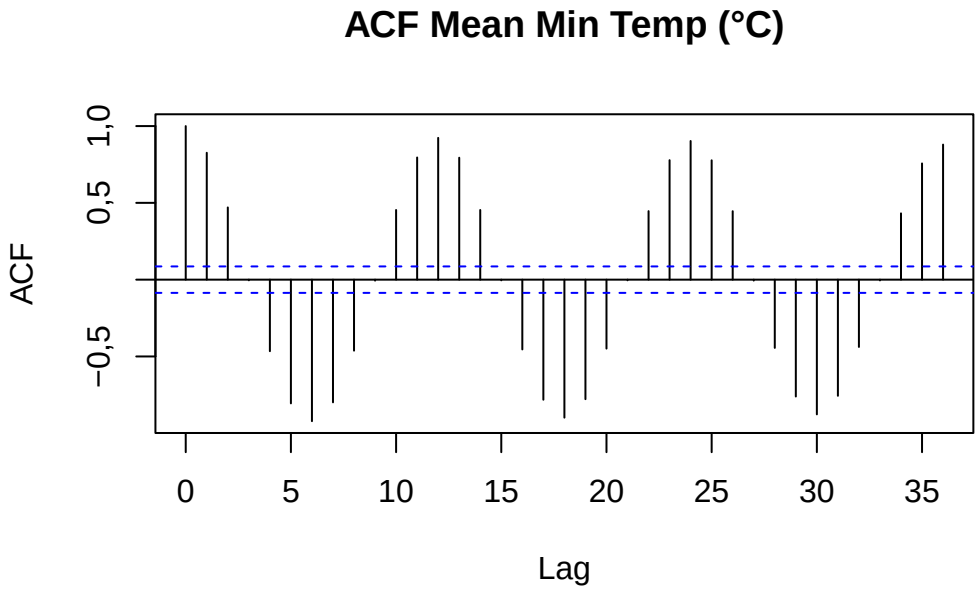
```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag    ADF p.value
[1,]   0  -4,94    0,01
[2,]   1 -12,03    0,01
[3,]   2 -13,70    0,01
[4,]   3  -8,66    0,01
[5,]   4  -5,86    0,01
[6,]   5  -3,34    0,01
Type 2: with drift no trend
     lag    ADF p.value
[1,]   0  -6,61    0,01
[2,]   1 -18,27    0,01
[3,]   2 -28,92    0,01
[4,]   3 -26,80    0,01
[5,]   4 -27,87    0,01
[6,]   5 -22,81    0,01
Type 3: with drift and trend
     lag    ADF p.value
[1,]   0  -6,61    0,01
[2,]   1 -18,26    0,01
[3,]   2 -28,91    0,01
[4,]   3 -26,78    0,01
[5,]   4 -27,87    0,01
[6,]   5 -22,82    0,01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```

Análise da série “Mean Min Temp (°C)”

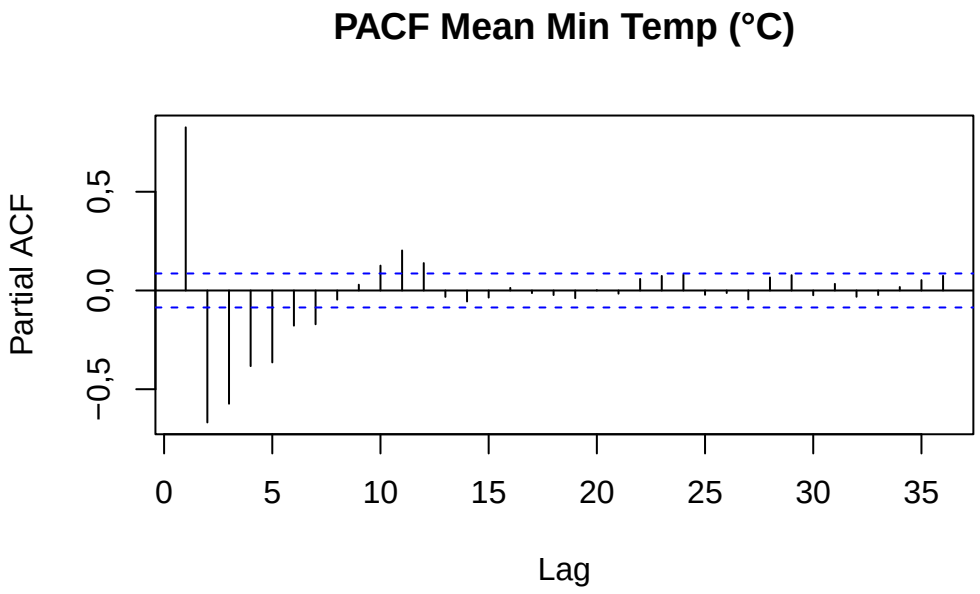
```r
plot(df$data, df$`Mean Min Temp (°C)`, type = "l",
    main = "Mean Min Temp (°C)", xlab = "Date", ylab = "Mean Min Temp (°C)")
```




```r
mmint <- na.omit(df$`Mean Min Temp (°C)`)
acf(mmint, lag.max = 36, main = "ACF Mean Min Temp (°C)")
```



```r
pacf(mmint, lag.max = 36, main = "PACF Mean Min Temp (°C)")
```



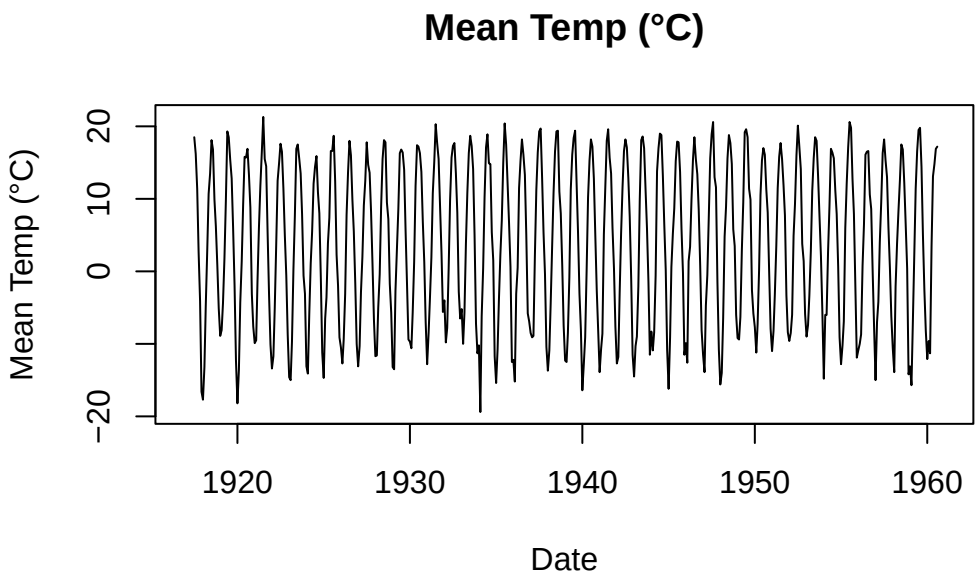

```r
adf.test(mmint)
```

```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag    ADF p.value
[1,]   0  -6,79    0,01
[2,]   1 -14,63    0,01
[3,]   2 -22,81    0,01
[4,]   3 -21,36    0,01
[5,]   4 -18,66    0,01
[6,]   5 -13,48    0,01
Type 2: with drift no trend
     lag    ADF p.value
[1,]   0  -6,96    0,01
[2,]   1 -15,14    0,01
[3,]   2 -24,56    0,01
[4,]   3 -24,92    0,01
```

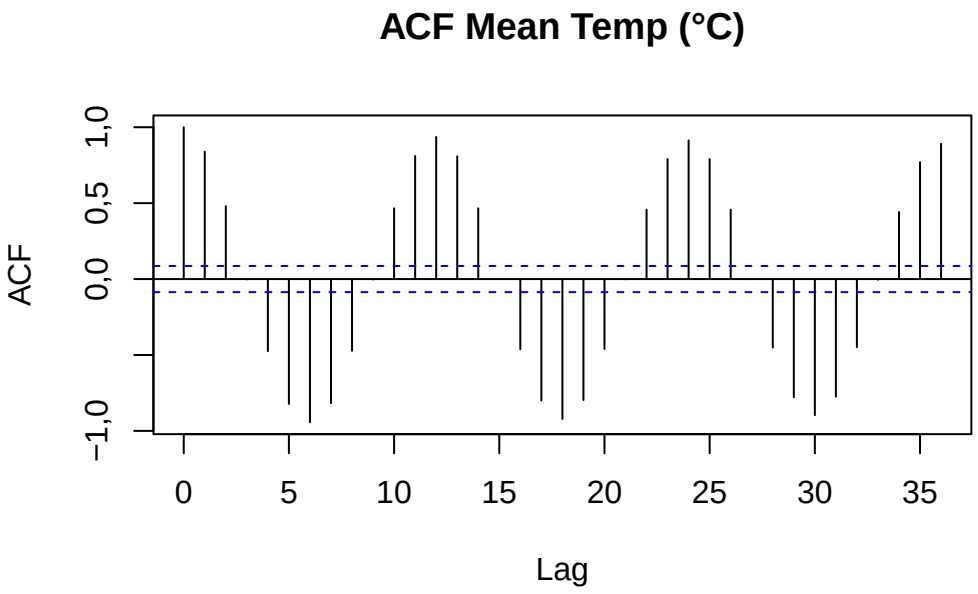
```
[5,]   4 -25,11    0,01
[6,]   5 -21,40    0,01
Type 3: with drift and trend
     lag    ADF p.value
[1,]   0  -6,97    0,01
[2,]   1 -15,15    0,01
[3,]   2 -24,60    0,01
[4,]   3 -25,04    0,01
[5,]   4 -25,40    0,01
[6,]   5 -21,84    0,01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```

Análise da série “Mean Temp (°C)”

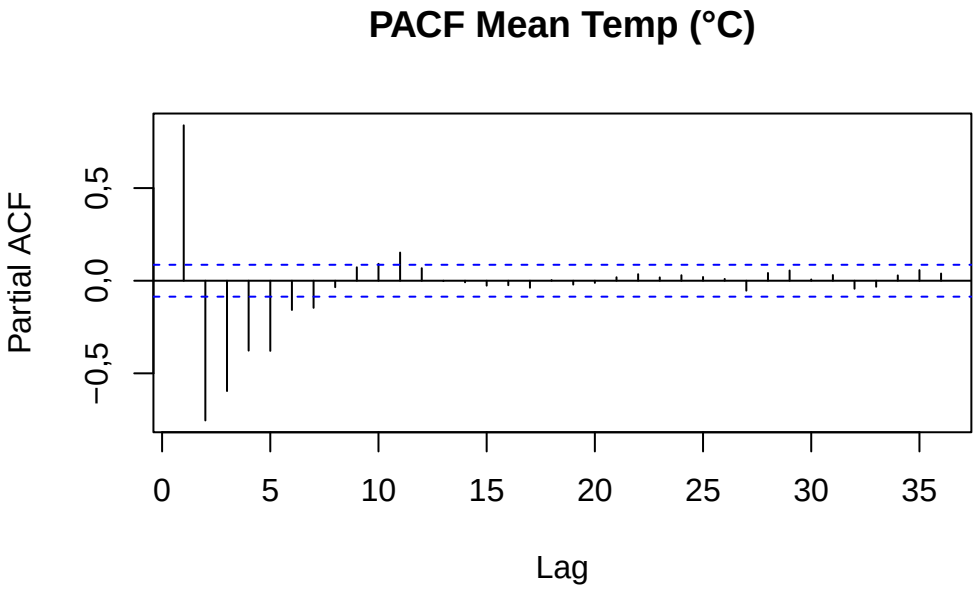
```r
plot(df$data, df$`Mean Temp (°C)`, type = "l",
    main = "Mean Temp (°C)", xlab = "Date", ylab = "Mean Temp (°C)")
```




```r
mt <- na.omit(df$`Mean Temp (°C)`)
acf(mt, lag.max = 36, main = "ACF Mean Temp (°C)")
```




```r
pacf(mt, lag.max = 36, main = "PACF Mean Temp (°C)")
```

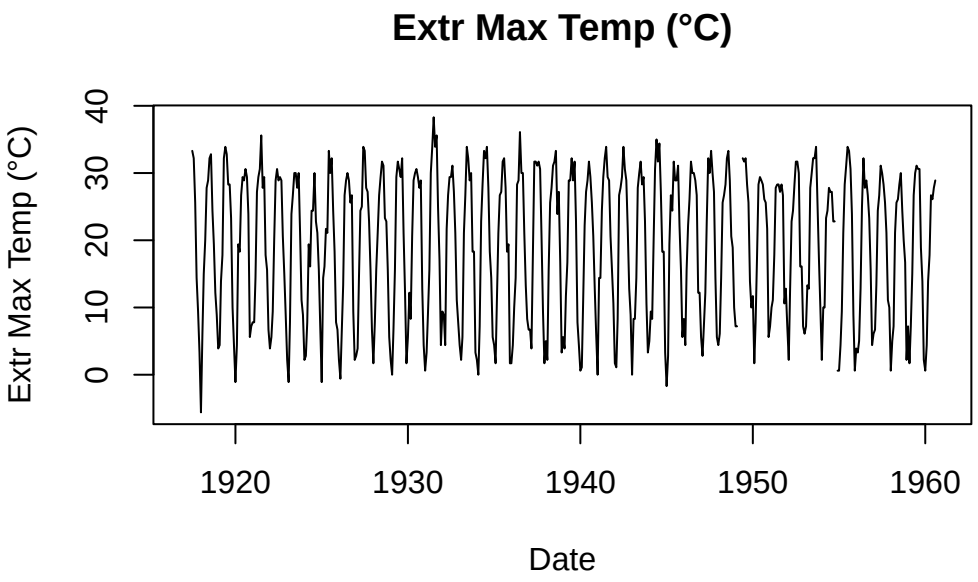


```r
adf.test(mt)
```

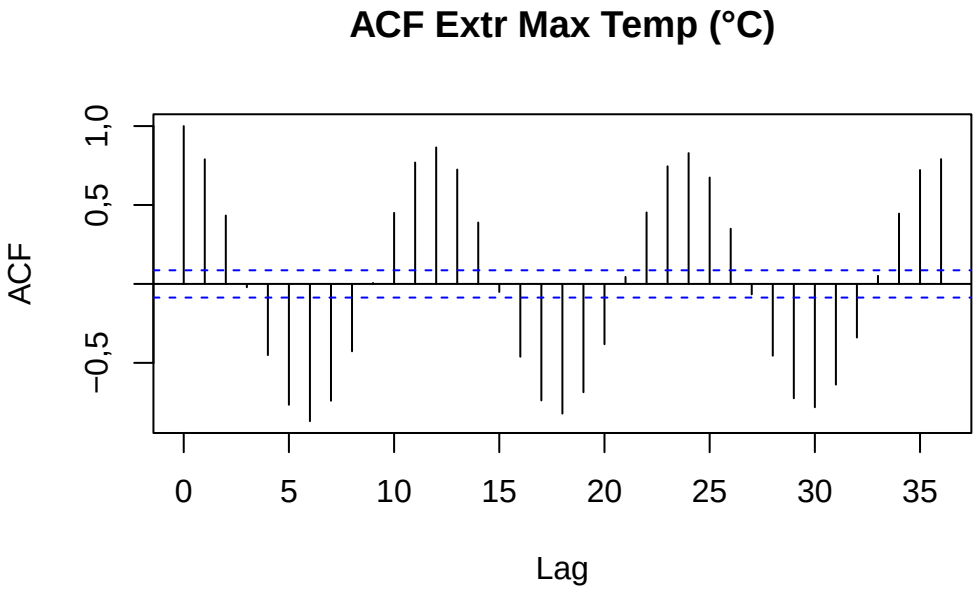
```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag    ADF p.value
[1,]   0  -6,30    0,01
[2,]   1 -16,07    0,01
[3,]   2 -22,97    0,01
[4,]   3 -17,87    0,01
[5,]   4 -13,51    0,01
[6,]   5  -8,43    0,01
Type 2: with drift no trend
     lag    ADF p.value
[1,]   0  -6,67    0,01
[2,]   1 -17,56    0,01
[3,]   2 -28,10    0,01
[4,]   3 -26,49    0,01
[5,]   4 -26,58    0,01
[6,]   5 -21,86    0,01
Type 3: with drift and trend
     lag    ADF p.value
[1,]   0  -6,68    0,01
[2,]   1 -17,56    0,01
[3,]   2 -28,11    0,01
[4,]   3 -26,54    0,01
[5,]   4 -26,72    0,01
[6,]   5 -22,08    0,01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```

Análise da série “Extr Max Temp (°C)”

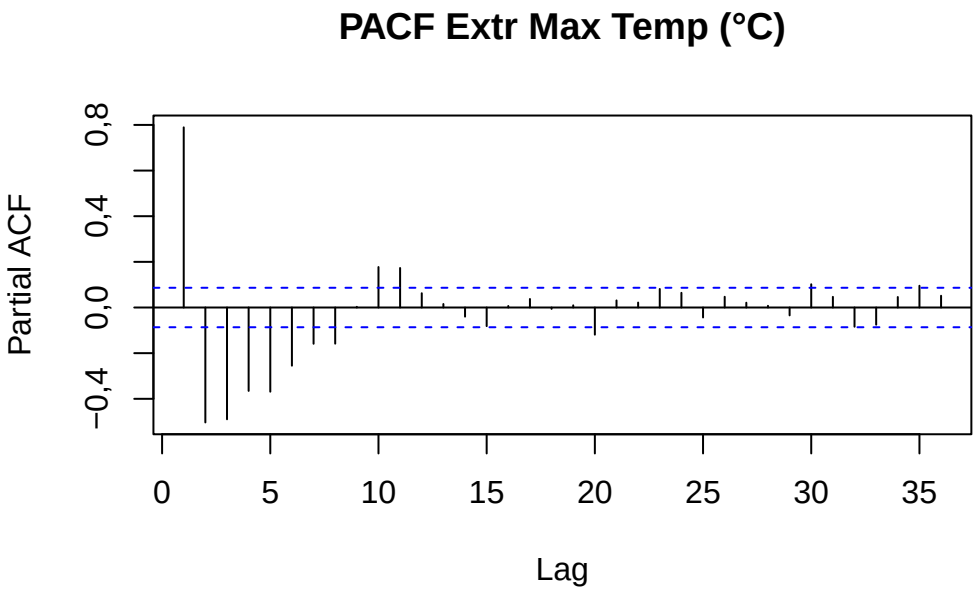
```r
plot(df$data, df$`Extr Max Temp (°C)`, type = "l",
    main = "Extr Max Temp (°C)", xlab = "Date", ylab = "Extr Max Temp (°C)")
```




```r
emaxt <- na.omit(df$`Extr Max Temp (°C)`)
acf(emaxt, lag.max = 36, main = "ACF Extr Max Temp (°C)")
```



```r
pacf(emaxt, lag.max = 36, main = "PACF Extr Max Temp (°C)")
```



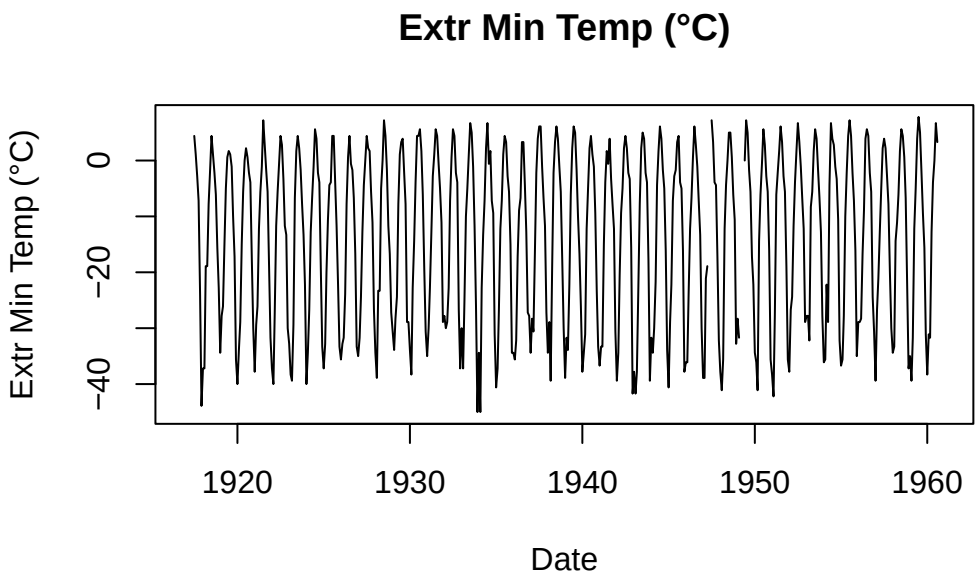

```r
adf.test(emaxt)
```

```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag   ADF p.value
[1,]   0 -3,69    0,01
[2,]   1 -5,43    0,01
[3,]   2 -6,38    0,01
[4,]   3 -5,27    0,01
[5,]   4 -4,01    0,01
[6,]   5 -2,66    0,01
Type 2: with drift no trend
     lag    ADF p.value
[1,]   0  -7,75    0,01
[2,]   1 -12,78    0,01
[3,]   2 -19,08    0,01
[4,]   3 -21,46    0,01
```

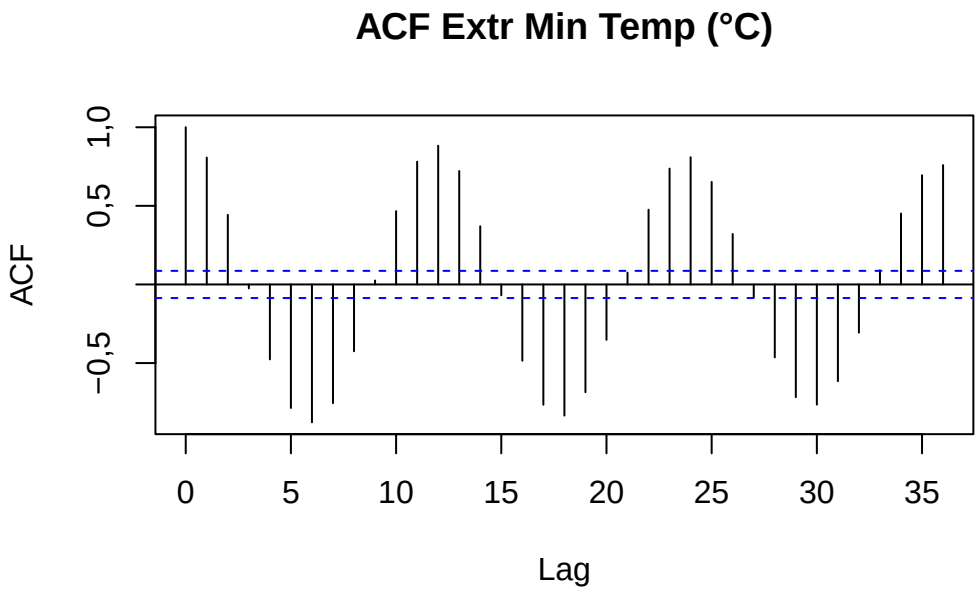
```
[5,]   4 -23,08    0,01
[6,]   5 -21,12    0,01
Type 3: with drift and trend
     lag    ADF p.value
[1,]   0  -7,74    0,01
[2,]   1 -12,77    0,01
[3,]   2 -19,06    0,01
[4,]   3 -21,44    0,01
[5,]   4 -23,06    0,01
[6,]   5 -21,11    0,01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```

Análise da série "Extr Min Temp (°C)"

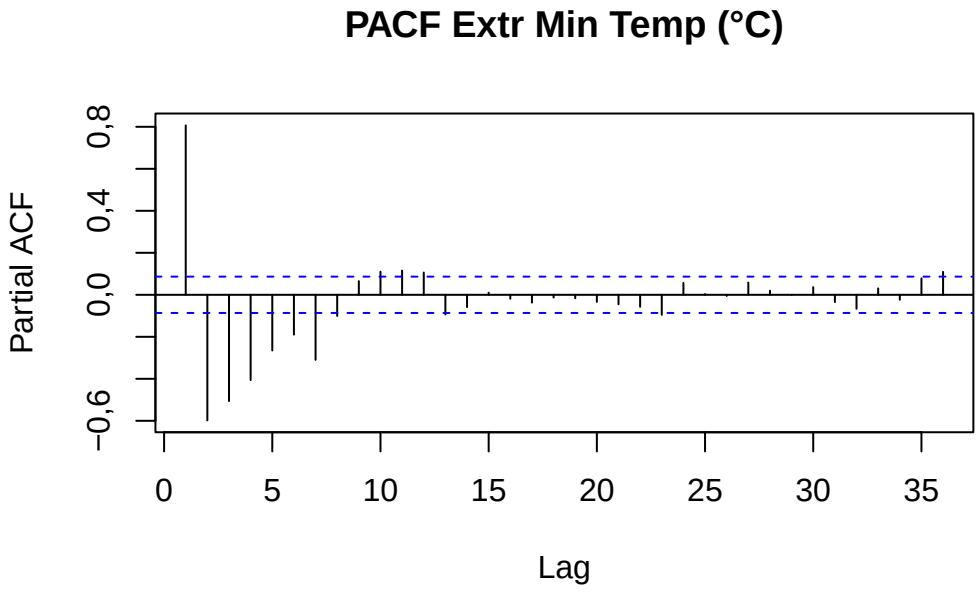
```r
plot(df$data, df$`Extr Min Temp (°C)`, type = "l",
    main = "Extr Min Temp (°C)", xlab = "Date", ylab = "Extr Min Temp (°C)")
```




```r
emint <- na.omit(df$`Extr Min Temp (°C)`)
acf(emint, lag.max = 36, main = "ACF Extr Min Temp (°C)")
```




```r
pacf(emint, lag.max = 36, main = "PACF Extr Min Temp (°C)")
```

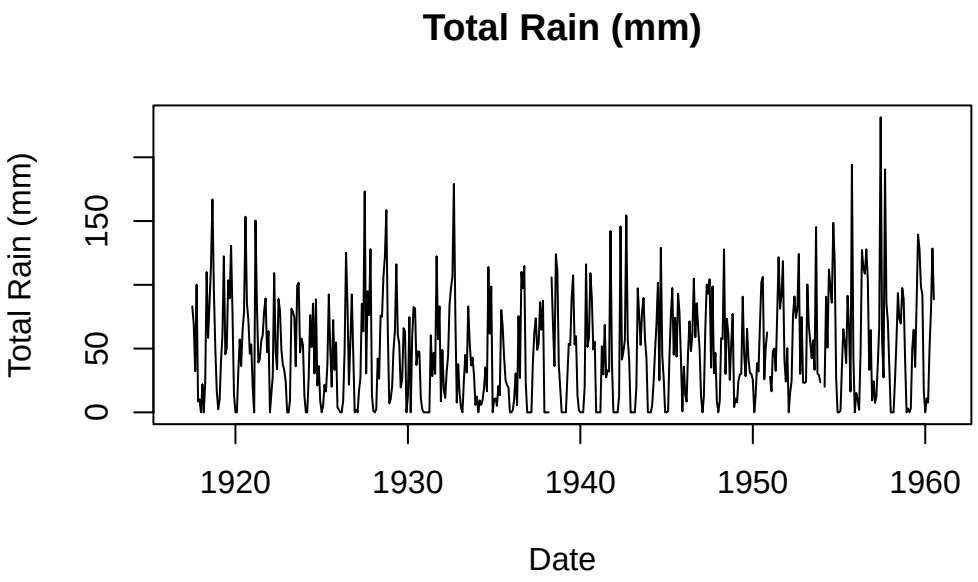


```r
adf.test(emint)
```

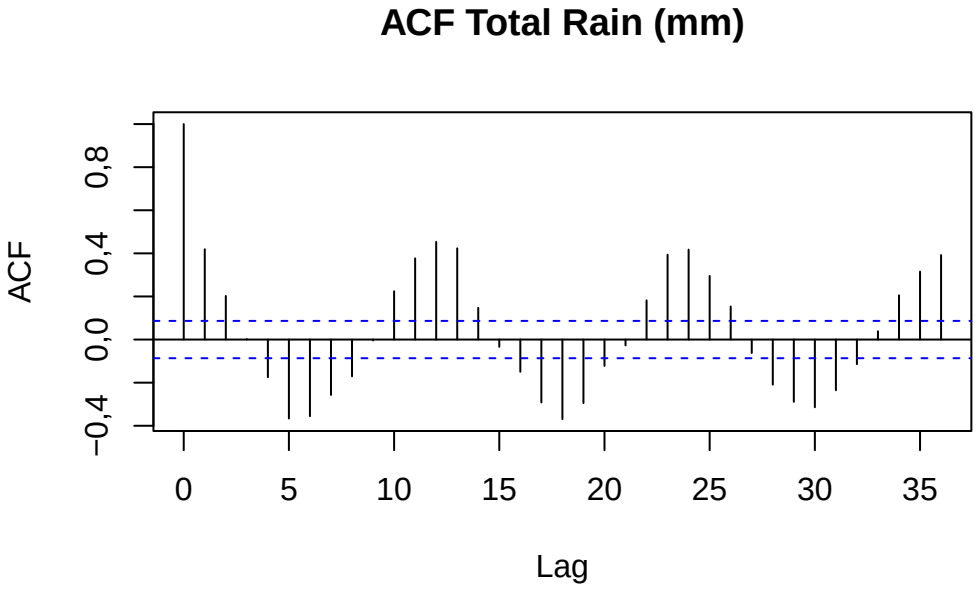
```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag    ADF p.value
[1,]   0  -5,28    0,01
[2,]   1  -9,26    0,01
[3,]   2 -11,34    0,01
[4,]   3  -9,58    0,01
[5,]   4  -6,63    0,01
[6,]   5  -4,70    0,01
Type 2: with drift no trend
     lag    ADF p.value
[1,]   0  -7,34    0,01
[2,]   1 -14,02    0,01
[3,]   2 -20,95    0,01
[4,]   3 -23,68    0,01
[5,]   4 -21,64    0,01
[6,]   5 -19,59    0,01
Type 3: with drift and trend
     lag    ADF p.value
[1,]   0  -7,34    0,01
[2,]   1 -14,02    0,01
[3,]   2 -20,95    0,01
[4,]   3 -23,70    0,01
[5,]   4 -21,68    0,01
[6,]   5 -19,65    0,01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```

Análise da série “Total Rain (mm)”

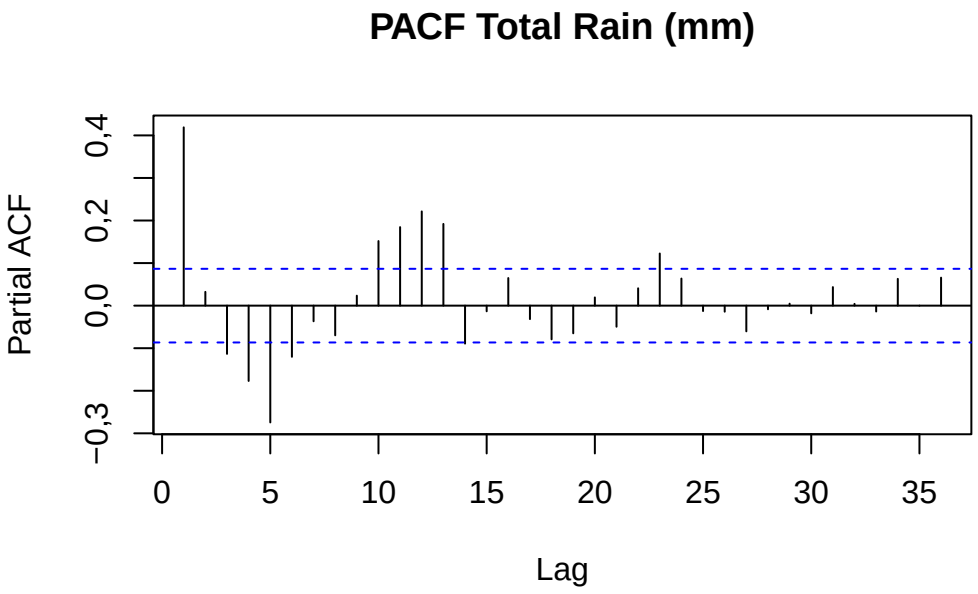
```r
plot(df$data, df$`Total Rain (mm)`, type = "l",
    main = "Total Rain (mm)", xlab = "Date", ylab = "Total Rain (mm)")
```




```r
rain <- na.omit(df$`Total Rain (mm)`)
acf(rain, lag.max = 36, main = "ACF Total Rain (mm)")
```



```r
pacf(rain, lag.max = 36, main = "PACF Total Rain (mm)")
```



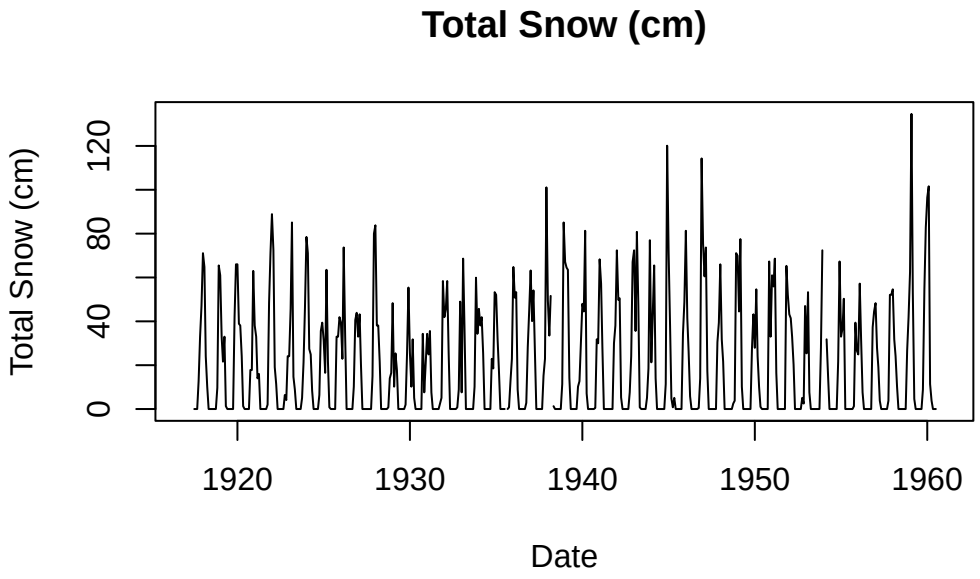

```r
adf.test(rain)
```

```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag   ADF p.value
[1,]   0 -8,41    0,01
[2,]   1 -6,25    0,01
[3,]   2 -5,64    0,01
[4,]   3 -5,47    0,01
[5,]   4 -5,44    0,01
[6,]   5 -4,48    0,01
Type 2: with drift no trend
     lag   ADF p.value
[1,]   0 -14,4    0,01
[2,]   1 -11,7    0,01
[3,]   2 -11,6    0,01
[4,]   3 -12,4    0,01
```

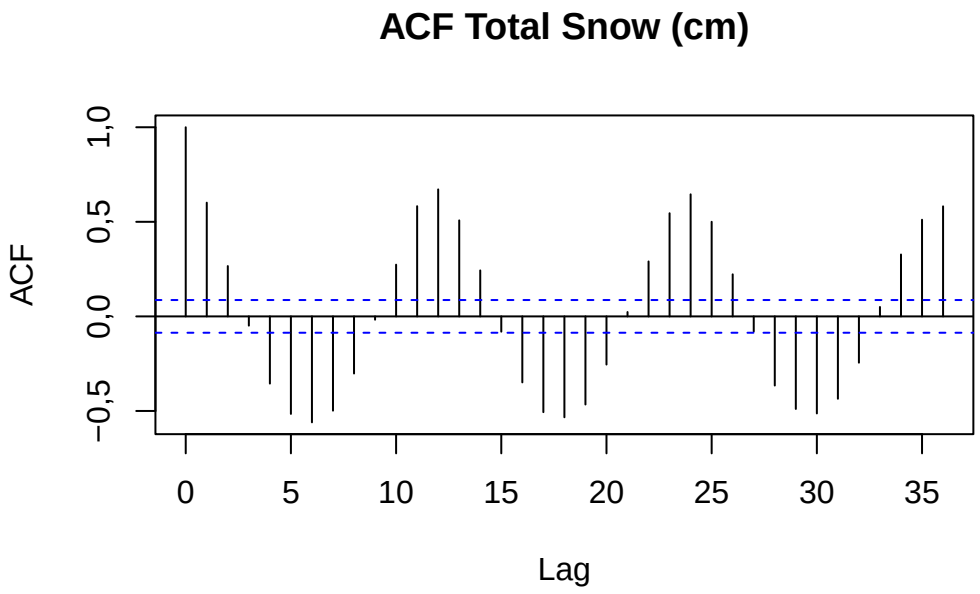
```
[5,]   4 -14,3    0,01
[6,]   5 -13,6    0,01
Type 3: with drift and trend
     lag   ADF p.value
[1,]   0 -14,5    0,01
[2,]   1 -11,7    0,01
[3,]   2 -11,6    0,01
[4,]   3 -12,4    0,01
[5,]   4 -14,4    0,01
[6,]   5 -13,7    0,01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```

Análise da série "Total Snow (cm)"

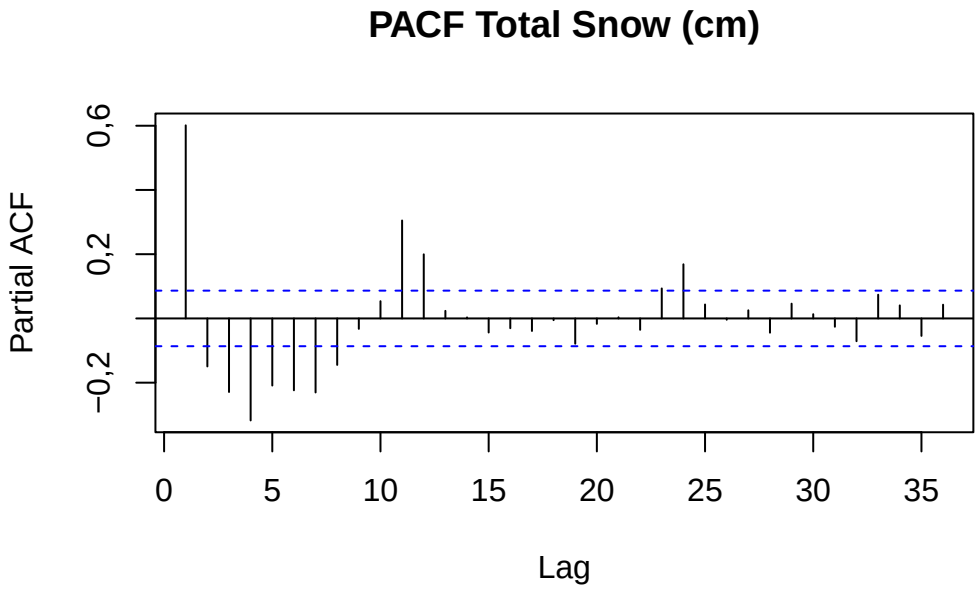
```r
plot(df$data, df$`Total Snow (cm)`, type = "l",
    main = "Total Snow (cm)", xlab = "Date", ylab = "Total Snow (cm)")
```




```r
snow <- na.omit(df$`Total Snow (cm)`)
acf(snow, lag.max = 36, main = "ACF Total Snow (cm)")
```




```r
pacf(snow, lag.max = 36, main = "PACF Total Snow (cm)")
```

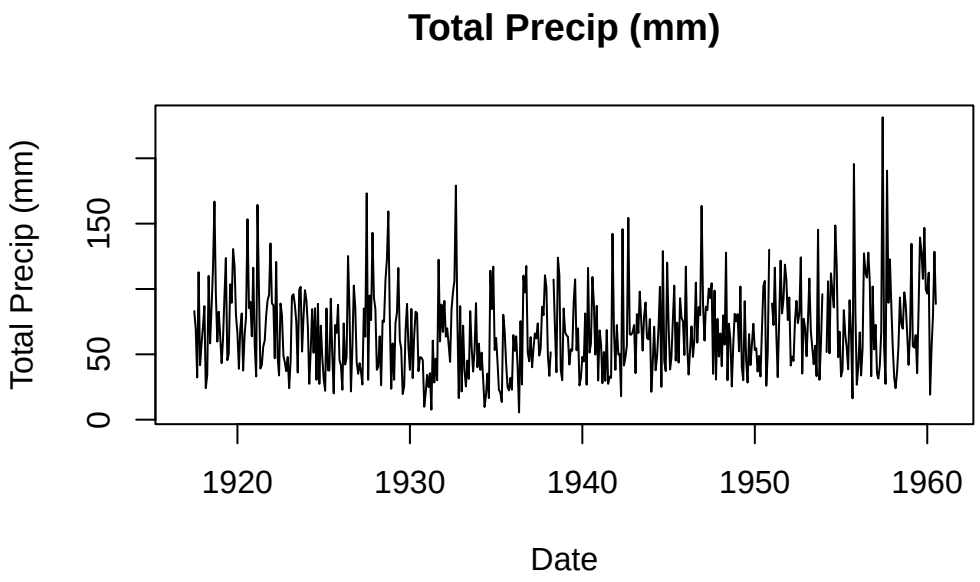


```r
adf.test(snow)
```

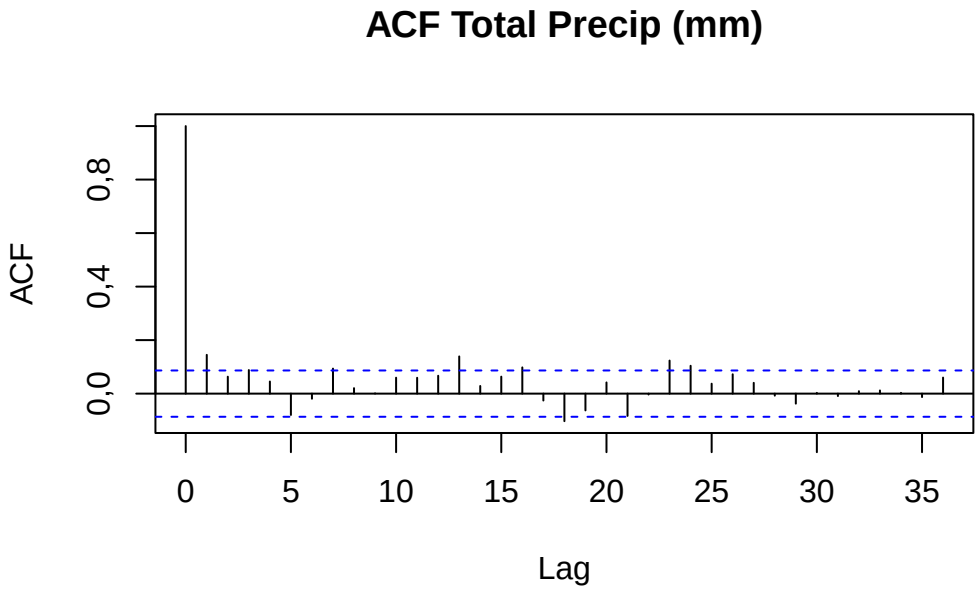
```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag   ADF p.value
[1,]   0 -8,55    0,01
[2,]   1 -8,40    0,01
[3,]   2 -8,71    0,01
[4,]   3 -9,27    0,01
[5,]   4 -8,18    0,01
[6,]   5 -7,15    0,01
Type 2: with drift no trend
     lag   ADF p.value
[1,]   0 -11,3    0,01
[2,]   1 -11,7    0,01
[3,]   2 -13,1    0,01
[4,]   3 -15,7    0,01
[5,]   4 -15,9    0,01
[6,]   5 -16,4    0,01
Type 3: with drift and trend
     lag   ADF p.value
[1,]   0 -11,2    0,01
[2,]   1 -11,7    0,01
[3,]   2 -13,1    0,01
[4,]   3 -15,7    0,01
[5,]   4 -15,9    0,01
[6,]   5 -16,4    0,01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```

Análise da série "Total Precip (mm)"

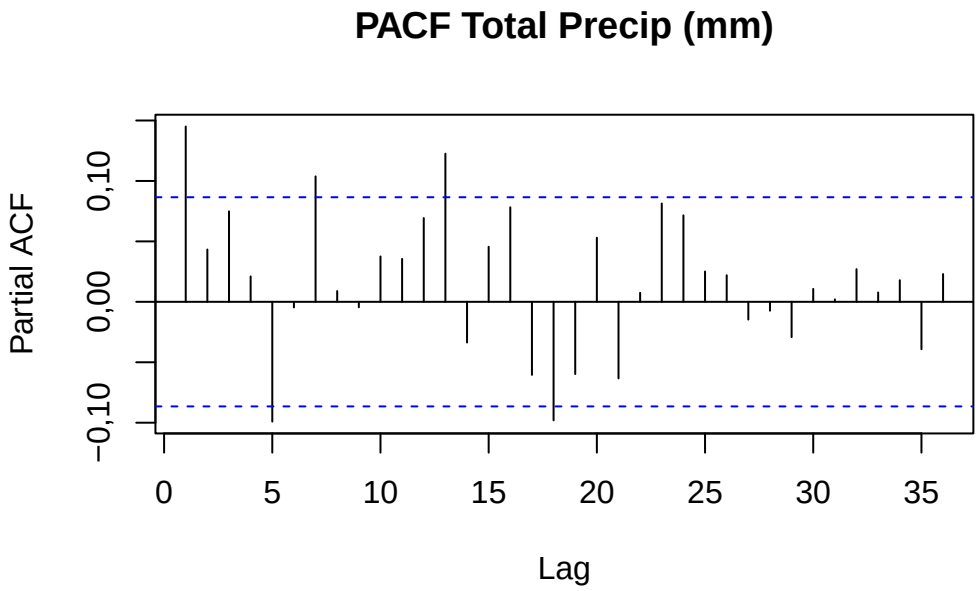
```r
plot(df$data, df$`Total Precip (mm)`, type = "l",
    main = "Total Precip (mm)", xlab = "Date", ylab = "Total Precip (mm)")
```




```r
precip <- na.omit(df$`Total Precip (mm)`)
acf(precip, lag.max = 36, main = "ACF Total Precip (mm)")
```



```r
pacf(precip, lag.max = 36, main = "PACF Total Precip (mm)")
```




```r
adf.test(precip)
```

```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag   ADF p.value
[1,]   0 -6,83  0,0100
[2,]   1 -4,21  0,0100
[3,]   2 -2,91  0,0100
[4,]   3 -2,40  0,0177
[5,]   4 -2,20  0,0278
[6,]   5 -1,86  0,0636
Type 2: with drift no trend
     lag    ADF p.value
[1,]   0 -19,51    0,01
[2,]   1 -14,06    0,01
[3,]   2 -11,02    0,01
[4,]   3  -9,66    0,01
```

```
[5,]   4  -9,80    0,01
[6,]   5  -8,99    0,01
Type 3: with drift and trend
     lag    ADF p.value
[1,]   0 -19,60    0,01
[2,]   1 -14,17    0,01
[3,]   2 -11,11    0,01
[4,]   3  -9,78    0,01
[5,]   4  -9,92    0,01
[6,]   5  -9,13    0,01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```