

# Cr\_GLM\_pluie.demain

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## R Markdown

Définition du problème : Développer un modèle qui permet de prédire SI il va pleuvoir demain ou pas.

### 1- Chargement des données

```
library(readr)

## Warning: le package 'readr' a été compilé avec la version R 4.3.3

meteo_train <- read_csv("C:/Users/Driouich/Desktop/Modèles linéaires
généralisés - R. RYDER-20240611/Projet/meteo.train.csv")

View(meteo_train)
```

### 2- Explorer et analyser les données :

```
summary(meteo_train)
```

##	...1	Year	Month	Day	Hour
##	Min. : 2.0	Min. :2010	Min. : 1.000	Min. : 1.0	Min. :0
##	1st Qu.: 721.5	1st Qu.:2012	1st Qu.: 3.000	1st Qu.: 8.0	1st Qu.:0
##	Median :1451.0	Median :2014	Median : 6.000	Median :16.0	Median :0
##	Mean :1459.8	Mean :2014	Mean : 6.436	Mean :15.8	Mean :0
##	3rd Qu.:2189.0	3rd Qu.:2016	3rd Qu.: 9.000	3rd Qu.:23.0	3rd Qu.:0
##	Max. :2940.0	Max. :2018	Max. :12.000	Max. :31.0	Max. :0
##	Minute Temperature.daily.mean..2.m.above.gnd.				
##	Min. :0	Min. :-7.63			
##	1st Qu.:0	1st Qu.: 6.71			
##	Median :0	Median :12.08			
##	Mean :0	Mean :12.23			
##	3rd Qu.:0	3rd Qu.:17.54			
##	Max. :0	Max. :29.45			
##	Relative.Humidity.daily.mean..2.m.above.gnd.				
##	Min. :38.33				
##	1st Qu.:64.82				
##	Median :72.21				
##	Mean :71.40				
##	3rd Qu.:78.63				
##	Max. :95.54				
##	Mean.Sea.Level.Pressure.daily.mean..MSL.				
##	Total.Precipitation.daily.sum..sfc.				

```

## Min.      : 978.9                      Min.      : 0.000
## 1st Qu.:1012.4                      1st Qu.: 0.000
## Median :1017.0                      Median : 0.100
## Mean    :1017.0                      Mean    : 2.085
## 3rd Qu.:1022.0                      3rd Qu.: 2.300
## Max.     :1042.4                      Max.     :31.500
## Snowfall.amount.raw.daily.sum..sfc. Total.Cloud.Cover.daily.mean..sfc.
## Min.      :0.00000                  Min.      : 0.00
## 1st Qu.:0.00000                  1st Qu.: 23.80
## Median :0.00000                  Median : 51.67
## Mean    :0.04965                  Mean    : 50.76
## 3rd Qu.:0.00000                  3rd Qu.: 78.53
## Max.     :8.61000                  Max.     :100.00
## High.Cloud.Cover.daily.mean..high.cld.lay.
## Min.      : 0.000
## 1st Qu.: 1.657
## Median : 11.880
## Mean    : 20.284
## 3rd Qu.: 33.260
## Max.     :100.000
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.
## Min.      : 0.00
## 1st Qu.: 1.83
## Median : 24.98
## Mean    : 31.50
## 3rd Qu.: 54.21
## Max.     :100.00
## Low.Cloud.Cover.daily.mean..low.cld.lay.
Sunshine.Duration.daily.sum..sfc.
## Min.      : 0.00                      Min.      : 0.0
## 1st Qu.: 9.42                      1st Qu.: 114.3
## Median : 36.35                      Median : 366.8
## Mean    : 39.34                      Mean    : 373.1
## 3rd Qu.: 65.76                      3rd Qu.: 587.7
## Max.     :100.00                      Max.     :1015.8
## Shortwave.Radiation.daily.sum..sfc.
Wind.Speed.daily.mean..10.m.above.gnd.
## Min.      : 265.2                      Min.      : 1.260
## 1st Qu.:2096.2                      1st Qu.: 6.428
## Median :3675.3                      Median : 9.195
## Mean    :3984.6                      Mean    :10.707
## 3rd Qu.:5723.6                      3rd Qu.:12.977
## Max.     :8363.3                      Max.     :42.210
## Wind.Direction.daily.mean..10.m.above.gnd.
## Min.      : 11.19
## 1st Qu.:152.40
## Median :206.36
## Mean    :201.82
## 3rd Qu.:254.19
## Max.     :331.67

```

```

## Wind.Speed.daily.mean..80.m.above.gnd.
## Min. : 1.34
## 1st Qu.: 8.68
## Median :12.41
## Mean :14.28
## 3rd Qu.:17.61
## Max. :54.03
## Wind.Direction.daily.mean..80.m.above.gnd. Wind.Speed.daily.mean..900.mb.
## Min. : 12.18 Min. : 2.25
## 1st Qu.:157.42 1st Qu.:13.02
## Median :213.78 Median :19.57
## Mean :206.23 Mean :24.57
## 3rd Qu.:259.06 3rd Qu.:32.10
## Max. :333.43 Max. :97.06
## Wind.Direction.daily.mean..900.mb. Wind.Gust.daily.mean..sfc.
## Min. : 17.37 Min. : 2.25
## 1st Qu.:144.02 1st Qu.: 9.48
## Median :233.47 Median :14.06
## Mean :206.22 Mean :16.69
## 3rd Qu.:265.93 3rd Qu.:21.15
## Max. :344.82 Max. :79.38
## Temperature.daily.max..2.m.above.gnd.
Temperature.daily.min..2.m.above.gnd.
## Min. :-3.84 Min. :-12.520
## 1st Qu.:10.58 1st Qu.: 3.350
## Median :16.54 Median : 8.005
## Mean :16.54 Mean : 8.062
## 3rd Qu.:22.36 3rd Qu.: 13.092
## Max. :35.77 Max. : 23.940
## Relative.Humidity.daily.max..2.m.above.gnd.
## Min. : 59.00
## 1st Qu.: 83.00
## Median : 89.00
## Mean : 87.69
## 3rd Qu.: 94.00
## Max. :100.00
## Relative.Humidity.daily.min..2.m.above.gnd.
## Min. :19.00
## 1st Qu.:45.00
## Median :54.00
## Mean :54.04
## 3rd Qu.:63.00
## Max. :92.00
## Mean.Sea.Level.Pressure.daily.max..MSL.
## Min. : 981.9
## 1st Qu.:1015.4
## Median :1019.5
## Mean :1019.9
## 3rd Qu.:1024.7
## Max. :1045.4

```

```

## Mean.Sea.Level.Pressure.daily.min..MSL. Total.Cloud.Cover.daily.max..sfc.
## Min. : 977 Min. : 0.00
## 1st Qu.:1009 1st Qu.:100.00
## Median :1015 Median :100.00
## Mean :1014 Mean : 88.23
## 3rd Qu.:1019 3rd Qu.:100.00
## Max. :1039 Max. :100.00
## Total.Cloud.Cover.daily.min..sfc.
High.Cloud.Cover.daily.max..high.cld.lay.
## Min. : 0.000 Min. : 0.00
## 1st Qu.: 0.000 1st Qu.: 15.00
## Median : 0.000 Median : 97.00
## Mean : 8.692 Mean : 60.17
## 3rd Qu.: 2.400 3rd Qu.:100.00
## Max. :100.000 Max. :100.00
## High.Cloud.Cover.daily.min..high.cld.lay.
## Min. : 0.0000
## 1st Qu.: 0.0000
## Median : 0.0000
## Mean : 0.9432
## 3rd Qu.: 0.0000
## Max. :100.0000
## Medium.Cloud.Cover.daily.max..mid.cld.lay.
## Min. : 0.00
## 1st Qu.: 22.75
## Median :100.00
## Mean : 70.94
## 3rd Qu.:100.00
## Max. :100.00
## Medium.Cloud.Cover.daily.min..mid.cld.lay.
## Min. : 0.000
## 1st Qu.: 0.000
## Median : 0.000
## Mean : 2.097
## 3rd Qu.: 0.000
## Max. :100.000
## Low.Cloud.Cover.daily.max..low.cld.lay.
## Min. : 0
## 1st Qu.:100
## Median :100
## Mean : 80
## 3rd Qu.:100
## Max. :100
## Low.Cloud.Cover.daily.min..low.cld.lay.
Wind.Speed.daily.max..10.m.above.gnd.
## Min. : 0.000 Min. : 2.52
## 1st Qu.: 0.000 1st Qu.:12.32
## Median : 0.000 Median :17.36
## Mean : 3.879 Mean :19.06
## 3rd Qu.: 0.000 3rd Qu.:23.44

```

```
## Max. :100.000 Max. :79.99
## Wind.Speed.daily.min..10.m.above.gnd.
Wind.Speed.daily.max..80.m.above.gnd.
## Min. : 0.00 Min. : 3.98
## 1st Qu.: 1.14 1st Qu.:18.27
## Median : 2.41 Median :23.85
## Mean : 3.57 Mean :25.35
## 3rd Qu.: 4.45 3rd Qu.:29.92
## Max. :27.73 Max. :93.84
## Wind.Speed.daily.min..80.m.above.gnd. Wind.Speed.daily.max..900.mb.
## Min. : 0.000 Min. : 4.02
## 1st Qu.: 1.140 1st Qu.: 24.54
## Median : 2.600 Median : 37.12
## Mean : 4.727 Mean : 41.82
## 3rd Qu.: 5.830 3rd Qu.: 54.37
## Max. :37.700 Max. :136.25
## Wind.Speed.daily.min..900.mb. Wind.Gust.daily.max..sfc.
## Min. : 0.00 Min. : 4.32
## 1st Qu.: 3.05 1st Qu.:19.08
## Median : 6.73 Median :26.10
## Mean :11.09 Mean :29.31
## 3rd Qu.:15.31 3rd Qu.:37.08
## Max. :76.13 Max. :95.04
## Wind.Gust.daily.min..sfc. pluie.demain
## Min. : 0.000 Mode :logical
## 1st Qu.: 2.160 FALSE:579
## Median : 3.960 TRUE :601
## Mean : 6.502
## 3rd Qu.: 8.280
## Max. :57.960
```

```
str(meteo_train)
```

```
## spc_tbl_ [1,180 × 47] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
## $ ...1 : num [1:1180] 2 4 6 8 10
12 14 16 18 20 ...
## $ Year : num [1:1180] 2010 2010
2010 2010 2010 2010 2010 2010 2010 2010 ...
## $ Month : num [1:1180] 6 6 6 6 6 6
6 6 6 6 ...
## $ Day : num [1:1180] 2 4 6 8 10
12 14 16 18 20 ...
## $ Hour : num [1:1180] 0 0 0 0 0 0
0 0 0 0 ...
## $ Minute : num [1:1180] 0 0 0 0 0 0
0 0 0 0 ...
## $ Temperature.daily.mean..2.m.above.gnd. : num [1:1180] 15 17.3 21.6
20.2 22.6 ...
## $ Relative.Humidity.daily.mean..2.m.above.gnd.: num [1:1180] 76.5 77.6
69.5 75.1 73.5 ...
```

```

## $ Mean.Sea.Level.Pressure.daily.mean..MSL. : num [1:1180] 1015 1017
1015 1008 1004 ...
## $ Total.Precipitation.daily.sum..sfc. : num [1:1180] 1 0 3.7 0.2
0 2.2 1.8 1.8 17.5 1.2 ...
## $ Snowfall.amount.raw.daily.sum..sfc. : num [1:1180] 0 0 0 0 0 0
0 0 0 0 ...
## $ Total.Cloud.Cover.daily.mean..sfc. : num [1:1180] 79.8 4.7
42.1 67.5 56.3 ...
## $ High.Cloud.Cover.daily.mean..high.cld.lay. : num [1:1180] 3 0.67 21.21
54.71 50.25 ...
## $ Medium.Cloud.Cover.daily.mean..mid.cld.lay. : num [1:1180] 31.6 0 25.9
65.8 55.3 ...
## $ Low.Cloud.Cover.daily.mean..low.cld.lay. : num [1:1180] 79.2 4.5
35.3 18.9 34.2 ...
## $ Sunshine.Duration.daily.sum..sfc. : num [1:1180] 287.2 821.4
441.3 41.9 473.2 ...
## $ Shortwave.Radiation.daily.sum..sfc. : num [1:1180] 6710 7974
4834 5390 7216 ...
## $ Wind.Speed.daily.mean..10.m.above.gnd. : num [1:1180] 11.64 6.34
8.4 5.4 9.16 ...
## $ Wind.Direction.daily.mean..10.m.above.gnd. : num [1:1180] 275 230 215
205 179 ...
## $ Wind.Speed.daily.mean..80.m.above.gnd. : num [1:1180] 14.99 8.92
10.38 6.53 11.91 ...
## $ Wind.Direction.daily.mean..80.m.above.gnd. : num [1:1180] 268 199 208
206 186 ...
## $ Wind.Speed.daily.mean..900.mb. : num [1:1180] 20.6 27.9
18.9 10.4 21.9 ...
## $ Wind.Direction.daily.mean..900.mb. : num [1:1180] 180.4 93.7
250.1 238.6 153 ...
## $ Wind.Gust.daily.mean..sfc. : num [1:1180] 14.88 9.48
13.5 5.31 12.21 ...
## $ Temperature.daily.max..2.m.above.gnd. : num [1:1180] 18.5 25 26.2
24.2 30.7 ...
## $ Temperature.daily.min..2.m.above.gnd. : num [1:1180] 11.1 10.4
17.7 14.7 16.9 ...
## $ Relative.Humidity.daily.max..2.m.above.gnd. : num [1:1180] 94 92 91 89
97 92 96 96 97 95 ...
## $ Relative.Humidity.daily.min..2.m.above.gnd. : num [1:1180] 59 54 57 62
39 65 69 64 74 61 ...
## $ Mean.Sea.Level.Pressure.daily.max..MSL. : num [1:1180] 1017 1019
1016 1010 1006 ...
## $ Mean.Sea.Level.Pressure.daily.min..MSL. : num [1:1180] 1014 1016
1013 1006 1001 ...
## $ Total.Cloud.Cover.daily.max..sfc. : num [1:1180] 100 28 100
100 100 100 100 100 100 100 ...
## $ Total.Cloud.Cover.daily.min..sfc. : num [1:1180] 0 0 0 0 0 0
0 100 0 0 ...
## $ High.Cloud.Cover.daily.max..high.cld.lay. : num [1:1180] 16 11 100
100 100 28 100 100 100 24 ...

```

```

## $ High.Cloud.Cover.daily.min..high.cld.lay. : num [1:1180] 0 0 0 0 0 0
0 0 0 0 ...
## $ Medium.Cloud.Cover.daily.max..mid.cld.lay. : num [1:1180] 100 0 100
100 100 100 100 100 100 41 ...
## $ Medium.Cloud.Cover.daily.min..mid.cld.lay. : num [1:1180] 0 0 0 0 0 0
0 0 0 0 ...
## $ Low.Cloud.Cover.daily.max..low.cld.lay. : num [1:1180] 100 28 100
100 100 100 100 100 100 100 ...
## $ Low.Cloud.Cover.daily.min..low.cld.lay. : num [1:1180] 0 0 0 0 0 0
0 29 0 0 ...
## $ Wind.Speed.daily.max..10.m.above.gnd. : num [1:1180] 22 15.5 22.7
10.7 20.5 ...
## $ Wind.Speed.daily.min..10.m.above.gnd. : num [1:1180] 5.62 1.08
2.41 0 2.52 2.28 1.3 4.32 7.2 8.05 ...
## $ Wind.Speed.daily.max..80.m.above.gnd. : num [1:1180] 23.8 18.7 32
10.2 23.4 ...
## $ Wind.Speed.daily.min..80.m.above.gnd. : num [1:1180] 8.65 0 0.51
1.44 2.97 ...
## $ Wind.Speed.daily.max..900.mb. : num [1:1180] 32.1 48.1 44
22.2 40.8 ...
## $ Wind.Speed.daily.min..900.mb. : num [1:1180] 12.25 6.62
5.48 4.69 4.68 ...
## $ Wind.Gust.daily.max..sfc. : num [1:1180] 25.2 20.2
41.8 11.2 24.1 ...
## $ Wind.Gust.daily.min..sfc. : num [1:1180] 6.48 2.16
1.08 0.36 1.44 ...
## $ pluie.demain : logi [1:1180] FALSE FALSE
TRUE TRUE TRUE TRUE ...
## - attr(*, "spec")=
## .. cols(
## .. ...1 = col_double(),
## .. Year = col_double(),
## .. Month = col_double(),
## .. Day = col_double(),
## .. Hour = col_double(),
## .. Minute = col_double(),
## .. Temperature.daily.mean..2.m.above.gnd. = col_double(),
## .. Relative.Humidity.daily.mean..2.m.above.gnd. = col_double(),
## .. Mean.Sea.Level.Pressure.daily.mean..MSL. = col_double(),
## .. Total.Precipitation.daily.sum..sfc. = col_double(),
## .. Snowfall.amount.raw.daily.sum..sfc. = col_double(),
## .. Total.Cloud.Cover.daily.mean..sfc. = col_double(),
## .. High.Cloud.Cover.daily.mean..high.cld.lay. = col_double(),
## .. Medium.Cloud.Cover.daily.mean..mid.cld.lay. = col_double(),
## .. Low.Cloud.Cover.daily.mean..low.cld.lay. = col_double(),
## .. Sunshine.Duration.daily.sum..sfc. = col_double(),
## .. Shortwave.Radiation.daily.sum..sfc. = col_double(),
## .. Wind.Speed.daily.mean..10.m.above.gnd. = col_double(),
## .. Wind.Direction.daily.mean..10.m.above.gnd. = col_double(),
## .. Wind.Speed.daily.mean..80.m.above.gnd. = col_double(),

```

```
## .. Wind.Direction.daily.mean..80.m.above.gnd. = col_double(),
## .. Wind.Speed.daily.mean..900.mb. = col_double(),
## .. Wind.Direction.daily.mean..900.mb. = col_double(),
## .. Wind.Gust.daily.mean..sfc. = col_double(),
## .. Temperature.daily.max..2.m.above.gnd. = col_double(),
## .. Temperature.daily.min..2.m.above.gnd. = col_double(),
## .. Relative.Humidity.daily.max..2.m.above.gnd. = col_double(),
## .. Relative.Humidity.daily.min..2.m.above.gnd. = col_double(),
## .. Mean.Sea.Level.Pressure.daily.max..MSL. = col_double(),
## .. Mean.Sea.Level.Pressure.daily.min..MSL. = col_double(),
## .. Total.Cloud.Cover.daily.max..sfc. = col_double(),
## .. Total.Cloud.Cover.daily.min..sfc. = col_double(),
## .. High.Cloud.Cover.daily.max..high.cld.lay. = col_double(),
## .. High.Cloud.Cover.daily.min..high.cld.lay. = col_double(),
## .. Medium.Cloud.Cover.daily.max..mid.cld.lay. = col_double(),
## .. Medium.Cloud.Cover.daily.min..mid.cld.lay. = col_double(),
## .. Low.Cloud.Cover.daily.max..low.cld.lay. = col_double(),
## .. Low.Cloud.Cover.daily.min..low.cld.lay. = col_double(),
## .. Wind.Speed.daily.max..10.m.above.gnd. = col_double(),
## .. Wind.Speed.daily.min..10.m.above.gnd. = col_double(),
## .. Wind.Speed.daily.max..80.m.above.gnd. = col_double(),
## .. Wind.Speed.daily.min..80.m.above.gnd. = col_double(),
## .. Wind.Speed.daily.max..900.mb. = col_double(),
## .. Wind.Speed.daily.min..900.mb. = col_double(),
## .. Wind.Gust.daily.max..sfc. = col_double(),
## .. Wind.Gust.daily.min..sfc. = col_double(),
## .. pluie.demain = col_logical()
## .. )
## - attr(*, "problems")=<externalptr>

any(is.na(meteo_train))

## [1] FALSE
```

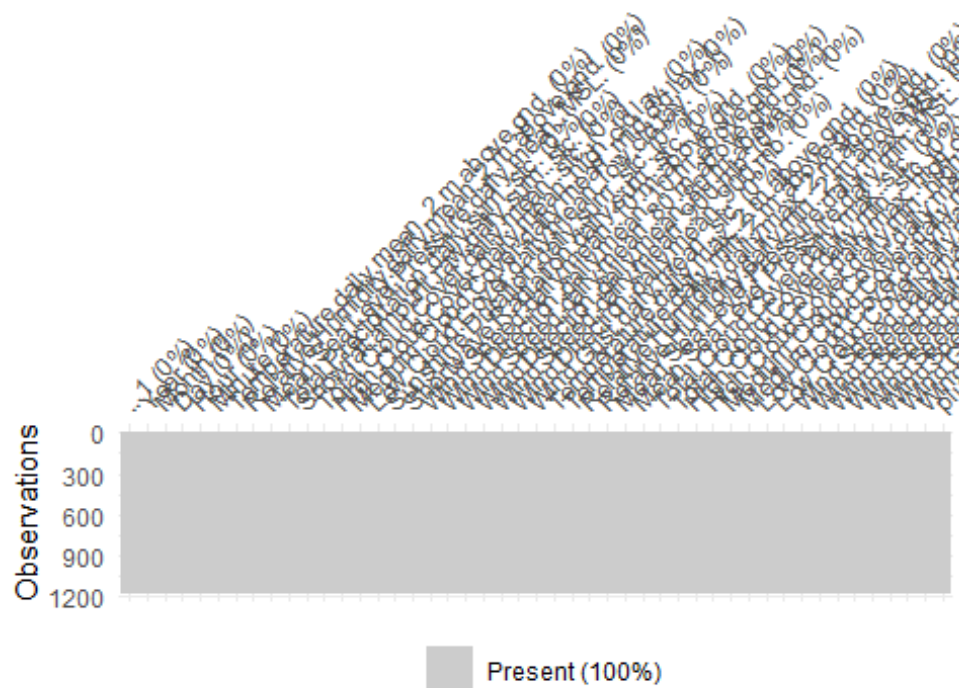
Toutes les variables sont numeriques sauf la variable à expliquer : pluie.demain qui est logique. En outre, dans le jeu de données train, heureusement on a pas de valeurs manquantes ce qui signifie que le jeu de données est plus ou moins bon. Pour confirmer cela on va utiliser le code ci-dessous :

```
library(naniar)

## Warning: le package 'naniar' a été compilé avec la version R 4.3.3

dtn <- meteo_train
vis_miss(dtn)
```





3- Conversion de la variable à expliquer : pluie.demain en factor et verification de la modification dans le code ci-dessous :

```
# convertir la variable en factor
dtn$pluie.demain <- factor(dtn$pluie.demain)
# vérifier la modification
str(dtn$pluie.demain)

## Factor w/ 2 levels "FALSE","TRUE": 1 1 2 2 2 2 2 2 2 2 ...
```

4- Proportions pour 'pluie.demain'

```
# Table et proportions pour 'pluie.demain'
pluie.demainTable <- table(dtn$pluie.demain)
proportionspluie.demain <- round(prop.table(pluie.demainTable) * 100, 1)
labels <- paste(names(pluie.demainTable), "\n", proportionspluie.demain, "%",
sep="")

# Diagramme en camembert avec proportions
pie(pluie.demainTable, labels = labels, main = "Répartition de la variable
pluie.demain", col = c("red", "green"))
```

## Répartition de la variable pluie.demain



on a pratiquement la même proportion de TRUE et FALSE ce qui est plutôt pas mal et cela prouve encore que les données sont plus ou moins propres et surtout équilibrées.

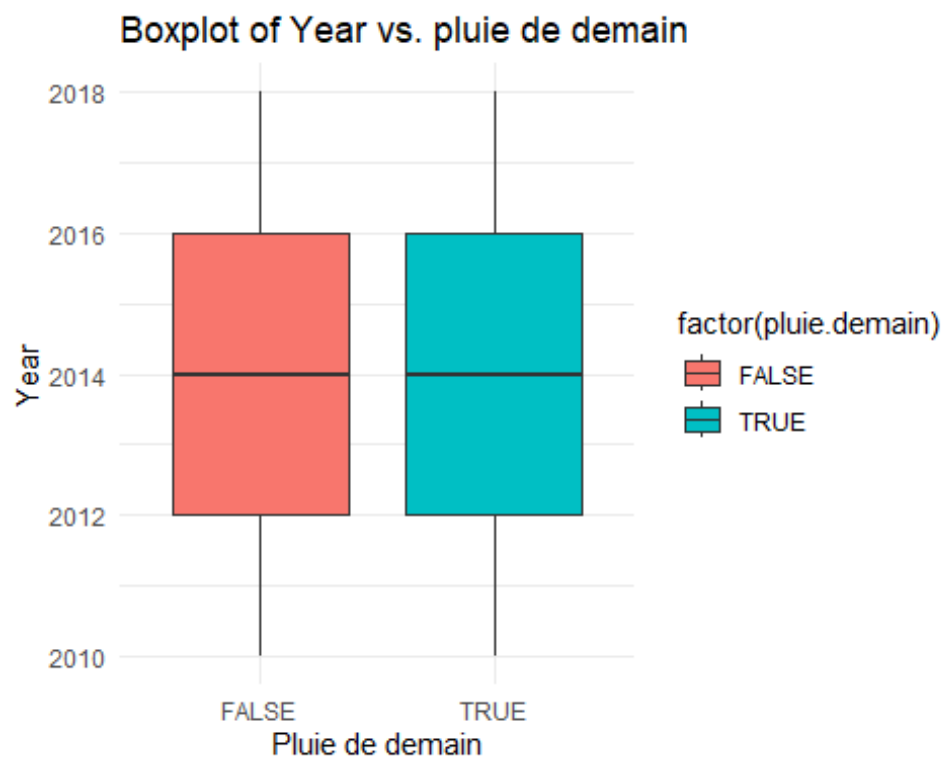
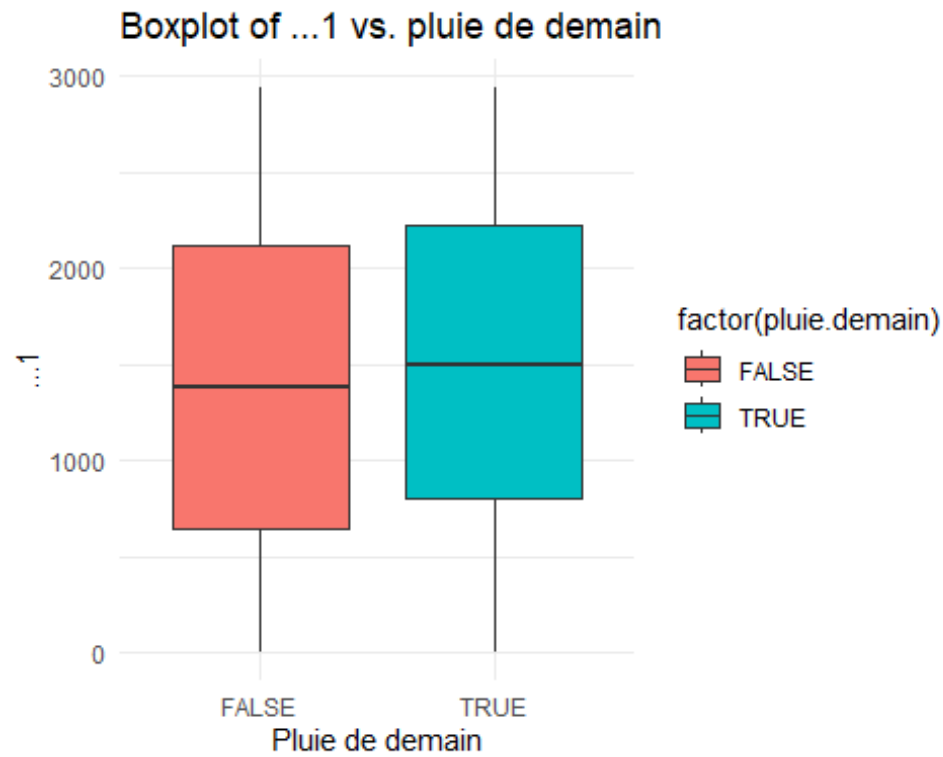
5- box plot des variables vs la variable à expliquer : pluie.demain.

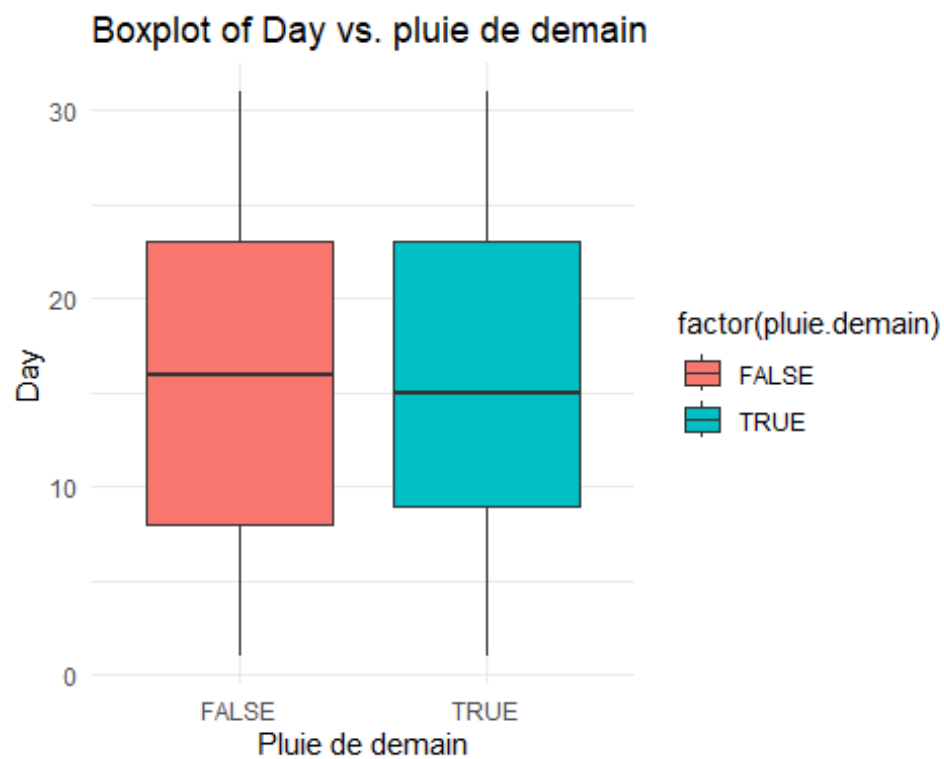
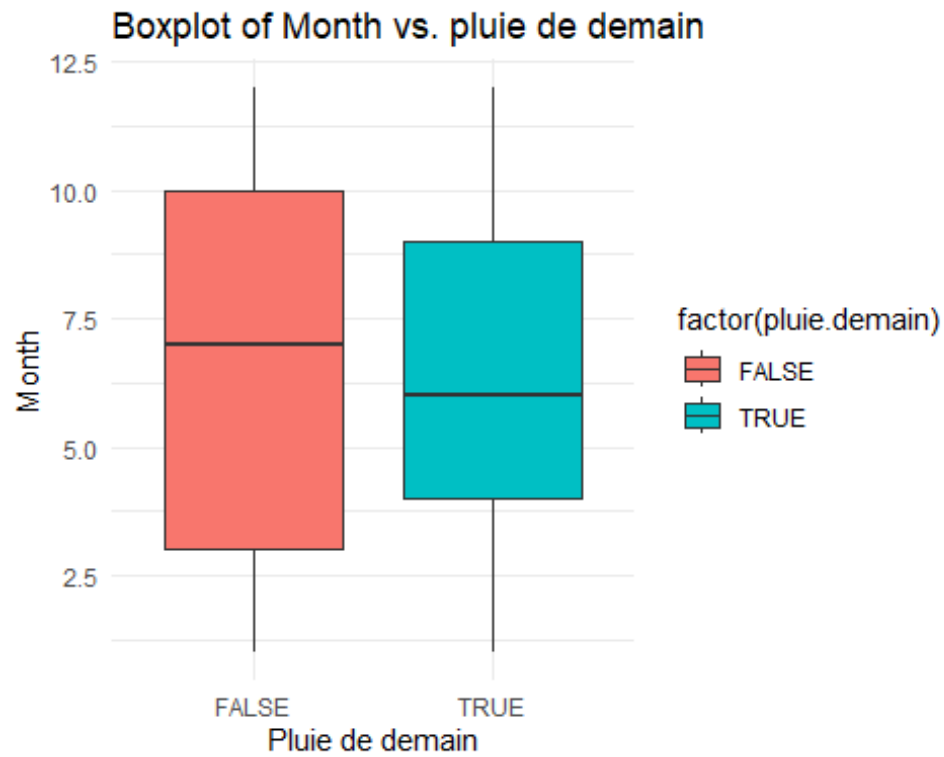
```
# Load necessary Libraries
library(ggplot2)

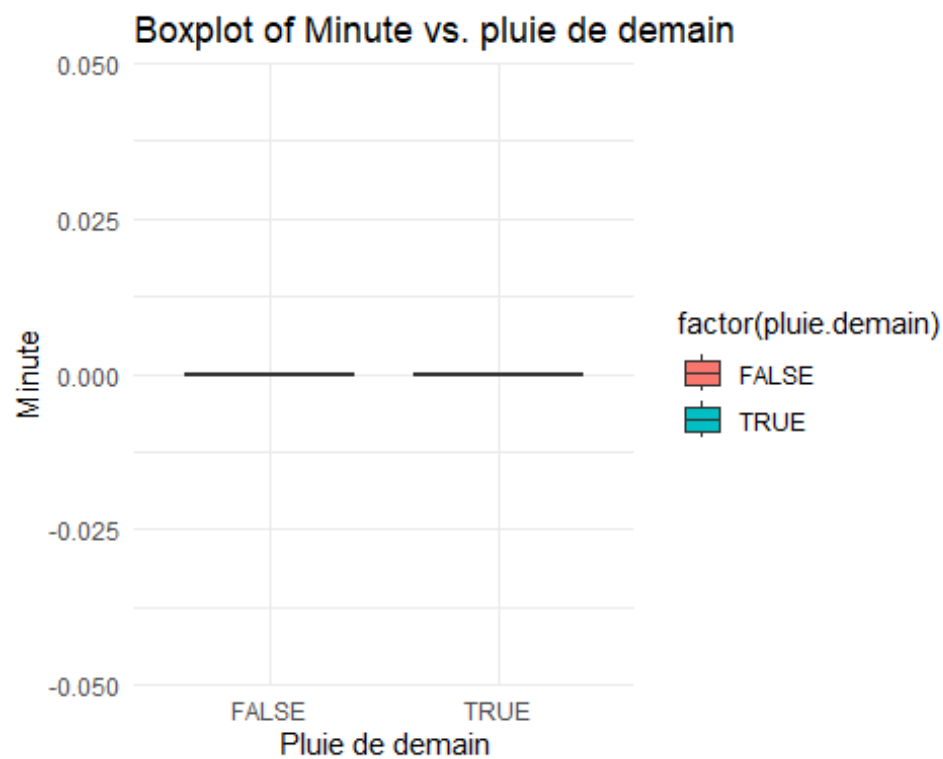
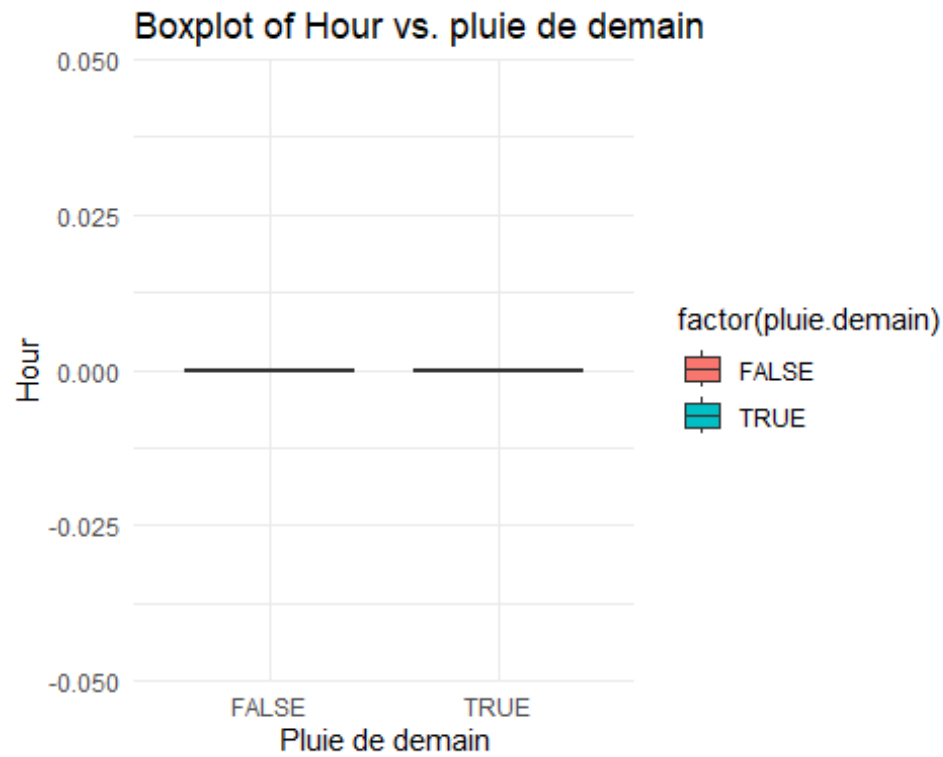
## Warning: le package 'ggplot2' a été compilé avec la version R 4.3.3

# Generate boxplots for each numeric variable in the dataset
boxplot_plots <- lapply(names(dtn)[sapply(dtn, is.numeric)],
function(variable){
  ggplot(dtn, aes(x = factor(pluie.demain), y = .data[[variable]], fill =
factor(pluie.demain))) +
    geom_boxplot() +
    labs(
      title = paste("Boxplot of", variable, "vs. pluie de demain"),
      x = "Pluie de demain",
      y = variable
    ) +
    theme_minimal()
})

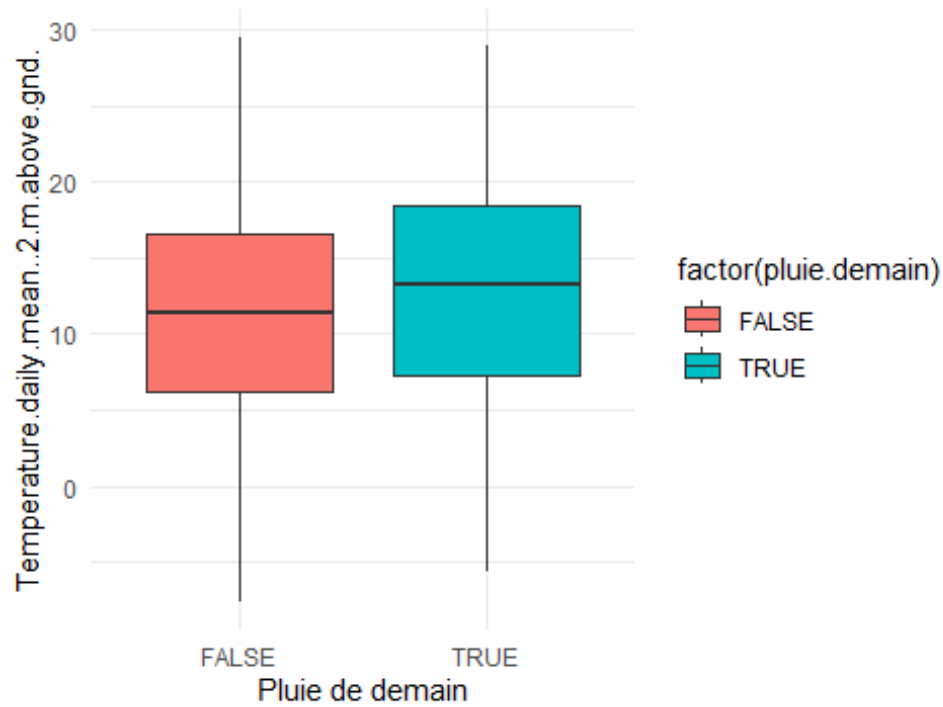
# To print all the plots
lapply(boxplot_plots, print)
```



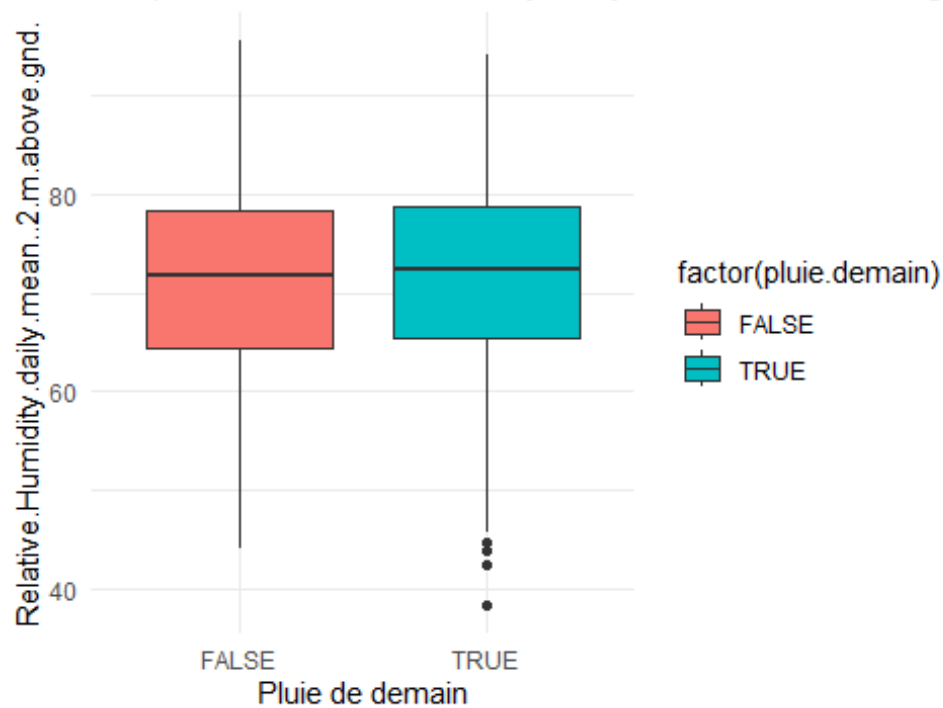




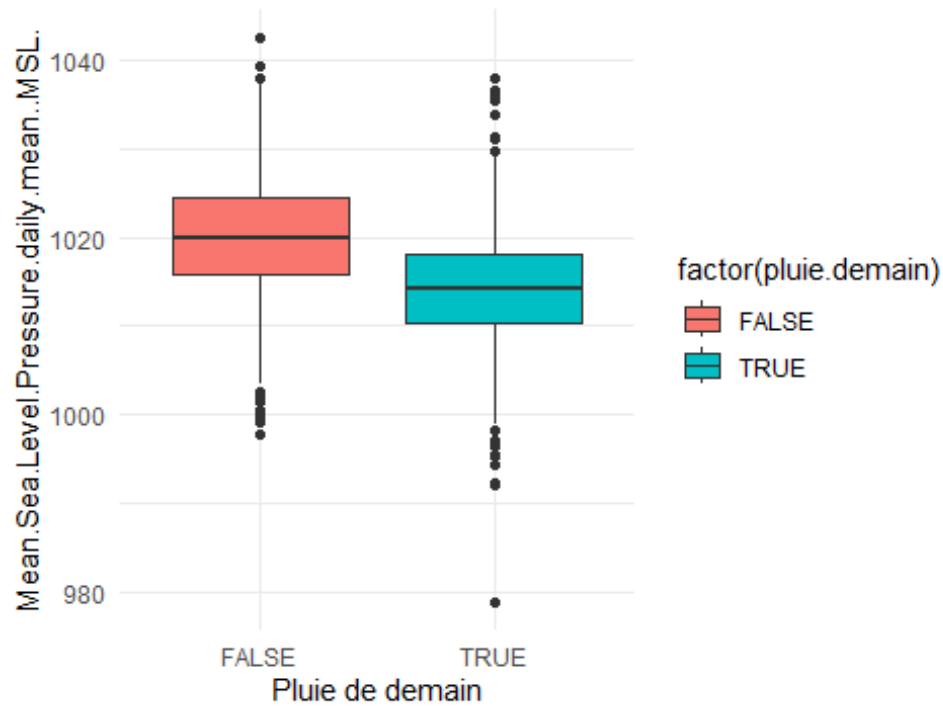
Boxplot of Temperature.daily.mean..2.m.above.gnd. vs



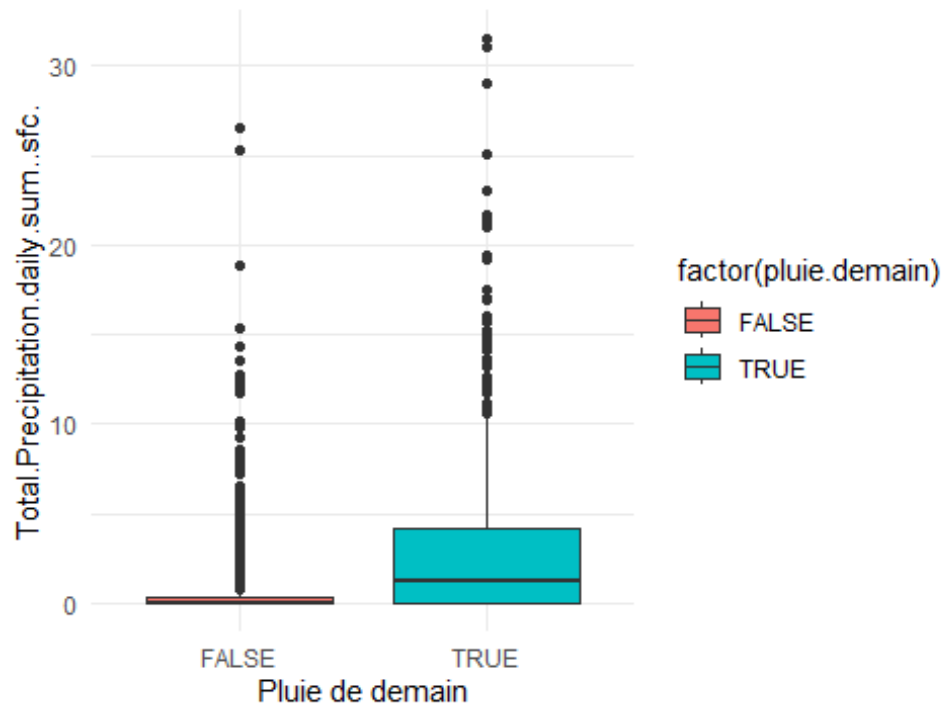
Boxplot of Relative.Humidity.daily.mean..2.m.above.gnd. vs



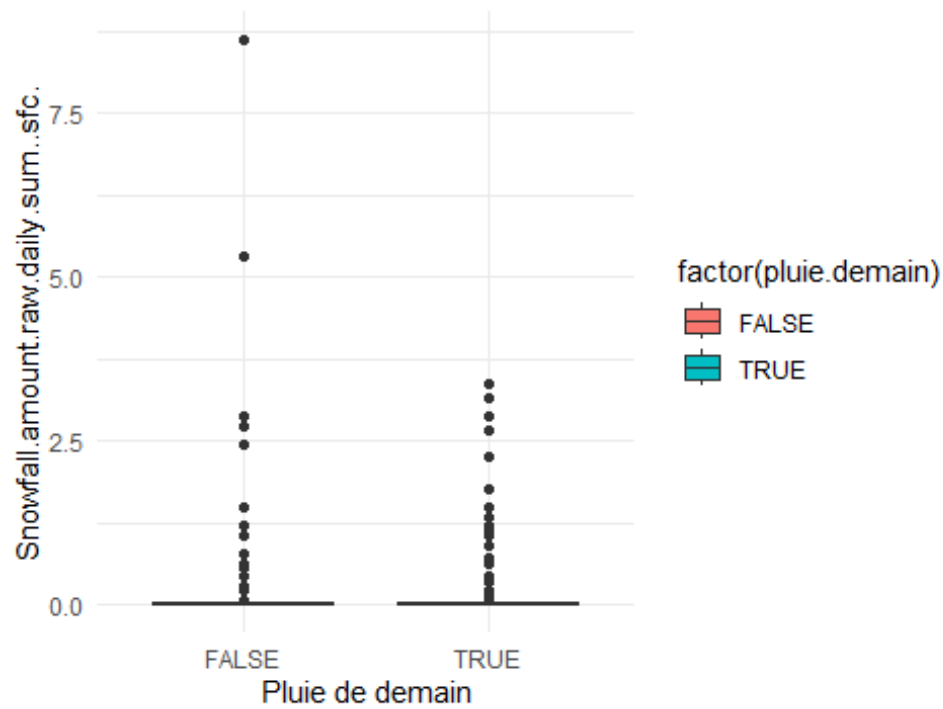
Boxplot of Mean.Sea.Level.Pressure.daily.mean..MS



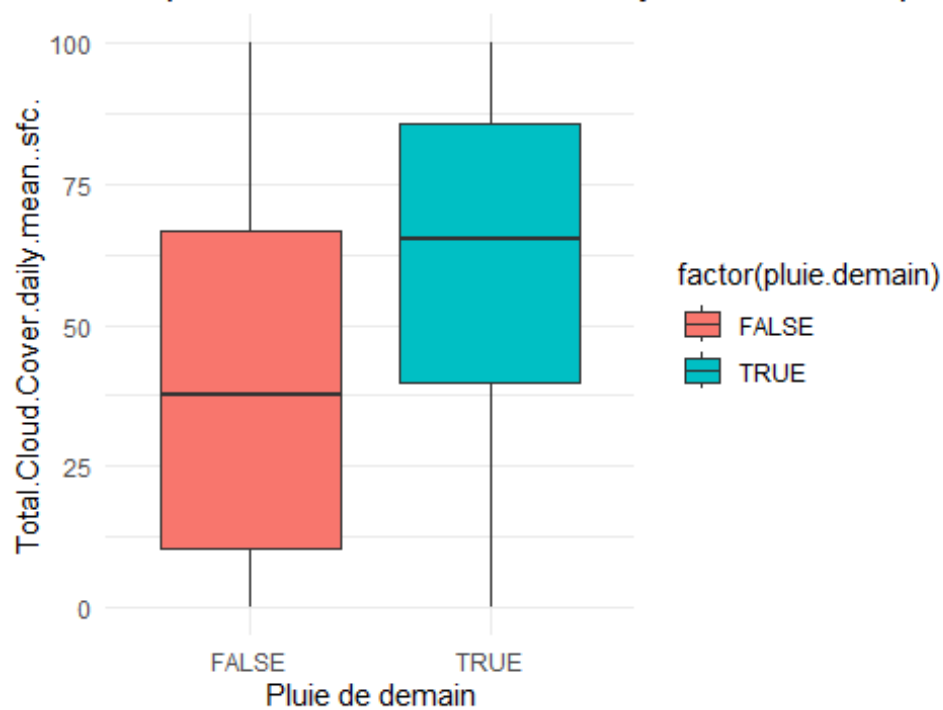
Boxplot of Total.Precipitation.daily.sum..sfc. vs. pluie d



Boxplot of Snowfall.amount.raw.daily.sum..sfc. vs. pluie

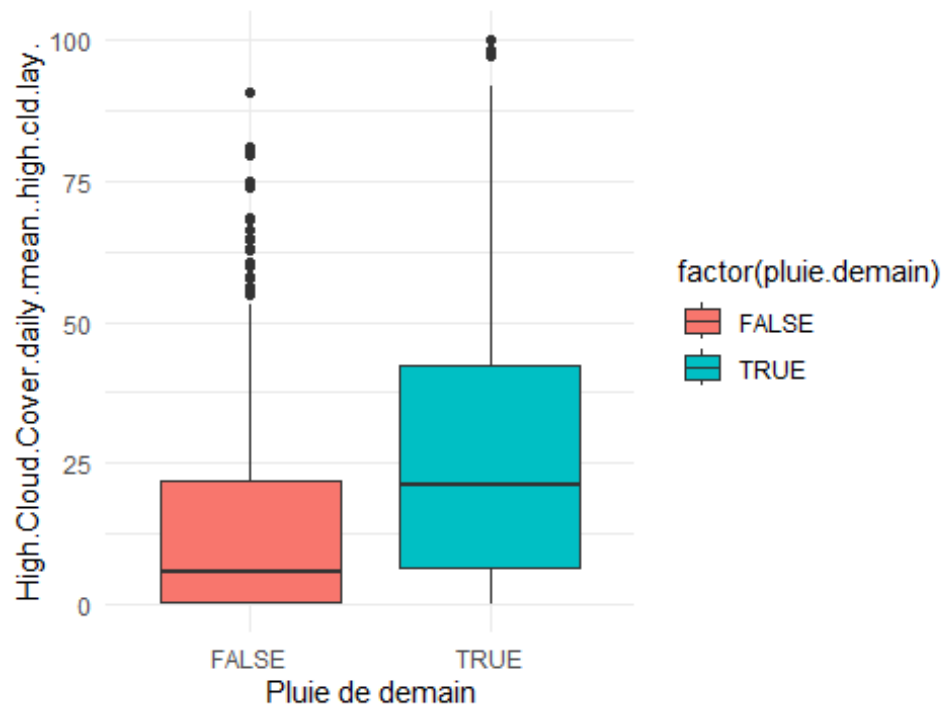


Boxplot of Total.Cloud.Cover.daily.mean..sfc. vs. pluie

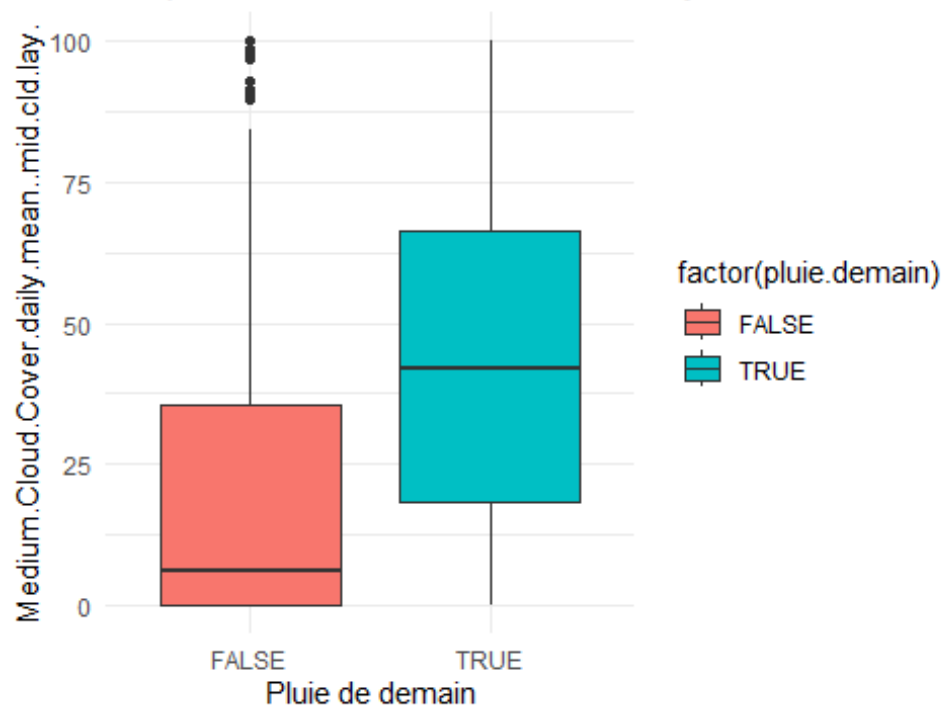




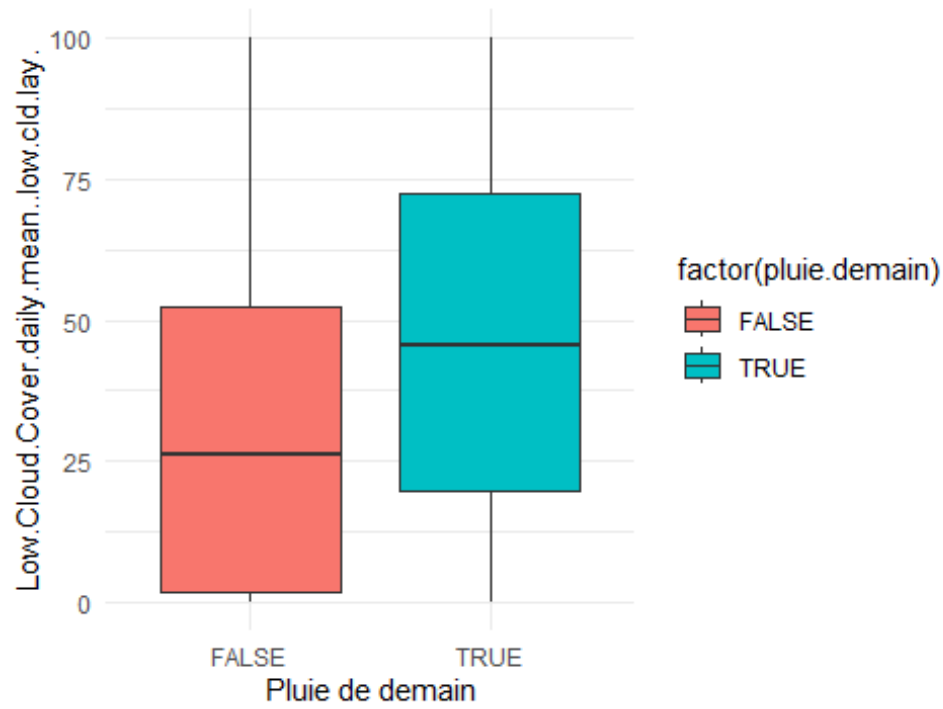
Boxplot of High.Cloud.Cover.daily.mean..high.cld.lay.



Boxplot of Medium.Cloud.Cover.daily.mean..mid.cld.la



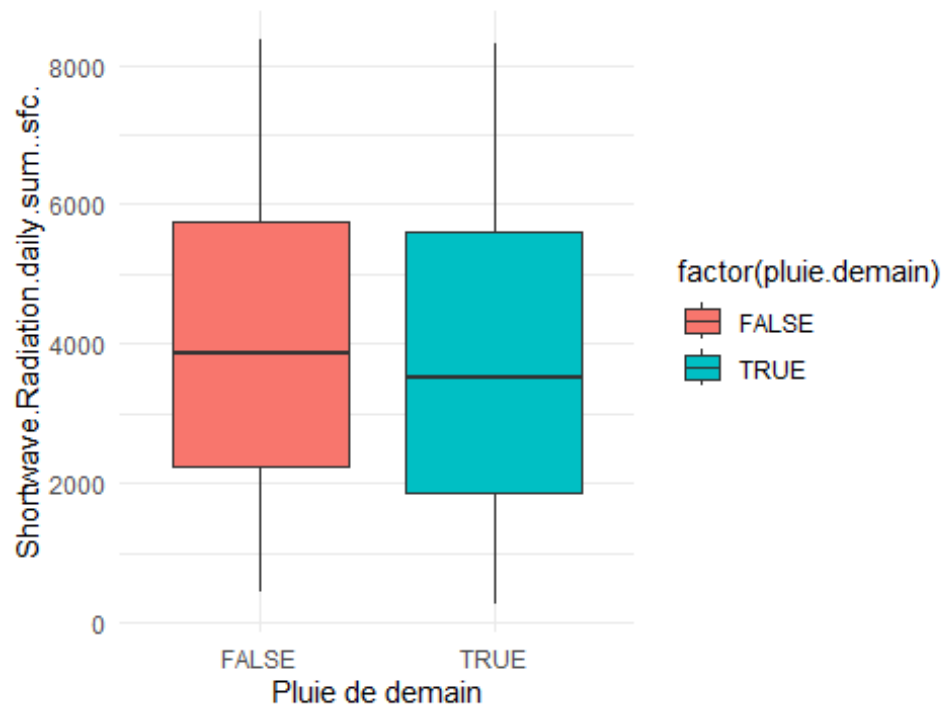
Boxplot of Low.Cloud.Cover.daily.mean..low.cld.lay. v:



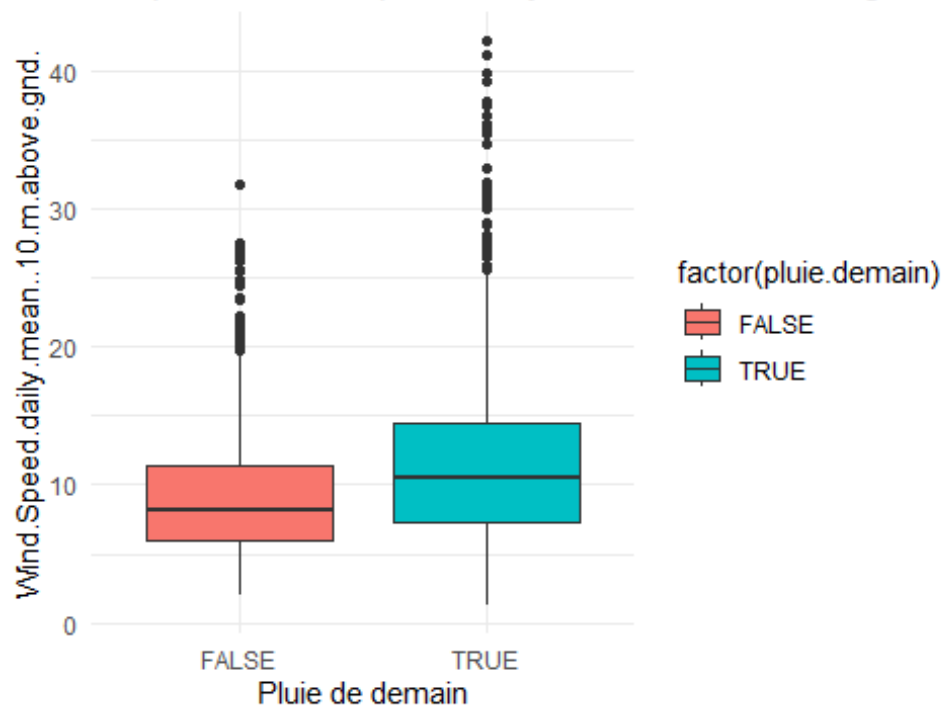
Boxplot of Sunshine.Duration.daily.sum..sfc. vs. pluie



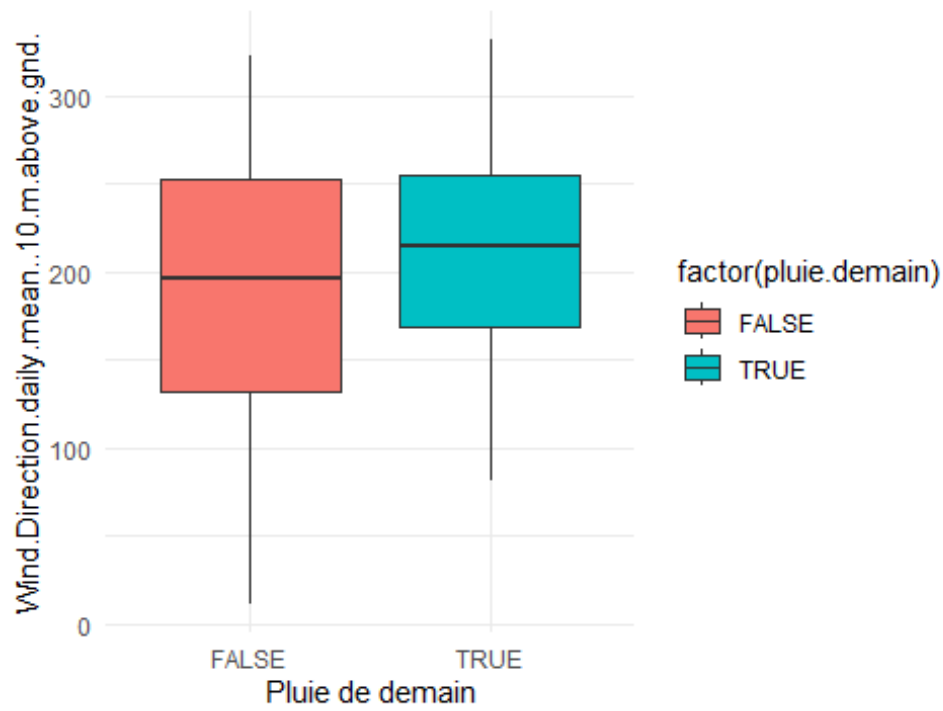
Boxplot of Shortwave.Radiation.daily.sum..sfc. vs. plu



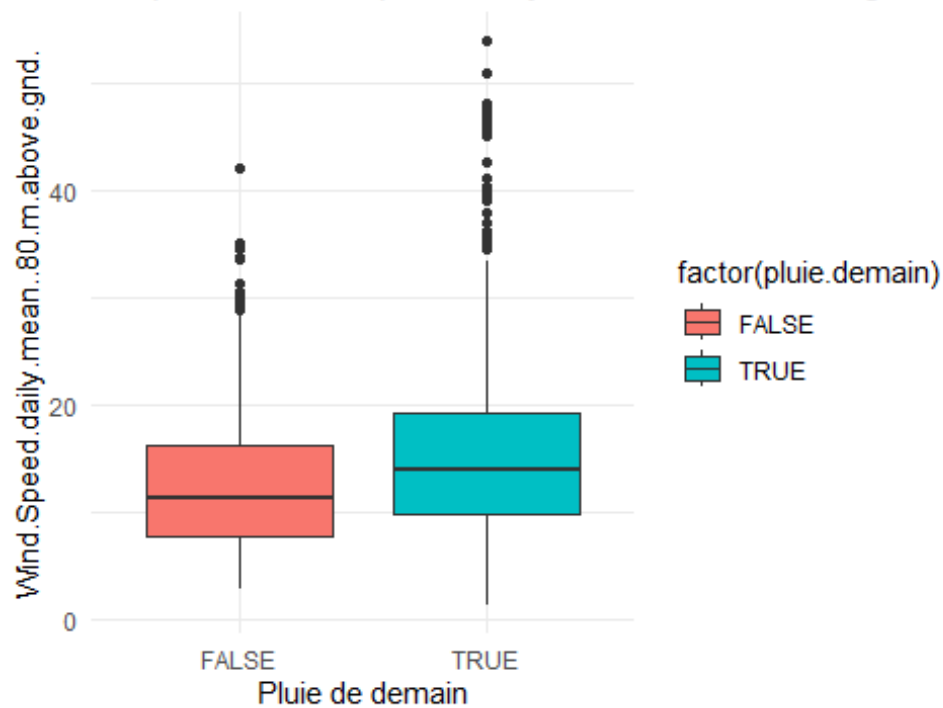
Boxplot of Wind.Speed.daily.mean..10.m.above.gnd. vs



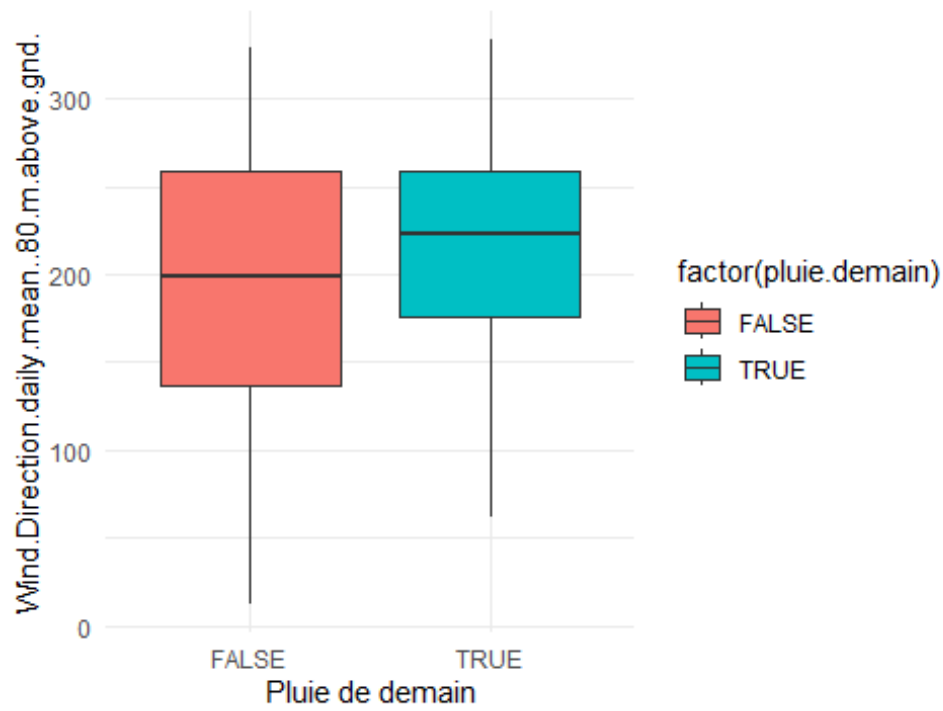
Boxplot of Wind.Direction.daily.mean..10.m.above.gnd.



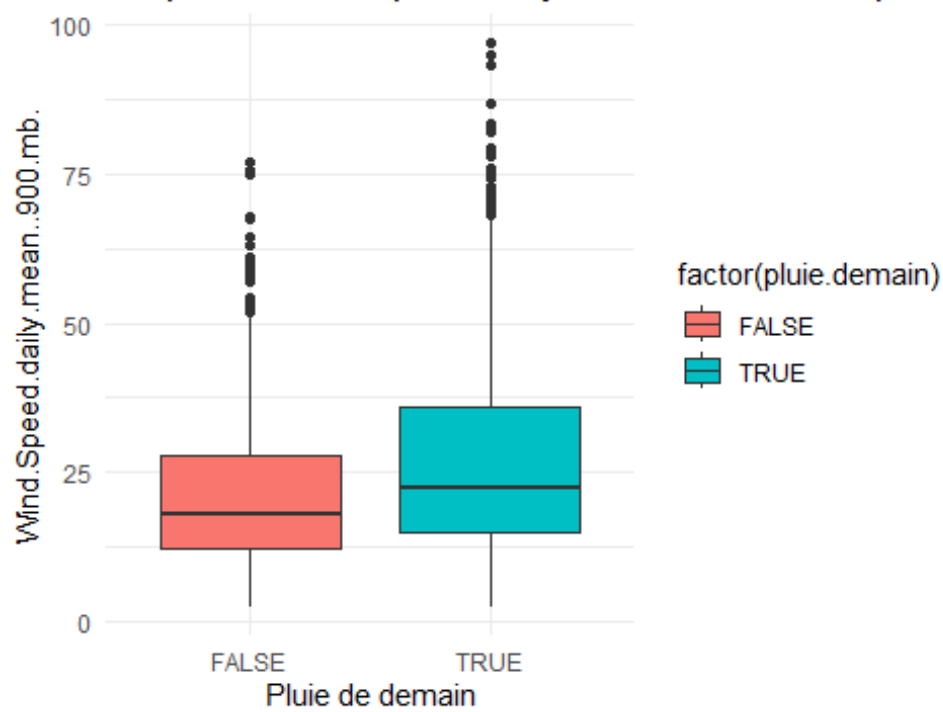
Boxplot of Wind.Speed.daily.mean..80.m.above.gnd. vs



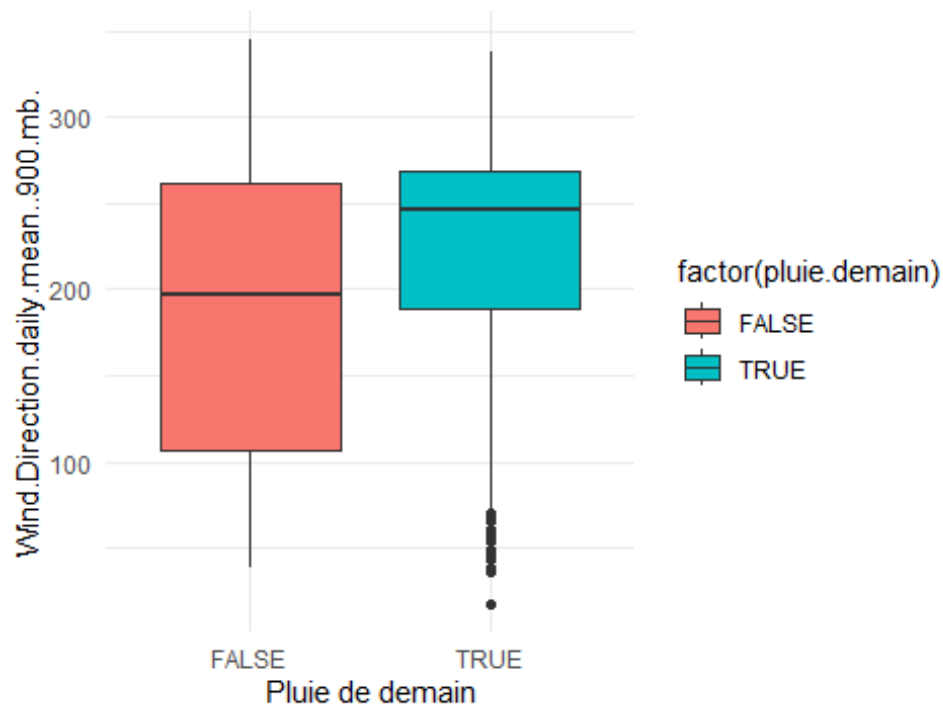
Boxplot of Wind.Direction.daily.mean..80.m.above.gnd.



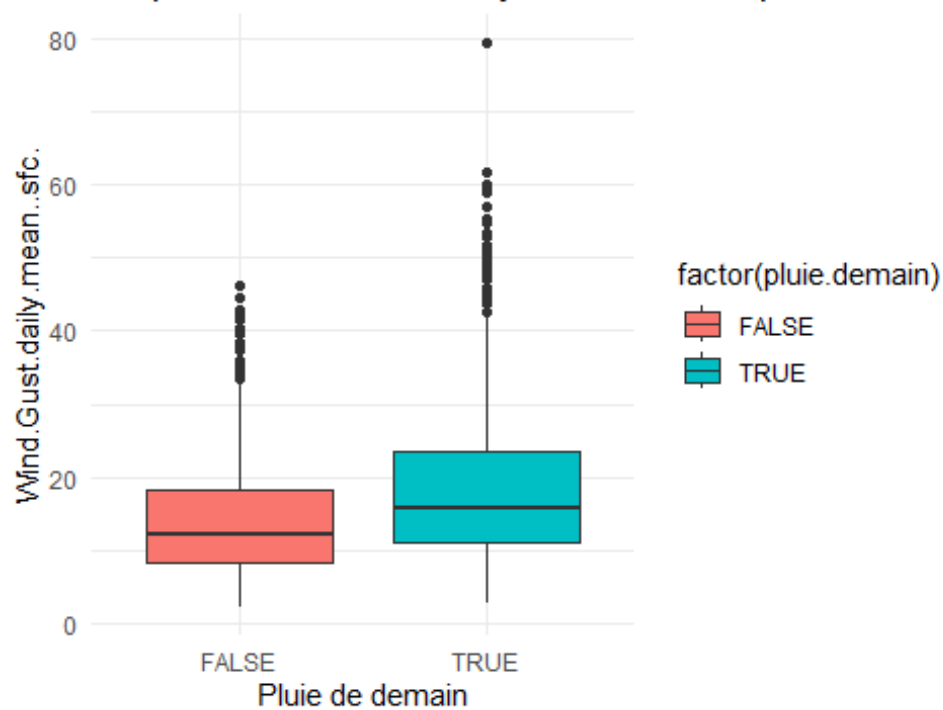
Boxplot of Wind.Speed.daily.mean..900.mb. vs. pluie de demain.



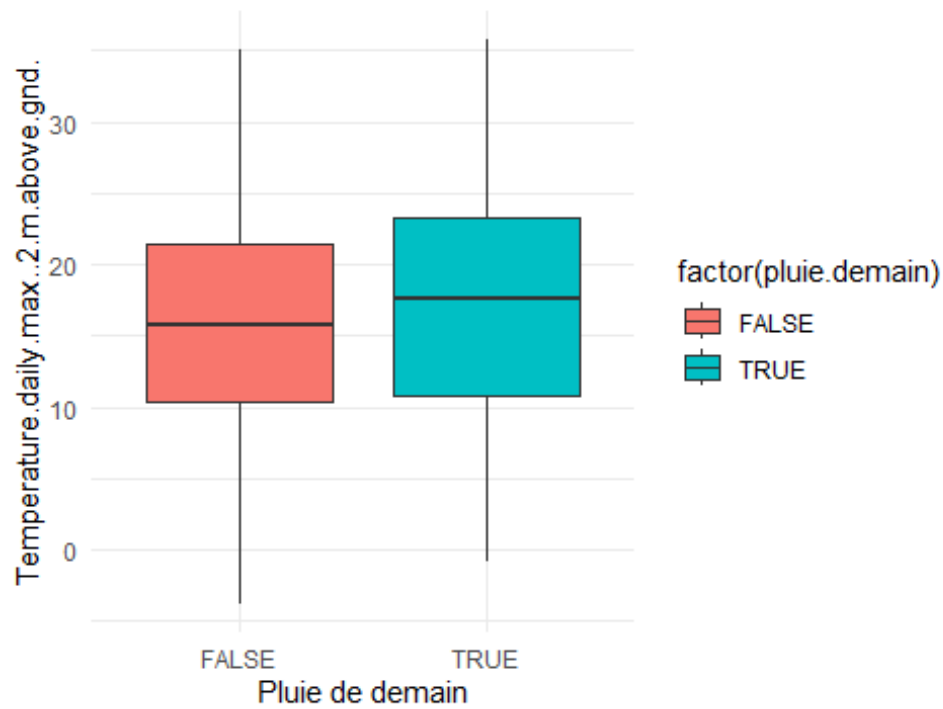
Boxplot of Wind.Direction.daily.mean..900.mb. vs. pluie



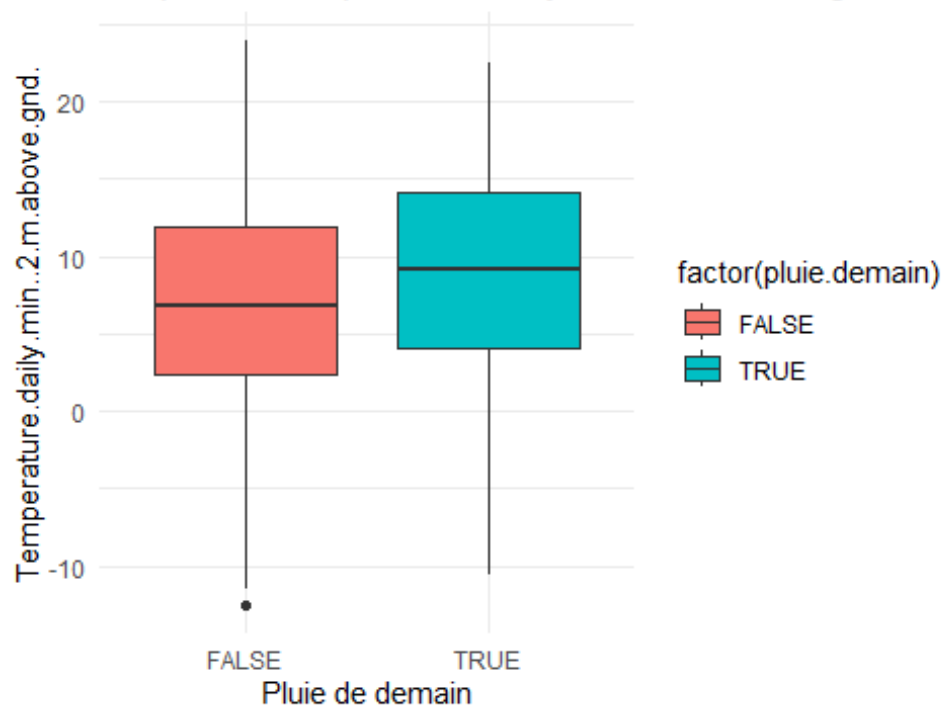
Boxplot of Wind.Gust.daily.mean..sfc. vs. pluie de demain



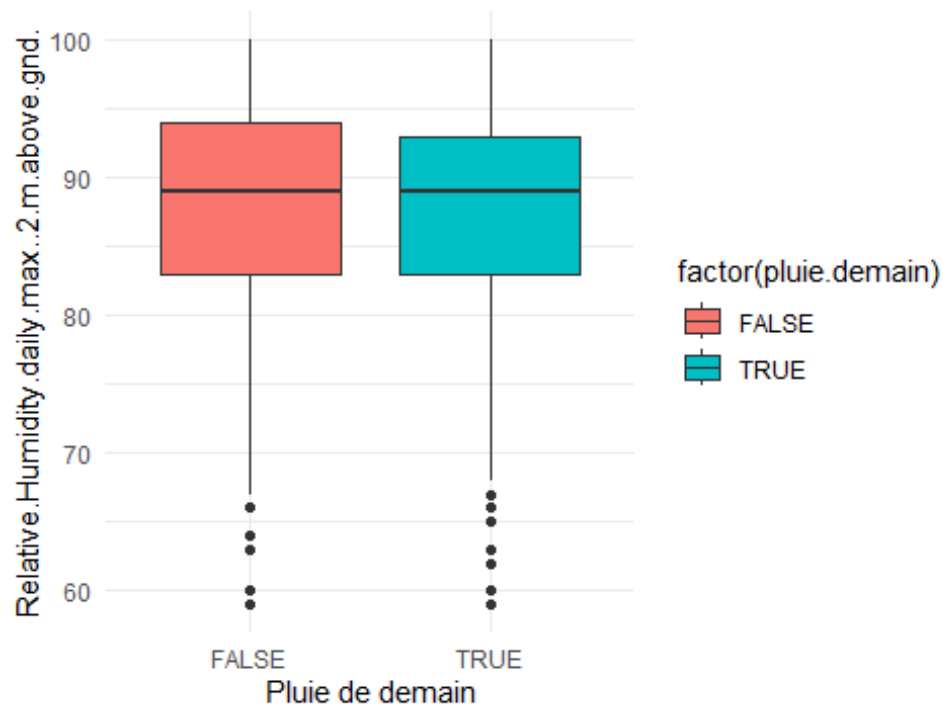
Boxplot of Temperature.daily.max..2.m.above.gnd. vs. |



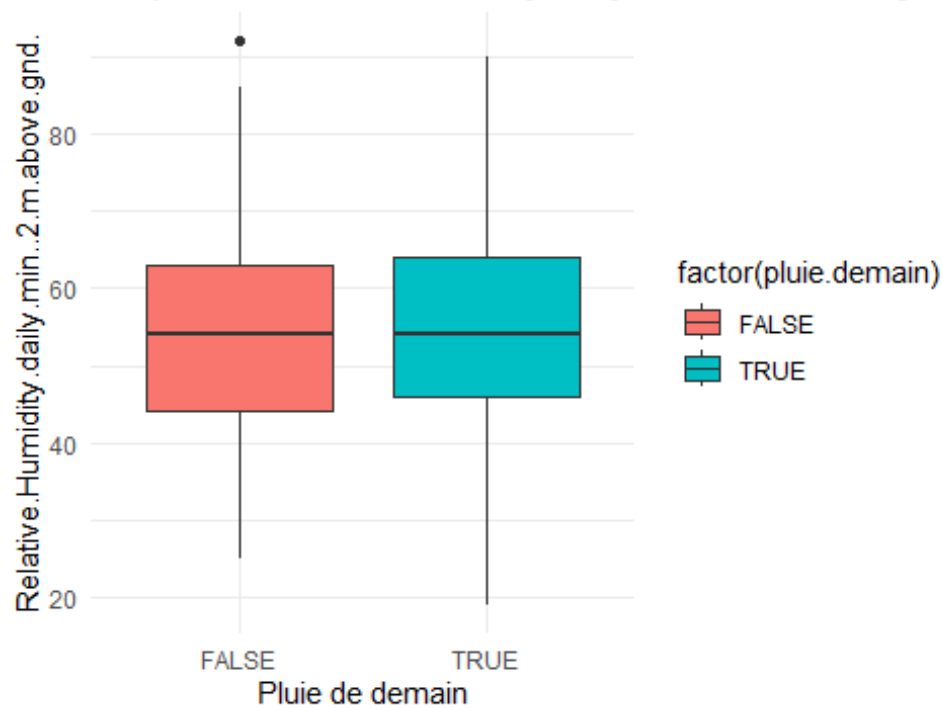
Boxplot of Temperature.daily.min..2.m.above.gnd. vs. |



Boxplot of Relative.Humidity.daily.max..2.m.above.gnd



Boxplot of Relative.Humidity.daily.min..2.m.above.gnd.

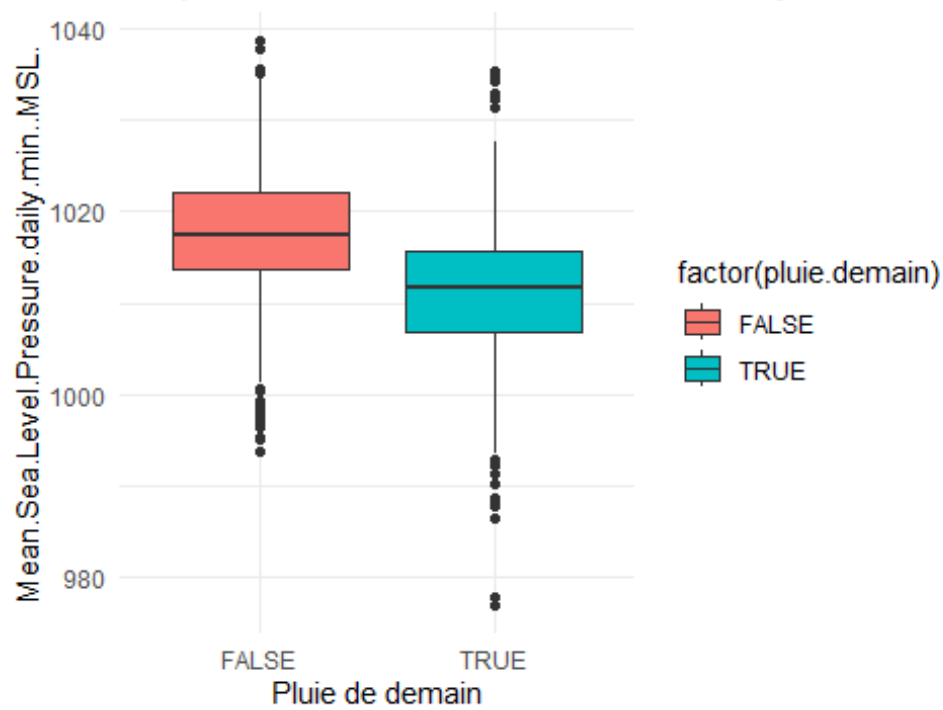




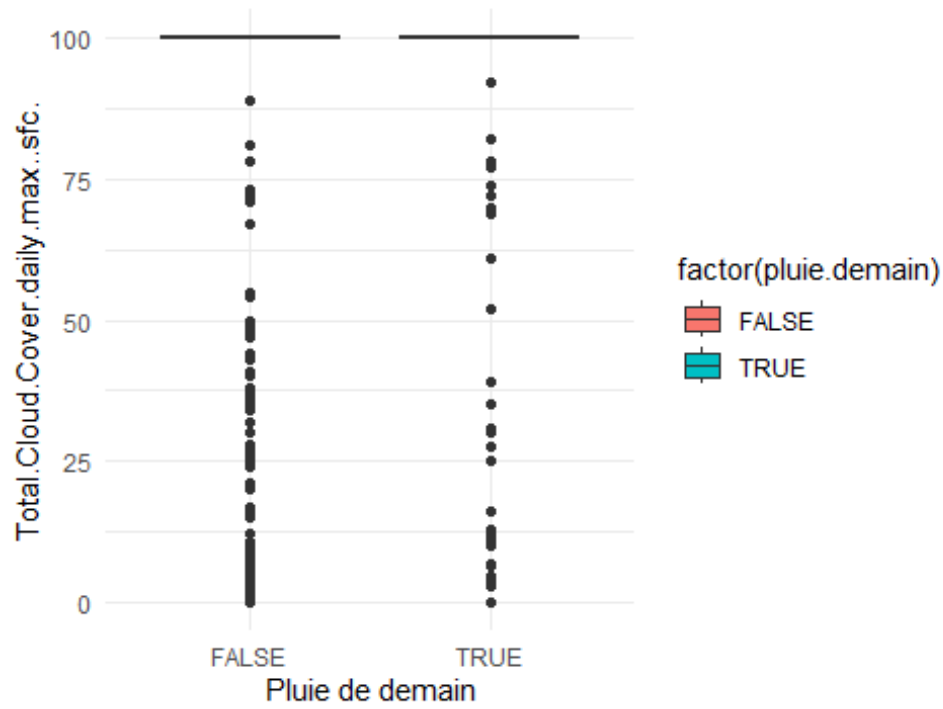
Boxplot of Mean.Sea.Level.Pressure.daily.max..MSL.



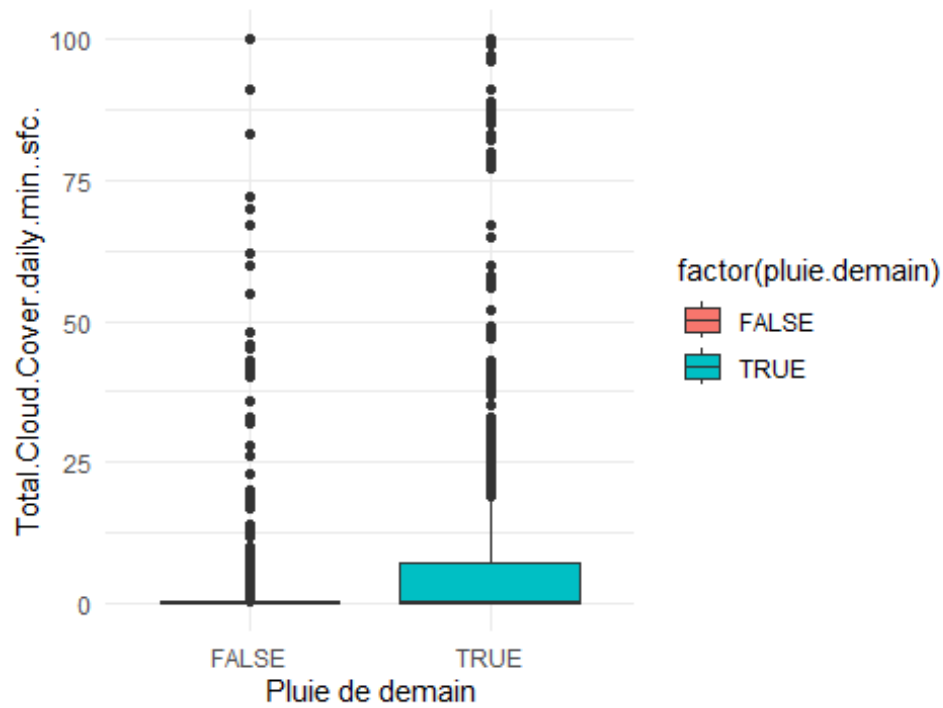
Boxplot of Mean.Sea.Level.Pressure.daily.min..MSL.



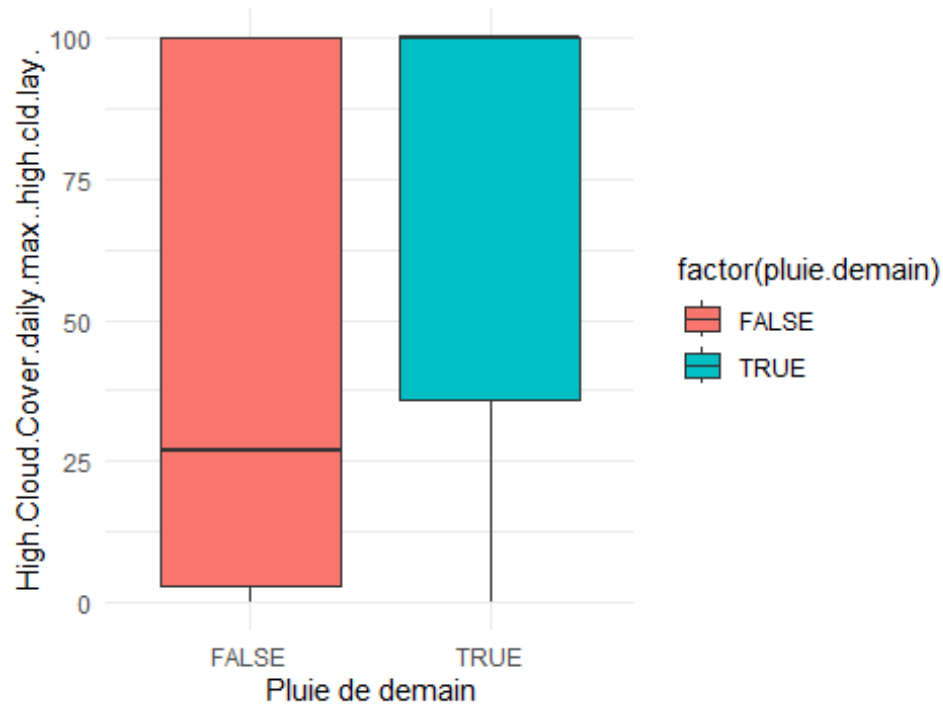
Boxplot of Total.Cloud.Cover.daily.max..sfc. vs. pluie d



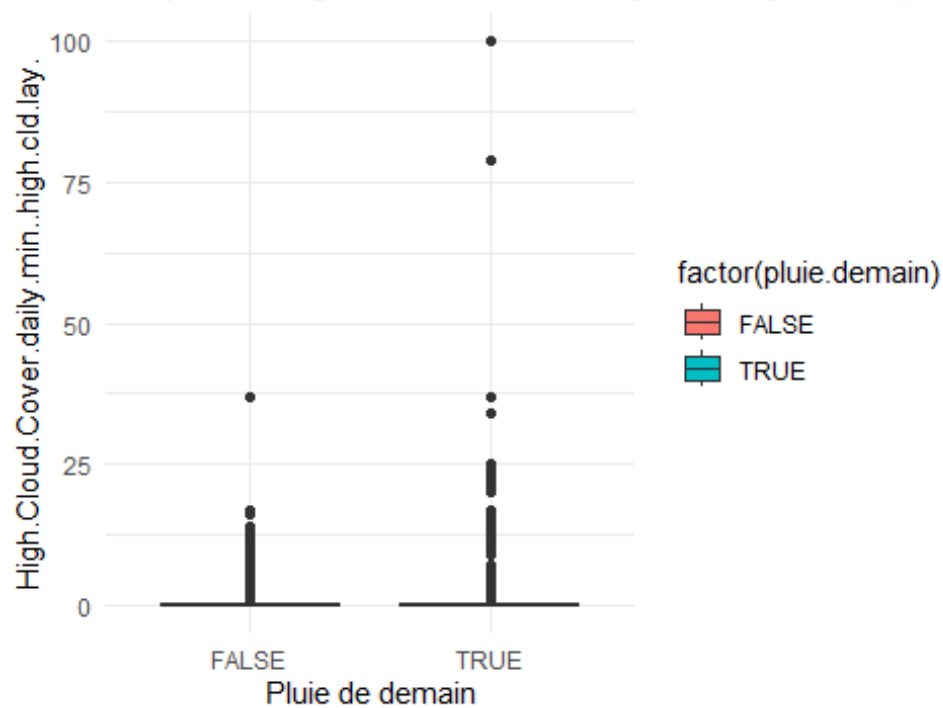
Boxplot of Total.Cloud.Cover.daily.min..sfc. vs. pluie d



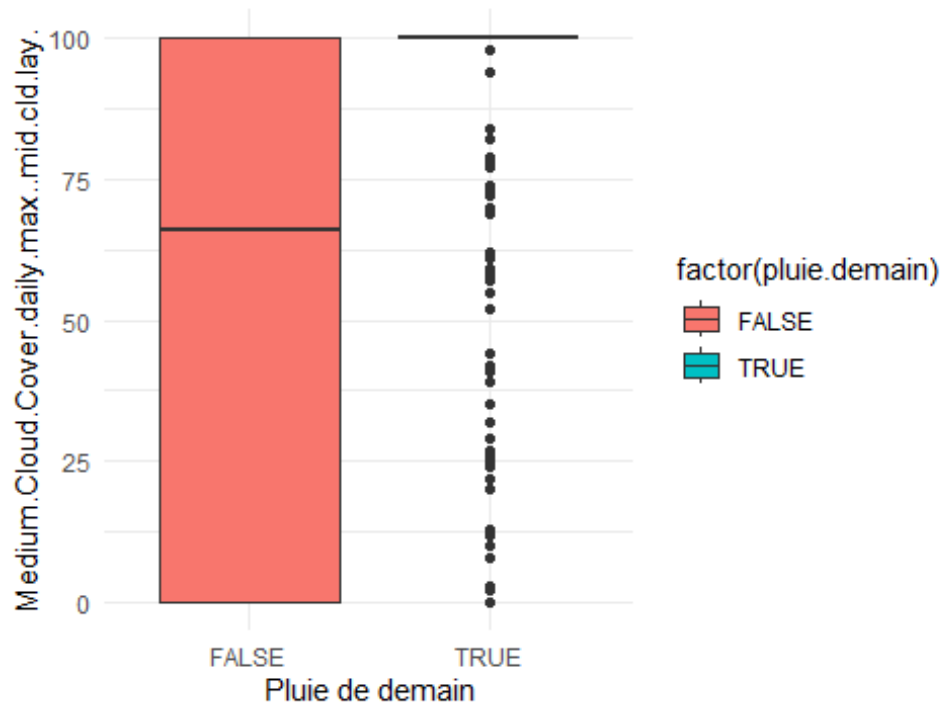
Boxplot of High.Cloud.Cover.daily.max..high.cld.lay. vs



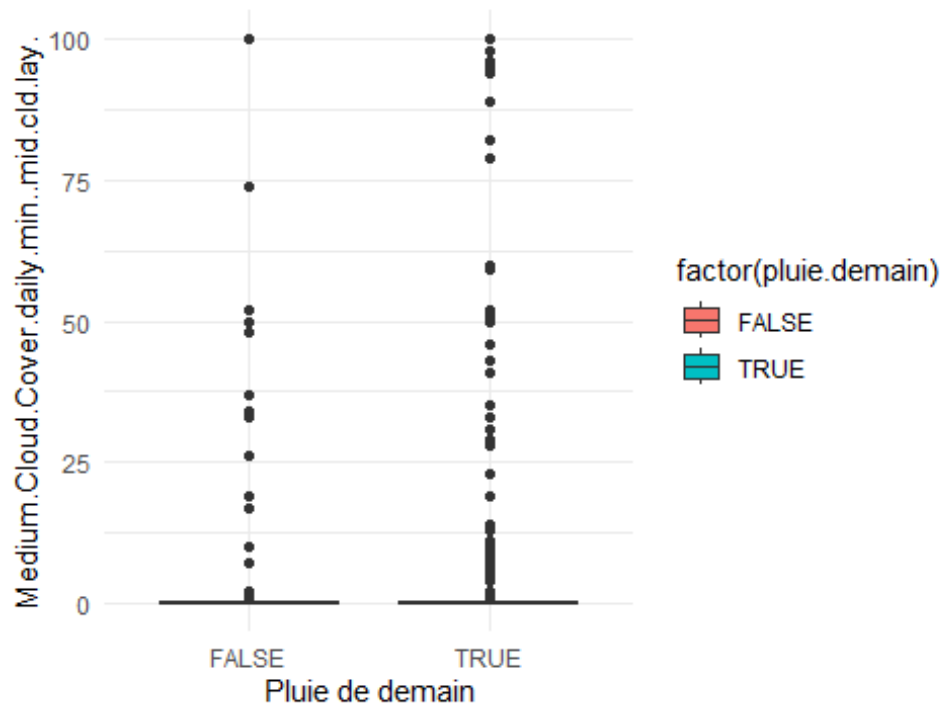
Boxplot of High.Cloud.Cover.daily.min..high.cld.lay. vs



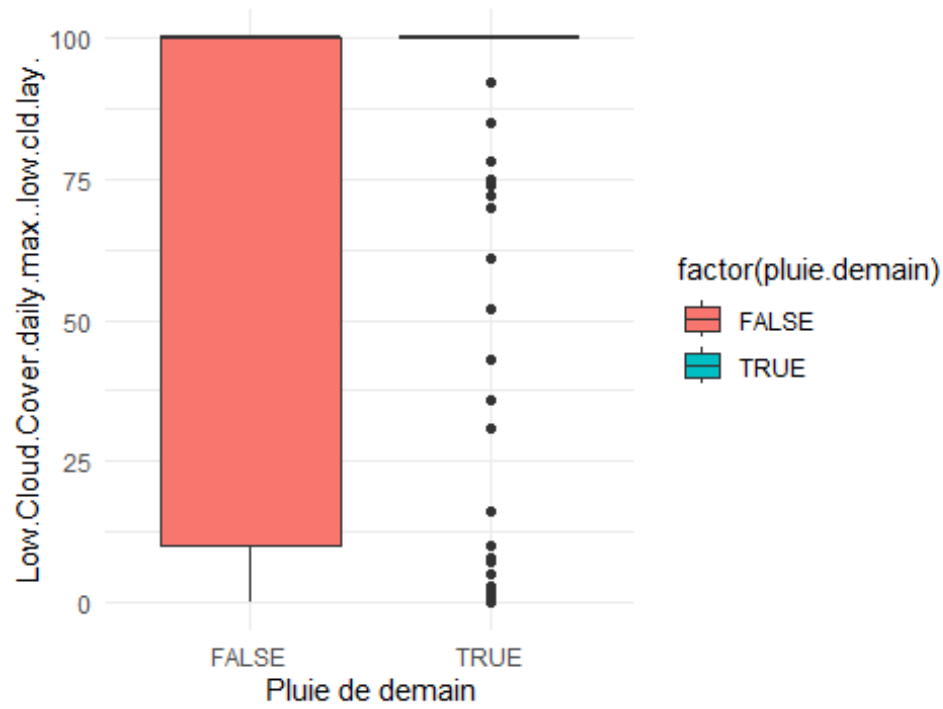
Boxplot of Medium.Cloud.Cover.daily.max..mid.cld.lay.



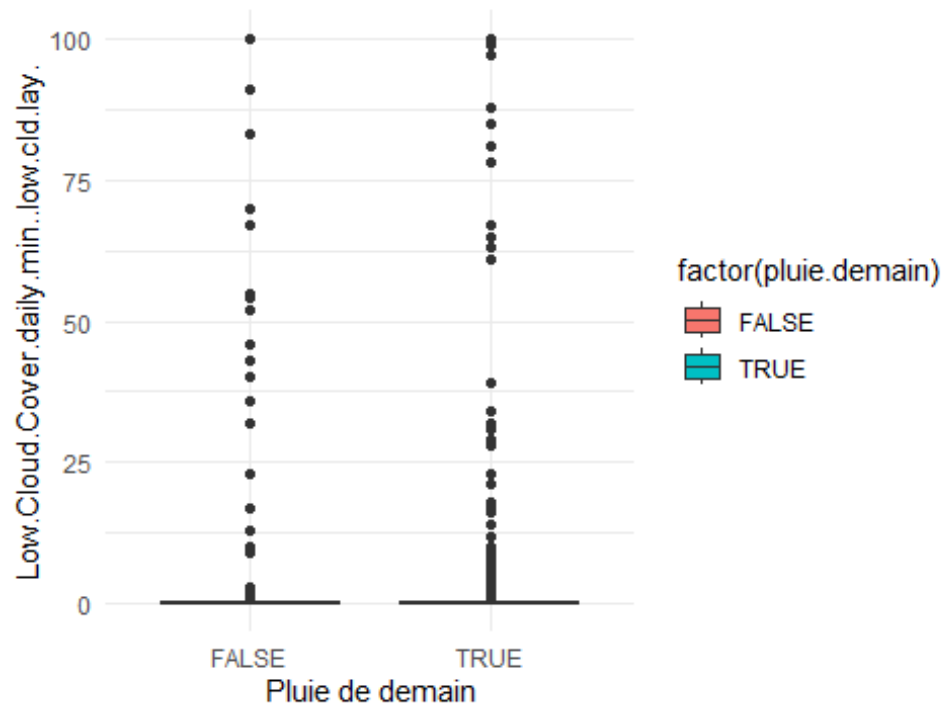
Boxplot of Medium.Cloud.Cover.daily.min..mid.cld.lay.



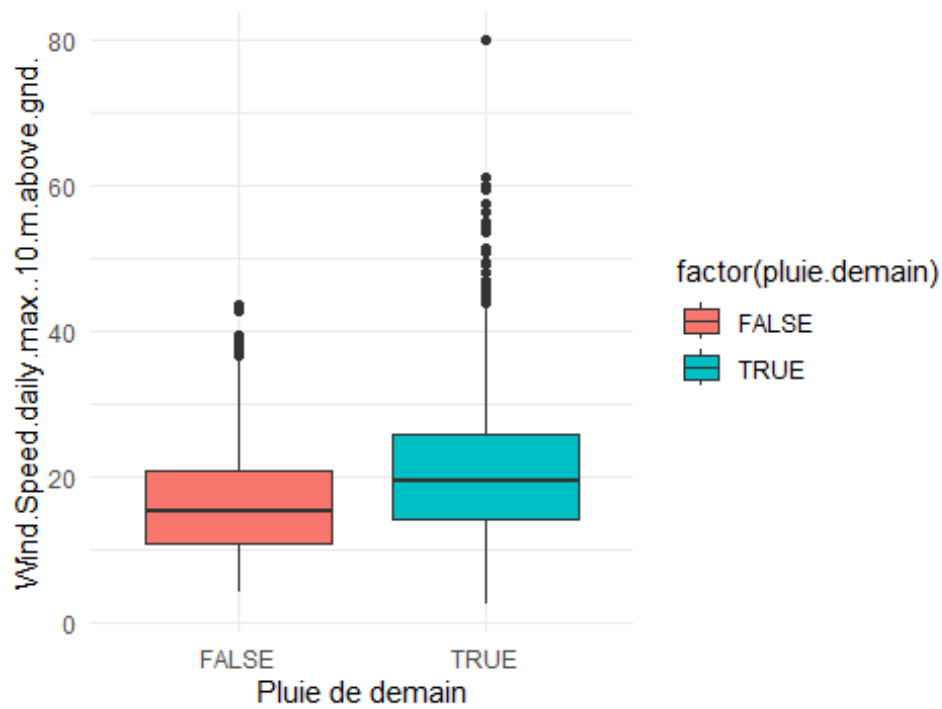
Boxplot of Low.Cloud.Cover.daily.max..low.cld.lay. vs.



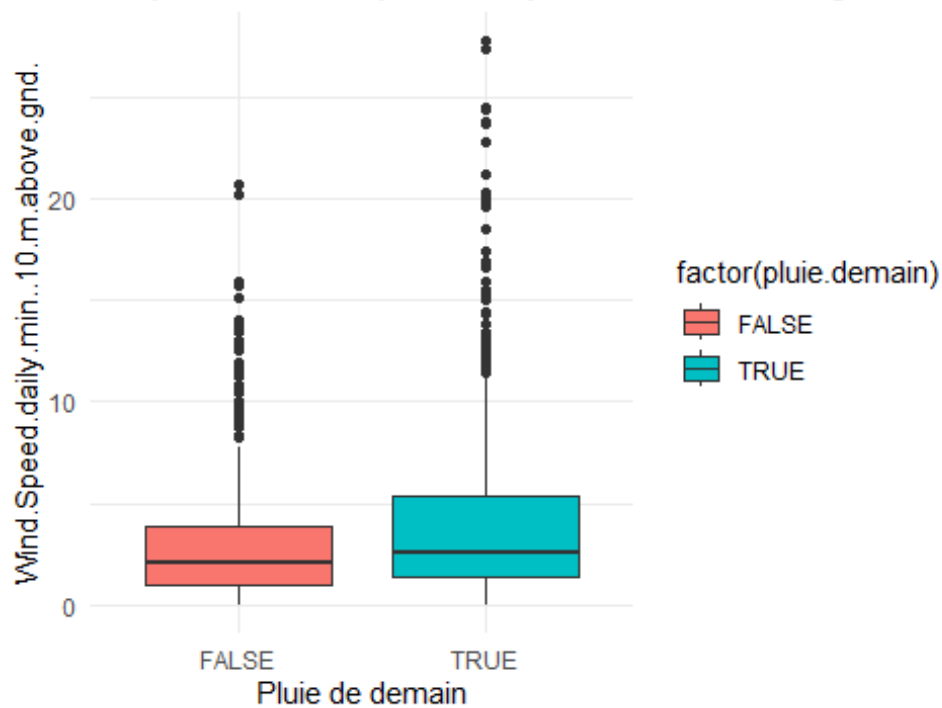
Boxplot of Low.Cloud.Cover.daily.min..low.cld.lay. vs.



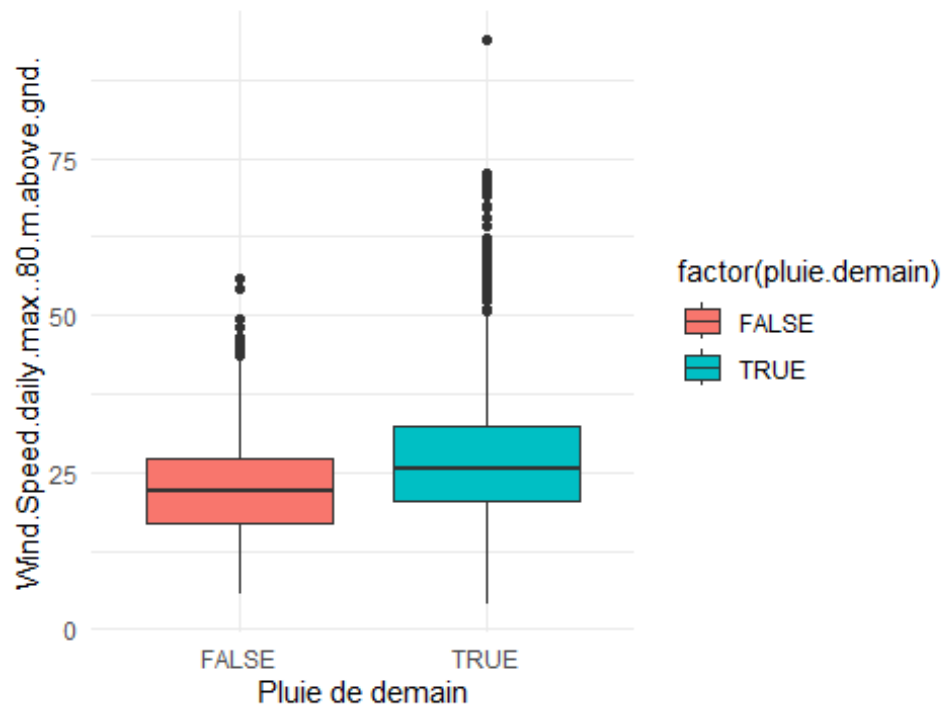
Boxplot of Wind.Speed.daily.max..10.m.above.gnd. vs.



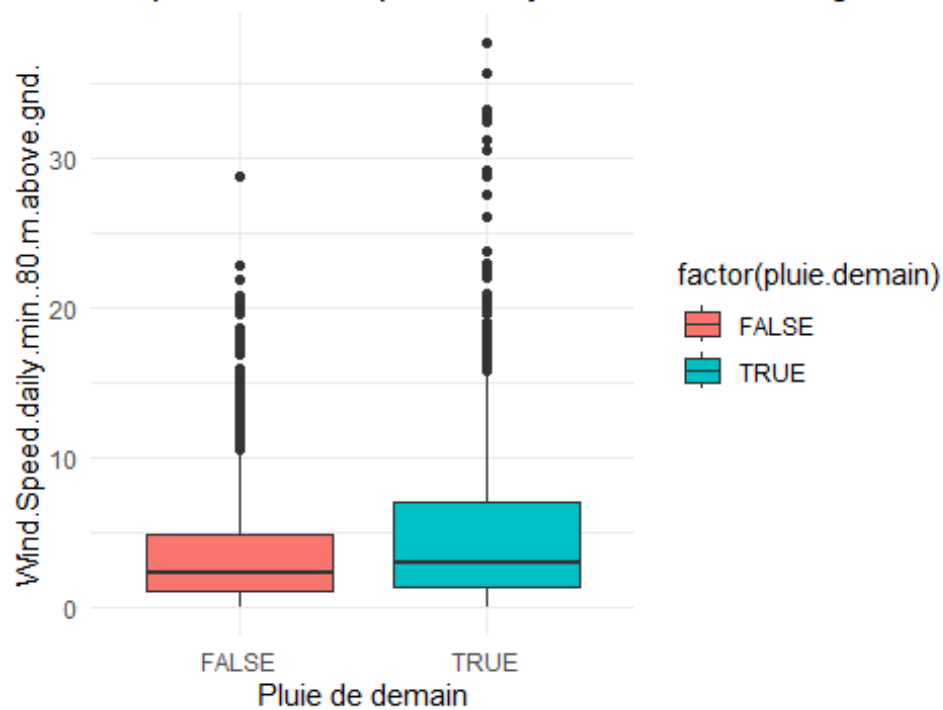
Boxplot of Wind.Speed.daily.min..10.m.above.gnd. vs. |



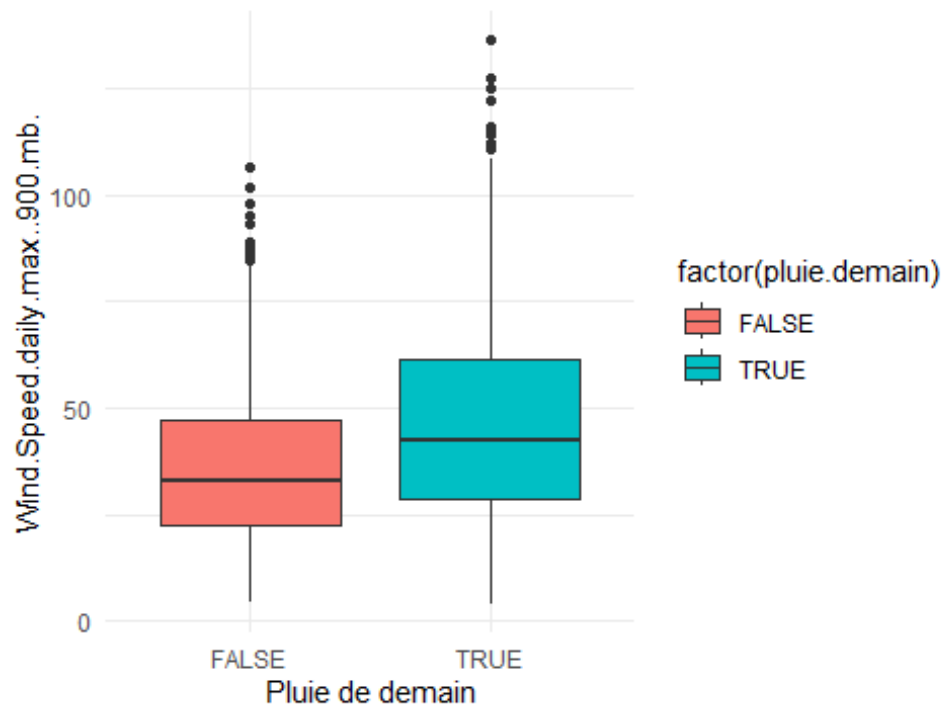
Boxplot of Wind.Speed.daily.max..80.m.above.gnd. vs.



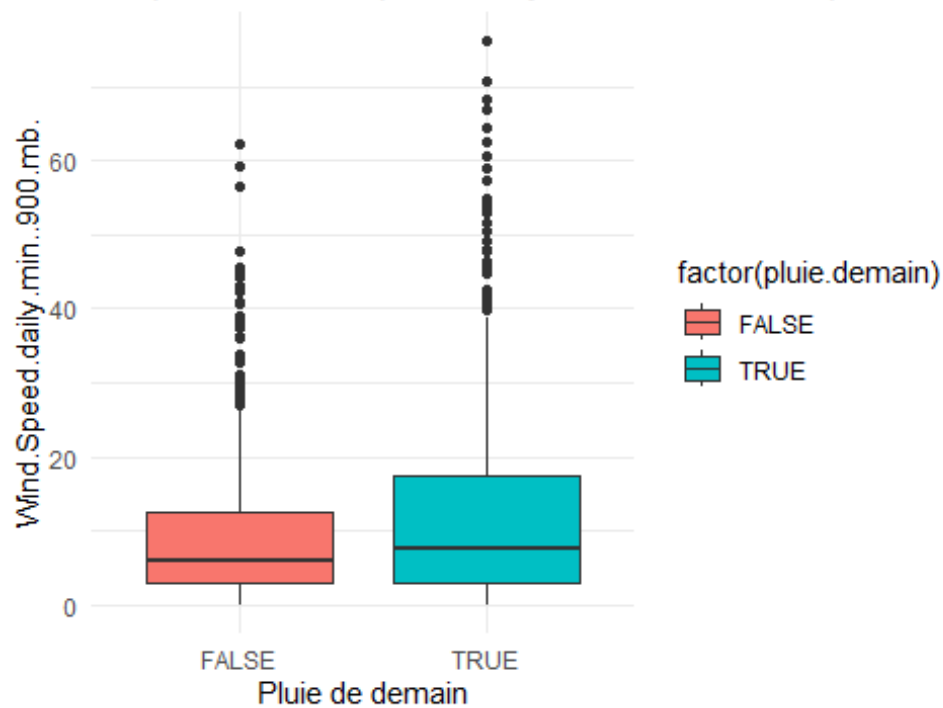
Boxplot of Wind.Speed.daily.min..80.m.above.gnd. vs.



Boxplot of Wind.Speed.daily.max..900.mb. vs. pluie de

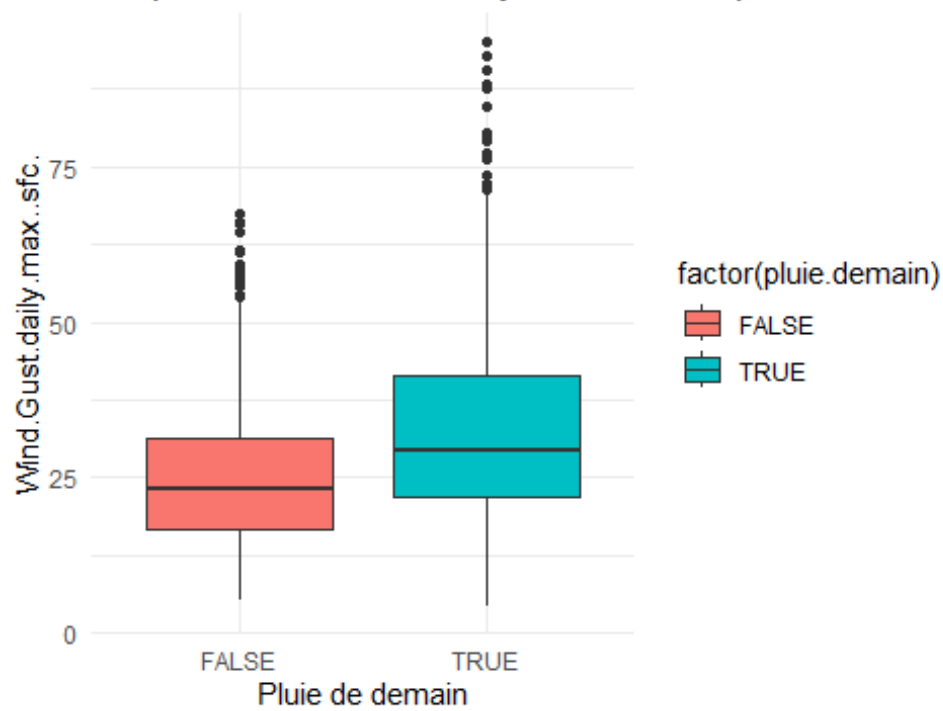


Boxplot of Wind.Speed.daily.min..900.mb. vs. pluie de

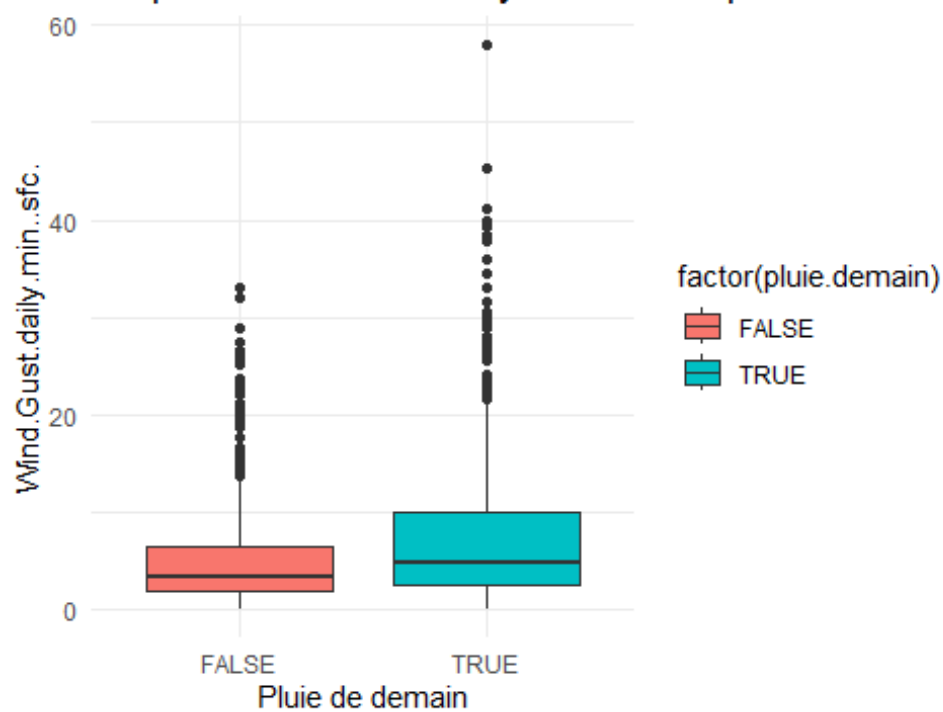




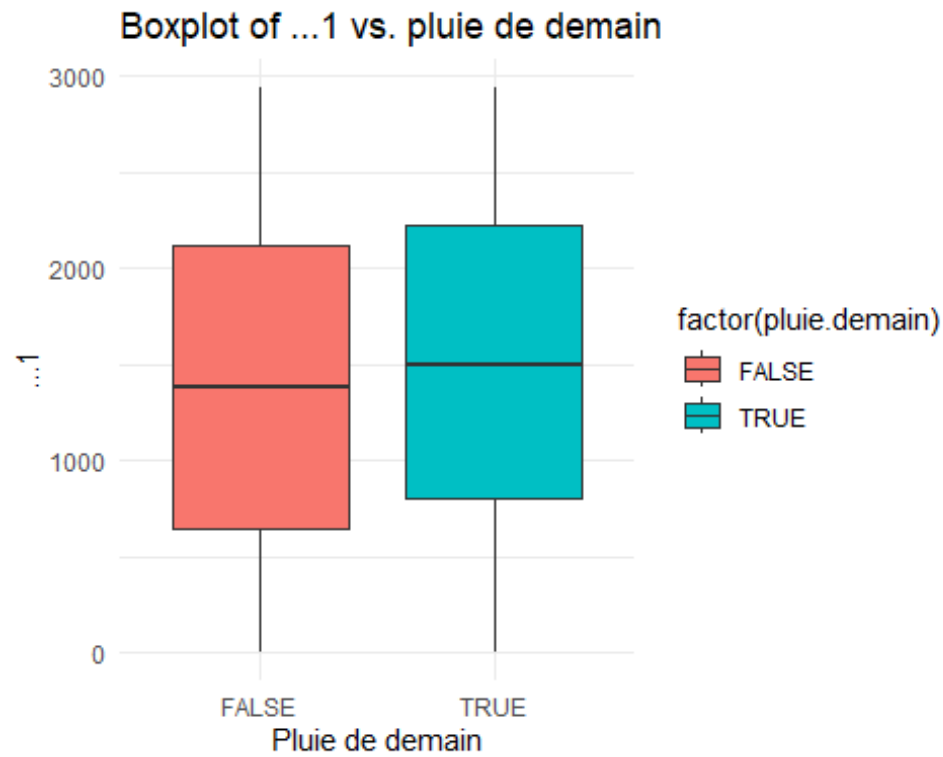
Boxplot of Wind.Gust.daily.max..sfc. vs. pluie de demai



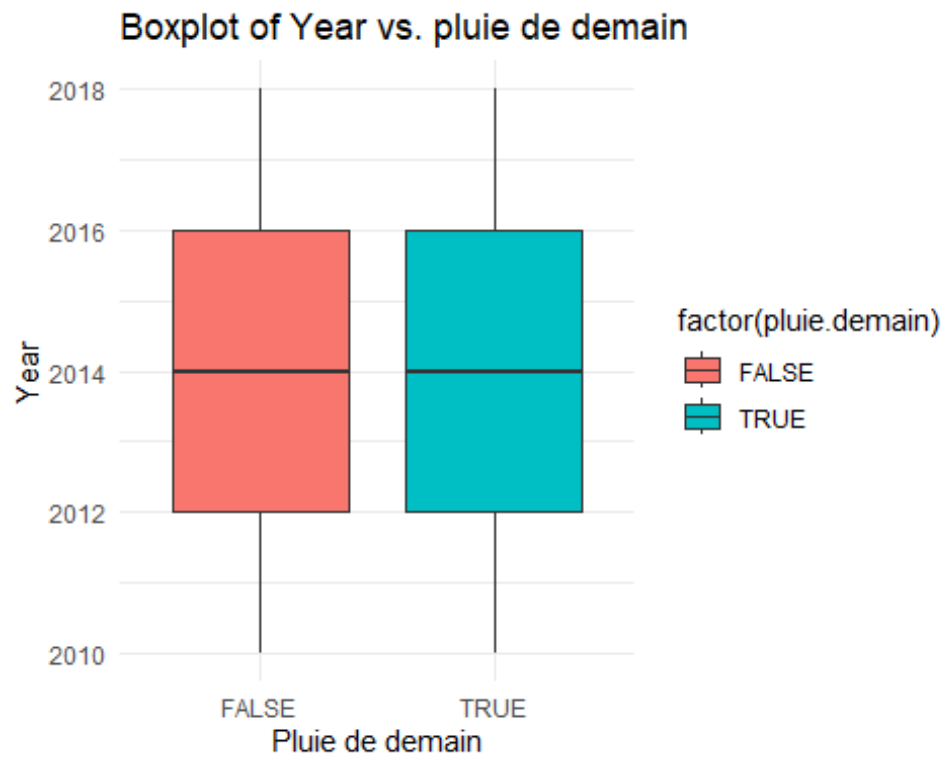
Boxplot of Wind.Gust.daily.min..sfc. vs. pluie de demai



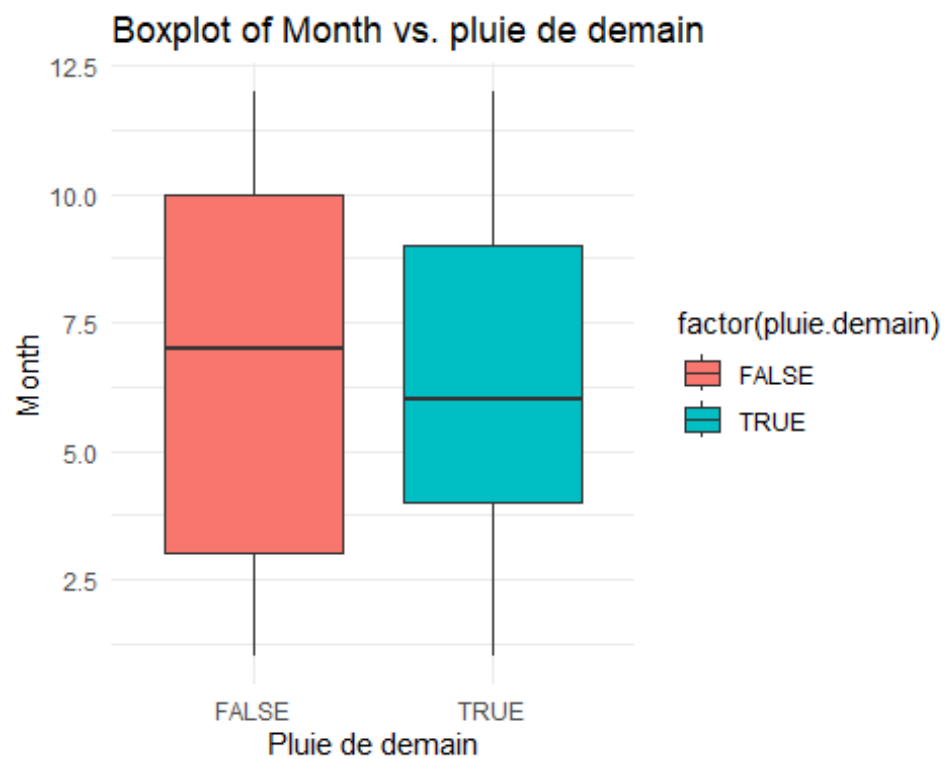
```
## [[1]]
```



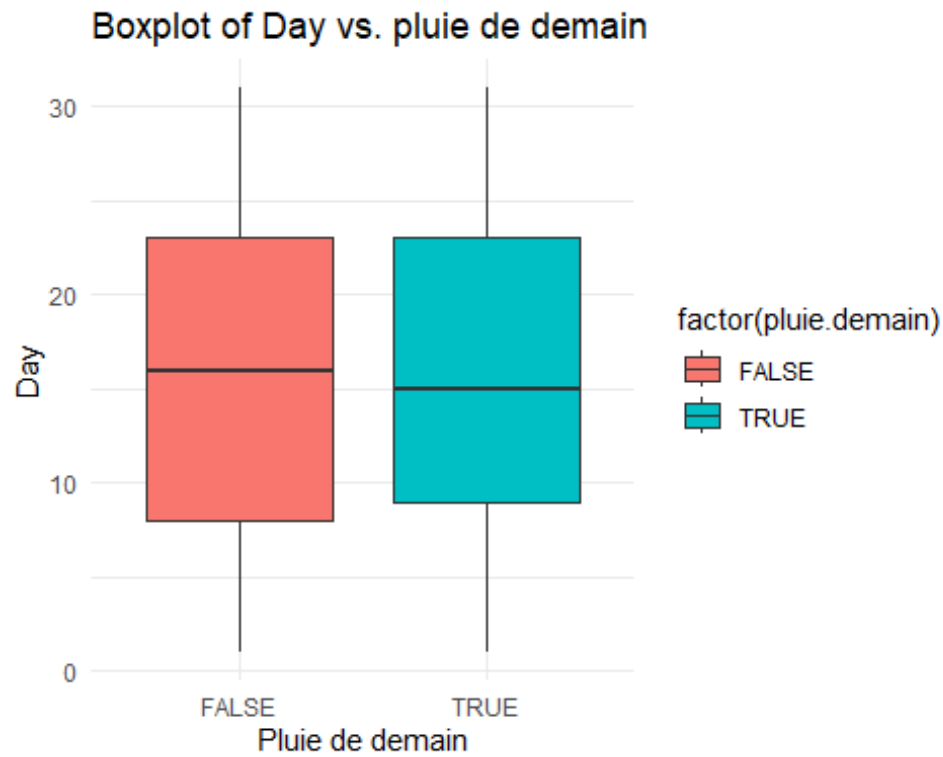
```
##  
## [[2]]
```



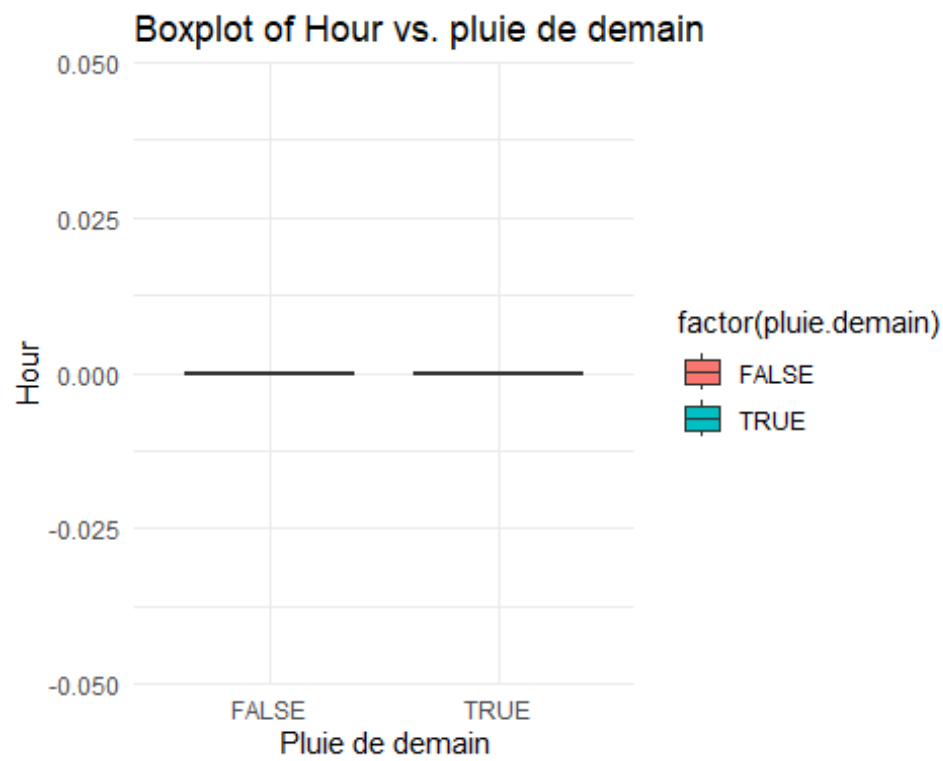
```
##  
## [[3]]
```



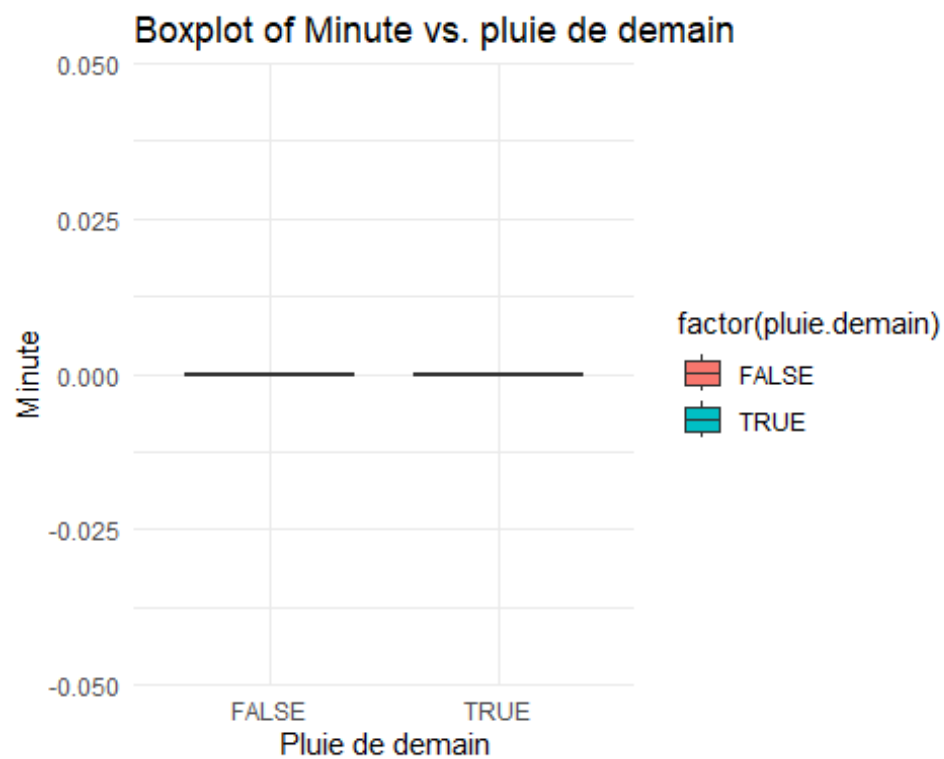
```
##  
## [[4]]
```



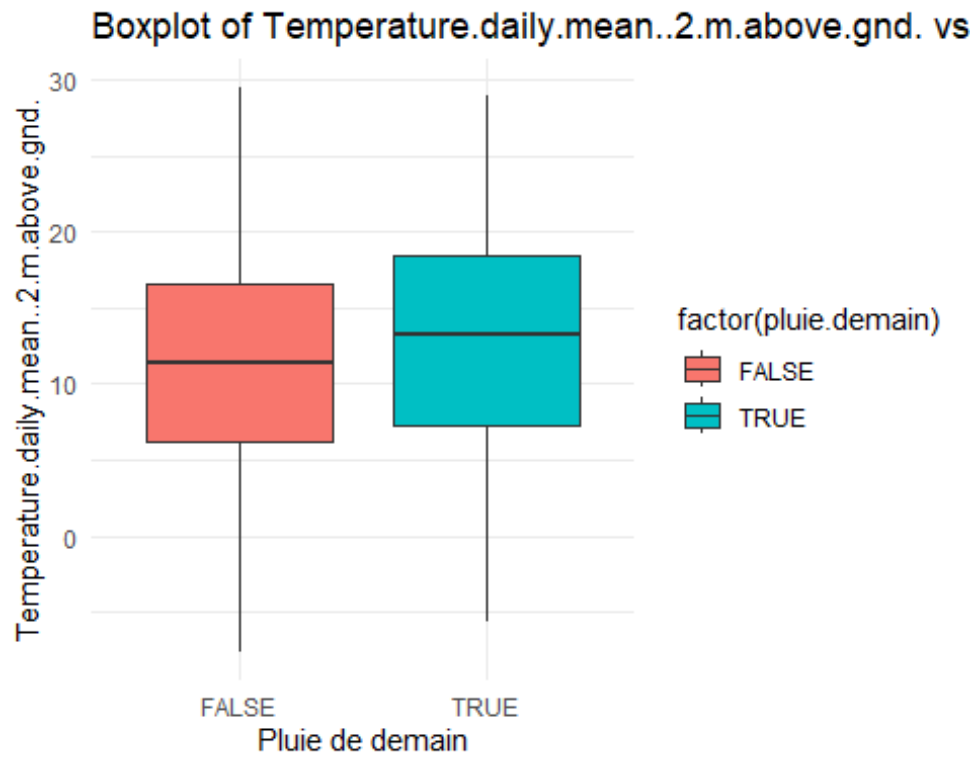
```
##  
## [[5]]
```



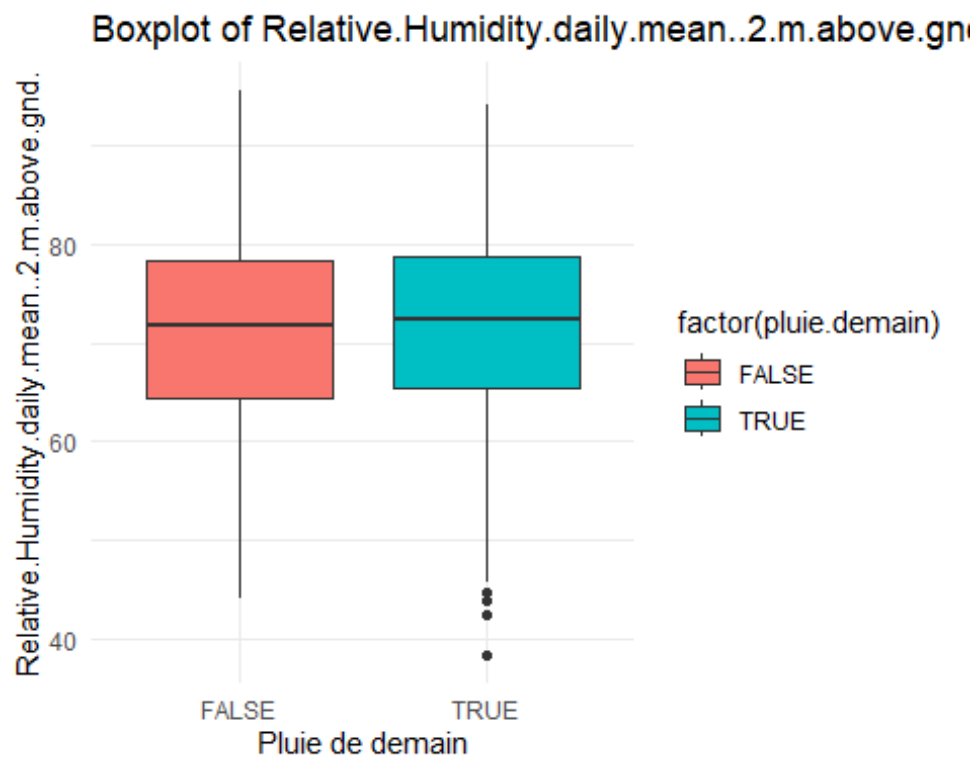
```
##  
## [[6]]
```



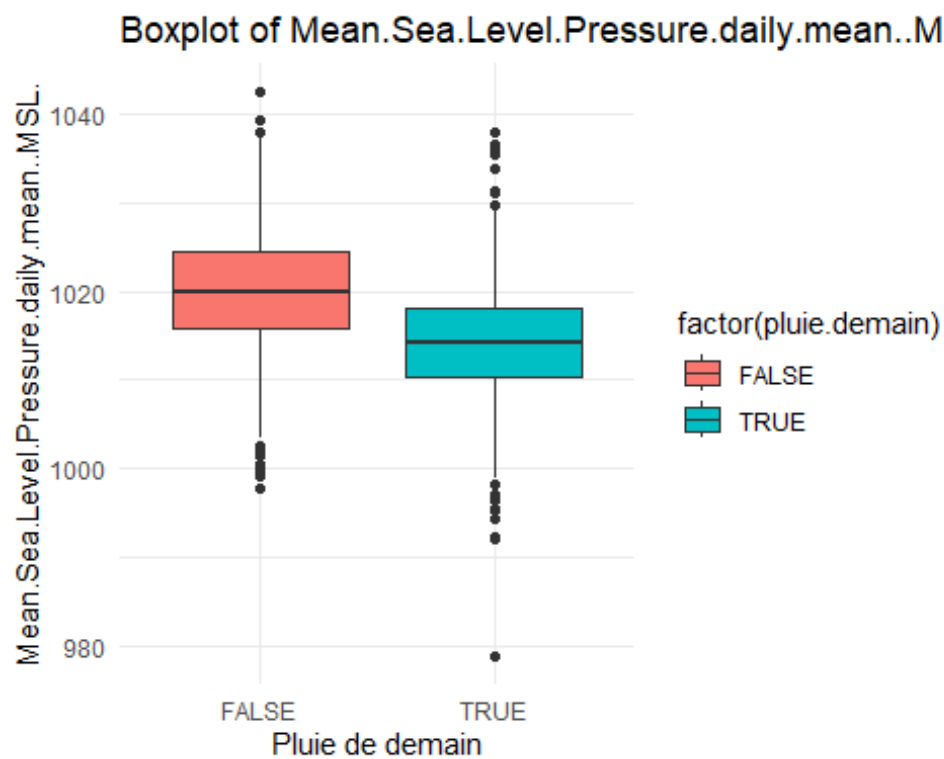
```
##  
## [[7]]
```



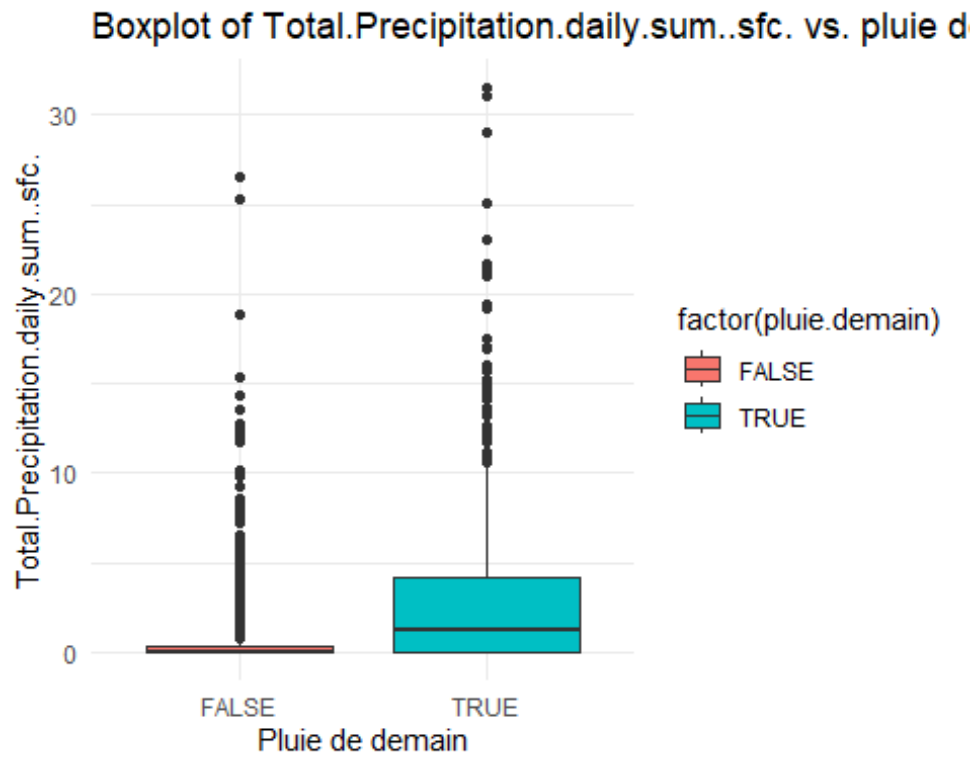
```
##  
## [[8]]
```



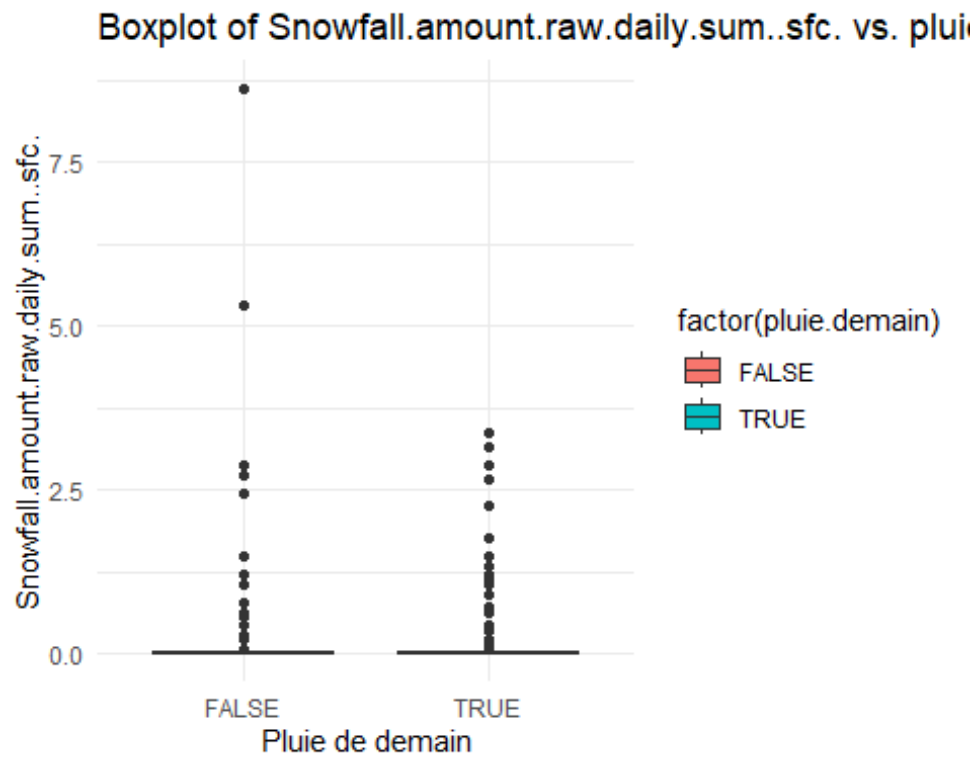
```
##  
## [[9]]
```



```
##  
## [[10]]
```

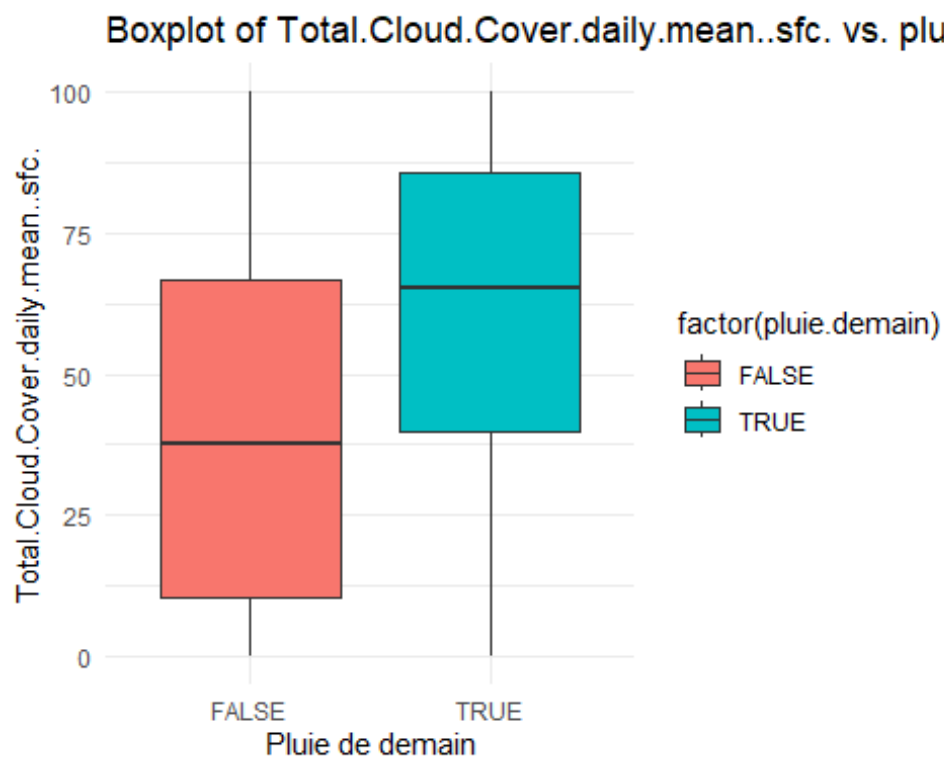


```
##  
## [[11]]
```



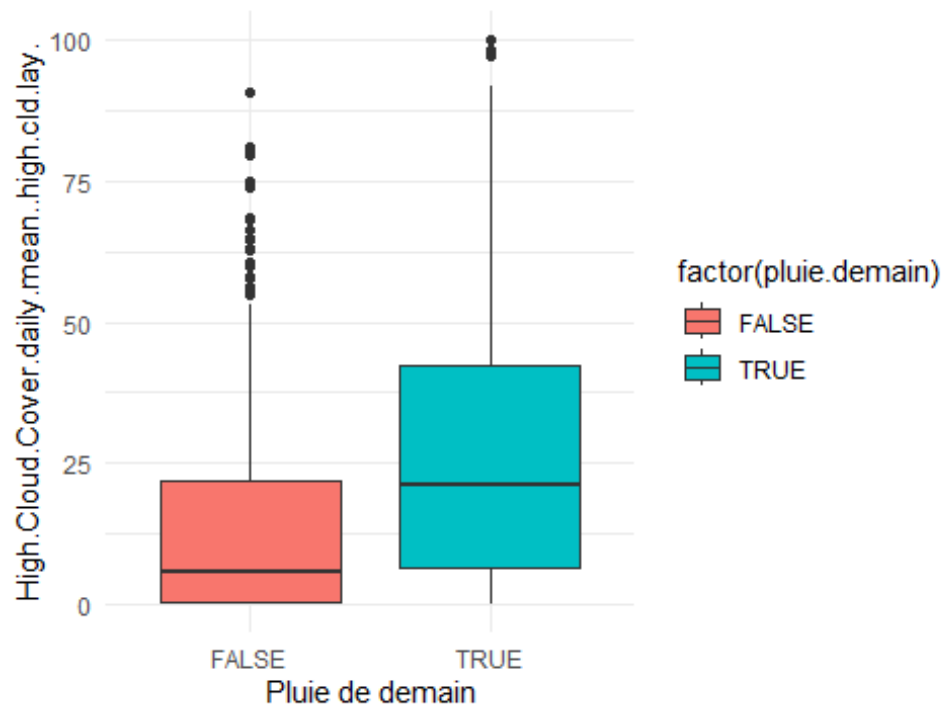


```
##  
## [[12]]
```



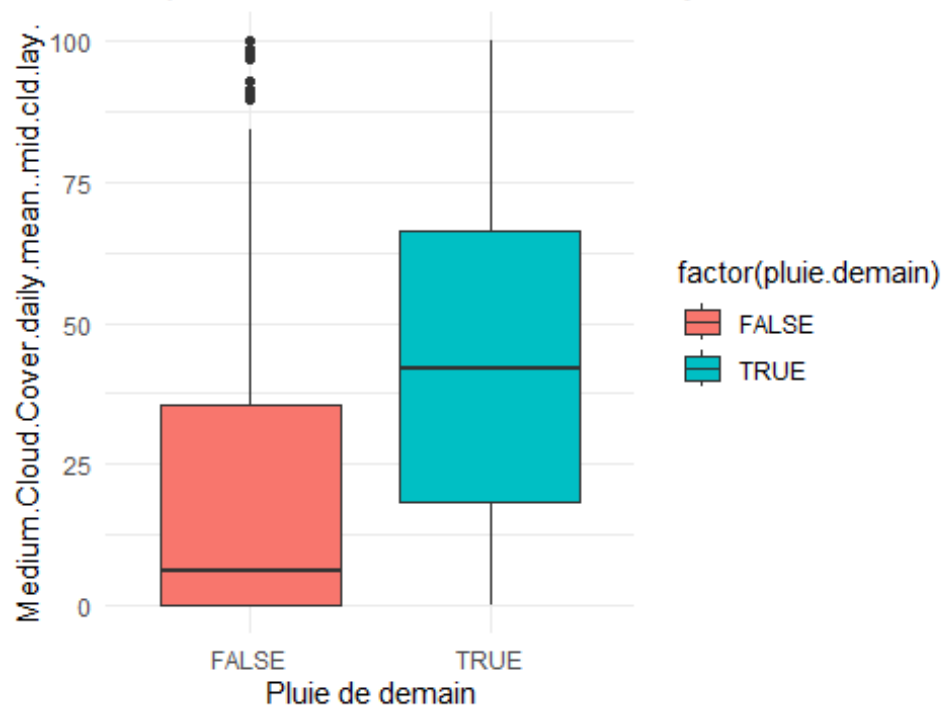
```
##  
## [[13]]
```

Boxplot of High.Cloud.Cover.daily.mean..high.cld.lay.

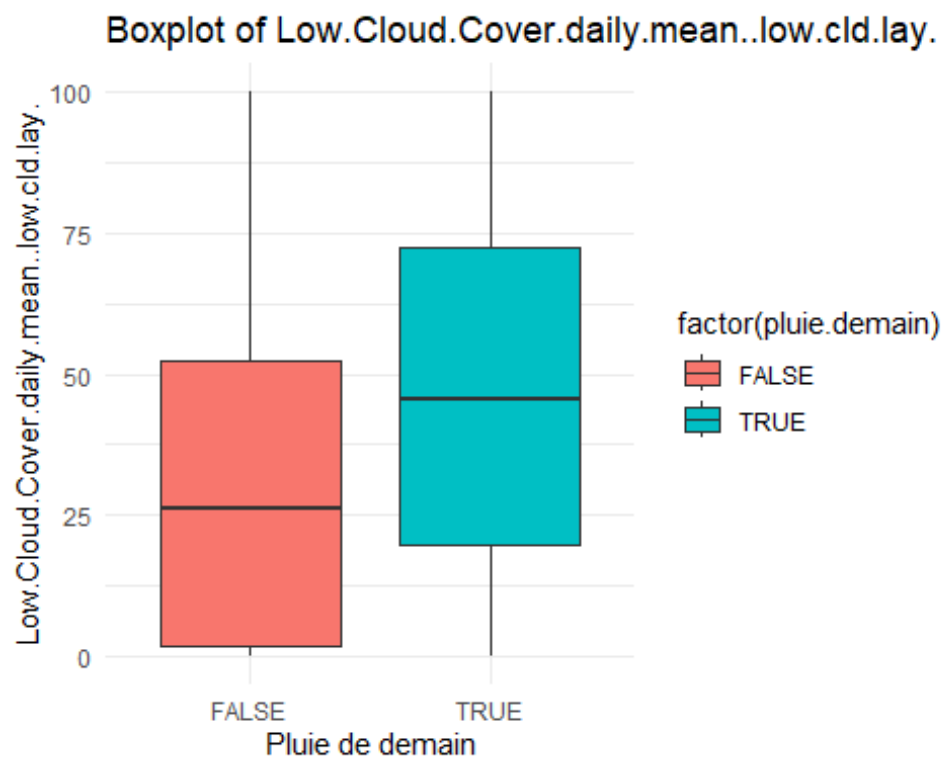


```
##  
## [[14]]
```

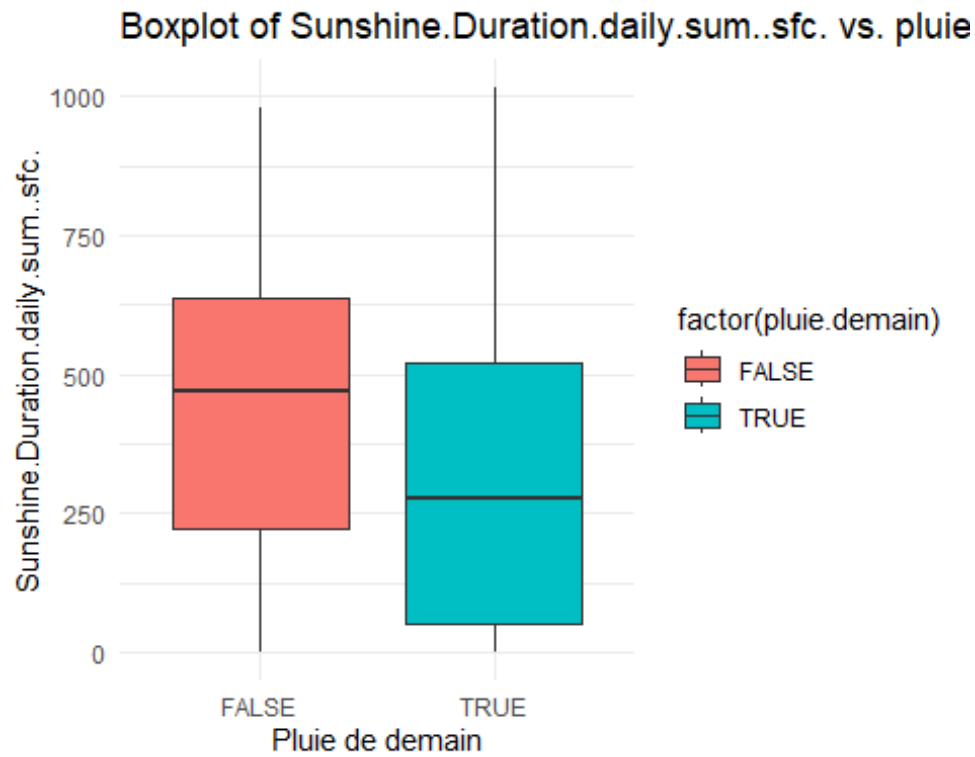
Boxplot of Medium.Cloud.Cover.daily.mean..mid.cld.la



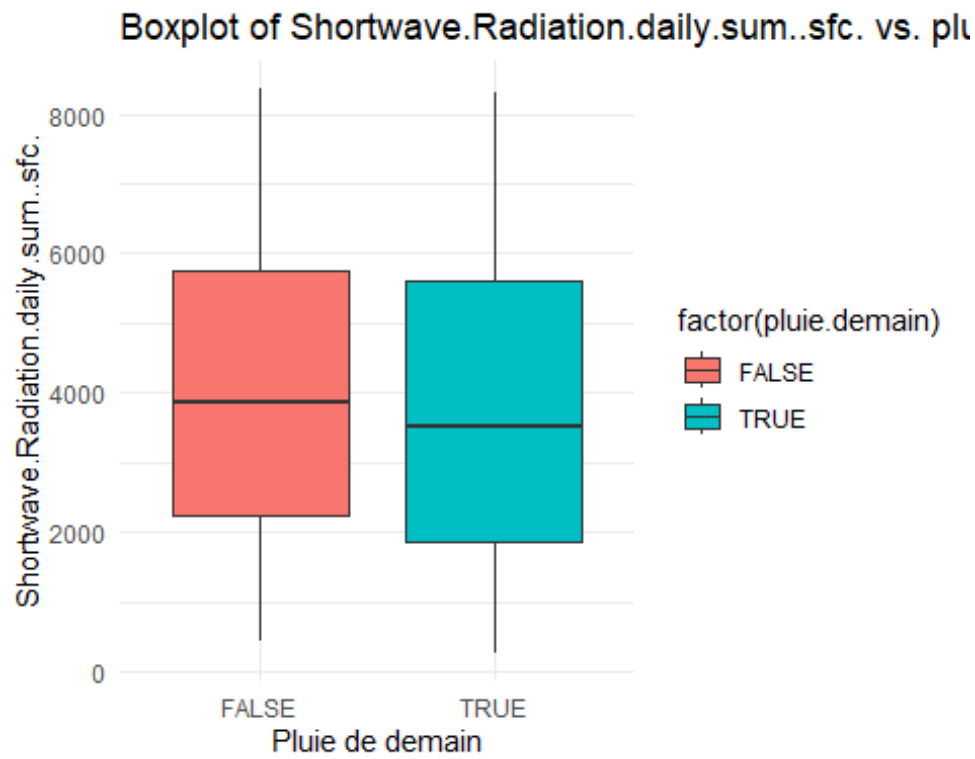
```
##  
## [[15]]
```



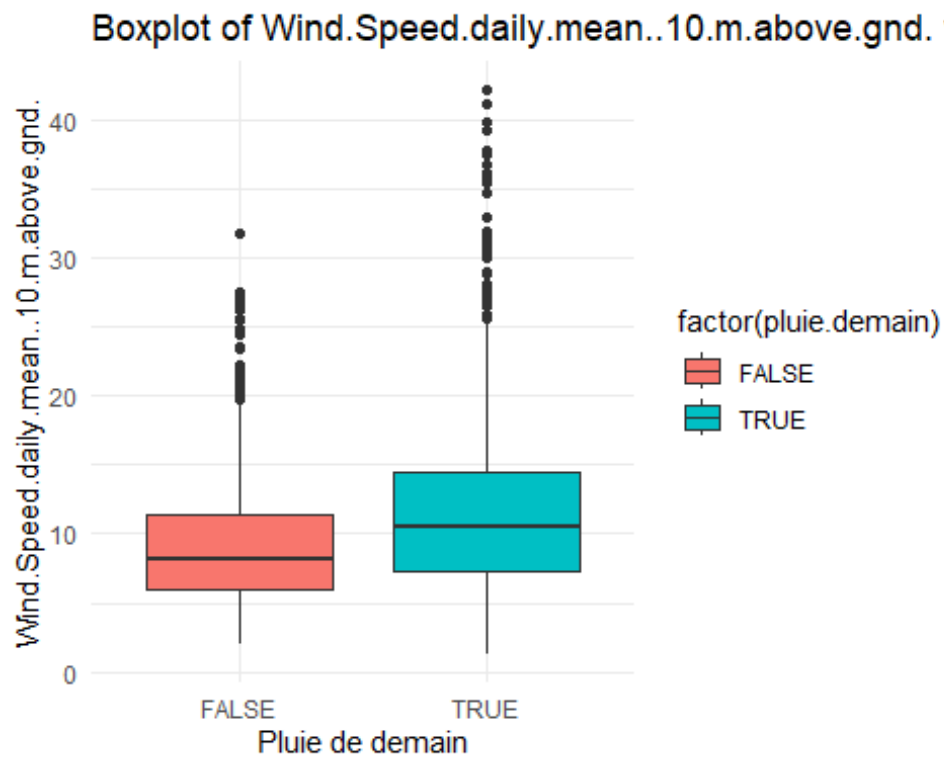
```
##  
## [[16]]
```



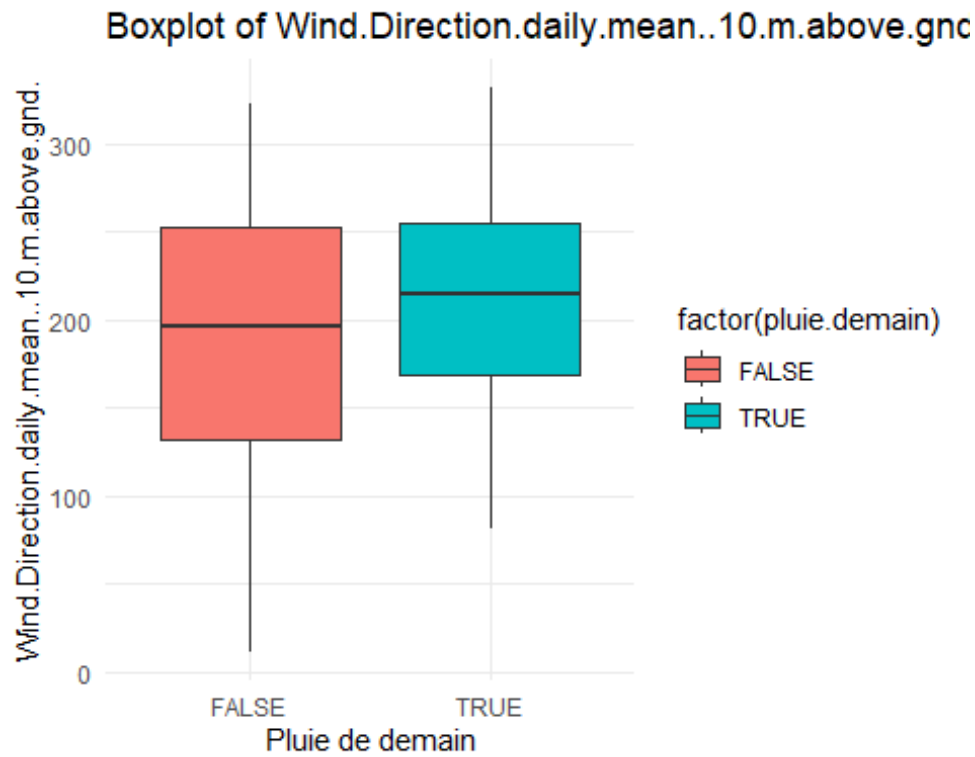
```
##  
## [[17]]
```



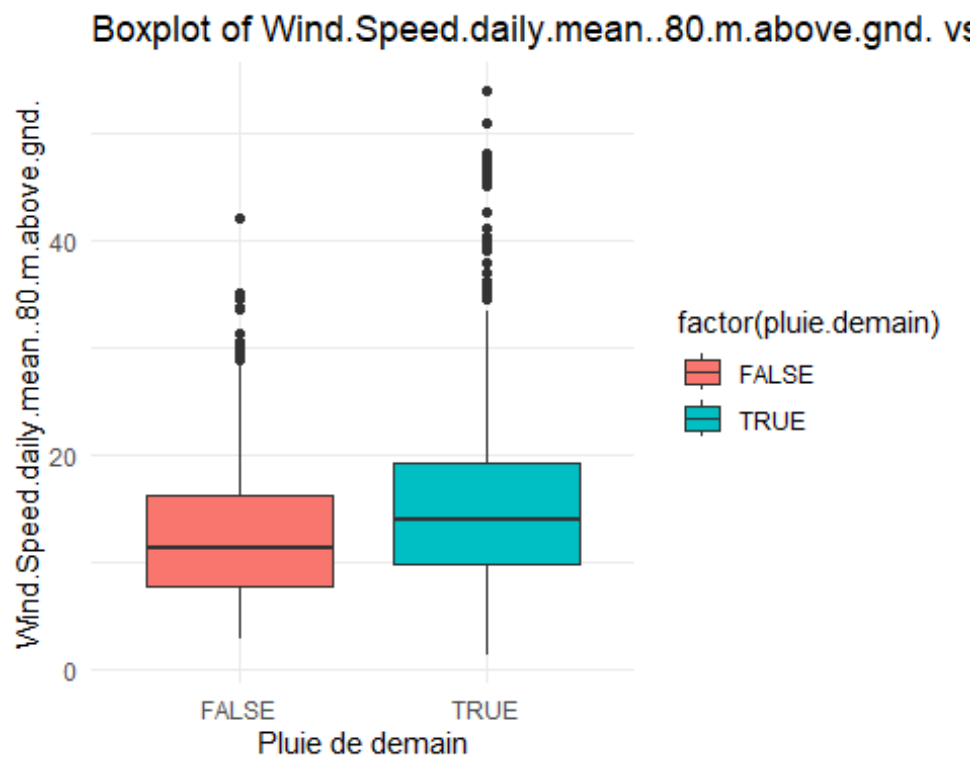
```
##  
## [[18]]
```



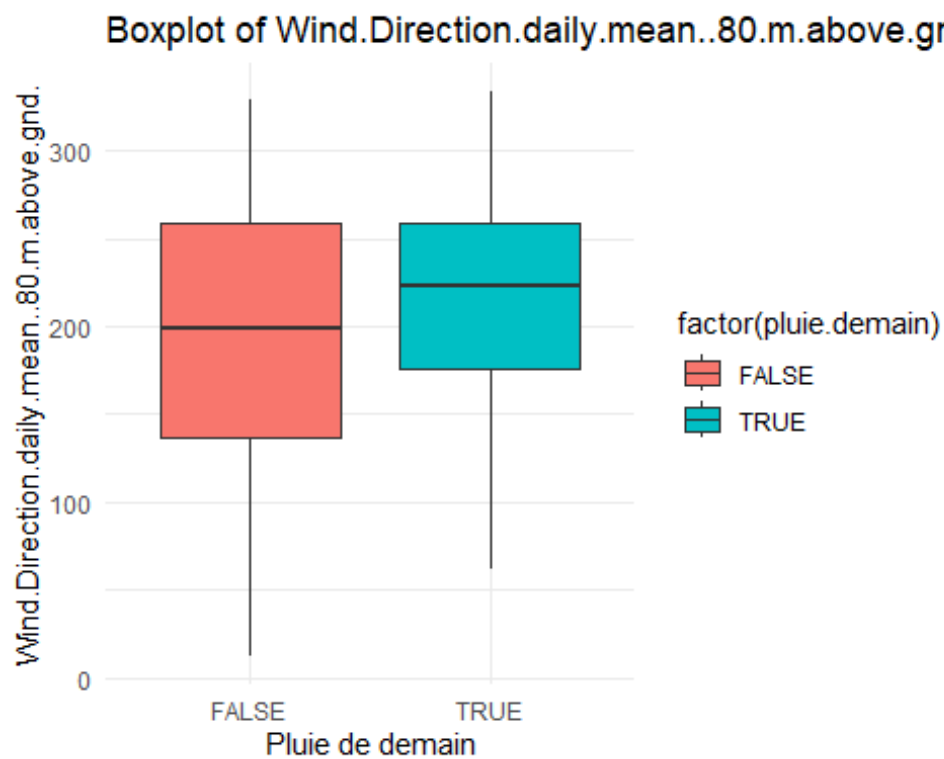
```
##  
## [[19]]
```



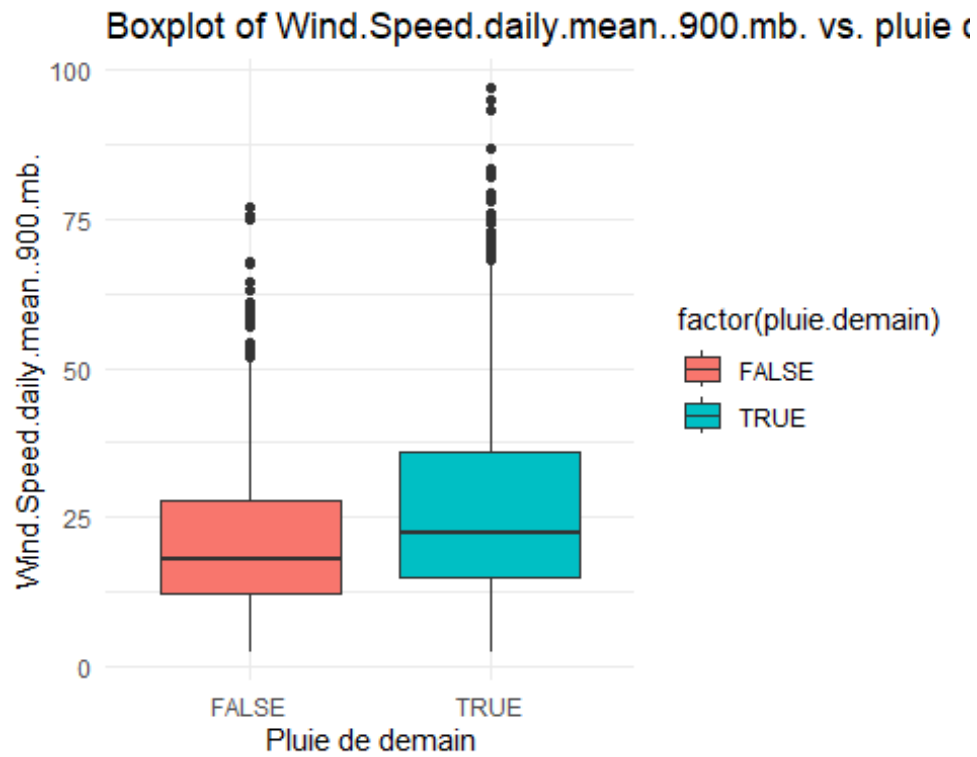
```
##  
## [[20]]
```



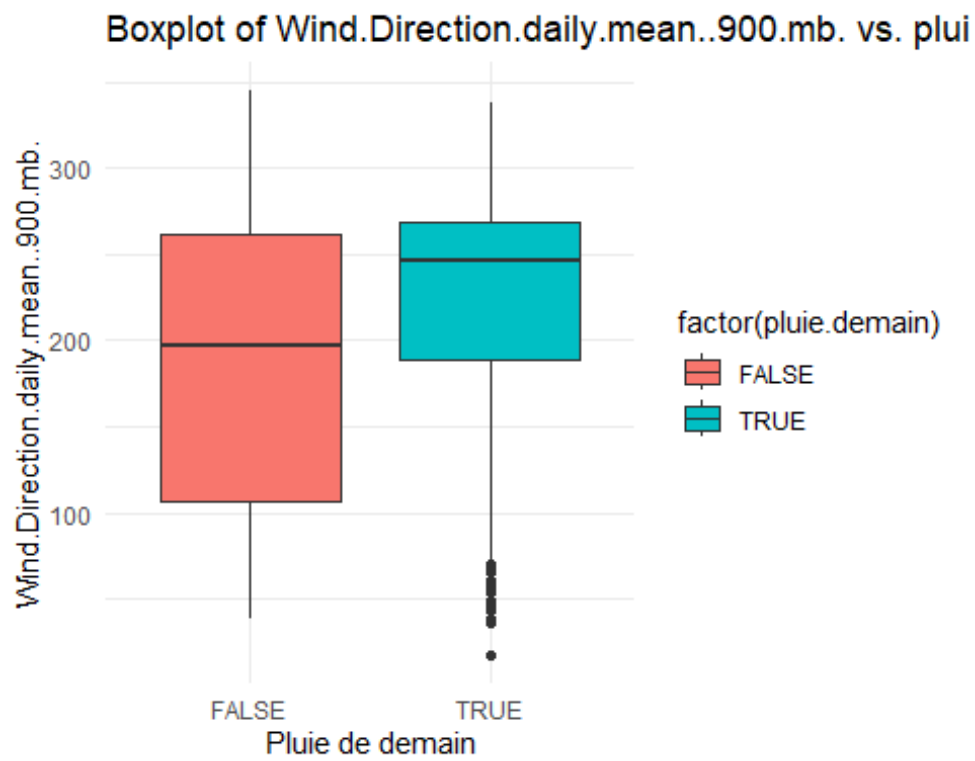
```
##  
## [[21]]
```



```
##  
## [[22]]
```

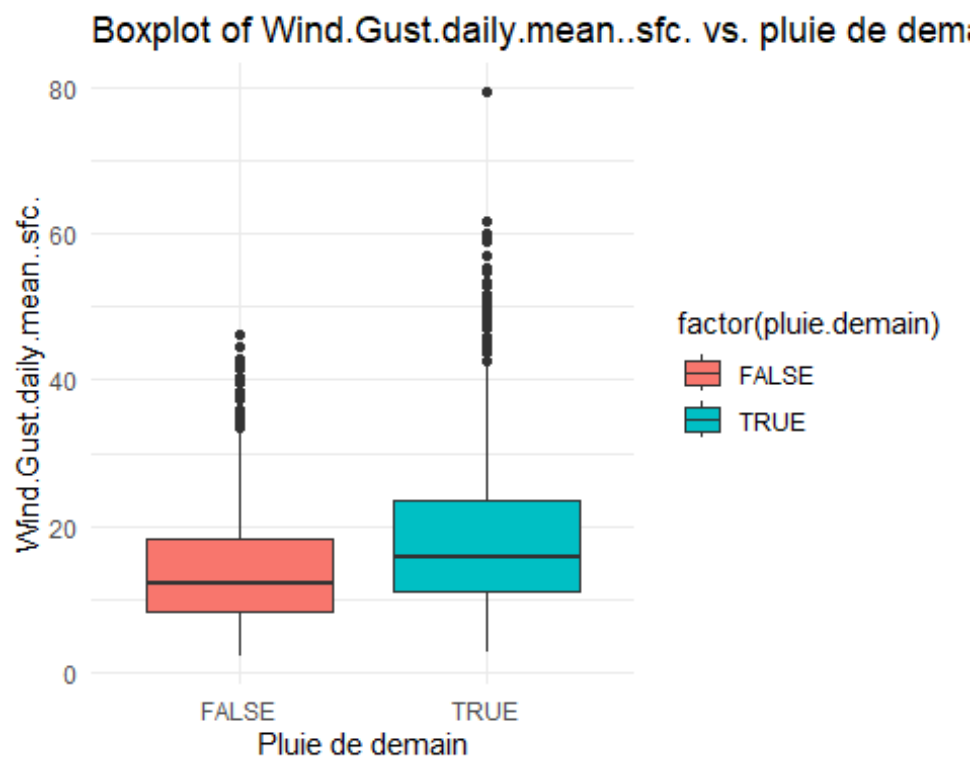


```
##  
## [[23]]
```



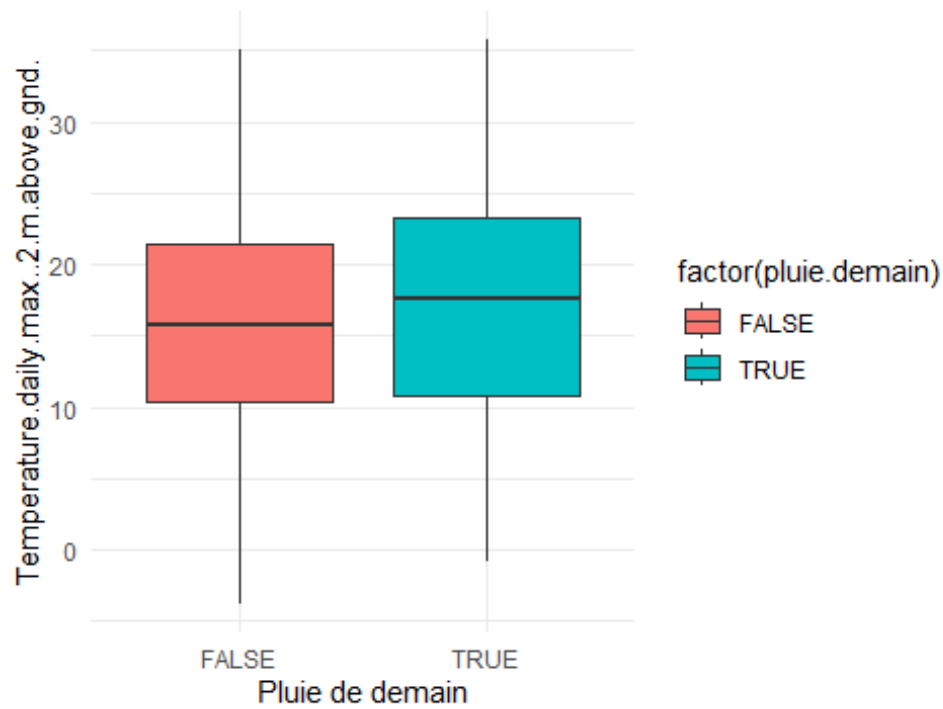


```
##  
## [[24]]
```



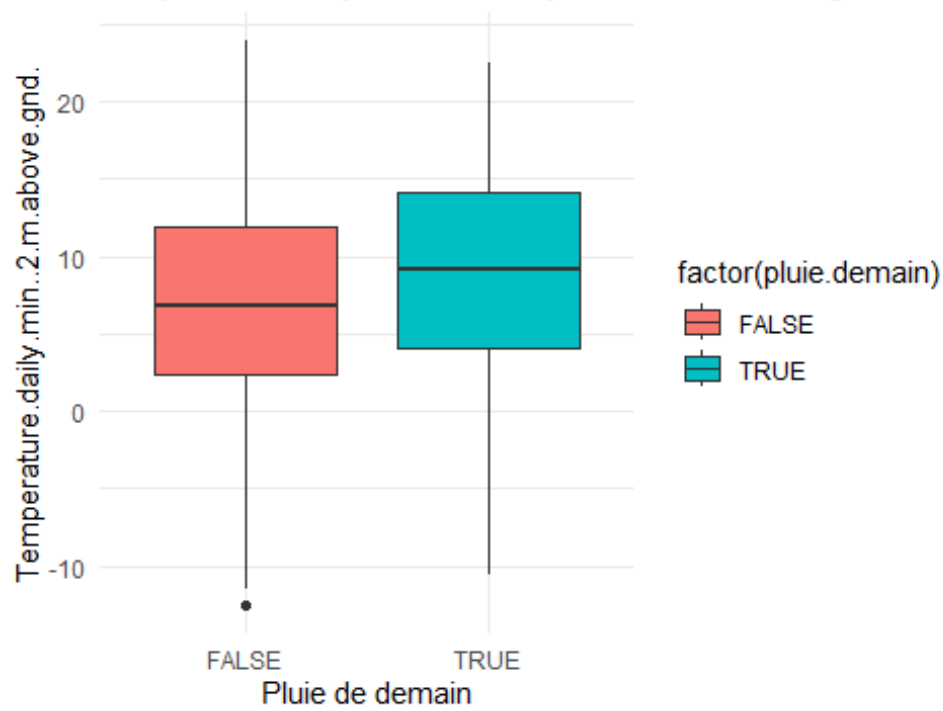
```
##  
## [[25]]
```

Boxplot of Temperature.daily.max..2.m.above.gnd. vs. |

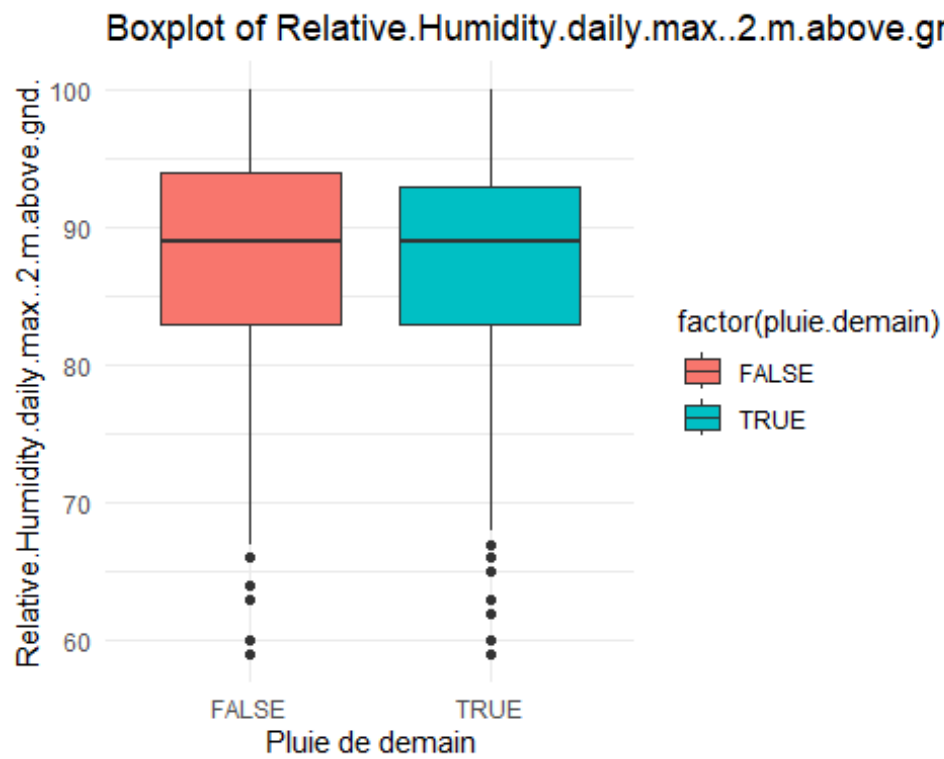


```
##  
## [[26]]
```

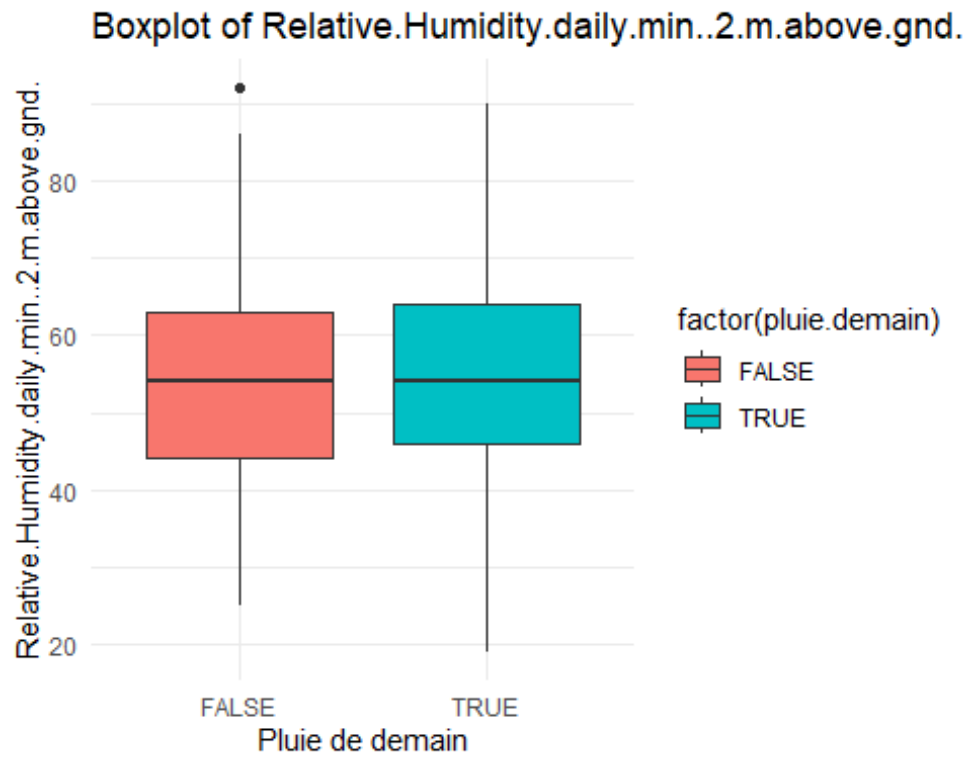
Boxplot of Temperature.daily.min..2.m.above.gnd. vs. |



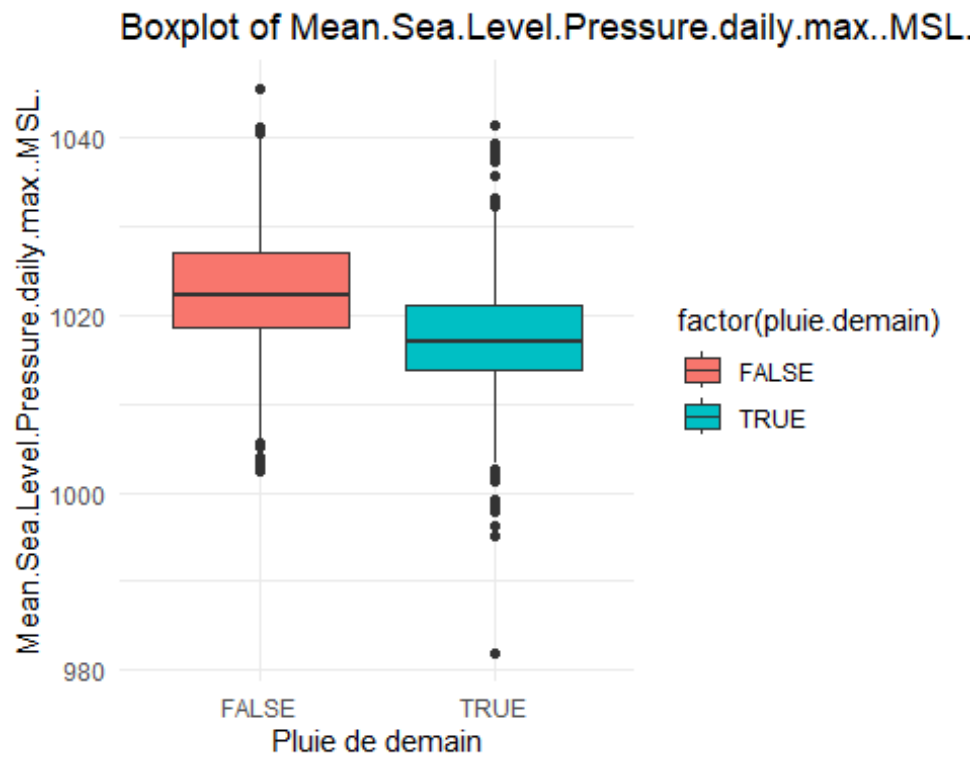
```
##  
## [[27]]
```



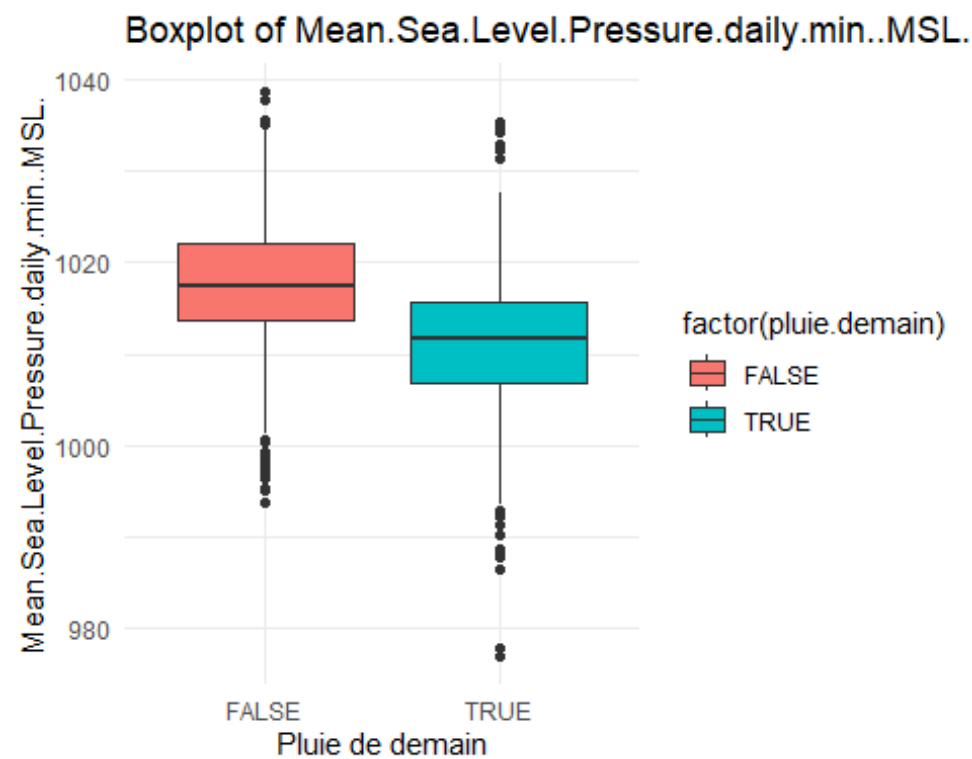
```
##  
## [[28]]
```



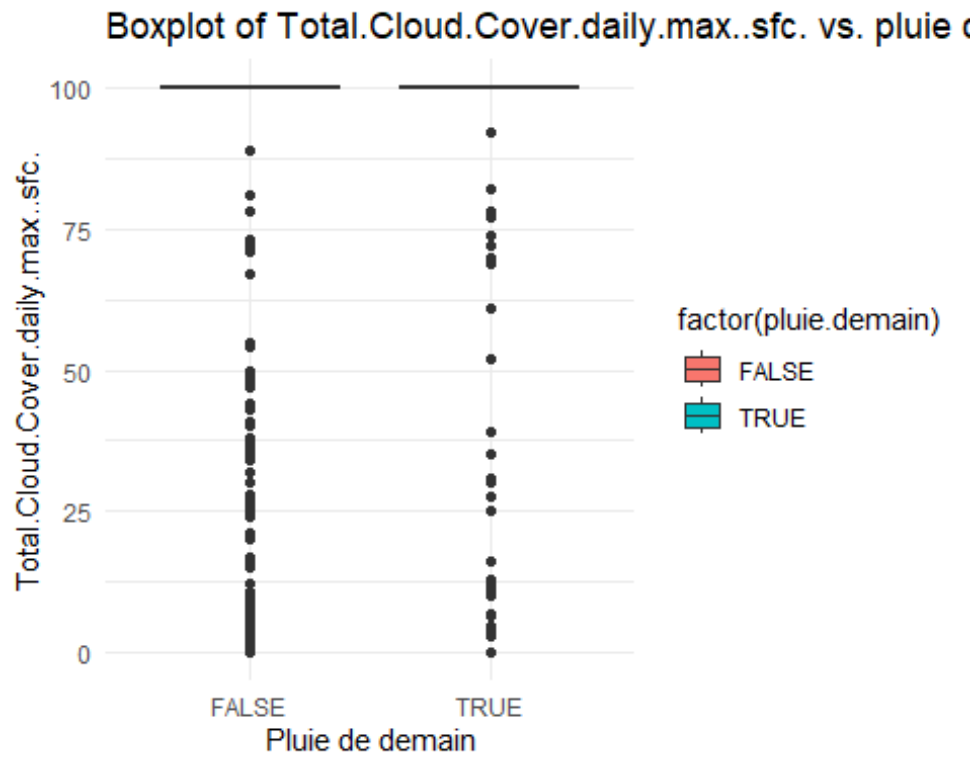
```
##  
## [[29]]
```



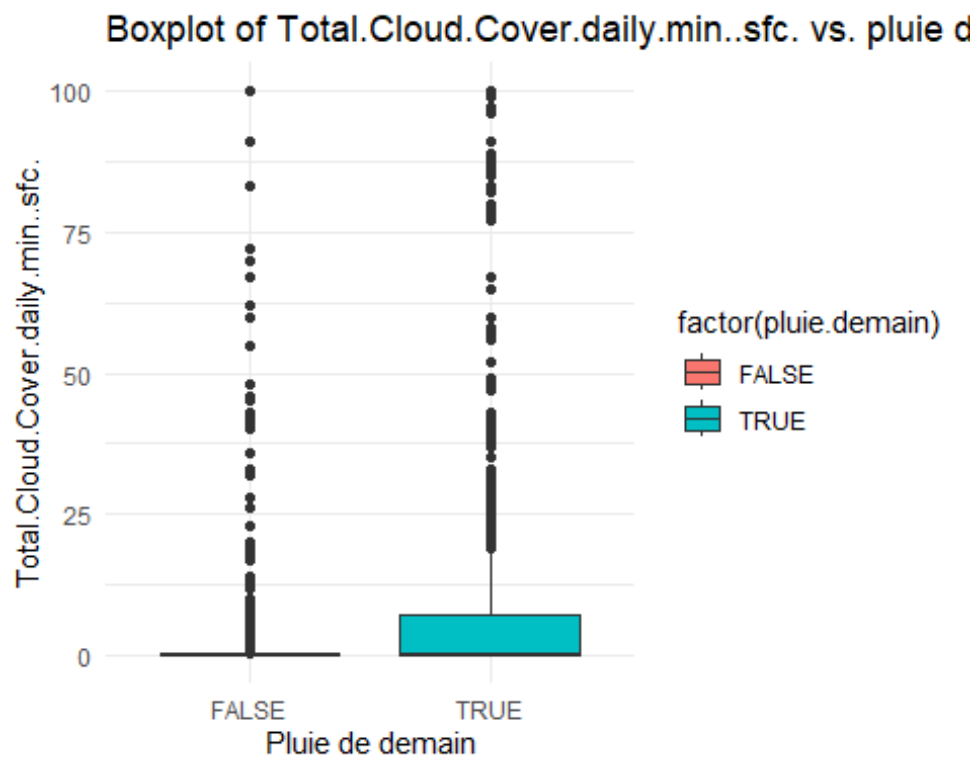
```
##  
## [[30]]
```



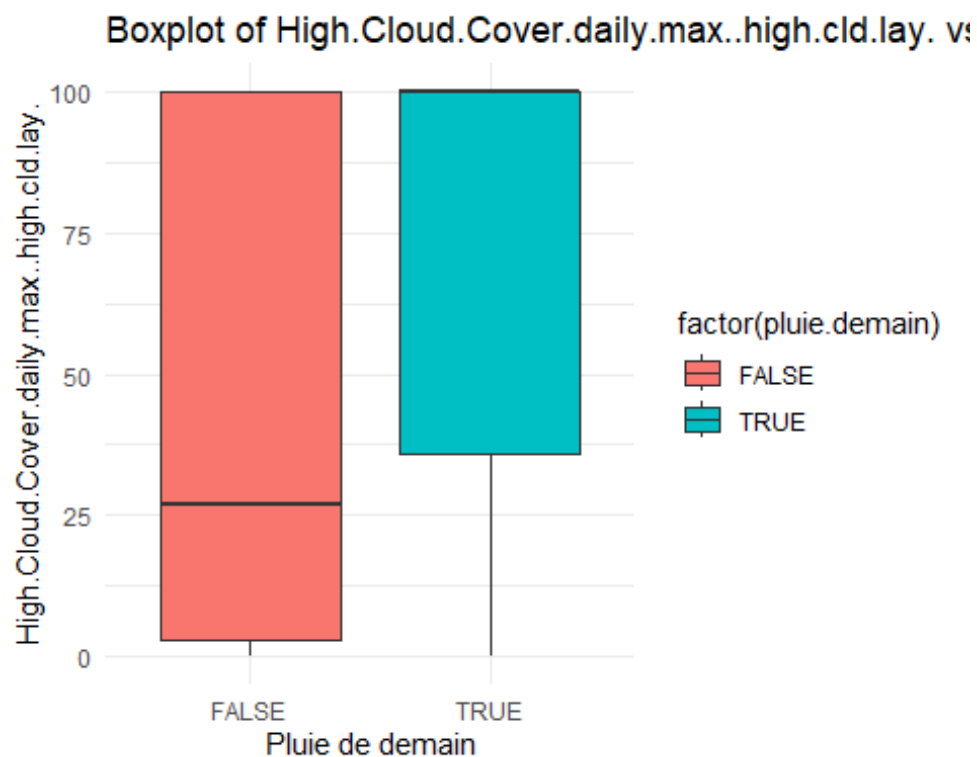
```
##  
## [[31]]
```



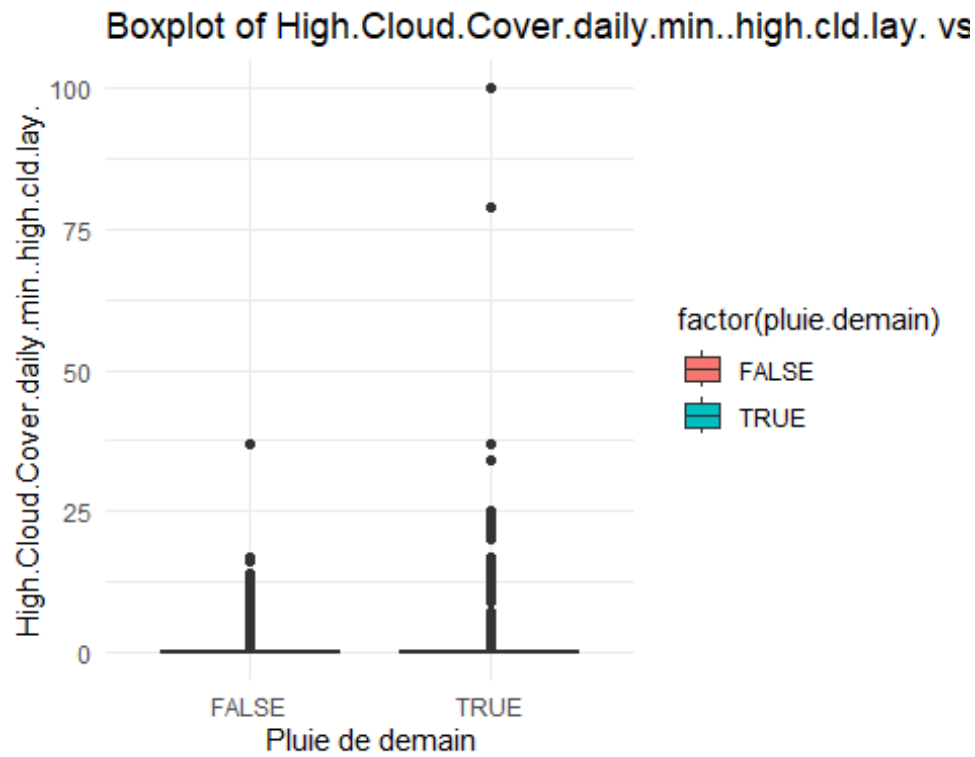
```
##  
## [[32]]
```



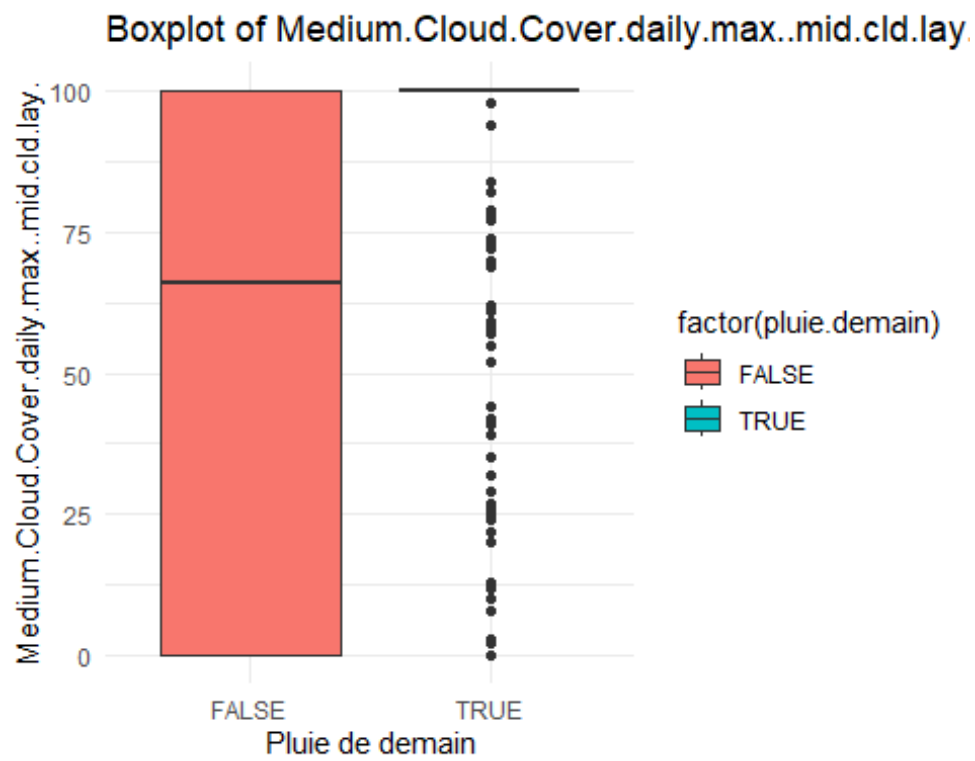
```
##  
## [[33]]
```



```
##  
## [[34]]
```

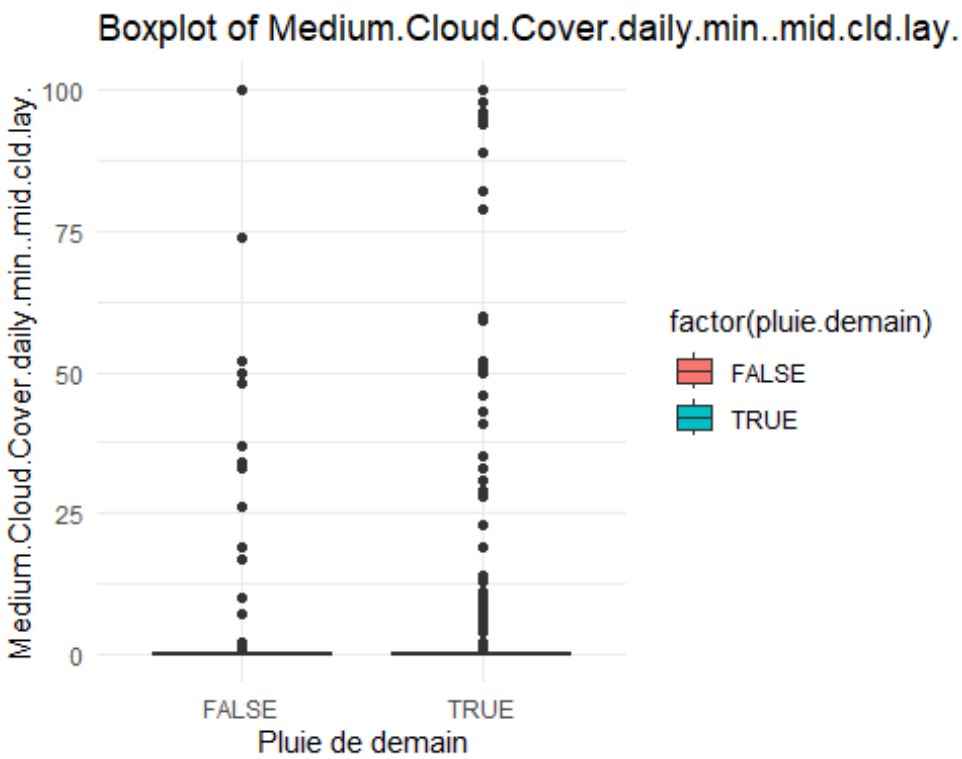


```
##  
## [[35]]
```

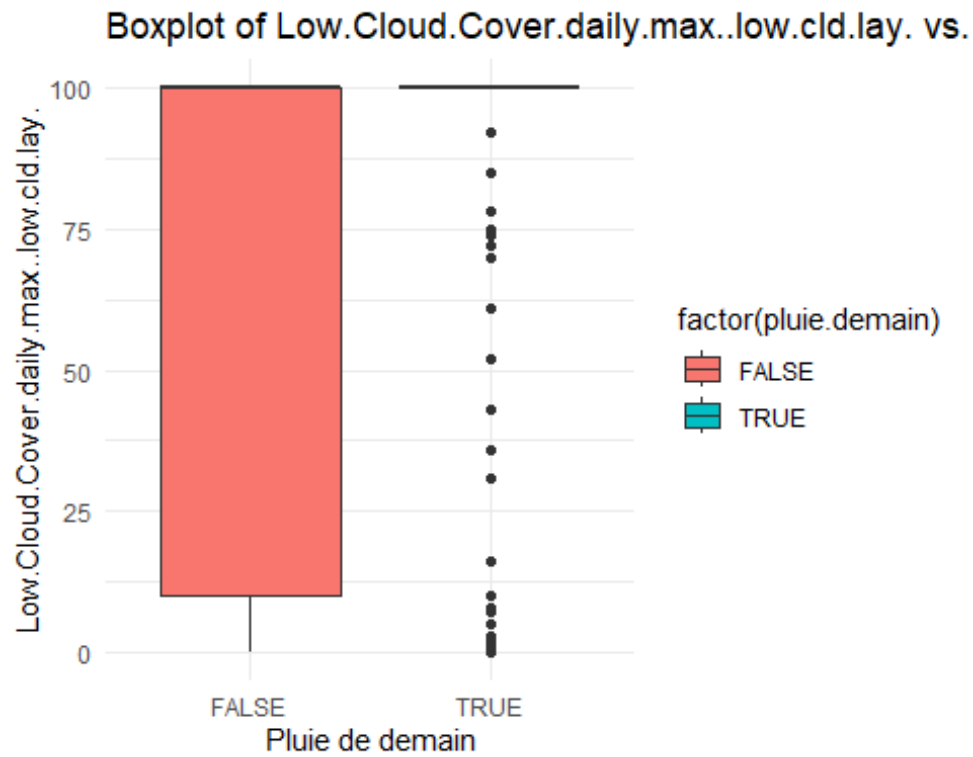




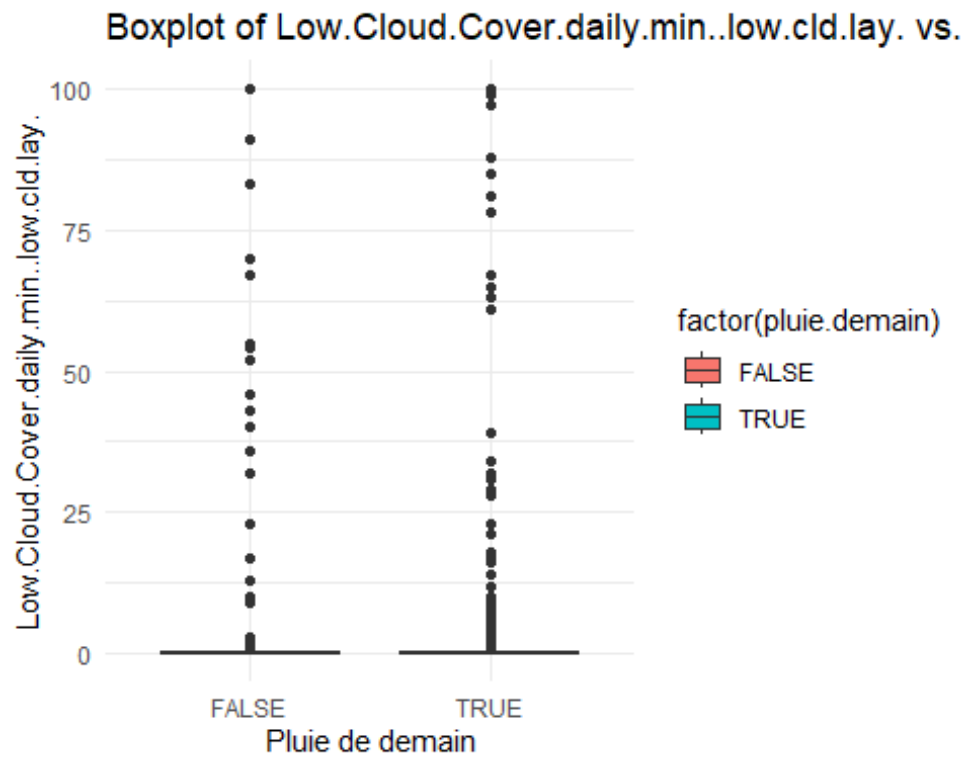
```
##  
## [[36]]
```



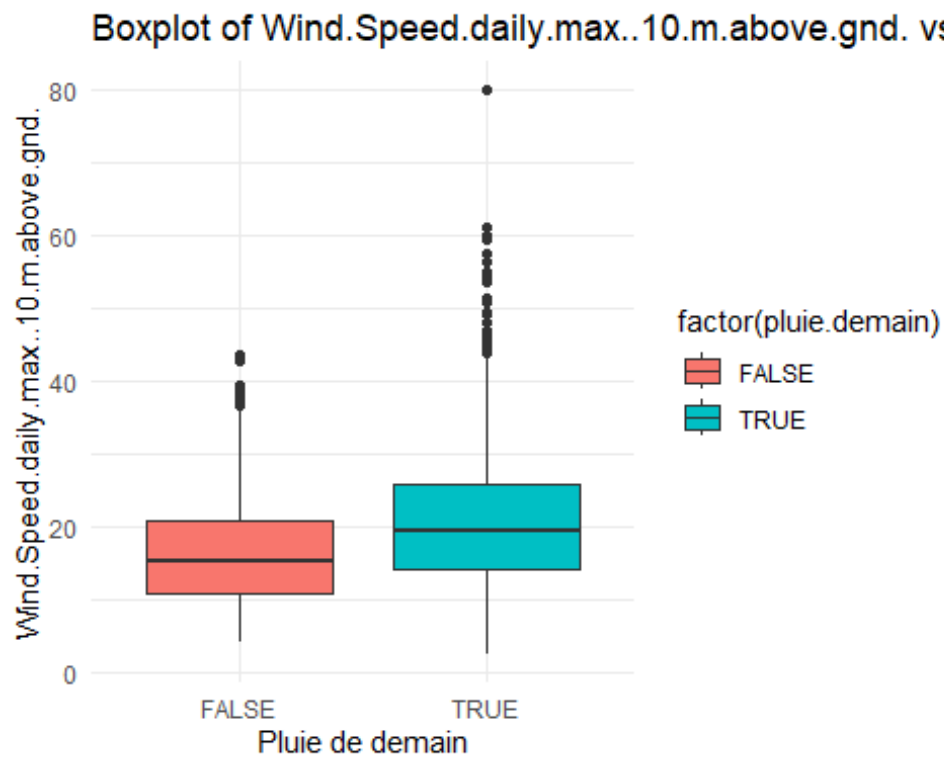
```
##  
## [[37]]
```



```
##  
## [[38]]
```

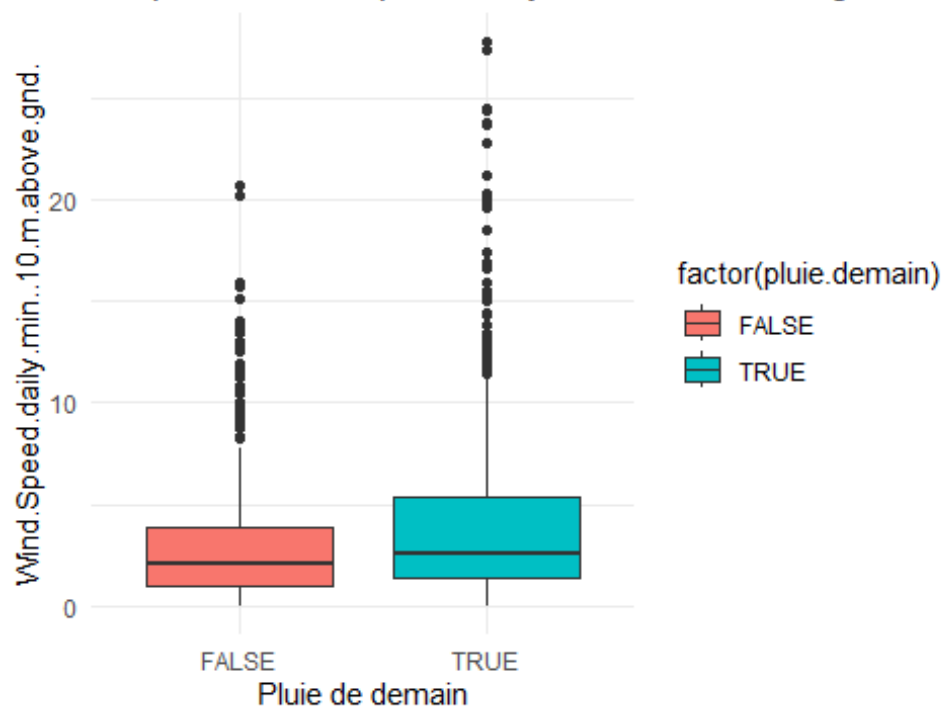


```
##  
## [[39]]
```



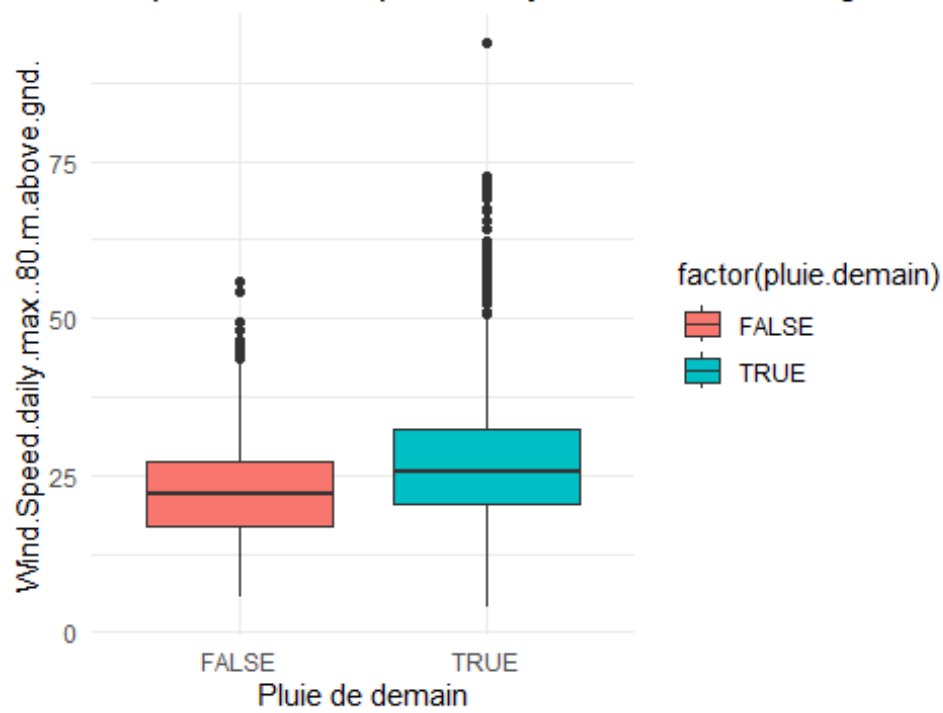
```
##  
## [[40]]
```

Boxplot of Wind.Speed.daily.min..10.m.above.gnd. vs.

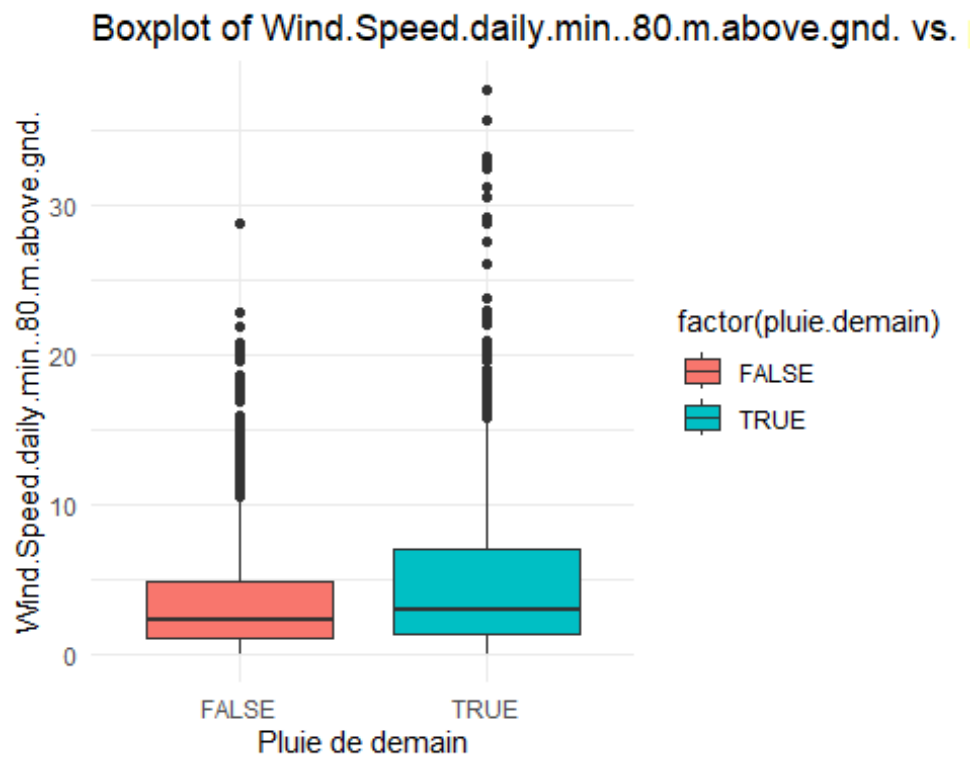


```
##  
## [[41]]
```

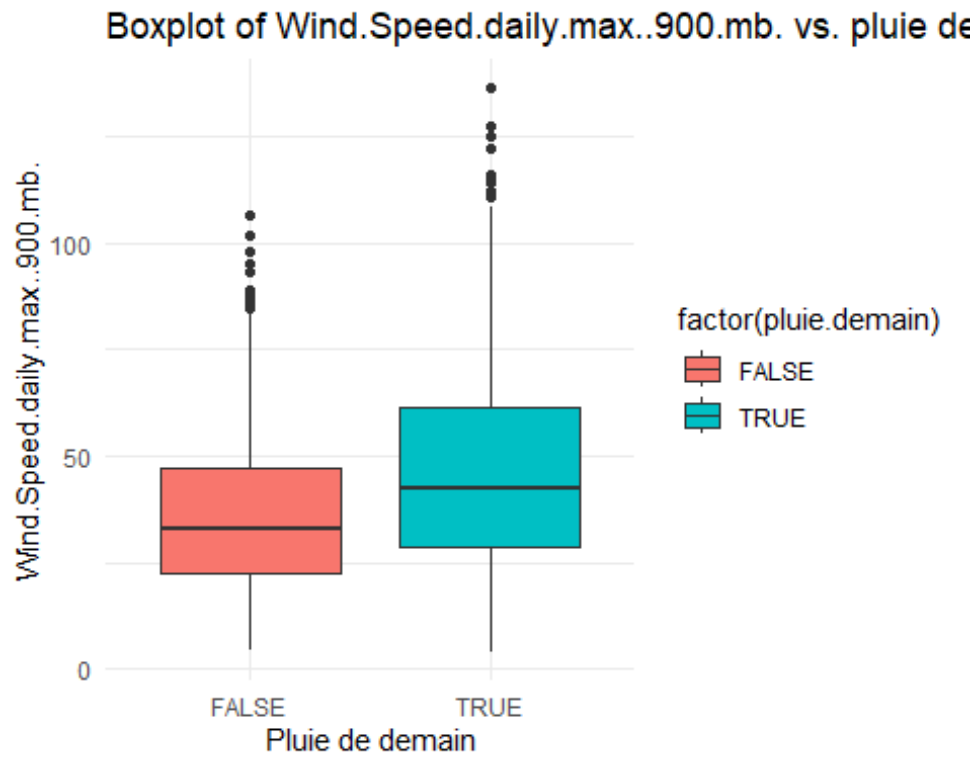
Boxplot of Wind.Speed.daily.max..80.m.above.gnd. vs.



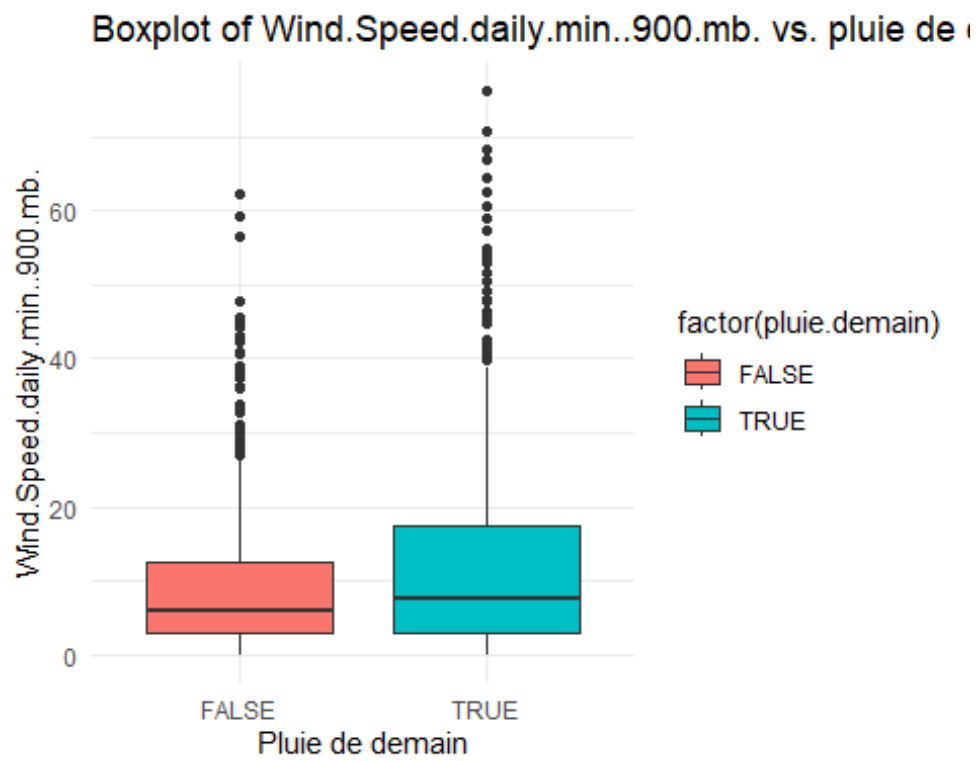
```
##  
## [[42]]
```



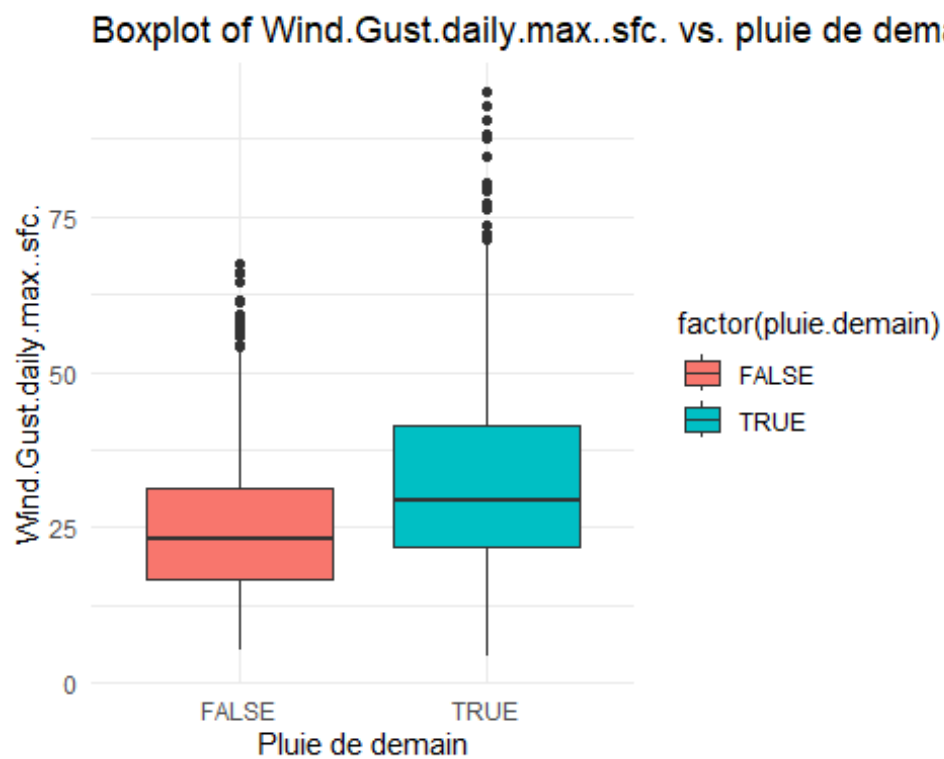
```
##  
## [[43]]
```



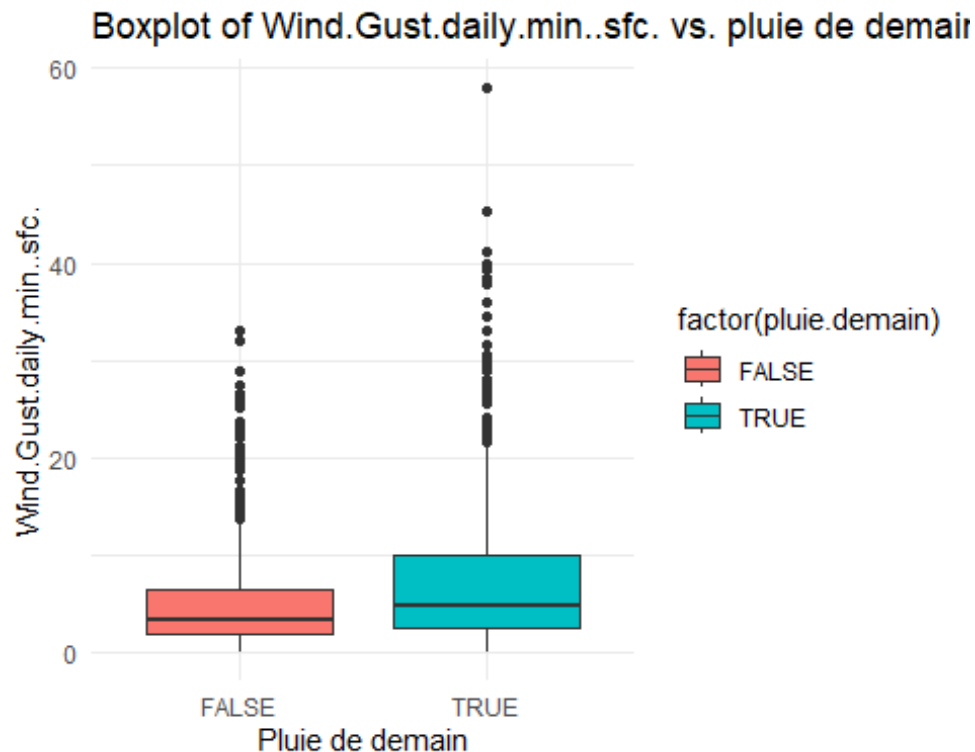
```
##  
## [[44]]
```



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



```
##  
## [[46]]
```



les box plot nous montrent qu'il n'y ait pas de valeurs aberrantes et que les données sont plus ou moins cohérentes 6- 1ere tentative GLM via la fonction : STEP ==> selection en automatique.

*# Construction du modèle initial avec toutes les variables*

```
mdr2 <- glm(pluie.demain ~
             . , data = dtn, family = binomial)
summary(mdr2)
```

##

## Call:

## glm(formula = pluie.demain ~ ., family = binomial, data = dtn)

##

## Coefficients: (2 not defined because of singularities)

##

## (Intercept)

## ...1

## Year

## Month

## Day

## Hour

## Minute

## Temperature.daily.mean..2.m.above.gnd.

## Relative.Humidity.daily.mean..2.m.above.gnd.

## Mean.Sea.Level.Pressure.daily.mean..MSL.

## Total.Precipitation.daily.sum..sfc.

## Snowfall.amount.raw.daily.sum..sfc.

## Total.Cloud.Cover.daily.mean..sfc.

## High.Cloud.Cover.daily.mean..high.cld.lay.

Estimate	Std. Error	z	value
5.031e+04	9.260e+04	0.543	
6.862e-02	1.261e-01	0.544	
-2.499e+01	4.606e+01	-0.543	
-2.107e+00	3.837e+00	-0.549	
-5.663e-02	1.260e-01	-0.449	
NA	NA	NA	
NA	NA	NA	
1.859e-01	1.641e-01	1.133	
2.011e-02	3.246e-02	0.620	
5.096e-01	1.394e-01	3.655	
2.660e-02	2.811e-02	0.946	
-2.973e-01	2.366e-01	-1.256	
1.192e-02	1.205e-02	0.989	
-3.216e-03	6.815e-03	-0.472	



## Medium.Cloud.Cover.daily.mean..mid.cld.lay.	5.727e-03	6.698e-03	0.855
## Low.Cloud.Cover.daily.mean..low.cld.lay.	-3.823e-03	8.162e-03	-0.468
## Sunshine.Duration.daily.sum..sfc.	4.403e-04	8.880e-04	0.496
## Shortwave.Radiation.daily.sum..sfc.	4.338e-05	1.021e-04	0.425
## Wind.Speed.daily.mean..10.m.above.gnd.	-4.846e-02	9.718e-02	-0.499
## Wind.Direction.daily.mean..10.m.above.gnd.	5.797e-03	5.781e-03	1.003
## Wind.Speed.daily.mean..80.m.above.gnd.	-9.287e-02	6.956e-02	-1.335
## Wind.Direction.daily.mean..80.m.above.gnd.	-9.606e-03	5.970e-03	-1.609
## Wind.Speed.daily.mean..900.mb.	1.883e-02	2.598e-02	0.725
## Wind.Direction.daily.mean..900.mb.	5.409e-03	1.451e-03	3.727
## Wind.Gust.daily.mean..sfc.	1.882e-02	3.697e-02	0.509
## Temperature.daily.max..2.m.above.gnd.	-1.067e-02	9.595e-02	-0.111
## Temperature.daily.min..2.m.above.gnd.	-1.335e-01	8.654e-02	-1.542
## Relative.Humidity.daily.max..2.m.above.gnd.	-2.289e-04	2.063e-02	-0.011
## Relative.Humidity.daily.min..2.m.above.gnd.	-7.114e-03	1.858e-02	-0.383
## Mean.Sea.Level.Pressure.daily.max..MSL.	-2.567e-01	7.518e-02	-3.414
## Mean.Sea.Level.Pressure.daily.min..MSL.	-3.196e-01	7.564e-02	-4.226
## Total.Cloud.Cover.daily.max..sfc.	3.459e-03	4.869e-03	0.711
## Total.Cloud.Cover.daily.min..sfc.	7.779e-03	6.263e-03	1.242
## High.Cloud.Cover.daily.max..high.cld.lay.	3.460e-03	2.888e-03	1.198
## High.Cloud.Cover.daily.min..high.cld.lay.	6.125e-03	2.087e-02	0.293
## Medium.Cloud.Cover.daily.max..mid.cld.lay.	6.164e-03	3.165e-03	1.947
## Medium.Cloud.Cover.daily.min..mid.cld.lay.	-5.117e-03	9.483e-03	-0.540
## Low.Cloud.Cover.daily.max..low.cld.lay.	2.962e-03	3.401e-03	0.871
## Low.Cloud.Cover.daily.min..low.cld.lay.	2.872e-04	7.030e-03	0.041
## Wind.Speed.daily.max..10.m.above.gnd.	5.599e-02	3.451e-02	1.622
## Wind.Speed.daily.min..10.m.above.gnd.	1.699e-01	6.420e-02	2.646
## Wind.Speed.daily.max..80.m.above.gnd.	4.034e-03	2.846e-02	0.142
## Wind.Speed.daily.min..80.m.above.gnd.	-5.365e-02	4.222e-02	-1.271
## Wind.Speed.daily.max..900.mb.	-1.346e-02	1.214e-02	-1.109
## Wind.Speed.daily.min..900.mb.	-4.779e-03	1.917e-02	-0.249
## Wind.Gust.daily.max..sfc.	2.209e-02	1.736e-02	1.272
## Wind.Gust.daily.min..sfc.	5.350e-03	2.804e-02	0.191
##	Pr(> z )		
## (Intercept)	0.586875		
## ...1	0.586307		
## Year	0.587341		
## Month	0.582985		
## Day	0.653079		
## Hour	NA		
## Minute	NA		
## Temperature.daily.mean..2.m.above.gnd.	0.257212		
## Relative.Humidity.daily.mean..2.m.above.gnd.	0.535569		
## Mean.Sea.Level.Pressure.daily.mean..MSL.	0.000257	***	
## Total.Precipitation.daily.sum..sfc.	0.344021		
## Snowfall.amount.raw.daily.sum..sfc.	0.208975		
## Total.Cloud.Cover.daily.mean..sfc.	0.322842		
## High.Cloud.Cover.daily.mean..high.cld.lay.	0.637003		
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.	0.392559		
## Low.Cloud.Cover.daily.mean..low.cld.lay.	0.639493		

```

## Sunshine.Duration.daily.sum..sfc.          0.620036
## Shortwave.Radiation.daily.sum..sfc.         0.670887
## Wind.Speed.daily.mean..10.m.above.gnd.      0.618033
## Wind.Direction.daily.mean..10.m.above.gnd.  0.315988
## Wind.Speed.daily.mean..80.m.above.gnd.      0.181842
## Wind.Direction.daily.mean..80.m.above.gnd.  0.107638
## Wind.Speed.daily.mean..900.mb.             0.468512
## Wind.Direction.daily.mean..900.mb.          0.000194 ***
## Wind.Gust.daily.mean..sfc.                  0.610701
## Temperature.daily.max..2.m.above.gnd.       0.911471
## Temperature.daily.min..2.m.above.gnd.       0.122976
## Relative.Humidity.daily.max..2.m.above.gnd. 0.991148
## Relative.Humidity.daily.min..2.m.above.gnd. 0.701853
## Mean.Sea.Level.Pressure.daily.max..MSL.     0.000640 ***
## Mean.Sea.Level.Pressure.daily.min..MSL.     2.38e-05 ***
## Total.Cloud.Cover.daily.max..sfc.           0.477369
## Total.Cloud.Cover.daily.min..sfc.           0.214165
## High.Cloud.Cover.daily.max..high.cld.lay.   0.230837
## High.Cloud.Cover.daily.min..high.cld.lay.   0.769159
## Medium.Cloud.Cover.daily.max..mid.cld.lay.  0.051483 .
## Medium.Cloud.Cover.daily.min..mid.cld.lay.  0.589517
## Low.Cloud.Cover.daily.max..low.cld.lay.     0.383830
## Low.Cloud.Cover.daily.min..low.cld.lay.     0.967413
## Wind.Speed.daily.max..10.m.above.gnd.       0.104752
## Wind.Speed.daily.min..10.m.above.gnd.       0.008156 **
## Wind.Speed.daily.max..80.m.above.gnd.       0.887292
## Wind.Speed.daily.min..80.m.above.gnd.       0.203813
## Wind.Speed.daily.max..900.mb.               0.267626
## Wind.Speed.daily.min..900.mb.               0.803111
## Wind.Gust.daily.max..sfc.                   0.203229
## Wind.Gust.daily.min..sfc.                   0.848666
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 1635.4  on 1179  degrees of freedom
## Residual deviance: 1232.4  on 1135  degrees of freedom
## AIC: 1322.4
##
## Number of Fisher Scoring iterations: 5

p4 = step(mdr2)

## Start:  AIC=1322.4
## plue.demain ~ ...1 + Year + Month + Day + Hour + Minute +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +

```

```

Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##      Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.max..2.m.above.gnd. +
##      Temperature.daily.min..2.m.above.gnd. +
Relative.Humidity.daily.max..2.m.above.gnd. +
##      Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      High.Cloud.Cover.daily.min..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##      Low.Cloud.Cover.daily.min..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.max..80.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Speed.daily.min..900.mb. + Wind.Gust.daily.max..sfc. +
##      Wind.Gust.daily.min..sfc.
##
##
## Step:  AIC=1322.4
## pluie.demain ~ ...1 + Year + Month + Day + Hour +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##      Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +

```

```

##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.max..2.m.above.gnd. +
##      Temperature.daily.min..2.m.above.gnd. +
Relative.Humidity.daily.max..2.m.above.gnd. +
##      Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      High.Cloud.Cover.daily.min..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##      Low.Cloud.Cover.daily.min..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.max..80.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Speed.daily.min..900.mb. + Wind.Gust.daily.max..sfc. +
##      Wind.Gust.daily.min..sfc.
##
##
## Step:  AIC=1322.4
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##      Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.max..2.m.above.gnd. +
##      Temperature.daily.min..2.m.above.gnd. +
Relative.Humidity.daily.max..2.m.above.gnd. +
##      Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +

```

```

Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      High.Cloud.Cover.daily.min..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##      Low.Cloud.Cover.daily.min..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.max..80.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Speed.daily.min..900.mb. + Wind.Gust.daily.max..sfc. +
##      Wind.Gust.daily.min..sfc.
##
##
##
##      Df Deviance      AIC
## - Relative.Humidity.daily.max..2.m.above.gnd.      1  1232.4 1320.4
## - Low.Cloud.Cover.daily.min..low.cld.lay.          1  1232.4 1320.4
## - Temperature.daily.max..2.m.above.gnd.            1  1232.4 1320.4
## - Wind.Speed.daily.max..80.m.above.gnd.             1  1232.4 1320.4
## - Wind.Gust.daily.min..sfc.                        1  1232.4 1320.4
## - Wind.Speed.daily.min..900.mb.                    1  1232.5 1320.5
## - High.Cloud.Cover.daily.min..high.cld.lay.        1  1232.5 1320.5
## - Relative.Humidity.daily.min..2.m.above.gnd.       1  1232.5 1320.5
## - Shortwave.Radiation.daily.sum..sfc.              1  1232.6 1320.6
## - Day                                               1  1232.6 1320.6
## - Low.Cloud.Cover.daily.mean..low.cld.lay.         1  1232.6 1320.6
## - High.Cloud.Cover.daily.mean..high.cld.lay.       1  1232.6 1320.6
## - Sunshine.Duration.daily.sum..sfc.                1  1232.7 1320.7
## - Wind.Speed.daily.mean..10.m.above.gnd.           1  1232.7 1320.7
## - Wind.Gust.daily.mean..sfc.                      1  1232.7 1320.7
## - Medium.Cloud.Cover.daily.min..mid.cld.lay.       1  1232.7 1320.7
## - Year                                              1  1232.7 1320.7
## - ...1                                             1  1232.7 1320.7
## - Month                                            1  1232.7 1320.7
## - Relative.Humidity.daily.mean..2.m.above.gnd.     1  1232.8 1320.8
## - Total.Cloud.Cover.daily.max..sfc.                1  1232.9 1320.9
## - Wind.Speed.daily.mean..900.mb.                   1  1232.9 1320.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.     1  1233.1 1321.1
## - Low.Cloud.Cover.daily.max..low.cld.lay.         1  1233.2 1321.2
## - Total.Precipitation.daily.sum..sfc.              1  1233.3 1321.3
## - Total.Cloud.Cover.daily.mean..sfc.              1  1233.4 1321.4
## - Wind.Direction.daily.mean..10.m.above.gnd.      1  1233.4 1321.4
## - Wind.Speed.daily.max..900.mb.                   1  1233.6 1321.6
## - Temperature.daily.mean..2.m.above.gnd.          1  1233.7 1321.7
## - High.Cloud.Cover.daily.max..high.cld.lay.       1  1233.8 1321.8
## - Wind.Speed.daily.min..80.m.above.gnd.           1  1234.0 1322.0
## - Total.Cloud.Cover.daily.min..sfc.               1  1234.0 1322.0
## - Wind.Gust.daily.max..sfc.                       1  1234.0 1322.0

```

```

## - Wind.Speed.daily.mean..80.m.above.gnd.      1  1234.2 1322.2
## - Snowfall.amount.raw.daily.sum..sfc.          1  1234.3 1322.3
## <none>                                         1232.4 1322.4
## - Temperature.daily.min..2.m.above.gnd.        1  1234.8 1322.8
## - Wind.Direction.daily.mean..80.m.above.gnd.    1  1235.0 1323.0
## - Wind.Speed.daily.max..10.m.above.gnd.         1  1235.0 1323.0
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.    1  1236.2 1324.2
## - Wind.Speed.daily.min..10.m.above.gnd.         1  1239.5 1327.5
## - Mean.Sea.Level.Pressure.daily.max..MSL.        1  1244.7 1332.7
## - Wind.Direction.daily.mean..900.mb.           1  1246.7 1334.7
## - Mean.Sea.Level.Pressure.daily.mean..MSL.       1  1247.0 1335.0
## - Mean.Sea.Level.Pressure.daily.min..MSL.       1  1252.9 1340.9
##
## Step:  AIC=1320.4
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
##     Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##     Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##     Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
##     Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
##     Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##     Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##     Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##     Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##     Wind.Gust.daily.mean..sfc. + Temperature.daily.max..2.m.above.gnd. +
##     Temperature.daily.min..2.m.above.gnd. +
Relative.Humidity.daily.min..2.m.above.gnd. +
##     Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
##     Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
##     High.Cloud.Cover.daily.max..high.cld.lay. +
High.Cloud.Cover.daily.min..high.cld.lay. +
##     Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Medium.Cloud.Cover.daily.min..mid.cld.lay. +
##     Low.Cloud.Cover.daily.max..low.cld.lay. +
Low.Cloud.Cover.daily.min..low.cld.lay. +
##     Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##     Wind.Speed.daily.max..80.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
##     Wind.Speed.daily.max..900.mb. + Wind.Speed.daily.min..900.mb. +
##     Wind.Gust.daily.max..sfc. + Wind.Gust.daily.min..sfc.

```

```

##
##
## - Low.Cloud.Cover.daily.min..low.cld.lay.      1  1232.4 1318.4
## - Temperature.daily.max..2.m.above.gnd.        1  1232.4 1318.4
## - Wind.Speed.daily.max..80.m.above.gnd.         1  1232.4 1318.4
## - Wind.Gust.daily.min..sfc.                     1  1232.4 1318.4
## - Wind.Speed.daily.min..900.mb.                 1  1232.5 1318.5
## - High.Cloud.Cover.daily.min..high.cld.lay.     1  1232.5 1318.5
## - Shortwave.Radiation.daily.sum..sfc.            1  1232.6 1318.6
## - Relative.Humidity.daily.min..2.m.above.gnd.   1  1232.6 1318.6
## - Day                                             1  1232.6 1318.6
## - Low.Cloud.Cover.daily.mean..low.cld.lay.      1  1232.6 1318.6
## - High.Cloud.Cover.daily.mean..high.cld.lay.    1  1232.6 1318.6
## - Sunshine.Duration.daily.sum..sfc.             1  1232.7 1318.7
## - Wind.Speed.daily.mean..10.m.above.gnd.        1  1232.7 1318.7
## - Wind.Gust.daily.mean..sfc.                    1  1232.7 1318.7
## - Medium.Cloud.Cover.daily.min..mid.cld.lay.    1  1232.7 1318.7
## - Year                                            1  1232.7 1318.7
## - ...1                                           1  1232.7 1318.7
## - Month                                          1  1232.7 1318.7
## - Total.Cloud.Cover.daily.max..sfc.             1  1232.9 1318.9
## - Wind.Speed.daily.mean..900.mb.                1  1232.9 1318.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.   1  1233.1 1319.1
## - Low.Cloud.Cover.daily.max..low.cld.lay.       1  1233.2 1319.2
## - Total.Precipitation.daily.sum..sfc.            1  1233.3 1319.3
## - Total.Cloud.Cover.daily.mean..sfc.            1  1233.4 1319.4
## - Relative.Humidity.daily.mean..2.m.above.gnd.  1  1233.4 1319.4
## - Wind.Direction.daily.mean..10.m.above.gnd.    1  1233.4 1319.4
## - Wind.Speed.daily.max..900.mb.                 1  1233.6 1319.6
## - Temperature.daily.mean..2.m.above.gnd.        1  1233.7 1319.7
## - High.Cloud.Cover.daily.max..high.cld.lay.     1  1233.8 1319.8
## - Wind.Speed.daily.min..80.m.above.gnd.         1  1234.0 1320.0
## - Total.Cloud.Cover.daily.min..sfc.             1  1234.0 1320.0
## - Wind.Gust.daily.max..sfc.                     1  1234.0 1320.0
## - Wind.Speed.daily.mean..80.m.above.gnd.        1  1234.2 1320.2
## - Snowfall.amount.raw.daily.sum..sfc.           1  1234.3 1320.3
## <none>                                           1232.4 1320.4
## - Temperature.daily.min..2.m.above.gnd.         1  1235.0 1321.0
## - Wind.Direction.daily.mean..80.m.above.gnd.    1  1235.0 1321.0
## - Wind.Speed.daily.max..10.m.above.gnd.         1  1235.0 1321.0
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.    1  1236.2 1322.2
## - Wind.Speed.daily.min..10.m.above.gnd.         1  1239.5 1325.5
## - Mean.Sea.Level.Pressure.daily.max..MSL.       1  1244.7 1330.7
## - Wind.Direction.daily.mean..900.mb.            1  1246.7 1332.7
## - Mean.Sea.Level.Pressure.daily.mean..MSL.      1  1247.0 1333.0
## - Mean.Sea.Level.Pressure.daily.min..MSL.      1  1252.9 1338.9
##
## Step:  AIC=1318.4
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +

```

```

##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##      Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.max..2.m.above.gnd. +
##      Temperature.daily.min..2.m.above.gnd. +
Relative.Humidity.daily.min..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
##      Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
##      High.Cloud.Cover.daily.max..high.cld.lay. +
High.Cloud.Cover.daily.min..high.cld.lay. +
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Medium.Cloud.Cover.daily.min..mid.cld.lay. +
##      Low.Cloud.Cover.daily.max..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.max..80.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Speed.daily.min..900.mb. + Wind.Gust.daily.max..sfc. +
##      Wind.Gust.daily.min..sfc.
##
##
##      Df Deviance    AIC
## - Temperature.daily.max..2.m.above.gnd.      1  1232.4 1316.4
## - Wind.Speed.daily.max..80.m.above.gnd.      1  1232.4 1316.4
## - Wind.Gust.daily.min..sfc.                  1  1232.4 1316.4
## - Wind.Speed.daily.min..900.mb.              1  1232.5 1316.5
## - High.Cloud.Cover.daily.min..high.cld.lay.  1  1232.5 1316.5
## - Shortwave.Radiation.daily.sum..sfc.        1  1232.6 1316.6
## - Relative.Humidity.daily.min..2.m.above.gnd. 1  1232.6 1316.6
## - Day                                         1  1232.6 1316.6
## - Low.Cloud.Cover.daily.mean..low.cld.lay.   1  1232.6 1316.6
## - High.Cloud.Cover.daily.mean..high.cld.lay. 1  1232.6 1316.6
## - Sunshine.Duration.daily.sum..sfc.          1  1232.7 1316.7
## - Wind.Speed.daily.mean..10.m.above.gnd.     1  1232.7 1316.7
## - Wind.Gust.daily.mean..sfc.                 1  1232.7 1316.7
## - Medium.Cloud.Cover.daily.min..mid.cld.lay. 1  1232.7 1316.7

```



```

## - Year 1 1232.7 1316.7
## - ...1 1 1232.7 1316.7
## - Month 1 1232.7 1316.7
## - Total.Cloud.Cover.daily.max..sfc. 1 1232.9 1316.9
## - Wind.Speed.daily.mean..900.mb. 1 1232.9 1316.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1233.2 1317.2
## - Low.Cloud.Cover.daily.max..low.cld.lay. 1 1233.2 1317.2
## - Total.Precipitation.daily.sum..sfc. 1 1233.4 1317.4
## - Total.Cloud.Cover.daily.mean..sfc. 1 1233.4 1317.4
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1 1233.4 1317.4
## - Wind.Direction.daily.mean..10.m.above.gnd. 1 1233.4 1317.4
## - Wind.Speed.daily.max..900.mb. 1 1233.6 1317.6
## - Temperature.daily.mean..2.m.above.gnd. 1 1233.7 1317.7
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1233.8 1317.8
## - Wind.Gust.daily.max..sfc. 1 1234.0 1318.0
## - Wind.Speed.daily.min..80.m.above.gnd. 1 1234.0 1318.0
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1234.2 1318.2
## - Snowfall.amount.raw.daily.sum..sfc. 1 1234.3 1318.3
## <none> 1232.4 1318.4
## - Temperature.daily.min..2.m.above.gnd. 1 1235.0 1319.0
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1235.0 1319.0
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1235.0 1319.0
## - Total.Cloud.Cover.daily.min..sfc. 1 1235.4 1319.4
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1236.3 1320.3
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1239.5 1323.5
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1244.7 1328.7
## - Wind.Direction.daily.mean..900.mb. 1 1246.7 1330.7
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1247.0 1331.0
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1253.0 1337.0
##
## Step: AIC=1316.41
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
## Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
## Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
## Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
## Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
## Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
## Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
## Relative.Humidity.daily.min..2.m.above.gnd. +

```

```

Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      High.Cloud.Cover.daily.min..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Speed.daily.max..80.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
##      Wind.Speed.daily.max..900.mb. + Wind.Speed.daily.min..900.mb. +
##      Wind.Gust.daily.max..sfc. + Wind.Gust.daily.min..sfc.
##
##
##
## - Wind.Speed.daily.max..80.m.above.gnd.      1  1232.4 1314.4
## - Wind.Gust.daily.min..sfc.                  1  1232.5 1314.5
## - Wind.Speed.daily.min..900.mb.              1  1232.5 1314.5
## - High.Cloud.Cover.daily.min..high.cld.lay. 1  1232.5 1314.5
## - Relative.Humidity.daily.min..2.m.above.gnd. 1  1232.6 1314.6
## - Shortwave.Radiation.daily.sum..sfc.        1  1232.6 1314.6
## - Day                                         1  1232.6 1314.6
## - Low.Cloud.Cover.daily.mean..low.cld.lay.  1  1232.6 1314.6
## - High.Cloud.Cover.daily.mean..high.cld.lay. 1  1232.6 1314.6
## - Wind.Speed.daily.mean..10.m.above.gnd.    1  1232.7 1314.7
## - Sunshine.Duration.daily.sum..sfc.         1  1232.7 1314.7
## - Wind.Gust.daily.mean..sfc.                 1  1232.7 1314.7
## - Medium.Cloud.Cover.daily.min..mid.cld.lay. 1  1232.7 1314.7
## - Year                                       1  1232.7 1314.7
## - ...1                                      1  1232.7 1314.7
## - Month                                     1  1232.7 1314.7
## - Total.Cloud.Cover.daily.max..sfc.         1  1232.9 1314.9
## - Wind.Speed.daily.mean..900.mb.            1  1232.9 1314.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1  1233.2 1315.2
## - Low.Cloud.Cover.daily.max..low.cld.lay.   1  1233.2 1315.2
## - Total.Precipitation.daily.sum..sfc.       1  1233.4 1315.4
## - Total.Cloud.Cover.daily.mean..sfc.       1  1233.4 1315.4
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1  1233.4 1315.4
## - Wind.Direction.daily.mean..10.m.above.gnd. 1  1233.4 1315.4
## - Wind.Speed.daily.max..900.mb.            1  1233.6 1315.6
## - High.Cloud.Cover.daily.max..high.cld.lay. 1  1233.8 1315.8
## - Wind.Gust.daily.max..sfc.                 1  1234.0 1316.0
## - Wind.Speed.daily.min..80.m.above.gnd.     1  1234.0 1316.0
## - Wind.Speed.daily.mean..80.m.above.gnd.    1  1234.2 1316.2
## - Snowfall.amount.raw.daily.sum..sfc.      1  1234.3 1316.3
## <none>                                       1232.4 1316.4
## - Wind.Direction.daily.mean..80.m.above.gnd. 1  1235.0 1317.0
## - Wind.Speed.daily.max..10.m.above.gnd.     1  1235.1 1317.1

```

```

## - Total.Cloud.Cover.daily.min..sfc.          1  1235.4 1317.4
## - Temperature.daily.min..2.m.above.gnd.      1  1235.9 1317.9
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.  1  1236.3 1318.3
## - Temperature.daily.mean..2.m.above.gnd.     1  1238.0 1320.0
## - Wind.Speed.daily.min..10.m.above.gnd.       1  1239.5 1321.5
## - Mean.Sea.Level.Pressure.daily.max..MSL.     1  1244.9 1326.9
## - Wind.Direction.daily.mean..900.mb.         1  1247.0 1329.0
## - Mean.Sea.Level.Pressure.daily.mean..MSL.    1  1247.4 1329.4
## - Mean.Sea.Level.Pressure.daily.min..MSL.     1  1253.4 1335.4
##
## Step: AIC=1314.43
## plue.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
##   Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##   Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##   Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
##   Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
##   Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##   Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##   Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##   Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##   Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
##   Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##   Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##   Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##   High.Cloud.Cover.daily.min..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##   Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##   Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##   Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##   Wind.Speed.daily.min..900.mb. + Wind.Gust.daily.max..sfc. +
##   Wind.Gust.daily.min..sfc.
##
##
##                                     Df Deviance    AIC
## - Wind.Gust.daily.min..sfc.          1  1232.5 1312.5
## - Wind.Speed.daily.min..900.mb.      1  1232.5 1312.5
## - High.Cloud.Cover.daily.min..high.cld.lay. 1  1232.5 1312.5

```

```

## - Relative.Humidity.daily.min..2.m.above.gnd. 1 1232.6 1312.6
## - Shortwave.Radiation.daily.sum..sfc. 1 1232.6 1312.6
## - Day 1 1232.6 1312.6
## - Low.Cloud.Cover.daily.mean..low.cld.lay. 1 1232.7 1312.7
## - High.Cloud.Cover.daily.mean..high.cld.lay. 1 1232.7 1312.7
## - Sunshine.Duration.daily.sum..sfc. 1 1232.7 1312.7
## - Wind.Gust.daily.mean..sfc. 1 1232.7 1312.7
## - Medium.Cloud.Cover.daily.min..mid.cld.lay. 1 1232.7 1312.7
## - Wind.Speed.daily.mean..10.m.above.gnd. 1 1232.7 1312.7
## - Year 1 1232.7 1312.7
## - ...1 1 1232.7 1312.7
## - Month 1 1232.7 1312.7
## - Total.Cloud.Cover.daily.max..sfc. 1 1232.9 1312.9
## - Wind.Speed.daily.mean..900.mb. 1 1232.9 1312.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1233.2 1313.2
## - Low.Cloud.Cover.daily.max..low.cld.lay. 1 1233.2 1313.2
## - Total.Precipitation.daily.sum..sfc. 1 1233.4 1313.4
## - Total.Cloud.Cover.daily.mean..sfc. 1 1233.4 1313.4
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1 1233.5 1313.5
## - Wind.Direction.daily.mean..10.m.above.gnd. 1 1233.5 1313.5
## - Wind.Speed.daily.max..900.mb. 1 1233.6 1313.6
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1233.9 1313.9
## - Wind.Speed.daily.min..80.m.above.gnd. 1 1234.2 1314.2
## - Snowfall.amount.raw.daily.sum..sfc. 1 1234.3 1314.3
## - Wind.Gust.daily.max..sfc. 1 1234.4 1314.4
## <none> 1232.4 1314.4
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1234.6 1314.6
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1235.1 1315.1
## - Total.Cloud.Cover.daily.min..sfc. 1 1235.4 1315.4
## - Temperature.daily.min..2.m.above.gnd. 1 1235.9 1315.9
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1236.4 1316.4
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1236.8 1316.8
## - Temperature.daily.mean..2.m.above.gnd. 1 1238.1 1318.1
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1239.7 1319.7
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1244.9 1324.9
## - Wind.Direction.daily.mean..900.mb. 1 1247.0 1327.0
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1247.4 1327.4
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1253.5 1333.5
##
## Step: AIC=1312.47
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
## Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +

```

```

##      Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##      Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
##      Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      High.Cloud.Cover.daily.min..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Speed.daily.min..900.mb. + Wind.Gust.daily.max..sfc.
##
##

```

	Df	Deviance	AIC
## - Wind.Speed.daily.min..900.mb.	1	1232.5	1310.5
## - High.Cloud.Cover.daily.min..high.cld.lay.	1	1232.6	1310.6
## - Relative.Humidity.daily.min..2.m.above.gnd.	1	1232.6	1310.6
## - Shortwave.Radiation.daily.sum..sfc.	1	1232.7	1310.7
## - Day	1	1232.7	1310.7
## - Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1232.7	1310.7
## - High.Cloud.Cover.daily.mean..high.cld.lay.	1	1232.7	1310.7
## - Sunshine.Duration.daily.sum..sfc.	1	1232.7	1310.7
## - Medium.Cloud.Cover.daily.min..mid.cld.lay.	1	1232.8	1310.8
## - Year	1	1232.8	1310.8
## - ...1	1	1232.8	1310.8
## - Month	1	1232.8	1310.8
## - Wind.Speed.daily.mean..10.m.above.gnd.	1	1232.8	1310.8
## - Wind.Gust.daily.mean..sfc.	1	1232.9	1310.9
## - Wind.Speed.daily.mean..900.mb.	1	1233.0	1311.0
## - Total.Cloud.Cover.daily.max..sfc.	1	1233.0	1311.0
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1233.2	1311.2
## - Low.Cloud.Cover.daily.max..low.cld.lay.	1	1233.2	1311.2
## - Total.Precipitation.daily.sum..sfc.	1	1233.4	1311.4
## - Total.Cloud.Cover.daily.mean..sfc.	1	1233.5	1311.5
## - Relative.Humidity.daily.mean..2.m.above.gnd.	1	1233.5	1311.5
## - Wind.Direction.daily.mean..10.m.above.gnd.	1	1233.5	1311.5
## - Wind.Speed.daily.max..900.mb.	1	1233.6	1311.6
## - High.Cloud.Cover.daily.max..high.cld.lay.	1	1234.0	1312.0
## - Wind.Speed.daily.min..80.m.above.gnd.	1	1234.2	1312.2

```

## - Snowfall.amount.raw.daily.sum..sfc.          1  1234.4 1312.4
## - Wind.Gust.daily.max..sfc.                    1  1234.4 1312.4
## <none>                                           1232.5 1312.5
## - Wind.Speed.daily.mean..80.m.above.gnd.       1  1234.7 1312.7
## - Wind.Direction.daily.mean..80.m.above.gnd.   1  1235.1 1313.1
## - Total.Cloud.Cover.daily.min..sfc.            1  1235.5 1313.5
## - Temperature.daily.min..2.m.above.gnd.        1  1236.0 1314.0
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.   1  1236.4 1314.4
## - Wind.Speed.daily.max..10.m.above.gnd.        1  1236.9 1314.9
## - Temperature.daily.mean..2.m.above.gnd.       1  1238.2 1316.2
## - Wind.Speed.daily.min..10.m.above.gnd.        1  1240.8 1318.8
## - Mean.Sea.Level.Pressure.daily.max..MSL.      1  1244.9 1322.9
## - Wind.Direction.daily.mean..900.mb.           1  1247.0 1325.0
## - Mean.Sea.Level.Pressure.daily.mean..MSL.     1  1247.4 1325.4
## - Mean.Sea.Level.Pressure.daily.min..MSL.      1  1253.5 1331.5
##
## Step:  AIC=1310.51
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##      Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
##      Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      High.Cloud.Cover.daily.min..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Gust.daily.max..sfc.

```

```

##
##
## - High.Cloud.Cover.daily.min..high.cld.lay.      1  1232.6 1308.6
## - Relative.Humidity.daily.min..2.m.above.gnd.    1  1232.7 1308.7
## - Shortwave.Radiation.daily.sum..sfc.            1  1232.7 1308.7
## - Day                                              1  1232.7 1308.7
## - Low.Cloud.Cover.daily.mean..low.cld.lay.      1  1232.7 1308.7
## - High.Cloud.Cover.daily.mean..high.cld.lay.    1  1232.7 1308.7
## - Sunshine.Duration.daily.sum..sfc.             1  1232.8 1308.8
## - Year                                             1  1232.8 1308.8
## - ...1                                            1  1232.8 1308.8
## - Month                                           1  1232.8 1308.8
## - Medium.Cloud.Cover.daily.min..mid.cld.lay.    1  1232.8 1308.8
## - Wind.Speed.daily.mean..10.m.above.gnd.        1  1232.8 1308.8
## - Wind.Gust.daily.mean..sfc.                    1  1232.9 1308.9
## - Total.Cloud.Cover.daily.max..sfc.             1  1233.0 1309.0
## - Wind.Speed.daily.mean..900.mb.                1  1233.2 1309.2
## - Low.Cloud.Cover.daily.max..low.cld.lay.       1  1233.3 1309.3
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.   1  1233.3 1309.3
## - Total.Precipitation.daily.sum..sfc.           1  1233.5 1309.5
## - Total.Cloud.Cover.daily.mean..sfc.            1  1233.5 1309.5
## - Relative.Humidity.daily.mean..2.m.above.gnd.  1  1233.5 1309.5
## - Wind.Direction.daily.mean..10.m.above.gnd.    1  1233.6 1309.6
## - Wind.Speed.daily.max..900.mb.                 1  1233.8 1309.8
## - High.Cloud.Cover.daily.max..high.cld.lay.     1  1234.0 1310.0
## - Wind.Speed.daily.min..80.m.above.gnd.         1  1234.3 1310.3
## - Snowfall.amount.raw.daily.sum..sfc.           1  1234.4 1310.4
## - Wind.Gust.daily.max..sfc.                     1  1234.5 1310.5
## <none>                                           1232.5 1310.5
## - Wind.Speed.daily.mean..80.m.above.gnd.        1  1234.7 1310.7
## - Wind.Direction.daily.mean..80.m.above.gnd.    1  1235.2 1311.2
## - Total.Cloud.Cover.daily.min..sfc.             1  1235.6 1311.6
## - Temperature.daily.min..2.m.above.gnd.         1  1236.1 1312.1
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.    1  1236.4 1312.4
## - Wind.Speed.daily.max..10.m.above.gnd.         1  1237.0 1313.0
## - Temperature.daily.mean..2.m.above.gnd.       1  1238.2 1314.2
## - Wind.Speed.daily.min..10.m.above.gnd.         1  1240.8 1316.8
## - Mean.Sea.Level.Pressure.daily.max..MSL.       1  1245.1 1321.1
## - Wind.Direction.daily.mean..900.mb.           1  1247.1 1323.1
## - Mean.Sea.Level.Pressure.daily.mean..MSL.      1  1247.5 1323.5
## - Mean.Sea.Level.Pressure.daily.min..MSL.      1  1253.6 1329.6
##
## Step:  AIC=1308.6
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +

```

```

High.Cloud.Cover.daily.mean..high.cld.lay. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##      Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
##      Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Medium.Cloud.Cover.daily.min..mid.cld.lay. +
##      Low.Cloud.Cover.daily.max..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
##      Wind.Speed.daily.max..900.mb. + Wind.Gust.daily.max..sfc.
##

```

	Df	Deviance	AIC
## - High.Cloud.Cover.daily.mean..high.cld.lay.	1	1232.8	1306.8
## - Shortwave.Radiation.daily.sum..sfc.	1	1232.8	1306.8
## - Relative.Humidity.daily.min..2.m.above.gnd.	1	1232.8	1306.8
## - Day	1	1232.8	1306.8
## - Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1232.8	1306.8
## - Medium.Cloud.Cover.daily.min..mid.cld.lay.	1	1232.8	1306.8
## - Sunshine.Duration.daily.sum..sfc.	1	1232.9	1306.9
## - Year	1	1232.9	1306.9
## - ...1	1	1232.9	1306.9
## - Month	1	1232.9	1306.9
## - Wind.Speed.daily.mean..10.m.above.gnd.	1	1232.9	1306.9
## - Wind.Gust.daily.mean..sfc.	1	1233.0	1307.0
## - Total.Cloud.Cover.daily.max..sfc.	1	1233.1	1307.1
## - Wind.Speed.daily.mean..900.mb.	1	1233.3	1307.3
## - Low.Cloud.Cover.daily.max..low.cld.lay.	1	1233.3	1307.3
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1233.3	1307.3
## - Total.Precipitation.daily.sum..sfc.	1	1233.5	1307.5
## - Total.Cloud.Cover.daily.mean..sfc.	1	1233.6	1307.6
## - Relative.Humidity.daily.mean..2.m.above.gnd.	1	1233.6	1307.6
## - Wind.Direction.daily.mean..10.m.above.gnd.	1	1233.7	1307.7
## - Wind.Speed.daily.max..900.mb.	1	1233.8	1307.8
## - High.Cloud.Cover.daily.max..high.cld.lay.	1	1234.0	1308.0
## - Wind.Speed.daily.min..80.m.above.gnd.	1	1234.4	1308.4
## - Snowfall.amount.raw.daily.sum..sfc.	1	1234.5	1308.5



```

## - Wind.Gust.daily.max..sfc. 1 1234.6 1308.6
## <none> 1232.6 1308.6
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1234.8 1308.8
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1235.3 1309.3
## - Total.Cloud.Cover.daily.min..sfc. 1 1235.7 1309.7
## - Temperature.daily.min..2.m.above.gnd. 1 1236.1 1310.1
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1236.6 1310.6
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1237.1 1311.1
## - Temperature.daily.mean..2.m.above.gnd. 1 1238.3 1312.3
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1241.0 1315.0
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1245.2 1319.2
## - Wind.Direction.daily.mean..900.mb. 1 1247.3 1321.3
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1247.6 1321.6
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1253.7 1327.7
##
## Step: AIC=1306.75
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
## Total.Cloud.Cover.daily.mean..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
## Low.Cloud.Cover.daily.mean..low.cld.lay. +
Sunshine.Duration.daily.sum..sfc. +
## Shortwave.Radiation.daily.sum..sfc. +
Wind.Speed.daily.mean..10.m.above.gnd. +
## Wind.Direction.daily.mean..10.m.above.gnd. +
Wind.Speed.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Speed.daily.mean..900.mb. +
## Wind.Direction.daily.mean..900.mb. + Wind.Gust.daily.mean..sfc. +
## Temperature.daily.min..2.m.above.gnd. +
Relative.Humidity.daily.min..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
## Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
## High.Cloud.Cover.daily.max..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
## Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
## Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
## Wind.Gust.daily.max..sfc.
##
##
Df Deviance AIC

```

```

## - Low.Cloud.Cover.daily.mean..low.cld.lay.      1  1232.9 1304.9
## - Relative.Humidity.daily.min..2.m.above.gnd.    1  1232.9 1304.9
## - Day                                              1  1232.9 1304.9
## - Shortwave.Radiation.daily.sum..sfc.            1  1233.0 1305.0
## - Medium.Cloud.Cover.daily.min..mid.cld.lay.     1  1233.0 1305.0
## - Year                                             1  1233.0 1305.0
## - ...1                                            1  1233.0 1305.0
## - Sunshine.Duration.daily.sum..sfc.              1  1233.0 1305.0
## - Month                                           1  1233.0 1305.0
## - Wind.Speed.daily.mean..10.m.above.gnd.         1  1233.1 1305.1
## - Wind.Gust.daily.mean..sfc.                     1  1233.2 1305.2
## - Total.Cloud.Cover.daily.max..sfc.              1  1233.2 1305.2
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.    1  1233.4 1305.4
## - Wind.Speed.daily.mean..900.mb.                 1  1233.4 1305.4
## - Low.Cloud.Cover.daily.max..low.cld.lay.        1  1233.5 1305.5
## - Total.Cloud.Cover.daily.mean..sfc.             1  1233.6 1305.6
## - Total.Precipitation.daily.sum..sfc.            1  1233.7 1305.7
## - Relative.Humidity.daily.mean..2.m.above.gnd.   1  1233.7 1305.7
## - Wind.Direction.daily.mean..10.m.above.gnd.     1  1233.8 1305.8
## - Wind.Speed.daily.max..900.mb.                  1  1234.0 1306.0
## - High.Cloud.Cover.daily.max..high.cld.lay.      1  1234.1 1306.1
## - Wind.Speed.daily.min..80.m.above.gnd.          1  1234.6 1306.6
## - Snowfall.amount.raw.daily.sum..sfc.            1  1234.6 1306.6
## - Wind.Gust.daily.max..sfc.                      1  1234.7 1306.7
## <none>                                           1232.8 1306.8
## - Wind.Speed.daily.mean..80.m.above.gnd.         1  1234.9 1306.9
## - Wind.Direction.daily.mean..80.m.above.gnd.     1  1235.4 1307.4
## - Total.Cloud.Cover.daily.min..sfc.              1  1235.8 1307.8
## - Temperature.daily.min..2.m.above.gnd.          1  1236.2 1308.2
## - Wind.Speed.daily.max..10.m.above.gnd.          1  1237.3 1309.3
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.     1  1237.3 1309.3
## - Temperature.daily.mean..2.m.above.gnd.         1  1238.3 1310.3
## - Wind.Speed.daily.min..10.m.above.gnd.          1  1241.2 1313.2
## - Mean.Sea.Level.Pressure.daily.max..MSL.        1  1245.4 1317.4
## - Wind.Direction.daily.mean..900.mb.             1  1247.4 1319.4
## - Mean.Sea.Level.Pressure.daily.mean..MSL.       1  1247.8 1319.8
## - Mean.Sea.Level.Pressure.daily.min..MSL.        1  1253.8 1325.8
##
## Step:  AIC=1304.89
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##      Wind.Speed.daily.mean..10.m.above.gnd. +

```

```

Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
##      Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Medium.Cloud.Cover.daily.min..mid.cld.lay. +
##      Low.Cloud.Cover.daily.max..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
##      Wind.Speed.daily.max..900.mb. + Wind.Gust.daily.max..sfc.
##
##
##
##      Df Deviance      AIC
## - Relative.Humidity.daily.min..2.m.above.gnd. 1 1233.0 1303.0
## - Sunshine.Duration.daily.sum..sfc. 1 1233.1 1303.1
## - Day 1 1233.1 1303.1
## - Shortwave.Radiation.daily.sum..sfc. 1 1233.2 1303.2
## - Medium.Cloud.Cover.daily.min..mid.cld.lay. 1 1233.2 1303.2
## - Year 1 1233.2 1303.2
## - ...1 1 1233.2 1303.2
## - Month 1 1233.2 1303.2
## - Wind.Speed.daily.mean..10.m.above.gnd. 1 1233.2 1303.2
## - Wind.Gust.daily.mean..sfc. 1 1233.3 1303.3
## - Total.Cloud.Cover.daily.max..sfc. 1 1233.5 1303.5
## - Wind.Speed.daily.mean..900.mb. 1 1233.5 1303.5
## - Low.Cloud.Cover.daily.max..low.cld.lay. 1 1233.5 1303.5
## - Total.Precipitation.daily.sum..sfc. 1 1233.7 1303.7
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1 1233.8 1303.8
## - Total.Cloud.Cover.daily.mean..sfc. 1 1233.9 1303.9
## - Wind.Direction.daily.mean..10.m.above.gnd. 1 1233.9 1303.9
## - Wind.Speed.daily.max..900.mb. 1 1234.1 1304.1
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1234.1 1304.1
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1234.5 1304.5
## - Wind.Speed.daily.min..80.m.above.gnd. 1 1234.7 1304.7
## - Wind.Gust.daily.max..sfc. 1 1234.8 1304.8
## - Snowfall.amount.raw.daily.sum..sfc. 1 1234.8 1304.8
## <none> 1232.9 1304.9
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1235.0 1305.0
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1235.5 1305.5
## - Total.Cloud.Cover.daily.min..sfc. 1 1235.8 1305.8
## - Temperature.daily.min..2.m.above.gnd. 1 1236.3 1306.3
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1237.4 1307.4
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1237.5 1307.5

```

```

## - Temperature.daily.mean..2.m.above.gnd.      1  1238.4 1308.4
## - Wind.Speed.daily.min..10.m.above.gnd.        1  1241.2 1311.2
## - Mean.Sea.Level.Pressure.daily.max..MSL.       1  1245.6 1315.6
## - Wind.Direction.daily.mean..900.mb.           1  1247.5 1317.5
## - Mean.Sea.Level.Pressure.daily.mean..MSL.      1  1248.2 1318.2
## - Mean.Sea.Level.Pressure.daily.min..MSL.       1  1254.5 1324.5
##
## Step: AIC=1303.04
## pluie.demain ~ ...1 + Year + Month + Day +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
## Total.Cloud.Cover.daily.mean..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
## Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
## Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
## Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
## Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
## Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
## Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
## High.Cloud.Cover.daily.max..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
## Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
## Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
## Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## - Day 1 1233.3 1301.3
## - Sunshine.Duration.daily.sum..sfc. 1 1233.3 1301.3
## - Medium.Cloud.Cover.daily.min..mid.cld.lay. 1 1233.3 1301.3
## - Shortwave.Radiation.daily.sum..sfc. 1 1233.3 1301.3
## - Year 1 1233.4 1301.4
## - ...1 1 1233.4 1301.4
## - Month 1 1233.4 1301.4
## - Wind.Speed.daily.mean..10.m.above.gnd. 1 1233.4 1301.4
## - Wind.Gust.daily.mean..sfc. 1 1233.5 1301.5
## - Wind.Speed.daily.mean..900.mb. 1 1233.7 1301.7
## - Total.Cloud.Cover.daily.max..sfc. 1 1233.7 1301.7

```

```

## - Low.Cloud.Cover.daily.max..low.cld.lay.      1  1233.7 1301.7
## - Total.Precipitation.daily.sum..sfc.           1  1233.8 1301.8
## - Total.Cloud.Cover.daily.mean..sfc.           1  1234.0 1302.0
## - Wind.Direction.daily.mean..10.m.above.gnd.    1  1234.1 1302.1
## - Relative.Humidity.daily.mean..2.m.above.gnd.  1  1234.2 1302.2
## - Wind.Speed.daily.max..900.mb.                 1  1234.2 1302.2
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.   1  1234.2 1302.2
## - High.Cloud.Cover.daily.max..high.cld.lay.     1  1234.7 1302.7
## - Wind.Gust.daily.max..sfc.                     1  1234.9 1302.9
## - Wind.Speed.daily.min..80.m.above.gnd.         1  1234.9 1302.9
## - Snowfall.amount.raw.daily.sum..sfc.           1  1234.9 1302.9
## <none>                                           1233.0 1303.0
## - Wind.Speed.daily.mean..80.m.above.gnd.        1  1235.1 1303.1
## - Wind.Direction.daily.mean..80.m.above.gnd.    1  1235.8 1303.8
## - Total.Cloud.Cover.daily.min..sfc.             1  1235.9 1303.9
## - Temperature.daily.min..2.m.above.gnd.         1  1236.9 1304.9
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.     1  1237.5 1305.5
## - Wind.Speed.daily.max..10.m.above.gnd.         1  1237.8 1305.8
## - Temperature.daily.mean..2.m.above.gnd.        1  1239.0 1307.0
## - Wind.Speed.daily.min..10.m.above.gnd.         1  1241.6 1309.6
## - Mean.Sea.Level.Pressure.daily.max..MSL.       1  1245.9 1313.9
## - Wind.Direction.daily.mean..900.mb.            1  1247.6 1315.6
## - Mean.Sea.Level.Pressure.daily.mean..MSL.      1  1248.7 1316.7
## - Mean.Sea.Level.Pressure.daily.min..MSL.       1  1255.0 1323.0
##
## Step:  AIC=1301.27
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
##     Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##     Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##     Total.Cloud.Cover.daily.mean..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##     Sunshine.Duration.daily.sum..sfc. +
Shortwave.Radiation.daily.sum..sfc. +
##     Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##     Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##     Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##     Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
##     Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
##     Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
##     High.Cloud.Cover.daily.max..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##     Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +

```

```

##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Gust.daily.max..sfc.
##
##
##                                     Df Deviance      AIC
## - Shortwave.Radiation.daily.sum..sfc.      1  1233.5 1299.5
## - Medium.Cloud.Cover.daily.min..mid.cld.lay. 1  1233.6 1299.6
## - Sunshine.Duration.daily.sum..sfc.      1  1233.6 1299.6
## - Wind.Speed.daily.mean..10.m.above.gnd.    1  1233.6 1299.6
## - Wind.Gust.daily.mean..sfc.              1  1233.7 1299.7
## - Total.Cloud.Cover.daily.max..sfc.        1  1233.9 1299.9
## - Wind.Speed.daily.mean..900.mb.          1  1233.9 1299.9
## - Low.Cloud.Cover.daily.max..low.cld.lay.  1  1233.9 1299.9
## - Total.Precipitation.daily.sum..sfc.      1  1234.0 1300.0
## - Total.Cloud.Cover.daily.mean..sfc.      1  1234.3 1300.3
## - Wind.Direction.daily.mean..10.m.above.gnd. 1  1234.3 1300.3
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1  1234.5 1300.5
## - Wind.Speed.daily.max..900.mb.          1  1234.5 1300.5
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1  1234.5 1300.5
## - High.Cloud.Cover.daily.max..high.cld.lay. 1  1234.9 1300.9
## - Snowfall.amount.raw.daily.sum..sfc.      1  1235.1 1301.1
## - Wind.Speed.daily.min..80.m.above.gnd.    1  1235.1 1301.1
## - Wind.Gust.daily.max..sfc.              1  1235.2 1301.2
## <none>                                     1233.3 1301.3
## - Year                                    1  1235.4 1301.4
## - Wind.Speed.daily.mean..80.m.above.gnd.  1  1235.4 1301.4
## - ...1                                   1  1235.5 1301.5
## - Month                                  1  1235.7 1301.7
## - Wind.Direction.daily.mean..80.m.above.gnd. 1  1236.0 1302.0
## - Total.Cloud.Cover.daily.min..sfc.        1  1236.0 1302.0
## - Temperature.daily.min..2.m.above.gnd.    1  1237.0 1303.0
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1  1237.7 1303.7
## - Wind.Speed.daily.max..10.m.above.gnd.    1  1238.0 1304.0
## - Temperature.daily.mean..2.m.above.gnd.    1  1239.0 1305.0
## - Wind.Speed.daily.min..10.m.above.gnd.    1  1241.7 1307.7
## - Mean.Sea.Level.Pressure.daily.max..MSL.  1  1246.4 1312.4
## - Wind.Direction.daily.mean..900.mb.      1  1247.8 1313.8
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1  1249.1 1315.1
## - Mean.Sea.Level.Pressure.daily.min..MSL.  1  1255.4 1321.4
##
## Step:  AIC=1299.45
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +

```

```

Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Wind.Speed.daily.mean..10.m.above.gnd. +
##      Wind.Direction.daily.mean..10.m.above.gnd. +
Wind.Speed.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Speed.daily.mean..900.mb. +
##      Wind.Direction.daily.mean..900.mb. + Wind.Gust.daily.mean..sfc. +
##      Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Medium.Cloud.Cover.daily.min..mid.cld.lay. +
##      Low.Cloud.Cover.daily.max..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
##      Wind.Speed.daily.max..900.mb. + Wind.Gust.daily.max..sfc.
##
##
##      Df Deviance    AIC
## - Wind.Speed.daily.mean..10.m.above.gnd.      1  1233.7 1297.7
## - Medium.Cloud.Cover.daily.min..mid.cld.lay.   1  1233.8 1297.8
## - Wind.Gust.daily.mean..sfc.                   1  1233.8 1297.8
## - Wind.Speed.daily.mean..900.mb.               1  1234.0 1298.0
## - Total.Precipitation.daily.sum..sfc.           1  1234.1 1298.1
## - Low.Cloud.Cover.daily.max..low.cld.lay.       1  1234.1 1298.1
## - Total.Cloud.Cover.daily.max..sfc.             1  1234.2 1298.2
## - Sunshine.Duration.daily.sum..sfc.             1  1234.2 1298.2
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1  1234.5 1298.5
## - Wind.Direction.daily.mean..10.m.above.gnd.   1  1234.6 1298.6
## - Wind.Speed.daily.max..900.mb.                 1  1234.7 1298.7
## - Total.Cloud.Cover.daily.mean..sfc.           1  1234.7 1298.7
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.  1  1234.7 1298.7
## - High.Cloud.Cover.daily.max..high.cld.lay.    1  1235.0 1299.0
## - Wind.Speed.daily.min..80.m.above.gnd.         1  1235.2 1299.2
## - Snowfall.amount.raw.daily.sum..sfc.           1  1235.3 1299.3
## <none>                                           1233.5 1299.5
## - Wind.Gust.daily.max..sfc.                     1  1235.5 1299.5
## - Year                                           1  1235.5 1299.5
## - ...1                                           1  1235.6 1299.6
## - Month                                          1  1235.8 1299.8
## - Wind.Speed.daily.mean..80.m.above.gnd.        1  1236.1 1300.1
## - Total.Cloud.Cover.daily.min..sfc.             1  1236.1 1300.1
## - Wind.Direction.daily.mean..80.m.above.gnd.    1  1236.2 1300.2
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.    1  1237.8 1301.8
## - Wind.Speed.daily.max..10.m.above.gnd.         1  1238.2 1302.2
## - Temperature.daily.min..2.m.above.gnd.         1  1238.7 1302.7

```

```

## - Wind.Speed.daily.min..10.m.above.gnd.      1  1241.7 1305.7
## - Temperature.daily.mean..2.m.above.gnd.     1  1243.1 1307.1
## - Mean.Sea.Level.Pressure.daily.max..MSL.     1  1246.8 1310.8
## - Wind.Direction.daily.mean..900.mb.         1  1247.9 1311.9
## - Mean.Sea.Level.Pressure.daily.mean..MSL.     1  1249.4 1313.4
## - Mean.Sea.Level.Pressure.daily.min..MSL.     1  1255.7 1319.7
##
## Step: AIC=1297.71
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
## Total.Cloud.Cover.daily.mean..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
## Sunshine.Duration.daily.sum..sfc. +
Wind.Direction.daily.mean..10.m.above.gnd. +
## Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
## Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
## Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
## Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
## High.Cloud.Cover.daily.max..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
## Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
## Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
## Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## - Medium.Cloud.Cover.daily.min..mid.cld.lay. 1 1234.0 1296.0
## - Wind.Gust.daily.mean..sfc. 1 1234.0 1296.0
## - Wind.Speed.daily.mean..900.mb. 1 1234.3 1296.3
## - Total.Precipitation.daily.sum..sfc. 1 1234.3 1296.3
## - Sunshine.Duration.daily.sum..sfc. 1 1234.3 1296.3
## - Low.Cloud.Cover.daily.max..low.cld.lay. 1 1234.4 1296.4
## - Total.Cloud.Cover.daily.max..sfc. 1 1234.5 1296.5
## - Wind.Direction.daily.mean..10.m.above.gnd. 1 1234.8 1296.8
## - Total.Cloud.Cover.daily.mean..sfc. 1 1234.8 1296.8
## - Wind.Speed.daily.max..900.mb. 1 1234.9 1296.9
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1 1234.9 1296.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1234.9 1296.9
## - Wind.Speed.daily.min..80.m.above.gnd. 1 1235.2 1297.2

```



```

## - High.Cloud.Cover.daily.max..high.cld.lay.      1  1235.4 1297.4
## <none>                                           1233.7 1297.7
## - Year                                           1  1235.8 1297.8
## - ...1                                           1  1235.9 1297.9
## - Snowfall.amount.raw.daily.sum..sfc.           1  1236.0 1298.0
## - Wind.Gust.daily.max..sfc.                     1  1236.1 1298.1
## - Month                                           1  1236.2 1298.2
## - Total.Cloud.Cover.daily.min..sfc.             1  1236.3 1298.3
## - Wind.Direction.daily.mean..80.m.above.gnd.    1  1236.4 1298.4
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.    1  1238.1 1300.1
## - Wind.Speed.daily.max..10.m.above.gnd.         1  1238.7 1300.7
## - Temperature.daily.min..2.m.above.gnd.         1  1239.0 1301.0
## - Wind.Speed.daily.min..10.m.above.gnd.         1  1242.2 1304.2
## - Temperature.daily.mean..2.m.above.gnd.        1  1243.5 1305.5
## - Wind.Speed.daily.mean..80.m.above.gnd.        1  1243.6 1305.6
## - Mean.Sea.Level.Pressure.daily.max..MSL.       1  1246.8 1308.8
## - Wind.Direction.daily.mean..900.mb.            1  1248.1 1310.1
## - Mean.Sea.Level.Pressure.daily.mean..MSL.      1  1249.5 1311.5
## - Mean.Sea.Level.Pressure.daily.min..MSL.       1  1255.7 1317.7
##
## Step:  AIC=1295.97
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.min..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
##      Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
##      High.Cloud.Cover.daily.max..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Low.Cloud.Cover.daily.max..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
##      Wind.Speed.daily.max..900.mb. + Wind.Gust.daily.max..sfc.
##
##
##                                     Df Deviance    AIC
## - Wind.Gust.daily.mean..sfc.         1  1234.2 1294.2
## - Wind.Speed.daily.mean..900.mb.     1  1234.5 1294.5

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```

## - Total.Precipitation.daily.sum..sfc.      1  1234.6 1294.6
## - Low.Cloud.Cover.daily.max..low.cld.lay.  1  1234.6 1294.6
## - Sunshine.Duration.daily.sum..sfc.       1  1234.6 1294.6
## - Total.Cloud.Cover.daily.max..sfc.       1  1234.7 1294.7
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1  1235.0 1295.0
## - Wind.Direction.daily.mean..10.m.above.gnd. 1  1235.0 1295.0
## - Wind.Speed.daily.max..900.mb.           1  1235.2 1295.2
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1  1235.2 1295.2
## - Total.Cloud.Cover.daily.mean..sfc.       1  1235.2 1295.2
## - Wind.Speed.daily.min..80.m.above.gnd.    1  1235.5 1295.5
## - High.Cloud.Cover.daily.max..high.cld.lay. 1  1235.7 1295.7
## <none>                                     1234.0 1296.0
## - Year                                     1  1236.1 1296.1
## - ...1                                     1  1236.2 1296.2
## - Total.Cloud.Cover.daily.min..sfc.       1  1236.3 1296.3
## - Wind.Gust.daily.max..sfc.               1  1236.4 1296.4
## - Month                                    1  1236.4 1296.4
## - Wind.Direction.daily.mean..80.m.above.gnd. 1  1236.6 1296.6
## - Snowfall.amount.raw.daily.sum..sfc.     1  1236.7 1296.7
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1  1238.6 1298.6
## - Wind.Speed.daily.max..10.m.above.gnd.    1  1239.1 1299.1
## - Temperature.daily.min..2.m.above.gnd.    1  1239.3 1299.3
## - Wind.Speed.daily.min..10.m.above.gnd.    1  1242.5 1302.5
## - Wind.Speed.daily.mean..80.m.above.gnd.   1  1243.8 1303.8
## - Temperature.daily.mean..2.m.above.gnd.   1  1243.9 1303.9
## - Mean.Sea.Level.Pressure.daily.max..MSL.   1  1247.0 1307.0
## - Wind.Direction.daily.mean..900.mb.       1  1248.4 1308.4
## - Mean.Sea.Level.Pressure.daily.mean..MSL.  1  1249.5 1309.5
## - Mean.Sea.Level.Pressure.daily.min..MSL.   1  1255.8 1315.8
##
## Step:  AIC=1294.2
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +

```

```

##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Gust.daily.max..sfc.
##
##
##                                     Df Deviance    AIC
## - Low.Cloud.Cover.daily.max..low.cld.lay.      1  1234.8 1292.8
## - Sunshine.Duration.daily.sum..sfc.             1  1234.9 1292.9
## - Total.Precipitation.daily.sum..sfc.           1  1234.9 1292.9
## - Total.Cloud.Cover.daily.max..sfc.            1  1234.9 1292.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.  1  1235.2 1293.2
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1  1235.3 1293.3
## - Wind.Direction.daily.mean..10.m.above.gnd.   1  1235.3 1293.3
## - Total.Cloud.Cover.daily.mean..sfc.           1  1235.5 1293.5
## - Wind.Speed.daily.min..80.m.above.gnd.         1  1235.6 1293.6
## - Wind.Speed.daily.mean..900.mb.               1  1235.7 1293.7
## - Wind.Speed.daily.max..900.mb.                1  1235.8 1293.8
## - High.Cloud.Cover.daily.max..high.cld.lay.    1  1235.9 1293.9
## <none>                                           1234.2 1294.2
## - Year                                           1  1236.3 1294.3
## - ...1                                           1  1236.4 1294.4
## - Total.Cloud.Cover.daily.min..sfc.            1  1236.5 1294.5
## - Month                                           1  1236.6 1294.6
## - Snowfall.amount.raw.daily.sum..sfc.          1  1236.8 1294.8
## - Wind.Direction.daily.mean..80.m.above.gnd.   1  1236.8 1294.8
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.   1  1238.8 1296.8
## - Wind.Gust.daily.max..sfc.                    1  1239.0 1297.0
## - Wind.Speed.daily.max..10.m.above.gnd.         1  1239.2 1297.2
## - Temperature.daily.min..2.m.above.gnd.         1  1239.5 1297.5
## - Wind.Speed.daily.min..10.m.above.gnd.         1  1242.7 1300.7
## - Temperature.daily.mean..2.m.above.gnd.       1  1244.1 1302.1
## - Wind.Speed.daily.mean..80.m.above.gnd.        1  1244.4 1302.4
## - Mean.Sea.Level.Pressure.daily.max..MSL.       1  1247.2 1305.2
## - Wind.Direction.daily.mean..900.mb.           1  1248.6 1306.6
## - Mean.Sea.Level.Pressure.daily.mean..MSL.      1  1249.7 1307.7
## - Mean.Sea.Level.Pressure.daily.min..MSL.      1  1256.0 1314.0
##
## Step:  AIC=1292.84
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Total.Cloud.Cover.daily.mean..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##      Sunshine.Duration.daily.sum..sfc. +

```

```

Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
##      Wind.Speed.daily.max..900.mb. + Wind.Gust.daily.max..sfc.
##
##
##
## - Total.Precipitation.daily.sum..sfc.          1  1235.5 1291.5
## - Sunshine.Duration.daily.sum..sfc.           1  1235.7 1291.7
## - Wind.Direction.daily.mean..10.m.above.gnd.  1  1235.9 1291.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1  1236.0 1292.0
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1  1236.0 1292.0
## - Wind.Speed.daily.min..80.m.above.gnd.       1  1236.2 1292.2
## - High.Cloud.Cover.daily.max..high.cld.lay.   1  1236.3 1292.3
## - Wind.Speed.daily.mean..900.mb.              1  1236.4 1292.4
## - Wind.Speed.daily.max..900.mb.              1  1236.4 1292.4
## - Total.Cloud.Cover.daily.min..sfc.           1  1236.8 1292.8
## <none>                                         1234.8 1292.8
## - Year                                         1  1236.9 1292.9
## - Total.Cloud.Cover.daily.mean..sfc.          1  1236.9 1292.9
## - ...1                                         1  1236.9 1292.9
## - Month                                        1  1237.2 1293.2
## - Wind.Direction.daily.mean..80.m.above.gnd.  1  1237.4 1293.4
## - Total.Cloud.Cover.daily.max..sfc.           1  1237.4 1293.4
## - Snowfall.amount.raw.daily.sum..sfc.         1  1237.5 1293.5
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.   1  1238.9 1294.9
## - Wind.Gust.daily.max..sfc.                   1  1239.6 1295.6
## - Temperature.daily.min..2.m.above.gnd.       1  1239.8 1295.8
## - Wind.Speed.daily.max..10.m.above.gnd.       1  1240.3 1296.3
## - Wind.Speed.daily.min..10.m.above.gnd.       1  1243.3 1299.3
## - Temperature.daily.mean..2.m.above.gnd.     1  1244.3 1300.3
## - Wind.Speed.daily.mean..80.m.above.gnd.     1  1245.6 1301.6
## - Mean.Sea.Level.Pressure.daily.max..MSL.     1  1247.7 1303.7
## - Wind.Direction.daily.mean..900.mb.         1  1249.2 1305.2
## - Mean.Sea.Level.Pressure.daily.mean..MSL.    1  1250.2 1306.2
## - Mean.Sea.Level.Pressure.daily.min..MSL.     1  1256.4 1312.4
##
## Step:  AIC=1291.48
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +

```

```

##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Snowfall.amount.raw.daily.sum..sfc. +
Total.Cloud.Cover.daily.mean..sfc. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Sunshine.Duration.daily.sum..sfc. +
##      Wind.Direction.daily.mean..10.m.above.gnd. +
Wind.Speed.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Speed.daily.mean..900.mb. +
##      Wind.Direction.daily.mean..900.mb. +
Temperature.daily.min..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
##      Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
##      High.Cloud.Cover.daily.max..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Gust.daily.max..sfc.
##
##

```

	Df	Deviance	AIC
## - Sunshine.Duration.daily.sum..sfc.	1	1236.4	1290.4
## - Wind.Direction.daily.mean..10.m.above.gnd.	1	1236.7	1290.7
## - Wind.Speed.daily.min..80.m.above.gnd.	1	1236.8	1290.8
## - Wind.Speed.daily.mean..900.mb.	1	1236.9	1290.9
## - Wind.Speed.daily.max..900.mb.	1	1236.9	1290.9
## - High.Cloud.Cover.daily.max..high.cld.lay.	1	1236.9	1290.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1237.0	1291.0
## - Relative.Humidity.daily.mean..2.m.above.gnd.	1	1237.3	1291.3
## <none>		1235.5	1291.5
## - Year	1	1237.5	1291.5
## - ...1	1	1237.6	1291.6
## - Total.Cloud.Cover.daily.mean..sfc.	1	1237.6	1291.6
## - Total.Cloud.Cover.daily.min..sfc.	1	1237.7	1291.7
## - Month	1	1237.8	1291.8
## - Snowfall.amount.raw.daily.sum..sfc.	1	1237.9	1291.9
## - Total.Cloud.Cover.daily.max..sfc.	1	1237.9	1291.9
## - Wind.Direction.daily.mean..80.m.above.gnd.	1	1238.1	1292.1
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1239.4	1293.4
## - Temperature.daily.min..2.m.above.gnd.	1	1240.2	1294.2
## - Wind.Gust.daily.max..sfc.	1	1240.6	1294.6
## - Wind.Speed.daily.max..10.m.above.gnd.	1	1240.8	1294.8
## - Wind.Speed.daily.min..10.m.above.gnd.	1	1243.9	1297.9
## - Temperature.daily.mean..2.m.above.gnd.	1	1244.9	1298.9
## - Wind.Speed.daily.mean..80.m.above.gnd.	1	1246.1	1300.1
## - Mean.Sea.Level.Pressure.daily.max..MSL.	1	1247.8	1301.8

```

## - Mean.Sea.Level.Pressure.daily.mean..MSL.      1  1250.3 1304.3
## - Wind.Direction.daily.mean..900.mb.            1  1250.5 1304.5
## - Mean.Sea.Level.Pressure.daily.min..MSL.        1  1256.6 1310.6
##
## Step:  AIC=1290.41
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
##   Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##   Snowfall.amount.raw.daily.sum..sfc. +
Total.Cloud.Cover.daily.mean..sfc. +
##   Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##   Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##   Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##   Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##   Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##   Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##   Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##   Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
##   Wind.Speed.daily.max..900.mb. + Wind.Gust.daily.max..sfc.
##
##
##                                     Df Deviance   AIC
## - Wind.Direction.daily.mean..10.m.above.gnd.    1  1237.6 1289.6
## - Total.Cloud.Cover.daily.mean..sfc.             1  1237.6 1289.6
## - Wind.Speed.daily.mean..900.mb.                 1  1237.7 1289.7
## - High.Cloud.Cover.daily.max..high.cld.lay.      1  1237.7 1289.7
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.    1  1237.7 1289.7
## - Wind.Speed.daily.min..80.m.above.gnd.          1  1237.8 1289.8
## - Wind.Speed.daily.max..900.mb.                 1  1237.8 1289.8
## - Relative.Humidity.daily.mean..2.m.above.gnd.   1  1237.9 1289.9
## <none>                                           1236.4 1290.4
## - Year                                           1  1238.5 1290.5
## - ...1                                           1  1238.5 1290.5
## - Snowfall.amount.raw.daily.sum..sfc.           1  1238.7 1290.7
## - Month                                           1  1238.8 1290.8
## - Total.Cloud.Cover.daily.min..sfc.             1  1238.9 1290.9
## - Total.Cloud.Cover.daily.max..sfc.             1  1238.9 1290.9
## - Wind.Direction.daily.mean..80.m.above.gnd.     1  1238.9 1290.9
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.     1  1240.3 1292.3
## - Temperature.daily.min..2.m.above.gnd.          1  1241.3 1293.3
## - Wind.Gust.daily.max..sfc.                     1  1241.5 1293.5
## - Wind.Speed.daily.max..10.m.above.gnd.          1  1241.9 1293.9
## - Wind.Speed.daily.min..10.m.above.gnd.          1  1244.9 1296.9

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## - Temperature.daily.mean..2.m.above.gnd.      1  1246.8 1298.8
## - Wind.Speed.daily.mean..80.m.above.gnd.      1  1246.9 1298.9
## - Mean.Sea.Level.Pressure.daily.max..MSL.      1  1249.0 1301.0
## - Wind.Direction.daily.mean..900.mb.          1  1250.9 1302.9
## - Mean.Sea.Level.Pressure.daily.mean..MSL.      1  1251.7 1303.7
## - Mean.Sea.Level.Pressure.daily.min..MSL.      1  1258.2 1310.2
##
## Step: AIC=1289.57
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Snowfall.amount.raw.daily.sum..sfc. +
Total.Cloud.Cover.daily.mean..sfc. +
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Speed.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Speed.daily.mean..900.mb. +
## Wind.Direction.daily.mean..900.mb. +
Temperature.daily.min..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
## Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
## High.Cloud.Cover.daily.max..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
## Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
## Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## - Wind.Speed.daily.mean..900.mb.      1  1238.6 1288.6
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1  1238.7 1288.7
## - High.Cloud.Cover.daily.max..high.cld.lay. 1  1238.8 1288.8
## - Wind.Speed.daily.min..80.m.above.gnd. 1  1238.8 1288.8
## - Total.Cloud.Cover.daily.mean..sfc. 1  1239.0 1289.0
## - Wind.Speed.daily.max..900.mb. 1  1239.0 1289.0
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1  1239.3 1289.3
## - Year 1  1239.6 1289.6
## <none> 1237.6 1289.6
## - ...1 1  1239.6 1289.6
## - Month 1  1239.9 1289.9
## - Total.Cloud.Cover.daily.min..sfc. 1  1240.0 1290.0
## - Total.Cloud.Cover.daily.max..sfc. 1  1240.0 1290.0
## - Snowfall.amount.raw.daily.sum..sfc. 1  1240.1 1290.1
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1  1241.6 1291.6
## - Wind.Direction.daily.mean..80.m.above.gnd. 1  1241.7 1291.7
## - Temperature.daily.min..2.m.above.gnd. 1  1242.2 1292.2

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## - Wind.Gust.daily.max..sfc. 1 1242.8 1292.8
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1243.3 1293.3
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1245.8 1295.8
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1247.7 1297.7
## - Temperature.daily.mean..2.m.above.gnd. 1 1247.7 1297.7
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1250.3 1300.3
## - Wind.Direction.daily.mean..900.mb. 1 1251.0 1301.0
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1253.2 1303.2
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1259.8 1309.8
##
## Step: AIC=1288.63
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Snowfall.amount.raw.daily.sum..sfc. +
Total.Cloud.Cover.daily.mean..sfc. +
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Speed.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. +
## Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
## Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
## Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
## Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
## Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
## Wind.Speed.daily.max..900.mb. + Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## - Wind.Speed.daily.max..900.mb. 1 1239.0 1287.0
## - Wind.Speed.daily.min..80.m.above.gnd. 1 1239.7 1287.7
## - Total.Cloud.Cover.daily.mean..sfc. 1 1239.8 1287.8
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1239.8 1287.8
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1239.9 1287.9
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1 1240.2 1288.2
## - Year 1 1240.5 1288.5
## - ...1 1 1240.6 1288.6
## <none> 1238.6 1288.6
## - Month 1 1240.8 1288.8
## - Total.Cloud.Cover.daily.min..sfc. 1 1241.0 1289.0
## - Total.Cloud.Cover.daily.max..sfc. 1 1241.2 1289.2
## - Snowfall.amount.raw.daily.sum..sfc. 1 1241.6 1289.6
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1242.4 1290.4
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1242.5 1290.5
## - Temperature.daily.min..2.m.above.gnd. 1 1243.0 1291.0

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```

## - Wind.Gust.daily.max..sfc. 1 1243.7 1291.7
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1244.1 1292.1
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1246.7 1294.7
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1247.7 1295.7
## - Temperature.daily.mean..2.m.above.gnd. 1 1248.3 1296.3
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1250.7 1298.7
## - Wind.Direction.daily.mean..900.mb. 1 1251.9 1299.9
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1253.3 1301.3
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1259.8 1307.8
##
## Step: AIC=1287.03
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Snowfall.amount.raw.daily.sum..sfc. +
Total.Cloud.Cover.daily.mean..sfc. +
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Speed.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. +
## Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
## Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
## Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
## Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
## Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. +
## Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## - Wind.Speed.daily.min..80.m.above.gnd. 1 1240.0 1286.0
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1240.1 1286.1
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1240.2 1286.2
## - Total.Cloud.Cover.daily.mean..sfc. 1 1240.2 1286.2
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1 1240.5 1286.5
## - Year 1 1240.9 1286.9
## - ...1 1 1240.9 1286.9
## <none> 1239.0 1287.0
## - Month 1 1241.2 1287.2
## - Total.Cloud.Cover.daily.min..sfc. 1 1241.5 1287.5
## - Total.Cloud.Cover.daily.max..sfc. 1 1241.6 1287.6
## - Snowfall.amount.raw.daily.sum..sfc. 1 1241.8 1287.8
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1242.7 1288.7
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1243.0 1289.0
## - Temperature.daily.min..2.m.above.gnd. 1 1243.4 1289.4
## - Wind.Gust.daily.max..sfc. 1 1244.1 1290.1

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## - Wind.Speed.daily.max..10.m.above.gnd.      1  1244.3 1290.3
## - Wind.Speed.daily.min..10.m.above.gnd.      1  1247.0 1293.0
## - Wind.Speed.daily.mean..80.m.above.gnd.     1  1248.2 1294.2
## - Temperature.daily.mean..2.m.above.gnd.     1  1248.8 1294.8
## - Mean.Sea.Level.Pressure.daily.max..MSL.     1  1251.2 1297.2
## - Wind.Direction.daily.mean..900.mb.         1  1251.9 1297.9
## - Mean.Sea.Level.Pressure.daily.mean..MSL.    1  1253.6 1299.6
## - Mean.Sea.Level.Pressure.daily.min..MSL.     1  1260.0 1306.0
##
## Step: AIC=1286.05
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
##   Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##   Snowfall.amount.raw.daily.sum..sfc. +
Total.Cloud.Cover.daily.mean..sfc. +
##   Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Speed.daily.mean..80.m.above.gnd. +
##   Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. +
##   Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##   Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##   Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##   Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##   Wind.Speed.daily.min..10.m.above.gnd. + Wind.Gust.daily.max..sfc.
##
##
##                                     Df Deviance   AIC
## - Total.Cloud.Cover.daily.mean..sfc.      1  1241.0 1285.0
## - High.Cloud.Cover.daily.max..high.cld.lay. 1  1241.2 1285.2
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1  1241.3 1285.3
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1  1241.6 1285.6
## - Year                                     1  1241.9 1285.9
## - ...1                                    1  1241.9 1285.9
## <none>                                     1240.0 1286.0
## - Month                                    1  1242.2 1286.2
## - Total.Cloud.Cover.daily.min..sfc.        1  1242.5 1286.5
## - Snowfall.amount.raw.daily.sum..sfc.      1  1242.5 1286.5
## - Total.Cloud.Cover.daily.max..sfc.        1  1242.7 1286.7
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1  1244.0 1288.0
## - Wind.Direction.daily.mean..80.m.above.gnd. 1  1244.3 1288.3
## - Temperature.daily.min..2.m.above.gnd.    1  1244.5 1288.5
## - Wind.Gust.daily.max..sfc.                1  1245.2 1289.2
## - Wind.Speed.daily.max..10.m.above.gnd.    1  1246.9 1290.9
## - Wind.Speed.daily.min..10.m.above.gnd.    1  1249.7 1293.7
## - Temperature.daily.mean..2.m.above.gnd.   1  1249.9 1293.9
## - Mean.Sea.Level.Pressure.daily.max..MSL.   1  1252.4 1296.4

```

```

## - Wind.Direction.daily.mean..900.mb.      1  1253.3 1297.3
## - Wind.Speed.daily.mean..80.m.above.gnd.   1  1254.4 1298.4
## - Mean.Sea.Level.Pressure.daily.mean..MSL.  1  1254.8 1298.8
## - Mean.Sea.Level.Pressure.daily.min..MSL.   1  1261.2 1305.2
##
## Step: AIC=1285.05
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Snowfall.amount.raw.daily.sum..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
## Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..900.mb. +
Temperature.daily.min..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
## Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
## High.Cloud.Cover.daily.max..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
## Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1242.1 1284.1
## - Year 1 1242.8 1284.8
## - ...1 1 1242.9 1284.9
## <none> 1241.0 1285.0
## - Month 1 1243.2 1285.2
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1 1243.3 1285.3
## - Snowfall.amount.raw.daily.sum..sfc. 1 1243.7 1285.7
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1244.7 1286.7
## - Total.Cloud.Cover.daily.min..sfc. 1 1244.7 1286.7
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1244.8 1286.8
## - Temperature.daily.min..2.m.above.gnd. 1 1244.9 1286.9
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1245.2 1287.2
## - Total.Cloud.Cover.daily.max..sfc. 1 1245.9 1287.9
## - Wind.Gust.daily.max..sfc. 1 1246.4 1288.4
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1248.0 1290.0
## - Temperature.daily.mean..2.m.above.gnd. 1 1250.0 1292.0
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1251.4 1293.4
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1253.3 1295.3
## - Wind.Direction.daily.mean..900.mb. 1 1254.4 1296.4
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1255.7 1297.7
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1256.0 1298.0
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1262.1 1304.1
##

```

```

## Step: AIC=1284.06
## pluie.demain ~ ...1 + Year + Month +
Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Snowfall.amount.raw.daily.sum..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
## Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..900.mb. +
Temperature.daily.min..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
## Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
## Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
## Wind.Speed.daily.min..10.m.above.gnd. + Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## - Year 1 1243.8 1283.8
## - ...1 1 1243.9 1283.9
## <none> 1242.1 1284.1
## - Month 1 1244.2 1284.2
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1 1244.4 1284.4
## - Snowfall.amount.raw.daily.sum..sfc. 1 1244.9 1284.9
## - Total.Cloud.Cover.daily.min..sfc. 1 1245.6 1285.6
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1245.9 1285.9
## - Temperature.daily.min..2.m.above.gnd. 1 1246.3 1286.3
## - Total.Cloud.Cover.daily.max..sfc. 1 1247.1 1287.1
## - Wind.Gust.daily.max..sfc. 1 1247.7 1287.7
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1247.9 1287.9
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1248.2 1288.2
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1248.8 1288.8
## - Temperature.daily.mean..2.m.above.gnd. 1 1252.0 1292.0
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1252.1 1292.1
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1254.4 1294.4
## - Wind.Direction.daily.mean..900.mb. 1 1255.6 1295.6
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1256.9 1296.9
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1257.1 1297.1
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1263.5 1303.5
##
## Step: AIC=1283.83
## pluie.demain ~ ...1 + Month + Temperature.daily.mean..2.m.above.gnd. +
## Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Snowfall.amount.raw.daily.sum..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
## Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +

```

```

##      Wind.Direction.daily.mean..900.mb. +
Temperature.daily.min..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
##      Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. + Wind.Gust.daily.max..sfc.
##
##
##                                     Df Deviance    AIC
## - Month                             1   1245.8 1283.8
## <none>                               1243.8 1283.8
## - Relative.Humidity.daily.mean..2.m.above.gnd. 1   1245.9 1283.9
## - Snowfall.amount.raw.daily.sum..sfc.          1   1246.5 1284.5
## - Total.Cloud.Cover.daily.min..sfc.            1   1247.6 1285.6
## - Wind.Direction.daily.mean..80.m.above.gnd.   1   1247.8 1285.8
## - Temperature.daily.min..2.m.above.gnd.        1   1248.0 1286.0
## - ...1                                          1   1248.8 1286.8
## - Total.Cloud.Cover.daily.max..sfc.            1   1249.0 1287.0
## - Wind.Gust.daily.max..sfc.                    1   1249.1 1287.1
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.  1   1249.7 1287.7
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.  1   1250.0 1288.0
## - Wind.Speed.daily.max..10.m.above.gnd.        1   1250.6 1288.6
## - Temperature.daily.mean..2.m.above.gnd.       1   1253.6 1291.6
## - Wind.Speed.daily.min..10.m.above.gnd.        1   1253.9 1291.9
## - Mean.Sea.Level.Pressure.daily.max..MSL.      1   1255.9 1293.9
## - Wind.Direction.daily.mean..900.mb.          1   1257.7 1295.7
## - Mean.Sea.Level.Pressure.daily.mean..MSL.     1   1258.5 1296.5
## - Wind.Speed.daily.mean..80.m.above.gnd.       1   1258.7 1296.7
## - Mean.Sea.Level.Pressure.daily.min..MSL.      1   1264.9 1302.9
##
## Step:  AIC=1283.77
## pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd. +
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Snowfall.amount.raw.daily.sum..sfc. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..900.mb. +
Temperature.daily.min..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
Mean.Sea.Level.Pressure.daily.min..MSL. +
##      Total.Cloud.Cover.daily.max..sfc. + Total.Cloud.Cover.daily.min..sfc.
+
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. + Wind.Gust.daily.max..sfc.
##

```

```

##                                     Df Deviance    AIC
## - Relative.Humidity.daily.mean..2.m.above.gnd.  1  1247.3 1283.3
## <none>                                           1245.8 1283.8
## - Snowfall.amount.raw.daily.sum..sfc.          1  1248.8 1284.8
## - Wind.Direction.daily.mean..80.m.above.gnd.   1  1249.0 1285.0
## - Total.Cloud.Cover.daily.min..sfc.            1  1249.6 1285.6
## - Wind.Gust.daily.max..sfc.                    1  1250.7 1286.7
## - ...1                                           1  1250.9 1286.9
## - Temperature.daily.min..2.m.above.gnd.        1  1251.0 1287.0
## - Total.Cloud.Cover.daily.max..sfc.            1  1251.1 1287.1
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.   1  1251.6 1287.6
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay.  1  1252.1 1288.1
## - Wind.Speed.daily.max..10.m.above.gnd.        1  1253.3 1289.3
## - Wind.Speed.daily.min..10.m.above.gnd.        1  1256.3 1292.3
## - Temperature.daily.mean..2.m.above.gnd.       1  1256.3 1292.3
## - Mean.Sea.Level.Pressure.daily.max..MSL.       1  1258.0 1294.0
## - Wind.Direction.daily.mean..900.mb.           1  1259.0 1295.0
## - Mean.Sea.Level.Pressure.daily.mean..MSL.     1  1260.4 1296.4
## - Wind.Speed.daily.mean..80.m.above.gnd.       1  1261.5 1297.5
## - Mean.Sea.Level.Pressure.daily.min..MSL.      1  1266.8 1302.8
##
## Step:  AIC=1283.29
## plue.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Snowfall.amount.raw.daily.sum..sfc. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..900.mb. +
##      Temperature.daily.min..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
##      Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Gust.daily.max..sfc.
##
##                                     Df Deviance    AIC
## <none>                                           1247.3 1283.3
## - Snowfall.amount.raw.daily.sum..sfc.          1  1250.1 1284.1
## - Wind.Direction.daily.mean..80.m.above.gnd.   1  1250.3 1284.3
## - Temperature.daily.min..2.m.above.gnd.        1  1251.2 1285.2
## - ...1                                           1  1251.4 1285.4
## - Total.Cloud.Cover.daily.min..sfc.            1  1251.5 1285.5
## - Wind.Gust.daily.max..sfc.                    1  1252.0 1286.0
## - Medium.Cloud.Cover.daily.max..mid.cld.lay.   1  1252.8 1286.8
## - Total.Cloud.Cover.daily.max..sfc.            1  1253.1 1287.1
## - Wind.Speed.daily.max..10.m.above.gnd.        1  1254.5 1288.5

```

```
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1254.6 1288.6
## - Temperature.daily.mean..2.m.above.gnd. 1 1256.4 1290.4
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1257.1 1291.1
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1259.5 1293.5
## - Wind.Direction.daily.mean..900.mb. 1 1260.1 1294.1
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1262.1 1296.1
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1262.5 1296.5
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1268.6 1302.6
```

```
summary(p4) # AIC=1393.27
```

```
##
## Call:
## glm(formula = pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd.
+
##      Mean.Sea.Level.Pressure.daily.mean..MSL. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Speed.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. +
##      Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Gust.daily.max..sfc., family = binomial, data = dtn)
##
## Coefficients:
##
##              Estimate Std. Error z value
## (Intercept)      6.382e+01  1.182e+01  5.397
## ...1            1.736e-04  8.558e-05  2.029
## Temperature.daily.mean..2.m.above.gnd.  1.489e-01  4.984e-02  2.988
## Mean.Sea.Level.Pressure.daily.mean..MSL.  4.822e-01  1.313e-01  3.672
## Snowfall.amount.raw.daily.sum..sfc.     -3.221e-01  2.155e-01 -1.494
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1.086e-02  4.059e-03  2.674
## Wind.Speed.daily.mean..80.m.above.gnd.    -1.150e-01  2.996e-02 -3.839
## Wind.Direction.daily.mean..80.m.above.gnd. -2.628e-03  1.523e-03 -1.726
## Wind.Direction.daily.mean..900.mb.        4.565e-03  1.289e-03  3.543
## Temperature.daily.min..2.m.above.gnd.     -1.059e-01  5.417e-02 -1.955
## Mean.Sea.Level.Pressure.daily.max..MSL.    -2.423e-01  7.062e-02 -3.432
## Mean.Sea.Level.Pressure.daily.min..MSL.    -3.064e-01  7.168e-02 -4.275
## Total.Cloud.Cover.daily.max..sfc.         8.335e-03  3.505e-03  2.378
## Total.Cloud.Cover.daily.min..sfc.         7.812e-03  3.863e-03  2.023
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 6.215e-03  2.671e-03  2.327
## Wind.Speed.daily.max..10.m.above.gnd.     6.051e-02  2.274e-02  2.661
## Wind.Speed.daily.min..10.m.above.gnd.     1.119e-01  3.610e-02  3.099
```

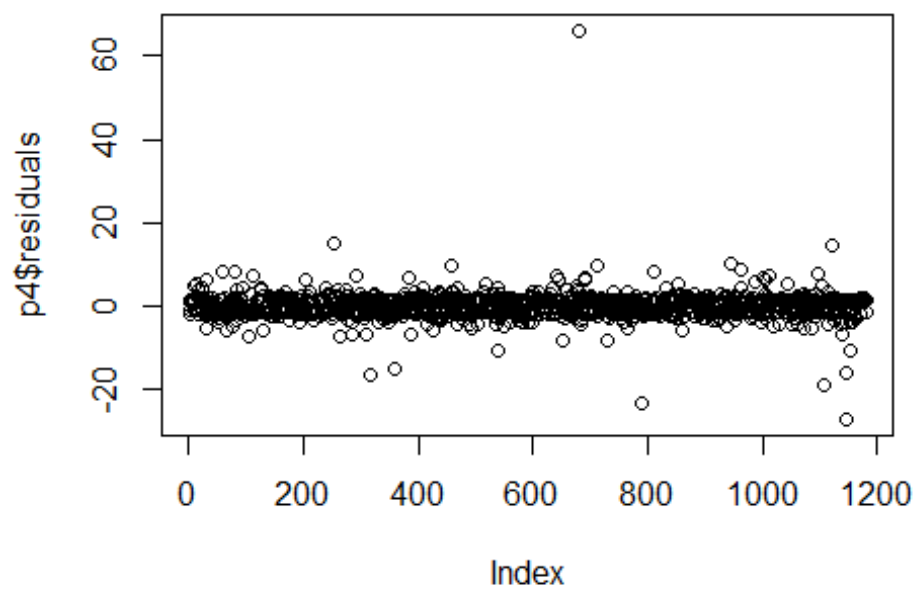
```

## Wind.Gust.daily.max..sfc.          2.331e-02  1.085e-02  2.149
##                                Pr(>|z|)
## (Intercept)                        6.78e-08 ***
## ...1                               0.042464 *
## Temperature.daily.mean..2.m.above.gnd. 0.002808 **
## Mean.Sea.Level.Pressure.daily.mean..MSL. 0.000240 ***
## Snowfall.amount.raw.daily.sum..sfc.    0.135057
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 0.007492 **
## Wind.Speed.daily.mean..80.m.above.gnd.  0.000124 ***
## Wind.Direction.daily.mean..80.m.above.gnd. 0.084346 .
## Wind.Direction.daily.mean..900.mb.      0.000396 ***
## Temperature.daily.min..2.m.above.gnd.   0.050642 .
## Mean.Sea.Level.Pressure.daily.max..MSL.  0.000600 ***
## Mean.Sea.Level.Pressure.daily.min..MSL.  1.91e-05 ***
## Total.Cloud.Cover.daily.max..sfc.       0.017387 *
## Total.Cloud.Cover.daily.min..sfc.       0.043122 *
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 0.019960 *
## Wind.Speed.daily.max..10.m.above.gnd.   0.007799 **
## Wind.Speed.daily.min..10.m.above.gnd.   0.001942 **
## Wind.Gust.daily.max..sfc.               0.031673 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##    Null deviance: 1635.4  on 1179  degrees of freedom
## Residual deviance: 1247.3  on 1162  degrees of freedom
## AIC: 1283.3
##
## Number of Fisher Scoring iterations: 4

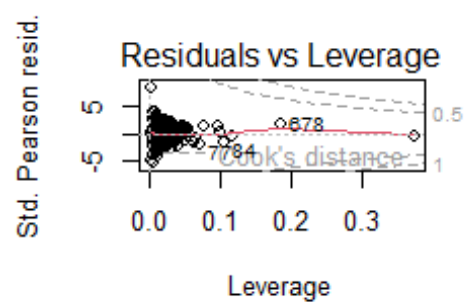
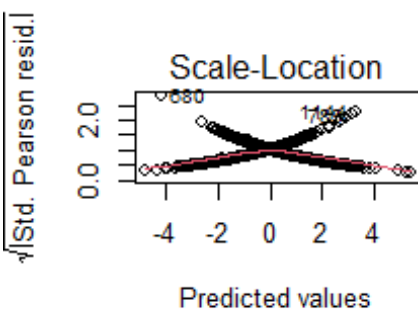
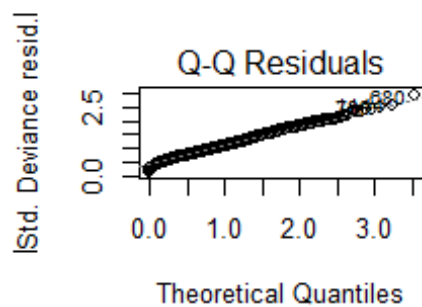
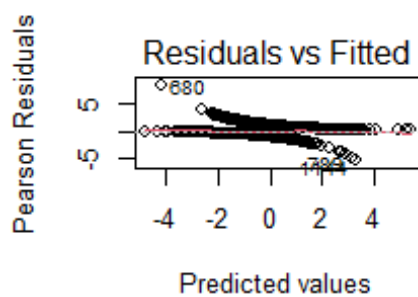
plot(p4$residuals)

```





```
# Diagnostics de base avec la fonction plot
par(mfrow = c(2, 2))
plot(p4)
```



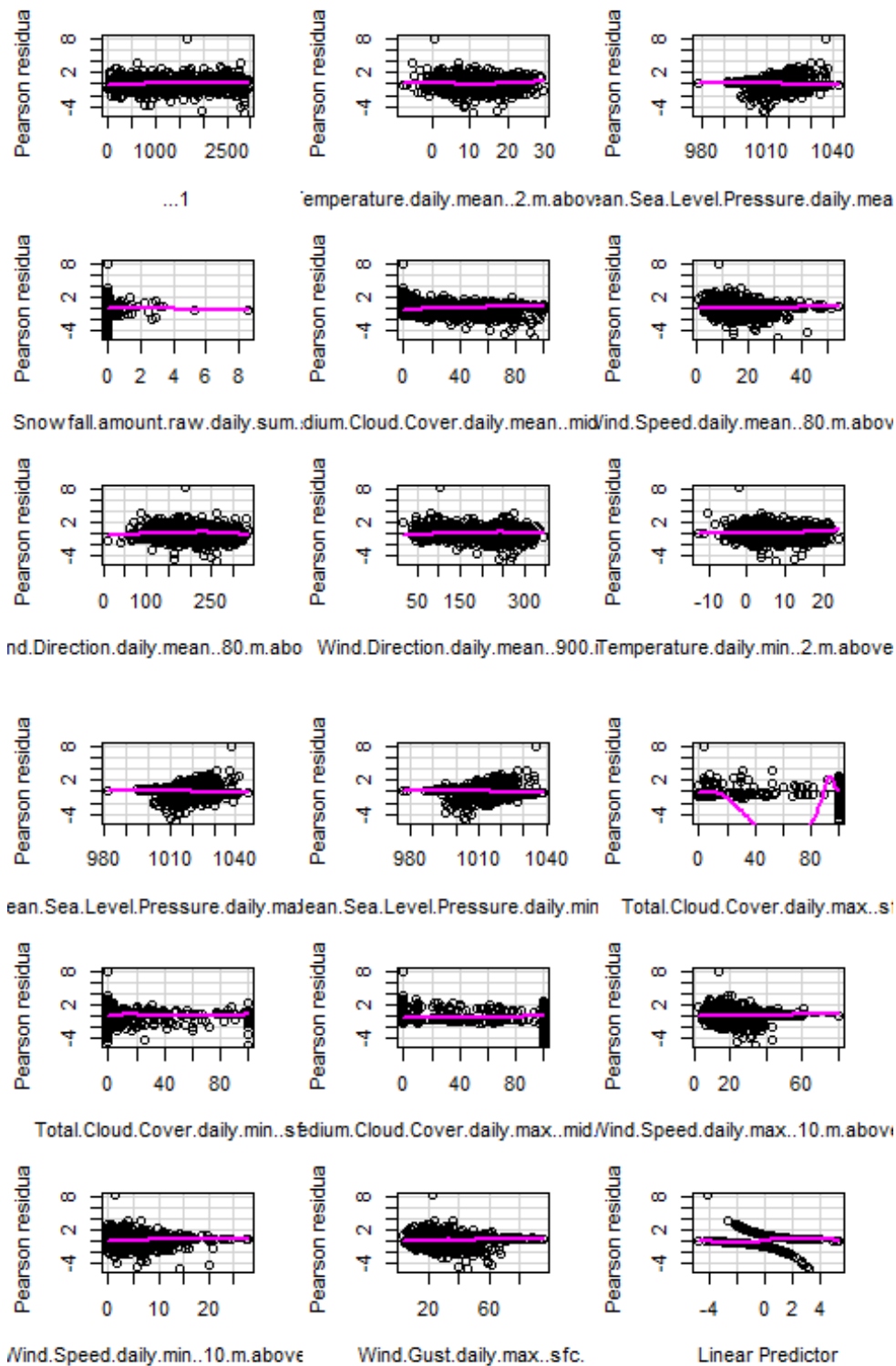
```
# p4
# Diagnostics supplémentaires avec Le package car
library(car)

## Warning: le package 'car' a été compilé avec la version R 4.3.3

## Le chargement a nécessité le package : carData

## Warning: le package 'carData' a été compilé avec la version R 4.3.3

residualPlots(p4)
```



##	Test stat	Pr(> Test stat )
## ...1	0.1560	0.6928398
## Temperature.daily.mean..2.m.above.gnd.	15.8080	7.01e-05 ***
## Mean.Sea.Level.Pressure.daily.mean..MSL.	0.0314	0.8593133

```
## Snowfall.amount.raw.daily.sum..sfc.      1.3408      0.2468901
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 0.3174      0.5731789
## Wind.Speed.daily.mean..80.m.above.gnd.    1.5166      0.2181321
## Wind.Direction.daily.mean..80.m.above.gnd. 7.7568      0.0053510 **
## Wind.Direction.daily.mean..900.mb.        0.1831      0.6687317
## Temperature.daily.min..2.m.above.gnd.    14.8991      0.0001134 ***
## Mean.Sea.Level.Pressure.daily.max..MSL.    0.0015      0.9693391
## Mean.Sea.Level.Pressure.daily.min..MSL.    0.0693      0.7923519
## Total.Cloud.Cover.daily.max..sfc.        2.0713      0.1500955
## Total.Cloud.Cover.daily.min..sfc.        0.1628      0.6866012
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 0.5777      0.4472046
## Wind.Speed.daily.max..10.m.above.gnd.     2.2595      0.1328000
## Wind.Speed.daily.min..10.m.above.gnd.     0.2621      0.6086829
## Wind.Gust.daily.max..sfc.                 0.0020      0.9641060
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
influencePlot(p4, main = "Influence Plot", sub = "Circle size is proportional
to Cook's Distance")
```

```
##      StudRes      Hat      CookD
## 77  -1.8760298 0.072068208 0.018501751
## 363 -0.6165307 0.374327555 0.008215328
## 678  1.7129218 0.186730042 0.036416269
## 680  2.9225646 0.002456940 0.008924333
## 1144 -2.6015287 0.006461682 0.009487801
```

```
# Vérifications avec Le package performance
```

```
if (!require(performance)) {
  install.packages("performance")
  library(performance)
}
```

```
## Le chargement a nécessité le package : performance
```

```
## Warning: le package 'performance' a été compilé avec la version R 4.3.3
```

```
check_collinearity(p4)
```

```
## # Check for Multicollinearity
```

```
##
```

```
## Low Correlation
```

```
##
```

```
##      Term  VIF      VIF 95% CI
```

```
Increased SE
```

```
##      ...1 1.09 [ 1.05, 1.19]
```

```
1.05
```

```
##      Snowfall.amount.raw.daily.sum..sfc. 1.16 [ 1.10, 1.25]
```

```
1.08
```

```
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. 2.67 [ 2.45, 2.94]
```

```
1.64
```

```
##      Wind.Direction.daily.mean..80.m.above.gnd. 1.89 [ 1.75, 2.06]
```

```

1.37
##          Wind.Direction.daily.mean..900.mb. 1.85 [ 1.71, 2.01]
1.36
##          Total.Cloud.Cover.daily.max..sfc. 1.62 [ 1.50, 1.75]
1.27
##          Total.Cloud.Cover.daily.min..sfc. 1.41 [ 1.32, 1.53]
1.19
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 2.40 [ 2.20, 2.63]
1.55
##          Wind.Speed.daily.min..10.m.above.gnd. 3.15 [ 2.87, 3.47]
1.77
##          Wind.Gust.daily.max..sfc. 4.31 [ 3.91, 4.77]
2.08
## Tolerance Tolerance 95% CI
##      0.91      [0.84, 0.96]
##      0.86      [0.80, 0.91]
##      0.37      [0.34, 0.41]
##      0.53      [0.49, 0.57]
##      0.54      [0.50, 0.59]
##      0.62      [0.57, 0.67]
##      0.71      [0.65, 0.76]
##      0.42      [0.38, 0.45]
##      0.32      [0.29, 0.35]
##      0.23      [0.21, 0.26]
##
## Moderate Correlation
##
##          Term      VIF          VIF 95% CI Increased SE
## Wind.Speed.daily.mean..80.m.above.gnd. 9.78 [ 8.79, 10.88]      3.13
## Wind.Speed.daily.max..10.m.above.gnd. 7.48 [ 6.74, 8.31]      2.73
## Tolerance Tolerance 95% CI
##      0.10      [0.09, 0.11]
##      0.13      [0.12, 0.15]
##
## High Correlation
##
##          Term      VIF          VIF 95% CI
Increased SE
## Temperature.daily.mean..2.m.above.gnd. 23.97 [ 21.48, 26.76]
4.90
## Mean.Sea.Level.Pressure.daily.mean..MSL. 170.12 [152.13, 190.25]
13.04
## Temperature.daily.min..2.m.above.gnd. 23.25 [ 20.84, 25.95]
4.82
## Mean.Sea.Level.Pressure.daily.max..MSL. 46.74 [ 41.84, 52.23]
6.84
## Mean.Sea.Level.Pressure.daily.min..MSL. 55.47 [ 49.64, 62.00]
7.45
## Tolerance Tolerance 95% CI
##      0.04      [0.04, 0.05]

```

```
##      5.88e-03      [0.01, 0.01]
##          0.04      [0.04, 0.05]
##          0.02      [0.02, 0.02]
##          0.02      [0.02, 0.02]
```

`model_performance(p4)`

```
## # Indices of model performance
```

```
##
```

```
## AIC      |      AICc |      BIC | Tjur's R2 |  RMSE | Sigma | Log_loss |
Score_log | Score_spherical |  PCP
```

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

```
## 1283.294 | 1283.883 | 1374.613 |      0.296 | 0.418 | 1.000 |      0.529 |
-Inf |          0.001 | 0.648
```

```
#install.packages("lmtest")
```

```
library(lmtest)
```

```
## Warning: le package 'lmtest' a été compilé avec la version R 4.3.3
```

```
## Le chargement a nécessité le package : zoo
```

```
## Warning: le package 'zoo' a été compilé avec la version R 4.3.3
```

```
##
```

```
## Attachement du package : 'zoo'
```

```
## Les objets suivants sont masqués depuis 'package:base':
```

```
##
```

```
##      as.Date, as.Date.numeric
```

```
# Effectuer le test du rapport de vraisemblance (Likelihood Ratio Test)
```

```
test_lrmdr2 <- lrtest(mdr2)
```

```
# Afficher les résultats du test
```

```
print(test_lrmdr2) # 2.2e-16 ***
```

```
## Likelihood ratio test
```

```
##
```

```
## Model 1: pluie.demain ~ ...1 + Year + Month + Day + Hour + Minute +
Temperature.daily.mean..2.m.above.gnd. +
```

```
##      Relative.Humidity.daily.mean..2.m.above.gnd. +
```

```
Mean.Sea.Level.Pressure.daily.mean..MSL. +
```

```
##      Total.Precipitation.daily.sum..sfc. +
```

```
Snowfall.amount.raw.daily.sum..sfc. +
```

```
##      Total.Cloud.Cover.daily.mean..sfc. +
```

```
High.Cloud.Cover.daily.mean..high.cld.lay. +
```

```
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
```

```
Low.Cloud.Cover.daily.mean..low.cld.lay. +
```

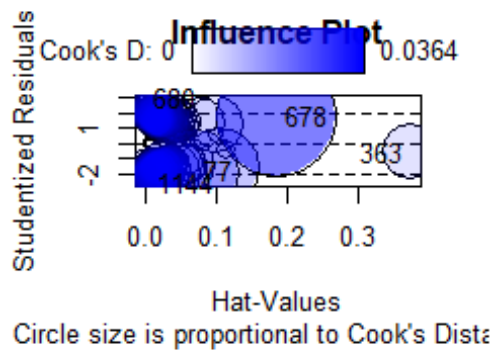
```
##      Sunshine.Duration.daily.sum..sfc. +
```

```
Shortwave.Radiation.daily.sum..sfc. +
```

```

##      Wind.Speed.daily.mean..10.m.above.gnd. +
Wind.Direction.daily.mean..10.m.above.gnd. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Speed.daily.mean..900.mb. + Wind.Direction.daily.mean..900.mb. +
##      Wind.Gust.daily.mean..sfc. + Temperature.daily.max..2.m.above.gnd. +
##      Temperature.daily.min..2.m.above.gnd. +
Relative.Humidity.daily.max..2.m.above.gnd. +
##      Relative.Humidity.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      High.Cloud.Cover.daily.min..high.cld.lay. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Medium.Cloud.Cover.daily.min..mid.cld.lay. +
Low.Cloud.Cover.daily.max..low.cld.lay. +
##      Low.Cloud.Cover.daily.min..low.cld.lay. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.max..80.m.above.gnd. +
##      Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.max..900.mb.
+
##      Wind.Speed.daily.min..900.mb. + Wind.Gust.daily.max..sfc. +
##      Wind.Gust.daily.min..sfc.
## Model 2: pluie.demain ~ 1
## #Df LogLik Df Chisq Pr(>Chisq)
## 1 45 -616.20
## 2 1 -817.71 -44 403.02 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```



6-1 le model retenu via la fonction step : le mdr5 est le model retenu via STEP, avec un AIC=1283.3 et un Likelihood Ratio Test 2.2e-16 \*\*\* (rapport vraisemblance)

```
# Charger les bibliothèques nécessaires
if (!require(car)) {
  install.packages("car")
  library(car)
}
if (!require(performance)) {
  install.packages("performance")
  library(performance)
}

# Construire le modèle initial avec toutes les variables
mdr5 <- glm(formula = pluie.demain ~ ...1 +
  Temperature.daily.mean..2.m.above.gnd. +
    Mean.Sea.Level.Pressure.daily.mean..MSL. +
  Snowfall.amount.raw.daily.sum..sfc. +
    Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
  Wind.Speed.daily.mean..80.m.above.gnd. +
    Wind.Direction.daily.mean..80.m.above.gnd. +
  Wind.Direction.daily.mean..900.mb. +
    Temperature.daily.min..2.m.above.gnd. +
  Mean.Sea.Level.Pressure.daily.max..MSL. +
    Mean.Sea.Level.Pressure.daily.min..MSL. +
  Total.Cloud.Cover.daily.max..sfc. +
    Total.Cloud.Cover.daily.min..sfc. +
```



```

Medium.Cloud.Cover.daily.max..mid.cld.lay. +
      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
      Wind.Gust.daily.max..sfc., family = binomial, data = dtn)

# Afficher le résumé du modèle initial
summary(mdr5)

##
## Call:
## glm(formula = pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd.
+
##      Mean.Sea.Level.Pressure.daily.mean..MSL. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Speed.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. +
##      Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Gust.daily.max..sfc., family = binomial, data = dtn)
##
## Coefficients:
##
##              Estimate Std. Error z value
## (Intercept)      6.382e+01  1.182e+01  5.397
## ...1              1.736e-04  8.558e-05  2.029
## Temperature.daily.mean..2.m.above.gnd.    1.489e-01  4.984e-02  2.988
## Mean.Sea.Level.Pressure.daily.mean..MSL.    4.822e-01  1.313e-01  3.672
## Snowfall.amount.raw.daily.sum..sfc.      -3.221e-01  2.155e-01 -1.494
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.  1.086e-02  4.059e-03  2.674
## Wind.Speed.daily.mean..80.m.above.gnd.     -1.150e-01  2.996e-02 -3.839
## Wind.Direction.daily.mean..80.m.above.gnd.   -2.628e-03  1.523e-03 -1.726
## Wind.Direction.daily.mean..900.mb.          4.565e-03  1.289e-03  3.543
## Temperature.daily.min..2.m.above.gnd.      -1.059e-01  5.417e-02 -1.955
## Mean.Sea.Level.Pressure.daily.max..MSL.     -2.423e-01  7.062e-02 -3.432
## Mean.Sea.Level.Pressure.daily.min..MSL.     -3.064e-01  7.168e-02 -4.275
## Total.Cloud.Cover.daily.max..sfc.           8.335e-03  3.505e-03  2.378
## Total.Cloud.Cover.daily.min..sfc.           7.812e-03  3.863e-03  2.023
## Medium.Cloud.Cover.daily.max..mid.cld.lay.   6.215e-03  2.671e-03  2.327
## Wind.Speed.daily.max..10.m.above.gnd.        6.051e-02  2.274e-02  2.661
## Wind.Speed.daily.min..10.m.above.gnd.        1.119e-01  3.610e-02  3.099
## Wind.Gust.daily.max..sfc.                   2.331e-02  1.085e-02  2.149
##
##              Pr(>|z|)
## (Intercept)      6.78e-08 ***

```

```

## ...1 0.042464 *
## Temperature.daily.mean..2.m.above.gnd. 0.002808 **
## Mean.Sea.Level.Pressure.daily.mean..MSL. 0.000240 ***
## Snowfall.amount.raw.daily.sum..sfc. 0.135057
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 0.007492 **
## Wind.Speed.daily.mean..80.m.above.gnd. 0.000124 ***
## Wind.Direction.daily.mean..80.m.above.gnd. 0.084346 .
## Wind.Direction.daily.mean..900.mb. 0.000396 ***
## Temperature.daily.min..2.m.above.gnd. 0.050642 .
## Mean.Sea.Level.Pressure.daily.max..MSL. 0.000600 ***
## Mean.Sea.Level.Pressure.daily.min..MSL. 1.91e-05 ***
## Total.Cloud.Cover.daily.max..sfc. 0.017387 *
## Total.Cloud.Cover.daily.min..sfc. 0.043122 *
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 0.019960 *
## Wind.Speed.daily.max..10.m.above.gnd. 0.007799 **
## Wind.Speed.daily.min..10.m.above.gnd. 0.001942 **
## Wind.Gust.daily.max..sfc. 0.031673 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 1635.4 on 1179 degrees of freedom
## Residual deviance: 1247.3 on 1162 degrees of freedom
## AIC: 1283.3
##
## Number of Fisher Scoring iterations: 4

# Sélection de variables avec la fonction step
p7 <- step(mdr5)

## Start: AIC=1283.29
## pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.mean..MSL. +
## Snowfall.amount.raw.daily.sum..sfc. +
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
## Wind.Speed.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..900.mb. +
## Temperature.daily.min..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
## Mean.Sea.Level.Pressure.daily.min..MSL. +
## Total.Cloud.Cover.daily.max..sfc. +
## Total.Cloud.Cover.daily.min..sfc. +
## Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Wind.Speed.daily.max..10.m.above.gnd. +
## Wind.Speed.daily.min..10.m.above.gnd. +
## Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC

```

```
## <none> 1247.3 1283.3
## - Snowfall.amount.raw.daily.sum..sfc. 1 1250.1 1284.1
## - Wind.Direction.daily.mean..80.m.above.gnd. 1 1250.3 1284.3
## - Temperature.daily.min..2.m.above.gnd. 1 1251.2 1285.2
## - ...1 1 1251.4 1285.4
## - Total.Cloud.Cover.daily.min..sfc. 1 1251.5 1285.5
## - Wind.Gust.daily.max..sfc. 1 1252.0 1286.0
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1252.8 1286.8
## - Total.Cloud.Cover.daily.max..sfc. 1 1253.1 1287.1
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1254.5 1288.5
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1254.6 1288.6
## - Temperature.daily.mean..2.m.above.gnd. 1 1256.4 1290.4
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1257.1 1291.1
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1259.5 1293.5
## - Wind.Direction.daily.mean..900.mb. 1 1260.1 1294.1
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1262.1 1296.1
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1262.5 1296.5
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1268.6 1302.6
```

*# Afficher le résumé du modèle après sélection de variables*

**summary(p7) # AIC=1283.3**

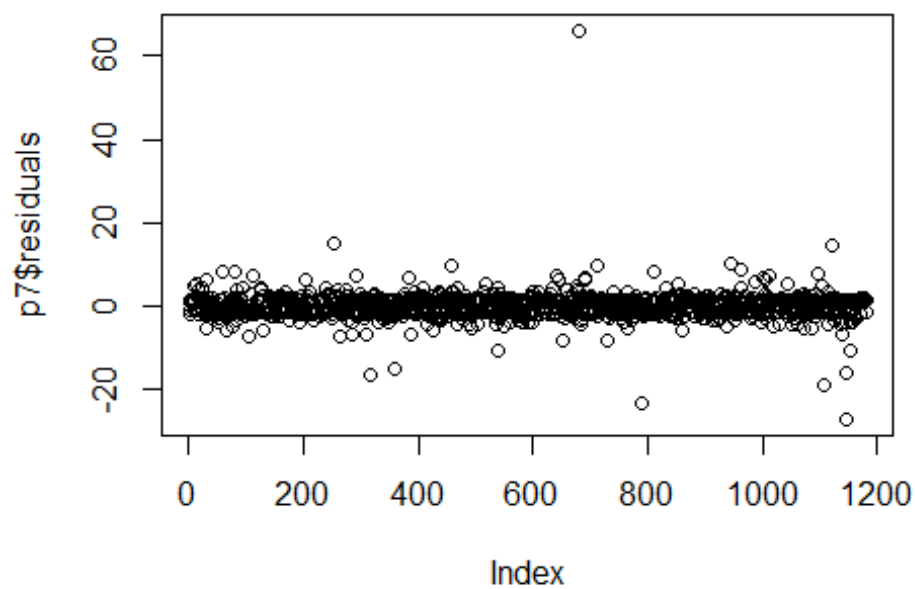
```
##
## Call:
## glm(formula = pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd.
+
## Mean.Sea.Level.Pressure.daily.mean..MSL. +
Snowfall.amount.raw.daily.sum..sfc. +
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Speed.daily.mean..80.m.above.gnd. +
## Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. +
## Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
## Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
## Total.Cloud.Cover.daily.min..sfc. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
## Wind.Gust.daily.max..sfc., family = binomial, data = dtn)
##
## Coefficients:
## Estimate Std. Error z value
## (Intercept) 6.382e+01 1.182e+01 5.397
## ...1 1.736e-04 8.558e-05 2.029
## Temperature.daily.mean..2.m.above.gnd. 1.489e-01 4.984e-02 2.988
## Mean.Sea.Level.Pressure.daily.mean..MSL. 4.822e-01 1.313e-01 3.672
## Snowfall.amount.raw.daily.sum..sfc. -3.221e-01 2.155e-01 -1.494
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1.086e-02 4.059e-03 2.674
```

```

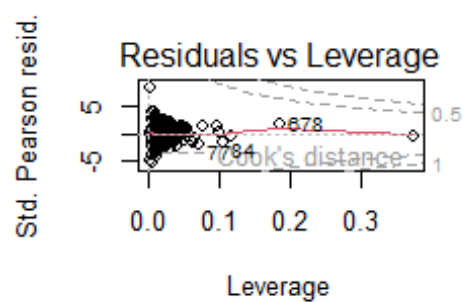
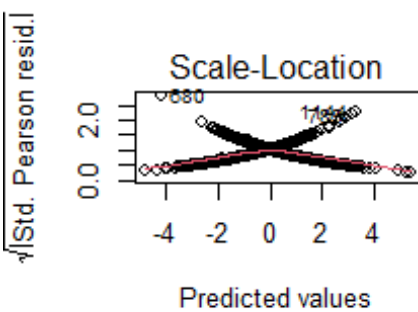
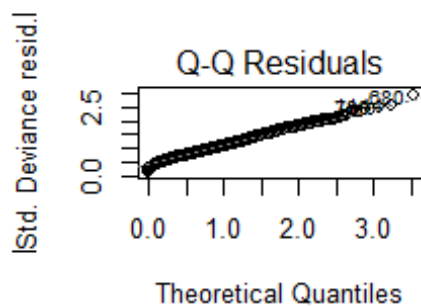
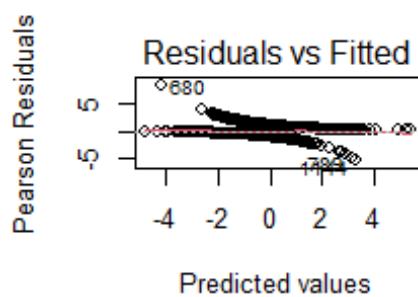
## Wind.Speed.daily.mean..80.m.above.gnd.      -1.150e-01  2.996e-02  -3.839
## Wind.Direction.daily.mean..80.m.above.gnd.    -2.628e-03  1.523e-03  -1.726
## Wind.Direction.daily.mean..900.mb.            4.565e-03  1.289e-03   3.543
## Temperature.daily.min..2.m.above.gnd.         -1.059e-01  5.417e-02  -1.955
## Mean.Sea.Level.Pressure.daily.max..MSL.        -2.423e-01  7.062e-02  -3.432
## Mean.Sea.Level.Pressure.daily.min..MSL.        -3.064e-01  7.168e-02  -4.275
## Total.Cloud.Cover.daily.max..sfc.             8.335e-03  3.505e-03   2.378
## Total.Cloud.Cover.daily.min..sfc.             7.812e-03  3.863e-03   2.023
## Medium.Cloud.Cover.daily.max..mid.cld.lay.     6.215e-03  2.671e-03   2.327
## Wind.Speed.daily.max..10.m.above.gnd.          6.051e-02  2.274e-02   2.661
## Wind.Speed.daily.min..10.m.above.gnd.          1.119e-01  3.610e-02   3.099
## Wind.Gust.daily.max..sfc.                     2.331e-02  1.085e-02   2.149
##
## Pr(>|z|)
## (Intercept)                                  6.78e-08 ***
## ...1                                         0.042464 *
## Temperature.daily.mean..2.m.above.gnd.       0.002808 **
## Mean.Sea.Level.Pressure.daily.mean..MSL.      0.000240 ***
## Snowfall.amount.raw.daily.sum..sfc.          0.135057
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.  0.007492 **
## Wind.Speed.daily.mean..80.m.above.gnd.        0.000124 ***
## Wind.Direction.daily.mean..80.m.above.gnd.    0.084346 .
## Wind.Direction.daily.mean..900.mb.           0.000396 ***
## Temperature.daily.min..2.m.above.gnd.         0.050642 .
## Mean.Sea.Level.Pressure.daily.max..MSL.       0.000600 ***
## Mean.Sea.Level.Pressure.daily.min..MSL.       1.91e-05 ***
## Total.Cloud.Cover.daily.max..sfc.            0.017387 *
## Total.Cloud.Cover.daily.min..sfc.            0.043122 *
## Medium.Cloud.Cover.daily.max..mid.cld.lay.    0.019960 *
## Wind.Speed.daily.max..10.m.above.gnd.         0.007799 **
## Wind.Speed.daily.min..10.m.above.gnd.         0.001942 **
## Wind.Gust.daily.max..sfc.                    0.031673 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 1635.4 on 1179 degrees of freedom
## Residual deviance: 1247.3 on 1162 degrees of freedom
## AIC: 1283.3
##
## Number of Fisher Scoring iterations: 4

# Plot des résidus
plot(p7$residuals)

```

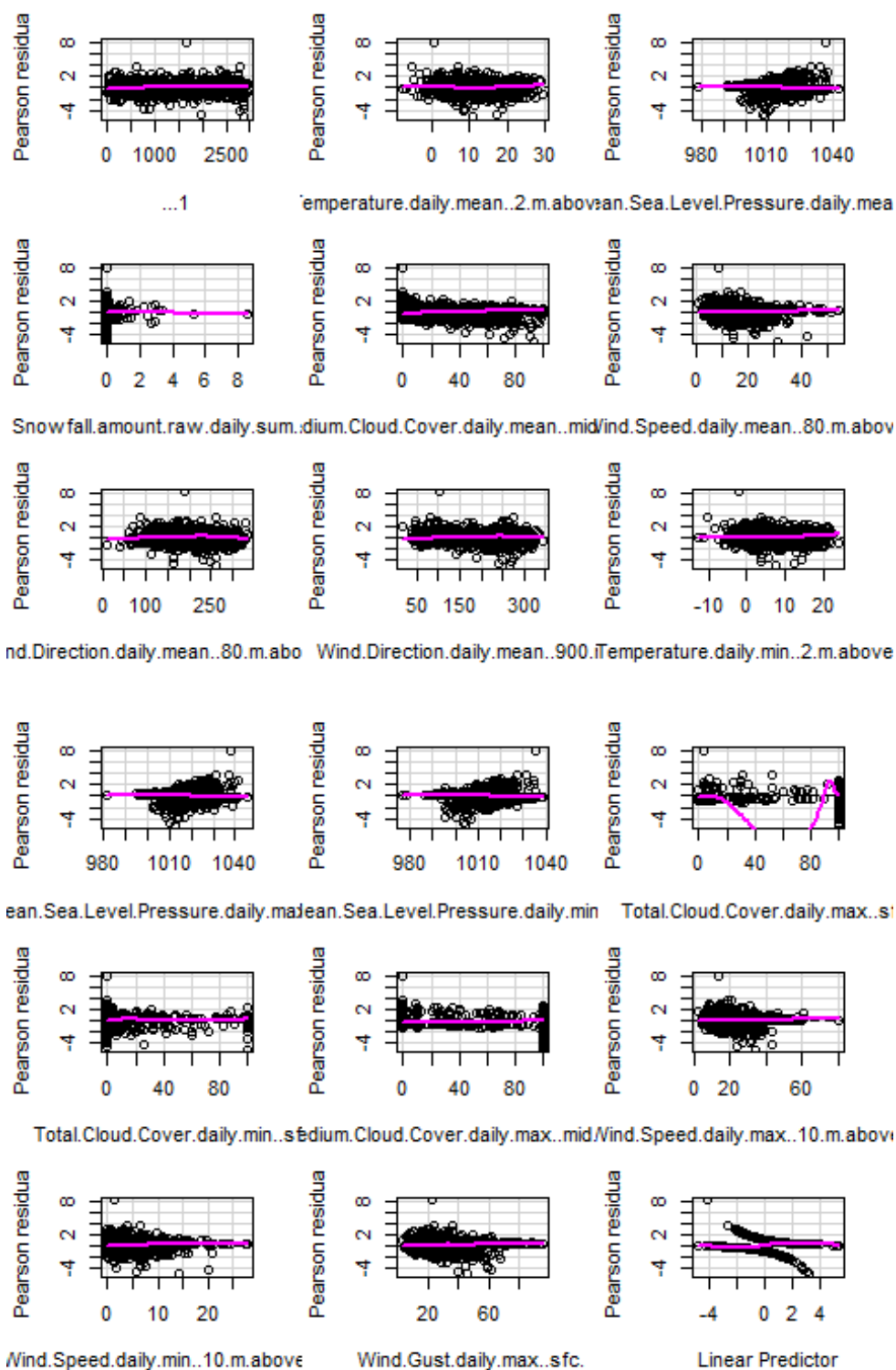


```
# Diagnostics de base avec la fonction plot
par(mfrow = c(2, 2))
plot(p7)
```



# Diagnostics supplémentaires avec le package car

```
library(car)
residualPlots(p7)
```



```
##                                Test stat Pr(>|Test stat|)
## ...1                          0.1560      0.6928398
## Temperature.daily.mean..2.m.above.gnd.    15.8080      7.01e-05 ***
## Mean.Sea.Level.Pressure.daily.mean..MSL.    0.0314      0.8593133
## Snowfall.amount.raw.daily.sum..sfc.        1.3408      0.2468901
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 0.3174      0.5731789
## Wind.Speed.daily.mean..80.m.above.gnd.      1.5166      0.2181321
## Wind.Direction.daily.mean..80.m.above.gnd.   7.7568      0.0053510 **
## Wind.Direction.daily.mean..900.mb.          0.1831      0.6687317
## Temperature.daily.min..2.m.above.gnd.       14.8991      0.0001134 ***
## Mean.Sea.Level.Pressure.daily.max..MSL.      0.0015      0.9693391
## Mean.Sea.Level.Pressure.daily.min..MSL.      0.0693      0.7923519
## Total.Cloud.Cover.daily.max..sfc.           2.0713      0.1500955
## Total.Cloud.Cover.daily.min..sfc.           0.1628      0.6866012
## Medium.Cloud.Cover.daily.max..mid.cld.lay.   0.5777      0.4472046
## Wind.Speed.daily.max..10.m.above.gnd.        2.2595      0.1328000
## Wind.Speed.daily.min..10.m.above.gnd.        0.2621      0.6086829
## Wind.Gust.daily.max..sfc.                   0.0020      0.9641060
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
influencePlot(p7, main = "Influence Plot", sub = "Circle size is proportional
to Cook's Distance")
```

```
##           StudRes           Hat           CookD
## 77    -1.8760298  0.072068208  0.018501751
## 363    -0.6165307  0.374327555  0.008215328
## 678     1.7129218  0.186730042  0.036416269
## 680     2.9225646  0.002456940  0.008924333
## 1144   -2.6015287  0.006461682  0.009487801
```

```
# Vérifications avec Le package performance
```

```
library(performance)
vif_values <- vif(p7)
print(vif_values)
```

```
##           ...1
##           1.093753
##      Temperature.daily.mean..2.m.above.gnd.
##           23.968568
##      Mean.Sea.Level.Pressure.daily.mean..MSL.
##           170.116474
##      Snowfall.amount.raw.daily.sum..sfc.
##           1.157846
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.
##           2.673327
##      Wind.Speed.daily.mean..80.m.above.gnd.
##           9.775636
##      Wind.Direction.daily.mean..80.m.above.gnd.
##           1.890155
##      Wind.Direction.daily.mean..900.mb.
```

```

##                                1.846207
##      Temperature.daily.min..2.m.above.gnd.
##                                23.251483
##      Mean.Sea.Level.Pressure.daily.max..MSL.
##                                46.738829
##      Mean.Sea.Level.Pressure.daily.min..MSL.
##                                55.472612
##      Total.Cloud.Cover.daily.max..sfc.
##                                1.616130
##      Total.Cloud.Cover.daily.min..sfc.
##                                1.413710
##      Medium.Cloud.Cover.daily.max..mid.cld.lay.
##                                2.395774
##      Wind.Speed.daily.max..10.m.above.gnd.
##                                7.478934
##      Wind.Speed.daily.min..10.m.above.gnd.
##                                3.148395
##      Wind.Gust.daily.max..sfc.
##                                4.312613

model_perf <- model_performance(p7)
print(model_perf)

## # Indices of model performance
##
## AIC      |      AICc |      BIC | Tjur's R2 |  RMSE | Sigma | Log_loss |
Score_log | Score_spherical |  PCP
## -----
## 1283.294 | 1283.883 | 1374.613 | 0.296 | 0.418 | 1.000 | 0.529 |
-Inf | 0.001 | 0.648

#install.packages("lmtest")
library(lmtest)

# Effectuer le test du rapport de vraisemblance (Likelihood Ratio Test)
test_lrmdr5 <- lrtest(mdr5)

# Afficher les résultats du test
print(test_lrmdr5) # 2.2e-16 ***

## Likelihood ratio test
##
## Model 1: pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.mean..MSL. +
##      Snowfall.amount.raw.daily.sum..sfc. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
##      Wind.Speed.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..900.mb. +
##      Temperature.daily.min..2.m.above.gnd. +

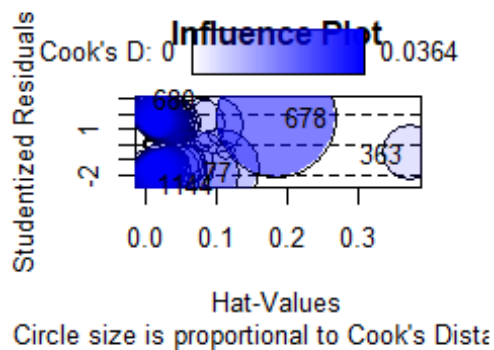
```



```

Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Gust.daily.max..sfc.
## Model 2: pluie.demain ~ 1
##      #Df LogLik Df Chisq Pr(>Chisq)
## 1  18 -623.65
## 2   1 -817.71 -17 388.12 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```



7- Sélection des caractéristiques numérique manuellement sans la fonction STEP Partie 1 : Charger les bibliothèques

```

# Charger la bibliothèque ggplot2 si ce n'est pas déjà fait
if (!require(ggplot2)) {
  install.packages("ggplot2")
  library(ggplot2)
}

# Charger la bibliothèque gridExtra si ce n'est pas déjà fait
if (!require(gridExtra)) {
  install.packages("gridExtra")
}

```

```
library(gridExtra)
}

## Le chargement a nécessité le package : gridExtra

## Warning: le package 'gridExtra' a été compilé avec la version R 4.3.3
```

Partie 2 : Définir la fonction pour générer des boxplots bivariés

```
# Créer une fonction pour générer des boxplots bivariés
boxplot_bivarie <- function(dtn, variable_x, variable_y) {
  ggplot(dtn, aes_string(x = variable_x, y = variable_y)) +
    geom_boxplot(aes(fill = as.factor(get(variable_x)))) +
    labs(title = paste("Boxplot de", variable_y, "par", variable_x),
         x = variable_x, y = variable_y) +
    theme_minimal() +
    theme(axis.text.x = element_text(angle = 45, hjust = 1))
}
```

Partie 3 : Générer les boxplots pour les variables quantitatives

```
# Variables quantitatives à explorer
variables_quantitatives <- names(dtn)[sapply(dtn, is.numeric)]

# Créer un boxplot bivarie pour chaque variable quantitative par rapport à pluie.demain
boxplot_plots <- lapply(variables_quantitatives, function(variable) {
  ggplot(dtn, aes(x = as.factor(pluie.demain), y = .data[[variable]], fill =
as.factor(pluie.demain))) +
    geom_boxplot() +
    labs(title = paste("Boxplot de", variable, "par pluie.demain"),
         x = "pluie.demain", y = variable) +
    theme_minimal()
})
```

Partie 4 : Afficher les boxplots en les divisant en quatre parties Cette partie est déjà réalisée ci-dessus : 5- box plot des variables vs la variable à expliquer : pluie.demain. 7-1 test de kruskal-walis ce test va nous permettre de classer les variables quantitatives :

```
# Charger les bibliothèques nécessaires
if (!require(dplyr)) {
  install.packages("dplyr")
  library(dplyr)
}

## Le chargement a nécessité le package : dplyr

## Warning: le package 'dplyr' a été compilé avec la version R 4.3.3

##
## Attachement du package : 'dplyr'
```

```

## L'objet suivant est masqué depuis 'package:gridExtra':
##
##     combine

## L'objet suivant est masqué depuis 'package:car':
##
##     recode

## Les objets suivants sont masqués depuis 'package:stats':
##
##     filter, lag

## Les objets suivants sont masqués depuis 'package:base':
##
##     intersect, setdiff, setequal, union

# Sélectionner les variables numériques
variables_numeriques <- names(dtn)[1:46]

# Créer un tableau pour les résultats
results <- data.frame(Variable = character(), Kruskal_Wallis = numeric(),
P_value = numeric(), stringsAsFactors = FALSE)

for (var in variables_numeriques) {
  # Effectuer le test de Kruskal-Wallis
  kruskal_test <- kruskal.test(dtn[[var]] ~ dtn$pluie.demain)

  # Ajouter les résultats au tableau
  results <- rbind(results, data.frame(Variable = var, Kruskal_Wallis =
kruskal_test$statistic, P_value = kruskal_test$p.value, stringsAsFactors =
FALSE))
}

# Trier les résultats par la statistique de test décroissant
results <- results[order(results$Kruskal_Wallis, decreasing = TRUE), ]

# Afficher les résultats
print(results)

##
##                                     Variable
## Kruskal-Wallis chi-squared13 Medium.Cloud.Cover.daily.mean..mid.cld.lay.
## Kruskal-Wallis chi-squared29      Mean.Sea.Level.Pressure.daily.min..MSL.
## Kruskal-Wallis chi-squared34 Medium.Cloud.Cover.daily.max..mid.cld.lay.
## Kruskal-Wallis chi-squared8      Mean.Sea.Level.Pressure.daily.mean..MSL.
## Kruskal-Wallis chi-squared9      Total.Precipitation.daily.sum..sfc.
## Kruskal-Wallis chi-squared28      Mean.Sea.Level.Pressure.daily.max..MSL.
## Kruskal-Wallis chi-squared32 High.Cloud.Cover.daily.max..high.cld.lay.
## Kruskal-Wallis chi-squared11      Total.Cloud.Cover.daily.mean..sfc.
## Kruskal-Wallis chi-squared12 High.Cloud.Cover.daily.mean..high.cld.lay.
## Kruskal-Wallis chi-squared44      Wind.Gust.daily.max..sfc.
## Kruskal-Wallis chi-squared30      Total.Cloud.Cover.daily.max..sfc.

```

##	Kruskal-Wallis	chi-squared15	Sunshine.Duration.daily.sum..sfc.
##	Kruskal-Wallis	chi-squared38	Wind.Speed.daily.max..10.m.above.gnd.
##	Kruskal-Wallis	chi-squared14	Low.Cloud.Cover.daily.mean..low.cld.lay.
##	Kruskal-Wallis	chi-squared23	Wind.Gust.daily.mean..sfc.
##	Kruskal-Wallis	chi-squared40	Wind.Speed.daily.max..80.m.above.gnd.
##	Kruskal-Wallis	chi-squared42	Wind.Speed.daily.max..900.mb.
##	Kruskal-Wallis	chi-squared36	Low.Cloud.Cover.daily.max..low.cld.lay.
##	Kruskal-Wallis	chi-squared31	Total.Cloud.Cover.daily.min..sfc.
##	Kruskal-Wallis	chi-squared17	Wind.Speed.daily.mean..10.m.above.gnd.
##	Kruskal-Wallis	chi-squared22	Wind.Direction.daily.mean..900.mb.
##	Kruskal-Wallis	chi-squared19	Wind.Speed.daily.mean..80.m.above.gnd.
##	Kruskal-Wallis	chi-squared45	Wind.Gust.daily.min..sfc.
##	Kruskal-Wallis	chi-squared21	Wind.Speed.daily.mean..900.mb.
##	Kruskal-Wallis	chi-squared39	Wind.Speed.daily.min..10.m.above.gnd.
##	Kruskal-Wallis	chi-squared25	Temperature.daily.min..2.m.above.gnd.
##	Kruskal-Wallis	chi-squared37	Low.Cloud.Cover.daily.min..low.cld.lay.
##	Kruskal-Wallis	chi-squared35	Medium.Cloud.Cover.daily.min..mid.cld.lay.
##	Kruskal-Wallis	chi-squared41	Wind.Speed.daily.min..80.m.above.gnd.
##	Kruskal-Wallis	chi-squared20	Wind.Direction.daily.mean..80.m.above.gnd.
##	Kruskal-Wallis	chi-squared18	Wind.Direction.daily.mean..10.m.above.gnd.
##	Kruskal-Wallis	chi-squared6	Temperature.daily.mean..2.m.above.gnd.
##	Kruskal-Wallis	chi-squared24	Temperature.daily.max..2.m.above.gnd.
##	Kruskal-Wallis	chi-squared33	High.Cloud.Cover.daily.min..high.cld.lay.
##	Kruskal-Wallis	chi-squared43	Wind.Speed.daily.min..900.mb.
##	Kruskal-Wallis	chi-squared1	Year
##	Kruskal-Wallis	chi-squared16	Shortwave.Radiation.daily.sum..sfc.
##	Kruskal-Wallis	chi-squared	...
##	Kruskal-Wallis	chi-squared10	Snowfall.amount.raw.daily.sum..sfc.
##	Kruskal-Wallis	chi-squared2	Month
##	Kruskal-Wallis	chi-squared27	Relative.Humidity.daily.min..2.m.above.gnd.
##	Kruskal-Wallis	chi-squared7	Relative.Humidity.daily.mean..2.m.above.gnd.
##	Kruskal-Wallis	chi-squared26	Relative.Humidity.daily.max..2.m.above.gnd.
##	Kruskal-Wallis	chi-squared3	Day
##	Kruskal-Wallis	chi-squared4	Hour
##	Kruskal-Wallis	chi-squared5	Minute
##			
##	Kruskal-Wallis	chi-squared13	Kruskal_Wallis P_value
##	Kruskal-Wallis	chi-squared29	205.67452762 1.206722e-46
##	Kruskal-Wallis	chi-squared34	203.56867158 3.476173e-46
##	Kruskal-Wallis	chi-squared8	192.25747519 1.022322e-43
##	Kruskal-Wallis	chi-squared9	186.80116963 1.587074e-42
##	Kruskal-Wallis	chi-squared28	170.86250903 4.795000e-39
##	Kruskal-Wallis	chi-squared32	164.17857568 1.382773e-37
##	Kruskal-Wallis	chi-squared11	129.51351868 5.235864e-30
##	Kruskal-Wallis	chi-squared12	122.46754913 1.823739e-28
##	Kruskal-Wallis	chi-squared44	117.64243432 2.076403e-27
##	Kruskal-Wallis	chi-squared30	88.04763852 6.389689e-21
##	Kruskal-Wallis	chi-squared15	80.63417964 2.716204e-19
##	Kruskal-Wallis	chi-squared38	73.80031510 8.643280e-18
##	Kruskal-Wallis	chi-squared14	70.27332559 5.163115e-17
##	Kruskal-Wallis	chi-squared14	66.18543586 4.104341e-16

```
## Kruskal-Wallis chi-squared23      64.45556549 9.873407e-16
## Kruskal-Wallis chi-squared40      62.46008902 2.718993e-15
## Kruskal-Wallis chi-squared42      58.94298775 1.623072e-14
## Kruskal-Wallis chi-squared36      58.20140654 2.366098e-14
## Kruskal-Wallis chi-squared31      57.53854627 3.314202e-14
## Kruskal-Wallis chi-squared17      54.06572657 1.938940e-13
## Kruskal-Wallis chi-squared22      50.75193249 1.048093e-12
## Kruskal-Wallis chi-squared19      41.01067420 1.514001e-10
## Kruskal-Wallis chi-squared45      34.94562458 3.390424e-09
## Kruskal-Wallis chi-squared21      34.29210291 4.743025e-09
## Kruskal-Wallis chi-squared39      31.59161331 1.902495e-08
## Kruskal-Wallis chi-squared25      23.13277207 1.511917e-06
## Kruskal-Wallis chi-squared37      22.50681726 2.093991e-06
## Kruskal-Wallis chi-squared35      21.83355460 2.973542e-06
## Kruskal-Wallis chi-squared41      17.51981731 2.843286e-05
## Kruskal-Wallis chi-squared20      15.91760529 6.616044e-05
## Kruskal-Wallis chi-squared18      14.77774924 1.209543e-04
## Kruskal-Wallis chi-squared6       14.75084255 1.226927e-04
## Kruskal-Wallis chi-squared24       8.09822565 4.430861e-03
## Kruskal-Wallis chi-squared33       8.08074796 4.473798e-03
## Kruskal-Wallis chi-squared43       7.66631524 5.626123e-03
## Kruskal-Wallis chi-squared1       5.18489213 2.278409e-02
## Kruskal-Wallis chi-squared16       5.11593263 2.370712e-02
## Kruskal-Wallis chi-squared        4.41582623 3.560703e-02
## Kruskal-Wallis chi-squared10       3.61665250 5.720387e-02
## Kruskal-Wallis chi-squared2        2.95143594 8.580129e-02
## Kruskal-Wallis chi-squared27       1.41509767 2.342120e-01
## Kruskal-Wallis chi-squared7        0.97383265 3.237262e-01
## Kruskal-Wallis chi-squared26       0.41566257 5.191093e-01
## Kruskal-Wallis chi-squared3        0.04744417 8.275718e-01
## Kruskal-Wallis chi-squared4              NaN              NaN
## Kruskal-Wallis chi-squared5              NaN              NaN
```

ici on que retenir que les résultats avec une valeur p inférieure à 0.05 :

```
# Charger les bibliothèques nécessaires
if (!require(dplyr)) {
  install.packages("dplyr")
  library(dplyr)
}

# Sélectionner les variables numériques
variables_numeriques <- names(dtn)[1:46]

# Créer un tableau pour les résultats
results <- data.frame(Variable = character(), Kruskal_Wallis = numeric(),
P_value = numeric(), stringsAsFactors = FALSE)

for (var in variables_numeriques) {
  # Effectuer le test de Kruskal-Wallis
```

```

kruskal_test <- kruskal.test(dtn[[var]] ~ dtn$pluie.demain)

# Ajouter les résultats au tableau
results <- rbind(results, data.frame(Variable = var, Kruskal_Wallis =
kruskal_test$statistic, P_value = kruskal_test$p.value, stringsAsFactors =
FALSE))
}

# Filtrer les résultats avec une p-value < 0.05
results_significatifs <- results %>% filter(P_value < 0.05)

# Trier les résultats par la statistique de test décroissant
results_significatifs <-
results_significatifs[order(results_significatifs$Kruskal_Wallis, decreasing
= TRUE), ]

# Afficher les résultats significatifs
print(results_significatifs)

##
## Kruskal-Wallis chi-squared13 Medium.Cloud.Cover.daily.mean..mid.cld.lay.
## Kruskal-Wallis chi-squared29 Mean.Sea.Level.Pressure.daily.min..MSL.
## Kruskal-Wallis chi-squared34 Medium.Cloud.Cover.daily.max..mid.cld.lay.
## Kruskal-Wallis chi-squared8 Mean.Sea.Level.Pressure.daily.mean..MSL.
## Kruskal-Wallis chi-squared9 Total.Precipitation.daily.sum..sfc.
## Kruskal-Wallis chi-squared28 Mean.Sea.Level.Pressure.daily.max..MSL.
## Kruskal-Wallis chi-squared32 High.Cloud.Cover.daily.max..high.cld.lay.
## Kruskal-Wallis chi-squared11 Total.Cloud.Cover.daily.mean..sfc.
## Kruskal-Wallis chi-squared12 High.Cloud.Cover.daily.mean..high.cld.lay.
## Kruskal-Wallis chi-squared44 Wind.Gust.daily.max..sfc.
## Kruskal-Wallis chi-squared30 Total.Cloud.Cover.daily.max..sfc.
## Kruskal-Wallis chi-squared15 Sunshine.Duration.daily.sum..sfc.
## Kruskal-Wallis chi-squared38 Wind.Speed.daily.max..10.m.above.gnd.
## Kruskal-Wallis chi-squared14 Low.Cloud.Cover.daily.mean..low.cld.lay.
## Kruskal-Wallis chi-squared23 Wind.Gust.daily.mean..sfc.
## Kruskal-Wallis chi-squared40 Wind.Speed.daily.max..80.m.above.gnd.
## Kruskal-Wallis chi-squared42 Wind.Speed.daily.max..900.mb.
## Kruskal-Wallis chi-squared36 Low.Cloud.Cover.daily.max..low.cld.lay.
## Kruskal-Wallis chi-squared31 Total.Cloud.Cover.daily.min..sfc.
## Kruskal-Wallis chi-squared17 Wind.Speed.daily.mean..10.m.above.gnd.
## Kruskal-Wallis chi-squared22 Wind.Direction.daily.mean..900.mb.
## Kruskal-Wallis chi-squared19 Wind.Speed.daily.mean..80.m.above.gnd.
## Kruskal-Wallis chi-squared45 Wind.Gust.daily.min..sfc.
## Kruskal-Wallis chi-squared21 Wind.Speed.daily.mean..900.mb.
## Kruskal-Wallis chi-squared39 Wind.Speed.daily.min..10.m.above.gnd.
## Kruskal-Wallis chi-squared25 Temperature.daily.min..2.m.above.gnd.
## Kruskal-Wallis chi-squared37 Low.Cloud.Cover.daily.min..low.cld.lay.
## Kruskal-Wallis chi-squared35 Medium.Cloud.Cover.daily.min..mid.cld.lay.
## Kruskal-Wallis chi-squared41 Wind.Speed.daily.min..80.m.above.gnd.
## Kruskal-Wallis chi-squared20 Wind.Direction.daily.mean..80.m.above.gnd.

```

```

## Kruskal-Wallis chi-squared18 Wind.Direction.daily.mean..10.m.above.gnd.
## Kruskal-Wallis chi-squared6 Temperature.daily.mean..2.m.above.gnd.
## Kruskal-Wallis chi-squared24 Temperature.daily.max..2.m.above.gnd.
## Kruskal-Wallis chi-squared33 High.Cloud.Cover.daily.min..high.cld.lay.
## Kruskal-Wallis chi-squared43 Wind.Speed.daily.min..900.mb.
## Kruskal-Wallis chi-squared1 Year
## Kruskal-Wallis chi-squared16 Shortwave.Radiation.daily.sum..sfc.
## Kruskal-Wallis chi-squared ...1
##
Kruskal_Wallis P_value
## Kruskal-Wallis chi-squared13 205.674528 1.206722e-46
## Kruskal-Wallis chi-squared29 203.568672 3.476173e-46
## Kruskal-Wallis chi-squared34 192.257475 1.022322e-43
## Kruskal-Wallis chi-squared8 186.801170 1.587074e-42
## Kruskal-Wallis chi-squared9 170.862509 4.795000e-39
## Kruskal-Wallis chi-squared28 164.178576 1.382773e-37
## Kruskal-Wallis chi-squared32 129.513519 5.235864e-30
## Kruskal-Wallis chi-squared11 122.467549 1.823739e-28
## Kruskal-Wallis chi-squared12 117.642434 2.076403e-27
## Kruskal-Wallis chi-squared44 88.047639 6.389689e-21
## Kruskal-Wallis chi-squared30 80.634180 2.716204e-19
## Kruskal-Wallis chi-squared15 73.800315 8.643280e-18
## Kruskal-Wallis chi-squared38 70.273326 5.163115e-17
## Kruskal-Wallis chi-squared14 66.185436 4.104341e-16
## Kruskal-Wallis chi-squared23 64.455565 9.873407e-16
## Kruskal-Wallis chi-squared40 62.460089 2.718993e-15
## Kruskal-Wallis chi-squared42 58.942988 1.623072e-14
## Kruskal-Wallis chi-squared36 58.201407 2.366098e-14
## Kruskal-Wallis chi-squared31 57.538546 3.314202e-14
## Kruskal-Wallis chi-squared17 54.065727 1.938940e-13
## Kruskal-Wallis chi-squared22 50.751932 1.048093e-12
## Kruskal-Wallis chi-squared19 41.010674 1.514001e-10
## Kruskal-Wallis chi-squared45 34.945625 3.390424e-09
## Kruskal-Wallis chi-squared21 34.292103 4.743025e-09
## Kruskal-Wallis chi-squared39 31.591613 1.902495e-08
## Kruskal-Wallis chi-squared25 23.132772 1.511917e-06
## Kruskal-Wallis chi-squared37 22.506817 2.093991e-06
## Kruskal-Wallis chi-squared35 21.833555 2.973542e-06
## Kruskal-Wallis chi-squared41 17.519817 2.843286e-05
## Kruskal-Wallis chi-squared20 15.917605 6.616044e-05
## Kruskal-Wallis chi-squared18 14.777749 1.209543e-04
## Kruskal-Wallis chi-squared6 14.750843 1.226927e-04
## Kruskal-Wallis chi-squared24 8.098226 4.430861e-03
## Kruskal-Wallis chi-squared33 8.080748 4.473798e-03
## Kruskal-Wallis chi-squared43 7.666315 5.626123e-03
## Kruskal-Wallis chi-squared1 5.184892 2.278409e-02
## Kruskal-Wallis chi-squared16 5.115933 2.370712e-02
## Kruskal-Wallis chi-squared 4.415826 3.560703e-02

```

Suite a la selection manuelle en se basant sur la selection pure et dure des variable : - Des boxplots bivariés visuelle - Le test de kruskal\_walis : classment des variable et filtrage sur

les p-values En suite j'ai fait le choix de me limiter à 10 variables Maintenant je vais analyser la corrélation entre ces 10 variables explicatives on va tester la corrélation entre les 10 variables les plus significatives :

```
# Charger les bibliothèques nécessaires
if (!require(corrplot)) {
  install.packages("corrplot")
  library(corrplot)
}

## Le chargement a nécessité le package : corrplot

## Warning: le package 'corrplot' a été compilé avec la version R 4.3.3

## corrplot 0.92 loaded

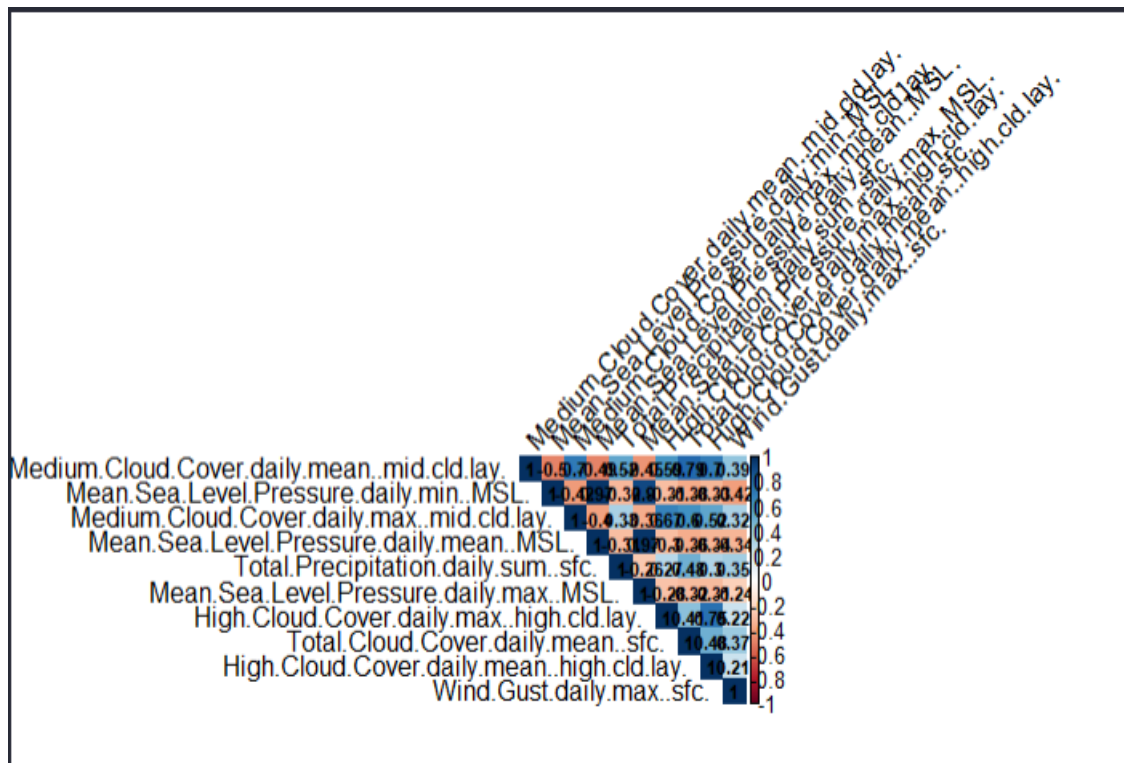
# Sélectionner les variables spécifiques
# Remplacer "var1", "var2", etc. par les noms réels des 10 variables que vous
souhaitez analyser
selected_variables <- dtn[, c("Medium.Cloud.Cover.daily.mean..mid.cld.lay.",
"Mean.Sea.Level.Pressure.daily.min..MSL.",
"Medium.Cloud.Cover.daily.max..mid.cld.lay.",
"Mean.Sea.Level.Pressure.daily.mean..MSL.",
"Total.Precipitation.daily.sum..sfc.",
"Mean.Sea.Level.Pressure.daily.max..MSL.",
"High.Cloud.Cover.daily.max..high.cld.lay.",
"Total.Cloud.Cover.daily.mean..sfc.",
"High.Cloud.Cover.daily.mean..high.cld.lay.",
"Wind.Gust.daily.max..sfc.")]

# Calculer la matrice de corrélation
correlation_matrix <- cor(selected_variables, use = "complete.obs", method =
"pearson")

# Afficher la matrice de corrélation
corrplot(correlation_matrix, method = "color", type = "upper",
  tl.col = "black", tl.srt = 45, addCoef.col = "black",
  number.cex = 0.7)

## Warning in corrplot(correlation_matrix, method = "color", type = "upper",
: Not
## been able to calculate text margin, please try again with a clean new
empty
## window using {plot.new(); dev.off()} or reduce tl.cex
```





suite à une première sélection ou enlèvement des variables trop corrélées on va effectuer un second test de corrélation :

```
# Charger les bibliothèques nécessaires
if (!require(corrplot)) {
  install.packages("corrplot")
  library(corrplot)
}

# Sélectionner les variables spécifiques
# Remplacer "var1", "var2", etc. par les noms réels des 9 variables que vous
souhaitez analyser
selected_variables <- dtn[, c("Medium.Cloud.Cover.daily.max..mid.cld.lay.",
"Total.Precipitation.daily.sum..sfc.",
"Mean.Sea.Level.Pressure.daily.max..MSL.",
"High.Cloud.Cover.daily.max..high.cld.lay.",
"Total.Cloud.Cover.daily.mean..sfc.",
"High.Cloud.Cover.daily.mean..high.cld.lay.",
"Wind.Gust.daily.max..sfc.")]

# Calculer la matrice de corrélation
correlation_matrix <- cor(selected_variables, use = "complete.obs", method =
"pearson")

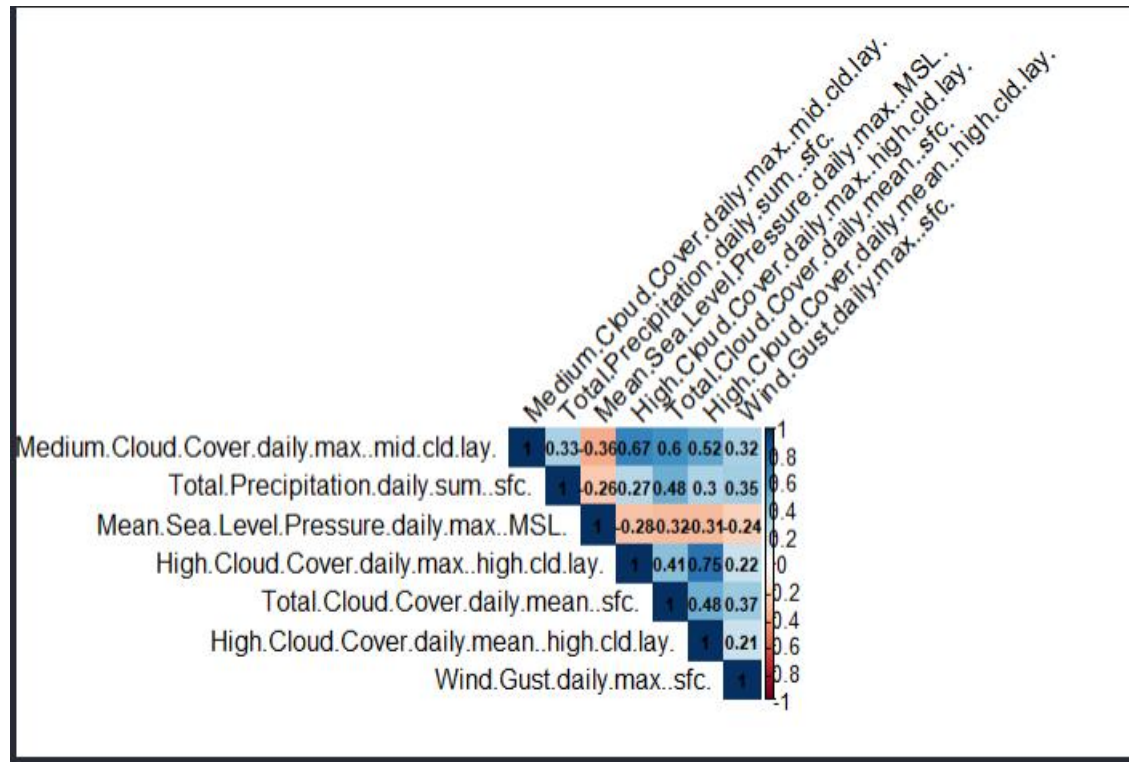
# Afficher la matrice de corrélation
corrplot(correlation_matrix, method = "color", type = "upper",
```

```

tl.col = "black", tl.srt = 45, addCoef.col = "black",
number.cex = 0.7)

## Warning in corplot(correlation_matrix, method = "color", type = "upper",
: Not
## been able to calculate text margin, please try again with a clean new
empty
## window using {plot.new(); dev.off()} or reduce tl.cex

```



le model retenue apres analyse de la correlation est celui qui fera l'objet du glm ci dessous:  
mdr6

```

# Construction du modèle avec les variables choisis manuellement
mdr6 <- glm(pluie.demain ~ Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Precipitation.daily.sum..sfc. +
Mean.Sea.Level.Pressure.daily.max..MSL. + High.Cloud.Cover.daily.max..high.cld.
lay. + Total.Cloud.Cover.daily.mean..sfc.
+ High.Cloud.Cover.daily.mean..high.cld.lay. +
Wind.Gust.daily.max..sfc. , data = dtn, family = binomial)
summary(mdr6)

##
## Call:
## glm(formula = pluie.demain ~ Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Total.Precipitation.daily.sum..sfc. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
##      High.Cloud.Cover.daily.max..high.cld.lay. +
##      Total.Cloud.Cover.daily.mean..sfc. +

```



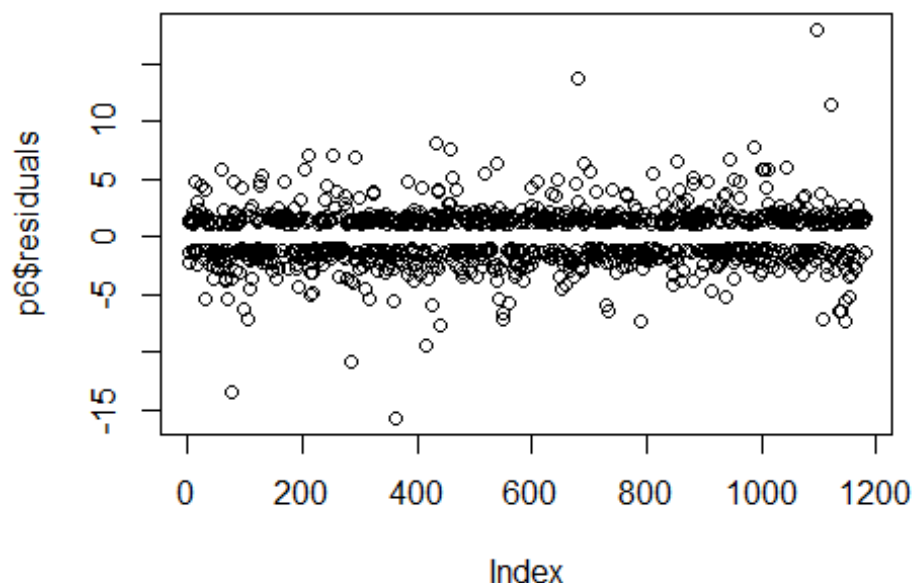
```
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1333.9 1347.9
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1345.7 1359.7
## - Wind.Gust.daily.max..sfc. 1 1346.4 1360.4
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1381.7 1395.7
##
## Step: AIC=1343.66
## pluie.demain ~ Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Precipitation.daily.sum..sfc. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
High.Cloud.Cover.daily.max..high.cld.lay. +
## Total.Cloud.Cover.daily.mean..sfc. + Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## - Total.Cloud.Cover.daily.mean..sfc. 1 1331.0 1343.0
## - Total.Precipitation.daily.sum..sfc. 1 1331.3 1343.3
## <none> 1329.7 1343.7
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1337.7 1349.7
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1345.7 1357.7
## - Wind.Gust.daily.max..sfc. 1 1346.4 1358.4
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1382.8 1394.8
##
## Step: AIC=1343.04
## pluie.demain ~ Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Precipitation.daily.sum..sfc. +
## Mean.Sea.Level.Pressure.daily.max..MSL. +
High.Cloud.Cover.daily.max..high.cld.lay. +
## Wind.Gust.daily.max..sfc.
##
##
## Df Deviance AIC
## <none> 1331.0 1343.0
## - Total.Precipitation.daily.sum..sfc. 1 1334.3 1344.3
## - High.Cloud.Cover.daily.max..high.cld.lay. 1 1339.0 1349.0
## - Wind.Gust.daily.max..sfc. 1 1349.5 1359.5
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1355.0 1365.0
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1385.0 1395.0
```

`summary(p6)` # AIC: 1347.5

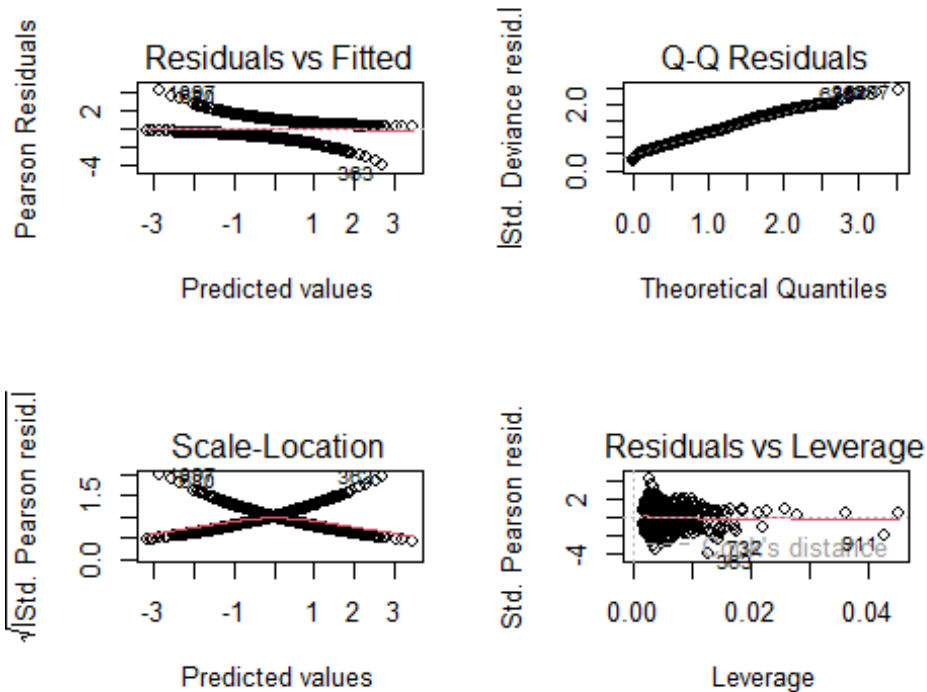
```
##
## Call:
## glm(formula = pluie.demain ~ Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Total.Precipitation.daily.sum..sfc. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
## High.Cloud.Cover.daily.max..high.cld.lay. + Wind.Gust.daily.max..sfc.,
## family = binomial, data = dtn)
##
## Coefficients:
##
## Estimate Std. Error z value
## (Intercept) 71.663031 10.484073 6.835
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 0.010588 0.002192 4.831
```

```
## Total.Precipitation.daily.sum..sfc.      0.035636    0.020556    1.734
## Mean.Sea.Level.Pressure.daily.max..MSL.  -0.072004    0.010250   -7.025
## High.Cloud.Cover.daily.max..high.cld.lay. 0.005565    0.001967    2.829
## Wind.Gust.daily.max..sfc.                0.022031    0.005261    4.187
##                                           Pr(>|z|)
## (Intercept)                             8.18e-12 ***
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 1.36e-06 ***
## Total.Precipitation.daily.sum..sfc.        0.08299 .
## Mean.Sea.Level.Pressure.daily.max..MSL.    2.14e-12 ***
## High.Cloud.Cover.daily.max..high.cld.lay.  0.00467 **
## Wind.Gust.daily.max..sfc.                  2.82e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##    Null deviance: 1635.4  on 1179  degrees of freedom
## Residual deviance: 1331.0  on 1174  degrees of freedom
## AIC: 1343
##
## Number of Fisher Scoring iterations: 4
```

```
plot(p6$residuals)
```



```
# Diagnostics de base avec la fonction plot
par(mfrow = c(2, 2))
plot(p6)
```



```
# p6
# Diagnostics supplémentaires avec le package car
# Charger la bibliothèque car si ce n'est pas déjà fait
if (!require(car)) {
  install.packages("car")
  library(car)
}
vif(p6)

## Medium.Cloud.Cover.daily.max..mid.cld.lay.
##                               1.704642
##      Total.Precipitation.daily.sum..sfc.
##                               1.185399
##      Mean.Sea.Level.Pressure.daily.max..MSL.
##                               1.064833
##      High.Cloud.Cover.daily.max..high.cld.lay.
##                               1.564658
##                               Wind.Gust.daily.max..sfc.
##                               1.131877

influencePlot(p6, main = "Influence Plot", sub = "Circle size is proportional
to Cook's Distance")

##      StudRes      Hat      CookD
## 363 -2.3885211 0.012706744 0.032070209
## 911 -1.8027276 0.042839861 0.028655395
```

```
## 927    0.5620683 0.045012266 0.001369882
## 1097   2.4123471 0.002723601 0.007728051

# Vérifications avec Le package performance
# Charger la bibliothèque performance si ce n'est pas déjà fait
if (!require(performance)) {
  install.packages("performance")
  library(performance)
}
check_collinearity(p6)

## # Check for Multicollinearity
##
## Low Correlation
##
##
##          Term    VIF    VIF 95% CI Increased SE
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 1.70 [1.58, 1.86]          1.31
##      Total.Precipitation.daily.sum..sfc. 1.19 [1.12, 1.28]          1.09
##      Mean.Sea.Level.Pressure.daily.max..MSL. 1.06 [1.02, 1.17]          1.03
##      High.Cloud.Cover.daily.max..high.cld.lay. 1.56 [1.46, 1.70]          1.25
##      Wind.Gust.daily.max..sfc. 1.13 [1.08, 1.23]          1.06
## Tolerance Tolerance 95% CI
##      0.59      [0.54, 0.63]
##      0.84      [0.78, 0.89]
##      0.94      [0.85, 0.98]
##      0.64      [0.59, 0.69]
##      0.88      [0.82, 0.93]

model_performance(p6)

## # Indices of model performance
##
## AIC      |      AICc |      BIC | Tjur's R2 |  RMSE | Sigma | Log_loss |
## Score_log | Score_spherical |  PCP
## -----
## -----
## 1343.038 | 1343.110 | 1373.478 |    0.237 | 0.436 | 1.000 |    0.564 |
## -Inf |          0.001 | 0.619

#install.packages("lmtest")
library(lmtest)

# Effectuer Le test du rapport de vraisemblance (Likelihood Ratio Test)
test_lrmdr6 <- lrtest(mdr6)

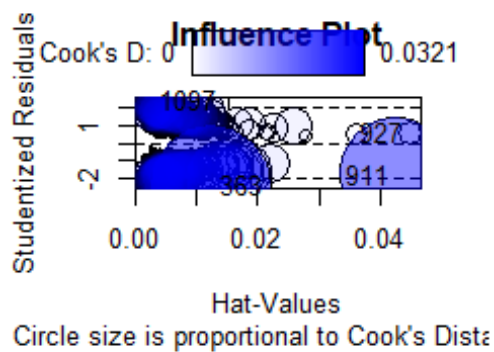
# Afficher les résultats du test
print(test_lrmdr6)

## Likelihood ratio test
##
## Model 1: pluie.demain ~ Medium.Cloud.Cover.daily.max..mid.cld.lay. +
```

```

Total.Precipitation.daily.sum..sfc. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +
##      Wind.Gust.daily.max..sfc.
## Model 2: pluie.demain ~ 1
##      #Df  LogLik Df  Chisq Pr(>Chisq)
## 1      8 -664.82
## 2      1 -817.71 -7 305.77  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```



## 7-2 Effectuer le test

du rapport de vraisemblance :

```

lrt_result <- anova(mdr6, mdr5, test = "LRT")

# Afficher les résultats
print(lrt_result)

## Analysis of Deviance Table
##
## Model 1: pluie.demain ~ Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Precipitation.daily.sum..sfc. +
##      Mean.Sea.Level.Pressure.daily.max..MSL. +
High.Cloud.Cover.daily.max..high.cld.lay. +
##      Total.Cloud.Cover.daily.mean..sfc. +
High.Cloud.Cover.daily.mean..high.cld.lay. +

```



```
##      Wind.Gust.daily.max..sfc.
## Model 2: pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd. +
##      Mean.Sea.Level.Pressure.daily.mean..MSL. +
Snowfall.amount.raw.daily.sum..sfc. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Wind.Speed.daily.mean..80.m.above.gnd. +
##      Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. +
##      Temperature.daily.min..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Total.Cloud.Cover.daily.max..sfc. +
##      Total.Cloud.Cover.daily.min..sfc. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Wind.Speed.daily.max..10.m.above.gnd. +
Wind.Speed.daily.min..10.m.above.gnd. +
##      Wind.Gust.daily.max..sfc.
## Resid. Df Resid. Dev Df Deviance Pr(>Chi)
## 1      1172      1329.6
## 2      1162      1247.3 10      82.351 1.735e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Pour le model retenue via selection manuelle mdr6 : le AIC: 1343 superieure a AIC du model mdr5(STEP) et on a pratiquement le mm Likelihood ratio : 2.2e-16 \*\*\* parcontre Je decide pour la suite de retenir le model : mdr5 selectionné via choix STEP JE VAIS essayer d'affiner le model mdr5 en regardant la correlation entre les variables quantitatives

```
# Construire le modèle initial avec toutes les variables sélectionnées via STEP
mdr7 <- glm(formula = pluie.demain ~ ...1 +
             Temperature.daily.mean..2.m.above.gnd.+
             Mean.Sea.Level.Pressure.daily.mean..MSL. +
             Wind.Gust.daily.max..sfc.
             +Wind.Speed.daily.min..10.m.above.gnd.
             + Wind.Speed.daily.max..10.m.above.gnd.
             + Medium.Cloud.Cover.daily.max..mid.cld.lay.

             + Total.Cloud.Cover.daily.max..sfc.
             + Mean.Sea.Level.Pressure.daily.min..MSL.
             + Mean.Sea.Level.Pressure.daily.max..MSL.
             + Wind.Direction.daily.mean..900.mb.
             + Wind.Speed.daily.mean..80.m.above.gnd.
             + Medium.Cloud.Cover.daily.mean..mid.cld.lay., family = binomial,
data = dtn)

# Afficher le résumé du modèle initial
summary(mdr7)
```

```
##
## Call:
## glm(formula = pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd.
+
##      Mean.Sea.Level.Pressure.daily.mean..MSL. + Wind.Gust.daily.max..sfc. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.max..10.m.above.gnd. +
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Cloud.Cover.daily.max..sfc. +
##      Mean.Sea.Level.Pressure.daily.min..MSL. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Wind.Direction.daily.mean..900.mb. +
Wind.Speed.daily.mean..80.m.above.gnd. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay., family = binomial,
##      data = dtn)
##
## Coefficients:
##
##                                     Estimate Std. Error z value
## (Intercept)                        6.446e+01  1.167e+01  5.522
## ...1                              1.752e-04  8.465e-05  2.070
## Temperature.daily.mean..2.m.above.gnd.  5.422e-02  1.195e-02  4.538
## Mean.Sea.Level.Pressure.daily.mean..MSL.  4.880e-01  1.326e-01  3.682
## Wind.Gust.daily.max..sfc.              2.527e-02  1.068e-02  2.367
## Wind.Speed.daily.min..10.m.above.gnd.    1.122e-01  3.523e-02  3.185
## Wind.Speed.daily.max..10.m.above.gnd.    4.930e-02  2.195e-02  2.246
## Medium.Cloud.Cover.daily.max..mid.cld.lay.  6.458e-03  2.617e-03  2.467
## Total.Cloud.Cover.daily.max..sfc.        6.072e-03  3.385e-03  1.794
## Mean.Sea.Level.Pressure.daily.min..MSL.   -3.087e-01  7.287e-02 -4.237
## Mean.Sea.Level.Pressure.daily.max..MSL.   -2.461e-01  7.009e-02 -3.511
## Wind.Direction.daily.mean..900.mb.        2.489e-03  1.008e-03  2.470
## Wind.Speed.daily.mean..80.m.above.gnd.    -1.095e-01  2.936e-02 -3.731
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.  1.208e-02  3.560e-03  3.394
##
##                                     Pr(>|z|)
## (Intercept)                        3.35e-08 ***
## ...1                              0.038493 *
## Temperature.daily.mean..2.m.above.gnd.    5.69e-06 ***
## Mean.Sea.Level.Pressure.daily.mean..MSL.    0.000232 ***
## Wind.Gust.daily.max..sfc.              0.017938 *
## Wind.Speed.daily.min..10.m.above.gnd.    0.001449 **
## Wind.Speed.daily.max..10.m.above.gnd.    0.024704 *
## Medium.Cloud.Cover.daily.max..mid.cld.lay.  0.013610 *
## Total.Cloud.Cover.daily.max..sfc.        0.072866 .
## Mean.Sea.Level.Pressure.daily.min..MSL.    2.27e-05 ***
## Mean.Sea.Level.Pressure.daily.max..MSL.    0.000446 ***
## Wind.Direction.daily.mean..900.mb.        0.013527 *
## Wind.Speed.daily.mean..80.m.above.gnd.    0.000191 ***
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 0.000688 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```

## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 1635.4 on 1179 degrees of freedom
## Residual deviance: 1261.3 on 1166 degrees of freedom
## AIC: 1289.3
##
## Number of Fisher Scoring iterations: 4

p8 = step(mdr7)

## Start: AIC=1289.3
## pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd. +
## Mean.Sea.Level.Pressure.daily.mean..MSL. + Wind.Gust.daily.max..sfc. +
## Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.max..10.m.above.gnd. +
## Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Cloud.Cover.daily.max..sfc. +
## Mean.Sea.Level.Pressure.daily.min..MSL. +
Mean.Sea.Level.Pressure.daily.max..MSL. +
## Wind.Direction.daily.mean..900.mb. +
Wind.Speed.daily.mean..80.m.above.gnd. +
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.
##
##
## Df Deviance AIC
## <none> 1261.3 1289.3
## - Total.Cloud.Cover.daily.max..sfc. 1 1264.6 1290.6
## - ...1 1 1265.6 1291.6
## - Wind.Speed.daily.max..10.m.above.gnd. 1 1266.4 1292.4
## - Wind.Gust.daily.max..sfc. 1 1267.0 1293.0
## - Wind.Direction.daily.mean..900.mb. 1 1267.4 1293.4
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1267.5 1293.5
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1271.7 1297.7
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1273.2 1299.2
## - Mean.Sea.Level.Pressure.daily.max..MSL. 1 1273.8 1299.8
## - Wind.Speed.daily.mean..80.m.above.gnd. 1 1275.5 1301.5
## - Mean.Sea.Level.Pressure.daily.mean..MSL. 1 1275.9 1301.9
## - Mean.Sea.Level.Pressure.daily.min..MSL. 1 1282.2 1308.2
## - Temperature.daily.mean..2.m.above.gnd. 1 1282.5 1308.5

summary(p8) # AIC: 1347.5

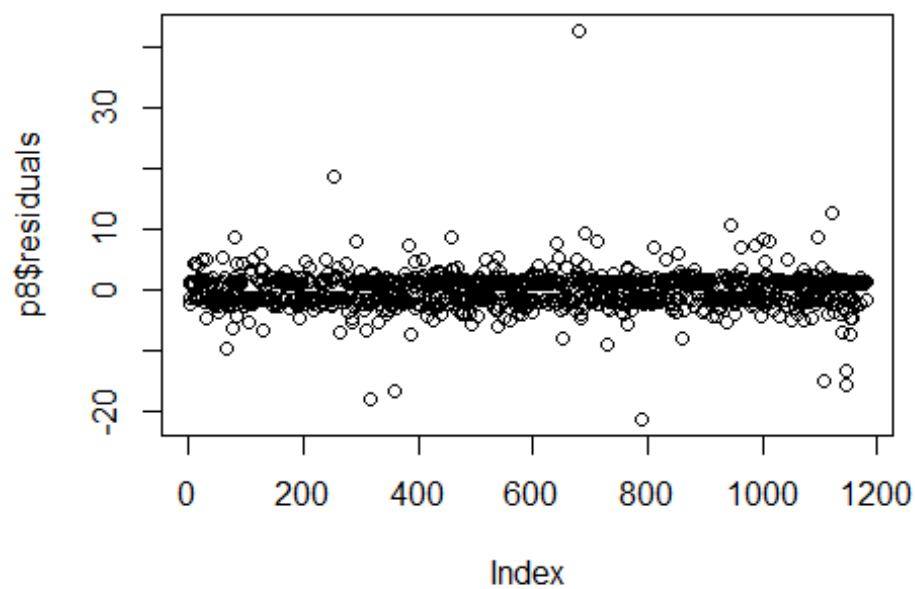
##
## Call:
## glm(formula = pluie.demain ~ ...1 + Temperature.daily.mean..2.m.above.gnd.
+
## Mean.Sea.Level.Pressure.daily.mean..MSL. + Wind.Gust.daily.max..sfc. +
## Wind.Speed.daily.min..10.m.above.gnd. +
Wind.Speed.daily.max..10.m.above.gnd. +
## Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Cloud.Cover.daily.max..sfc. +
## Mean.Sea.Level.Pressure.daily.min..MSL. +

```

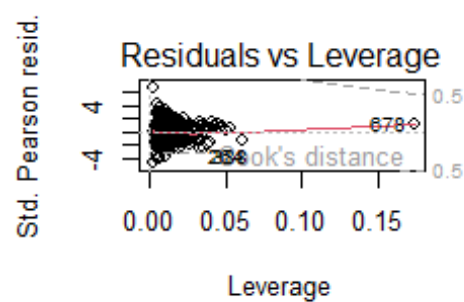
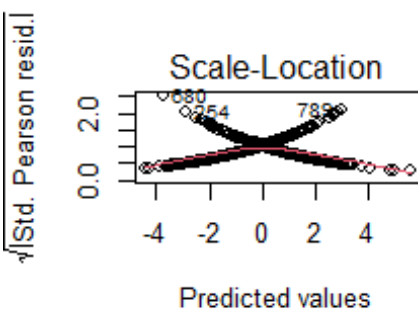
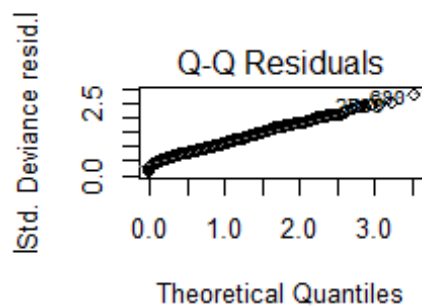
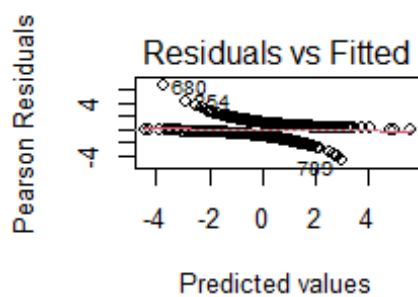
```

Mean.Sea.Level.Pressure.daily.max..MSL. +
##      Wind.Direction.daily.mean..900.mb. +
Wind.Speed.daily.mean..80.m.above.gnd. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay., family = binomial,
##      data = dtn)
##
## Coefficients:
##                                     Estimate Std. Error z value
## (Intercept)                      6.446e+01  1.167e+01  5.522
## ...1                            1.752e-04  8.465e-05  2.070
## Temperature.daily.mean..2.m.above.gnd.  5.422e-02  1.195e-02  4.538
## Mean.Sea.Level.Pressure.daily.mean..MSL.  4.880e-01  1.326e-01  3.682
## Wind.Gust.daily.max..sfc.             2.527e-02  1.068e-02  2.367
## Wind.Speed.daily.min..10.m.above.gnd.    1.122e-01  3.523e-02  3.185
## Wind.Speed.daily.max..10.m.above.gnd.    4.930e-02  2.195e-02  2.246
## Medium.Cloud.Cover.daily.max..mid.cld.lay.  6.458e-03  2.617e-03  2.467
## Total.Cloud.Cover.daily.max..sfc.        6.072e-03  3.385e-03  1.794
## Mean.Sea.Level.Pressure.daily.min..MSL.   -3.087e-01  7.287e-02 -4.237
## Mean.Sea.Level.Pressure.daily.max..MSL.   -2.461e-01  7.009e-02 -3.511
## Wind.Direction.daily.mean..900.mb.        2.489e-03  1.008e-03  2.470
## Wind.Speed.daily.mean..80.m.above.gnd.   -1.095e-01  2.936e-02 -3.731
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.  1.208e-02  3.560e-03  3.394
##                                     Pr(>|z|)
## (Intercept)                      3.35e-08 ***
## ...1                            0.038493 *
## Temperature.daily.mean..2.m.above.gnd.    5.69e-06 ***
## Mean.Sea.Level.Pressure.daily.mean..MSL.    0.000232 ***
## Wind.Gust.daily.max..sfc.                 0.017938 *
## Wind.Speed.daily.min..10.m.above.gnd.      0.001449 **
## Wind.Speed.daily.max..10.m.above.gnd.      0.024704 *
## Medium.Cloud.Cover.daily.max..mid.cld.lay.  0.013610 *
## Total.Cloud.Cover.daily.max..sfc.          0.072866 .
## Mean.Sea.Level.Pressure.daily.min..MSL.     2.27e-05 ***
## Mean.Sea.Level.Pressure.daily.max..MSL.     0.000446 ***
## Wind.Direction.daily.mean..900.mb.         0.013527 *
## Wind.Speed.daily.mean..80.m.above.gnd.      0.000191 ***
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 0.000688 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 1635.4  on 1179  degrees of freedom
## Residual deviance: 1261.3  on 1166  degrees of freedom
## AIC: 1289.3
##
## Number of Fisher Scoring iterations: 4
plot(p8$residuals)

```



```
# Diagnostics de base avec la fonction plot
par(mfrow = c(2, 2))
plot(p8)
```



```

# p8
# Diagnostics supplémentaires avec Le package car
# Charger la bibliothèque car si ce n'est pas déjà fait
if (!require(car)) {
  install.packages("car")
  library(car)
}
vif(p8)

##              ...1
##              1.084990
##      Temperature.daily.mean..2.m.above.gnd.
##              1.399578
##      Mean.Sea.Level.Pressure.daily.mean..MSL.
##              176.835004
##              Wind.Gust.daily.max..sfc.
##              4.263113
##      Wind.Speed.daily.min..10.m.above.gnd.
##              3.028601
##      Wind.Speed.daily.max..10.m.above.gnd.
##              7.161243
##      Medium.Cloud.Cover.daily.max..mid.cld.lay.
##              2.319373
##      Total.Cloud.Cover.daily.max..sfc.
##              1.522958
##      Mean.Sea.Level.Pressure.daily.min..MSL.
##              58.529109
##      Mean.Sea.Level.Pressure.daily.max..MSL.
##              46.809636
##      Wind.Direction.daily.mean..900.mb.
##              1.155613
##      Wind.Speed.daily.mean..80.m.above.gnd.
##              9.555922
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay.
##              2.125391

influencePlot(p8, main = "Influence Plot", sub = "Circle size is proportional
to Cook's Distance")

##      StudRes      Hat      CookD
## 251 -1.392030 0.061229816 0.007486129
## 388 -2.042225 0.036345349 0.017232744
## 678  1.379061 0.173876399 0.023027247
## 680  2.765785 0.003178476 0.009565318
## 789 -2.483579 0.003203259 0.004640395

# Vérifications avec Le package performance
# Charger la bibliothèque performance si ce n'est pas déjà fait
if (!require(performance)) {
  install.packages("performance")
  library(performance)
}

```

```

}
check_collinearity(p8)

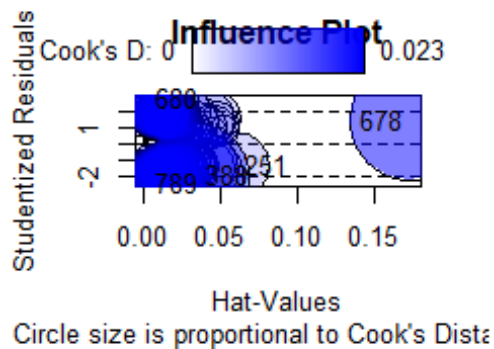
## # Check for Multicollinearity
##
## Low Correlation
##
##
##          Term   VIF          VIF 95% CI
Increased SE
##          ...1 1.08 [  1.04,   1.18]
1.04
##      Temperature.daily.mean..2.m.above.gnd. 1.40 [  1.31,   1.51]
1.18
##                      Wind.Gust.daily.max..sfc. 4.26 [  3.87,   4.72]
2.06
##      Wind.Speed.daily.min..10.m.above.gnd. 3.03 [  2.76,   3.33]
1.74
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. 2.32 [  2.13,   2.54]
1.52
##          Total.Cloud.Cover.daily.max..sfc. 1.52 [  1.42,   1.65]
1.23
##          Wind.Direction.daily.mean..900.mb. 1.16 [  1.10,   1.25]
1.07
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. 2.13 [  1.96,   2.32]
1.46
##      Tolerance Tolerance 95% CI
##          0.92      [0.84, 0.96]
##          0.71      [0.66, 0.76]
##          0.23      [0.21, 0.26]
##          0.33      [0.30, 0.36]
##          0.43      [0.39, 0.47]
##          0.66      [0.61, 0.70]
##          0.87      [0.80, 0.91]
##          0.47      [0.43, 0.51]
##
## Moderate Correlation
##
##          Term   VIF          VIF 95% CI Increased SE
##      Wind.Speed.daily.max..10.m.above.gnd. 7.16 [  6.46,   7.96]          2.68
##      Wind.Speed.daily.mean..80.m.above.gnd. 9.56 [  8.60,  10.64]          3.09
##      Tolerance Tolerance 95% CI
##          0.14      [0.13, 0.15]
##          0.10      [0.09, 0.12]
##
## High Correlation
##
##          Term   VIF          VIF 95% CI
Increased SE
##      Mean.Sea.Level.Pressure.daily.mean..MSL. 176.84 [158.07, 197.84]
13.30

```

```
## Mean.Sea.Level.Pressure.daily.min..MSL. 58.53 [ 52.36, 65.44]
7.65
## Mean.Sea.Level.Pressure.daily.max..MSL. 46.81 [ 41.88, 52.33]
6.84
## Tolerance Tolerance 95% CI
## 5.65e-03 [0.01, 0.01]
## 0.02 [0.02, 0.02]
## 0.02 [0.02, 0.02]
```

`model_performance(p8)`

```
## # Indices of model performance
##
## AIC | AICc | BIC | Tjur's R2 | RMSE | Sigma | Log_loss |
Score_log | Score_spherical | PCP
## -----
## 1289.302 | 1289.662 | 1360.328 | 0.286 | 0.421 | 1.000 | 0.534 |
-Inf | 0.001 | 0.643
```



variable non significatives en terme de p-values  
cela va nous donner :

```
# Construire le modèle initial avec toutes les variables
mdr8 <- glm(formula = pluie.demain ~ Temperature.daily.mean..2.m.above.gnd. +
             Wind.Gust.daily.max..sfc. +
             Wind.Speed.daily.min..10.m.above.gnd. +
```



```

Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Cloud.Cover.daily.max..sfc. +
Wind.Direction.daily.mean..900.mb. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay. , family =
binomial, data = dtn)

# Afficher le résumé du modèle initial
summary(mdr8) # AIC = 1347.160

##
## Call:
## glm(formula = pluie.demain ~ Temperature.daily.mean..2.m.above.gnd. +
##      Wind.Gust.daily.max..sfc. + Wind.Speed.daily.min..10.m.above.gnd. +
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Total.Cloud.Cover.daily.max..sfc. +
##      Wind.Direction.daily.mean..900.mb. +
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay.,
##      family = binomial, data = dtn)
##
## Coefficients:
##
##              Estimate Std. Error z value
## (Intercept)      -3.680345   0.359137 -10.248
## Temperature.daily.mean..2.m.above.gnd.    0.069237   0.010716   6.461
## Wind.Gust.daily.max..sfc.    0.026257   0.006037   4.349
## Wind.Speed.daily.min..10.m.above.gnd.    0.027645   0.022933   1.205
## Medium.Cloud.Cover.daily.max..mid.cld.lay.  0.007825   0.002526   3.098
## Total.Cloud.Cover.daily.max..sfc.    0.006482   0.003271   1.982
## Wind.Direction.daily.mean..900.mb.    0.001802   0.000968   1.862
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.  0.015349   0.003242   4.735
##
##              Pr(>|z|)
## (Intercept)      < 2e-16 ***
## Temperature.daily.mean..2.m.above.gnd.    1.04e-10 ***
## Wind.Gust.daily.max..sfc.    1.37e-05 ***
## Wind.Speed.daily.min..10.m.above.gnd.    0.22802
## Medium.Cloud.Cover.daily.max..mid.cld.lay.  0.00195 **
## Total.Cloud.Cover.daily.max..sfc.    0.04751 *
## Wind.Direction.daily.mean..900.mb.    0.06265 .
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 2.19e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##      Null deviance: 1635.4  on 1179  degrees of freedom
## Residual deviance: 1331.7  on 1172  degrees of freedom
## AIC: 1347.7
##
## Number of Fisher Scoring iterations: 4

p9 = step(mdr8)

```

```

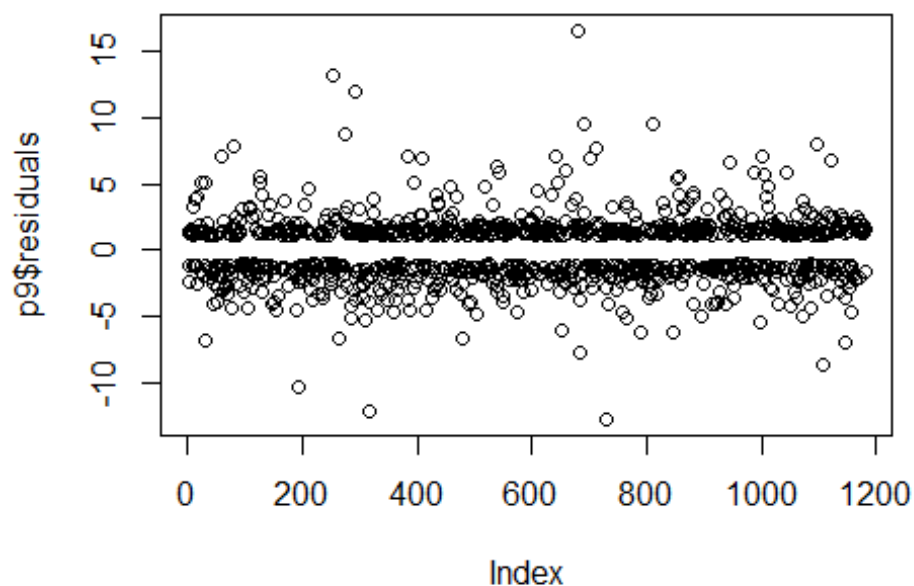
## Start: AIC=1347.68
## pluie.demain ~ Temperature.daily.mean..2.m.above.gnd. +
Wind.Gust.daily.max..sfc. +
## Wind.Speed.daily.min..10.m.above.gnd. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
## Total.Cloud.Cover.daily.max..sfc. + Wind.Direction.daily.mean..900.mb.
+
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.
##
##
## Df Deviance AIC
## - Wind.Speed.daily.min..10.m.above.gnd. 1 1333.2 1347.2
## <none> 1331.7 1347.7
## - Wind.Direction.daily.mean..900.mb. 1 1335.1 1349.1
## - Total.Cloud.Cover.daily.max..sfc. 1 1335.7 1349.7
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1341.5 1355.5
## - Wind.Gust.daily.max..sfc. 1 1351.6 1365.6
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1355.1 1369.1
## - Temperature.daily.mean..2.m.above.gnd. 1 1375.7 1389.7
##
## Step: AIC=1347.16
## pluie.demain ~ Temperature.daily.mean..2.m.above.gnd. +
Wind.Gust.daily.max..sfc. +
## Medium.Cloud.Cover.daily.max..mid.cld.lay. +
Total.Cloud.Cover.daily.max..sfc. +
## Wind.Direction.daily.mean..900.mb. +
Medium.Cloud.Cover.daily.mean..mid.cld.lay.
##
##
## Df Deviance AIC
## <none> 1333.2 1347.2
## - Total.Cloud.Cover.daily.max..sfc. 1 1336.9 1348.9
## - Wind.Direction.daily.mean..900.mb. 1 1337.3 1349.3
## - Medium.Cloud.Cover.daily.max..mid.cld.lay. 1 1343.4 1355.4
## - Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1 1356.5 1368.5
## - Wind.Gust.daily.max..sfc. 1 1364.9 1376.9
## - Temperature.daily.mean..2.m.above.gnd. 1 1375.7 1387.7

summary(p9)

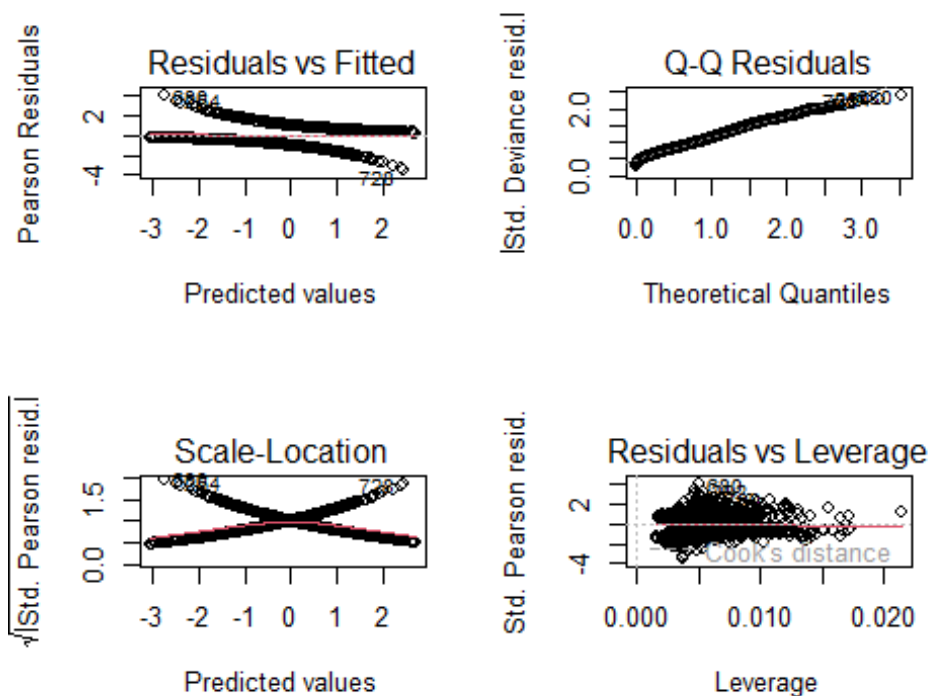
##
## Call:
## glm(formula = pluie.demain ~ Temperature.daily.mean..2.m.above.gnd. +
## Wind.Gust.daily.max..sfc. + Medium.Cloud.Cover.daily.max..mid.cld.lay.
+
## Total.Cloud.Cover.daily.max..sfc. + Wind.Direction.daily.mean..900.mb.
+
## Medium.Cloud.Cover.daily.mean..mid.cld.lay., family = binomial,
## data = dtn)
##
## Coefficients:
## Estimate Std. Error z value

```

```
## (Intercept) -3.6621434 0.3583429 -10.220
## Temperature.daily.mean..2.m.above.gnd. 0.0667100 0.0105037 6.351
## Wind.Gust.daily.max..sfc. 0.0295034 0.0054449 5.419
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 0.0079505 0.0025221 3.152
## Total.Cloud.Cover.daily.max..sfc. 0.0062376 0.0032643 1.911
## Wind.Direction.daily.mean..900.mb. 0.0019452 0.0009597 2.027
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 0.0153326 0.0032402 4.732
## Pr(>|z|)
## (Intercept) < 2e-16 ***
## Temperature.daily.mean..2.m.above.gnd. 2.14e-10 ***
## Wind.Gust.daily.max..sfc. 6.01e-08 ***
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 0.00162 **
## Total.Cloud.Cover.daily.max..sfc. 0.05602 .
## Wind.Direction.daily.mean..900.mb. 0.04268 *
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 2.22e-06 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 1635.4 on 1179 degrees of freedom
## Residual deviance: 1333.2 on 1173 degrees of freedom
## AIC: 1347.2
##
## Number of Fisher Scoring iterations: 4
plot(p9$residuals)
```



```
# Diagnostics de base avec la fonction plot
par(mfrow = c(2, 2))
plot(p9)
```



```
# p9
# Diagnostics supplémentaires avec le package car
# Charger la bibliothèque car si ce n'est pas déjà fait
if (!require(car)) {
  install.packages("car")
  library(car)
}
vif(p9)

##      Temperature.daily.mean..2.m.above.gnd.
##                                1.167478
##      Wind.Gust.daily.max..sfc.
##                                1.224618
##      Medium.Cloud.Cover.daily.max..mid.cld.lay.
##                                2.262715
##      Total.Cloud.Cover.daily.max..sfc.
##                                1.489873
##      Wind.Direction.daily.mean..900.mb.
##                                1.114534
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay.
##                                1.868702
```

```
influencePlot(p9, main = "Influence Plot", sub = "Circle size is proportional to Cook's Distance")
```

```
##           StudRes           Hat           CookD
## 254    2.2839613 0.004770464 0.0083834314
## 454    1.3511594 0.021396444 0.0046347255
## 680    2.3850456 0.005070175 0.0113573791
## 700    1.9806900 0.010740496 0.0092296802
## 1156 -0.7083014 0.017321725 0.0007224366
```

```
# Vérifications avec le package performance
```

```
# Charger la bibliothèque performance si ce n'est pas déjà fait
```

```
if (!require(performance)) {
  install.packages("performance")
  library(performance)
}
```

```
check_collinearity(p9)
```

```
## # Check for Multicollinearity
```

```
##
```

```
## Low Correlation
```

```
##
```

```
##                                     Term  VIF    VIF 95% CI Increased
SE
```

```
##      Temperature.daily.mean..2.m.above.gnd. 1.17 [1.11, 1.26]
```

```
1.08
```

```
##              Wind.Gust.daily.max..sfc. 1.22 [1.16, 1.32]
```

```
1.11
```

```
##      Medium.Cloud.Cover.daily.max..mid.cld.lay. 2.26 [2.08, 2.48]
```

```
1.50
```

```
##              Total.Cloud.Cover.daily.max..sfc. 1.49 [1.39, 1.62]
```

```
1.22
```

```
##              Wind.Direction.daily.mean..900.mb. 1.11 [1.06, 1.21]
```

```
1.06
```

```
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1.87 [1.73, 2.04]
```

```
1.37
```

```
## Tolerance Tolerance 95% CI
```

```
##      0.86      [0.79, 0.90]
```

```
##      0.82      [0.76, 0.87]
```

```
##      0.44      [0.40, 0.48]
```

```
##      0.67      [0.62, 0.72]
```

```
##      0.90      [0.83, 0.94]
```

```
##      0.54      [0.49, 0.58]
```

```
model_performance(p9)
```

```
## # Indices of model performance
```

```
##
```

```
## AIC      |      AICc |      BIC | Tjur's R2 |  RMSE | Sigma | Log_loss |
Score_log | Score_spherical |  PCP
```

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

```

-----
## 1347.160 | 1347.256 | 1382.673 |      0.236 | 0.436 | 1.000 |      0.565 |
-Inf |          0.001 | 0.618

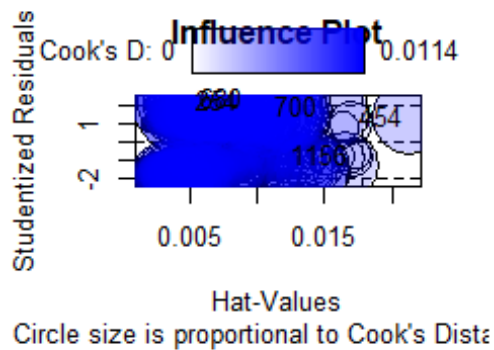
#install.packages("lmtest")
library(lmtest)

# Effectuer le test du rapport de vraisemblance (Likelihood Ratio Test)
test_lrmdr8 <- lrtest(mdr8)

# Afficher les résultats du test
print(test_lrmdr8)

## Likelihood ratio test
##
## Model 1: pluie.demain ~ Temperature.daily.mean..2.m.above.gnd. +
Wind.Gust.daily.max..sfc. +
##      Wind.Speed.daily.min..10.m.above.gnd. +
Medium.Cloud.Cover.daily.max..mid.cld.lay. +
##      Total.Cloud.Cover.daily.max..sfc. + Wind.Direction.daily.mean..900.mb.
+
##      Medium.Cloud.Cover.daily.mean..mid.cld.lay.
## Model 2: pluie.demain ~ 1
##   #Df  LogLik Df  Chisq Pr(>Chisq)
## 1    8 -665.84
## 2    1 -817.71 -7 303.73  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```



pour le modele mdr8 : AIC: 1347.7 et pas de changement dans le rapport de vraisemblance (Likelihood Ratio Test) 8-1 Interprétation des résultats

```
# Obtenir les coefficients estimés du modèle
coefficients <- coef(mdr8)

# Calculer les rapports de cotes en exponentiant les coefficients
odds_ratios <- exp(coefficients)

# Créer un tableau avec les noms des variables et leurs rapports de cotes
variables <- names(coefficients)
tableau_odds_ratios <- data.frame(Variable = variables, OddsRatio =
odds_ratios)

# Afficher le tableau des rapports de cotes
tableau_odds_ratios

##
Variable
## (Intercept)
(Intercept)
## Temperature.daily.mean..2.m.above.gnd.
Temperature.daily.mean..2.m.above.gnd.
## Wind.Gust.daily.max..sfc.
Wind.Gust.daily.max..sfc.
## Wind.Speed.daily.min..10.m.above.gnd.
Wind.Speed.daily.min..10.m.above.gnd.
```

```
## Medium.Cloud.Cover.daily.max..mid.cld.lay.
Medium.Cloud.Cover.daily.max..mid.cld.lay.
## Total.Cloud.Cover.daily.max..sfc.
Total.Cloud.Cover.daily.max..sfc.
## Wind.Direction.daily.mean..900.mb.
Wind.Direction.daily.mean..900.mb.
## Medium.Cloud.Cover.daily.mean..mid.cld.lay.
Medium.Cloud.Cover.daily.mean..mid.cld.lay.
##
## OddsRatio
## (Intercept) 0.02521428
## Temperature.daily.mean..2.m.above.gnd. 1.07168978
## Wind.Gust.daily.max..sfc. 1.02660461
## Wind.Speed.daily.min..10.m.above.gnd. 1.02803036
## Medium.Cloud.Cover.daily.max..mid.cld.lay. 1.00785537
## Total.Cloud.Cover.daily.max..sfc. 1.00650284
## Wind.Direction.daily.mean..900.mb. 1.00180370
## Medium.Cloud.Cover.daily.mean..mid.cld.lay. 1.01546769
```

le tableau tableau\_odds\_ratios indique les quotes est multiplier par les oddsRatio 8-2 La courbe ROC

```
if (!require(caret)) {
  install.packages("caret")
  library(caret)
}

## Le chargement a nécessité le package : caret
## Warning: le package 'caret' a été compilé avec la version R 4.3.3
## Le chargement a nécessité le package : lattice
# Vérifier si la bibliothèque pROC est déjà installée, sinon l'installer
if (!require(pROC)) {
  install.packages("pROC")
  library(pROC)
}

## Le chargement a nécessité le package : pROC
## Warning: le package 'pROC' a été compilé avec la version R 4.3.3
## Type 'citation("pROC")' for a citation.

##
## Attachement du package : 'pROC'

## Les objets suivants sont masqués depuis 'package:stats':
##
## cov, smooth, var
# Charger Les fichiers CSV
library(readr)
```



```

meteo_test <- read_csv("C:/Users/Driouich/Desktop/Modèles linéaires
généralisés - R. RYDER-20240611/Projet/meteo.test.csv")

## New names:
## • `` -> `...1`

## Rows: 290 Columns: 46
## — Column specification

```

---

```

## Delimiter: ","
## dbl (46): ...1, Year, Month, Day, Hour, Minute,
Temperature.daily.mean..2.m....
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this
message.

View(meteo_test)
dts <- meteo_test
train_set <- dtn
test_set <- dts

# Vérifier Les dimensions des jeux de données
cat("Dimensions du jeu de données d'entraînement:", dim(train_set), "\n")

## Dimensions du jeu de données d'entraînement: 1180 47

cat("Dimensions du jeu de données de test:", dim(test_set), "\n")

## Dimensions du jeu de données de test: 290 46

# Vérifier Le contenu de la colonne 'pluie.demain'
if ("pluie.demain" %in% colnames(train_set)) {
  cat("Aperçu des valeurs dans 'pluie.demain' (Entraînement) :\n")
  print(head(train_set$pluie.demain))
  cat("Distribution des classes dans 'pluie.demain' (Entraînement) :\n")
  print(table(train_set$pluie.demain))
} else {
  cat("La colonne 'pluie.demain' n'existe pas dans le jeu de données
d'entraînement.\n")
}

## Aperçu des valeurs dans 'pluie.demain' (Entraînement) :
## [1] FALSE FALSE TRUE TRUE TRUE TRUE
## Levels: FALSE TRUE
## Distribution des classes dans 'pluie.demain' (Entraînement) :
##
## FALSE TRUE
## 579 601

# Si la colonne 'pluie.demain' est absente ou vide, il faudra corriger cela
# Supposons que 'pluie.demain' soit une colonne créée pendant la préparation

```

*des données*

```
# Exemple de correction : Générer des valeurs aléatoires pour 'pluie.demain'
(pour démonstration seulement)
set.seed(123) # Fixer la graine pour reproductibilité
train_set$pluie.demain <- sample(0:1, size = nrow(train_set), replace = TRUE)

# Vérifier à nouveau la distribution des classes après correction
cat("Distribution des classes dans 'pluie.demain' après correction
(Entraînement) :\n")

## Distribution des classes dans 'pluie.demain' après correction
(Entraînement) :

print(table(train_set$pluie.demain))

##
##    0    1
## 594 586

# Continuer avec l'évaluation du modèle
# Prédire les probabilités pour l'ensemble d'entraînement
probas_train <- predict(mdr8, train_set, type = "response")

# Prédire les classes en utilisant un seuil de probabilité de 0.5
seuil <- 0.5
predictions_train <- ifelse(probas_train >= seuil, 1, 0)
predictions_train <- factor(predictions_train, levels = c(0, 1))

# Convertir la colonne 'pluie.demain' en facteur
train_set$pluie.demain <- factor(train_set$pluie.demain, levels = c(0, 1))

# Créer la matrice de confusion
confusion_matrix <- confusionMatrix(predictions_train,
train_set$pluie.demain)

# Calculer l'AUC
roc_curve <- roc(response = train_set$pluie.demain, predictor = probas_train)

## Setting levels: control = 0, case = 1
## Setting direction: controls > cases

auc_value <- auc(roc_curve)

# Afficher les résultats
print(confusion_matrix)

## Confusion Matrix and Statistics
##
##              Reference
## Prediction    0    1
##
```

```

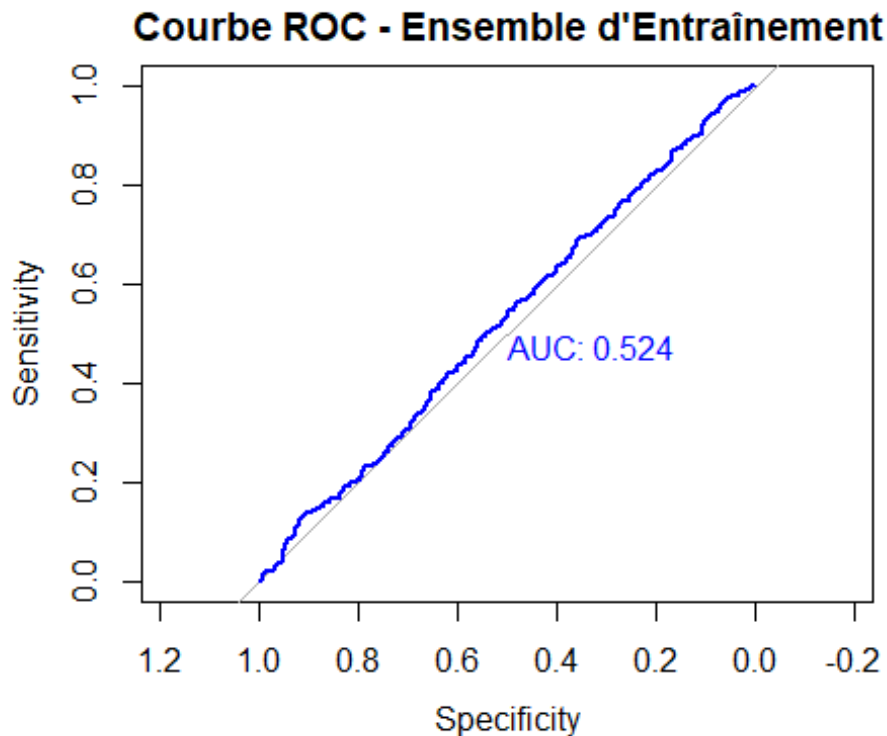
##          0 258 272
##          1 336 314
##
##          Accuracy : 0.4847
##          95% CI : (0.4559, 0.5137)
##      No Information Rate : 0.5034
##      P-Value [Acc > NIR] : 0.90491
##
##          Kappa : -0.0298
##
##      McNemar's Test P-Value : 0.01062
##
##          Sensitivity : 0.4343
##          Specificity : 0.5358
##          Pos Pred Value : 0.4868
##          Neg Pred Value : 0.4831
##          Prevalence : 0.5034
##          Detection Rate : 0.2186
##      Detection Prevalence : 0.4492
##          Balanced Accuracy : 0.4851
##
##          'Positive' Class : 0
##

cat("AUC:", auc_value, "\n")

## AUC: 0.5239195

# Afficher la courbe ROC
plot(roc_curve, main = "Courbe ROC - Ensemble d'Entraînement", col = "blue",
print.auc = TRUE)

```



9- on va effectuer la prediction

```
library(readr)
meteo_test <- read_csv("C:/Users/Driouich/Desktop/Modèles linéaires
généralisés - R. RYDER-20240611/Projet/meteo.test.csv")

## New names:
## Rows: 290 Columns: 46
## — Column specification
## _____ Delimiter: ","
dbl
## (46): ...1, Year, Month, Day, Hour, Minute,
Temperature.daily.mean..2.m....
## i Use `spec()` to retrieve the full column specification for this data. i
## Specify the column types or set `show_col_types = FALSE` to quiet this
message.
## • `` -> `...1`

View(meteo_test)
# Installer et charger les bibliothèques nécessaires
if (!require(caret)) {
  install.packages("caret")
  library(caret)
}

# Charger les fichiers CSV
dts <- meteo_test
```

```

train_set <- dtn
test_set <- dts

# Vérifier les dimensions des jeux de données
cat("Dimensions du jeu de données d'entraînement:", dim(train_set), "\n")
## Dimensions du jeu de données d'entraînement: 1180 47

cat("Dimensions du jeu de données de test:", dim(test_set), "\n")
## Dimensions du jeu de données de test: 290 46

# Vérifier que le modèle mdr8 est chargé dans l'environnement
# print(summary(mdr8))

# Prédire les probabilités pour l'ensemble de test
probas_test <- predict(mdr8, test_set, type = "response")

# Prédire les classes en utilisant un seuil de probabilité de 0.5
seuil <- 0.5
predictions_test <- ifelse(probas_test >= seuil, 1, 0)

# Convertir les prédictions en facteurs
predictions_test <- factor(predictions_test, levels = c(0, 1))

# Ajouter une colonne Identifiant si elle n'existe pas
if (!"Identifiant" %in% colnames(test_set)) {
  test_set$Identifiant <- 1:nrow(test_set)
}

# Ajouter les colonnes de prédictions et probabilités au DataFrame de test
test_set$Probabilités <- probas_test
test_set$Prédictions <- predictions_test

# Ajouter la colonne pluie.demain avec les valeurs "True" ou "False"
test_set$pluie.demain <- ifelse(predictions_test == 1, "True", "False")

# Enregistrer le DataFrame modifié dans un fichier .csv pour l'ensemble de test
write.csv(test_set, file = "meteo.test.csv", row.names = FALSE)

# Vérifier la création du fichier .csv
cat("Les prédictions pour l'ensemble de test ont été enregistrées dans le
fichier 'meteo.test.csv'.\n")

## Les prédictions pour l'ensemble de test ont été enregistrées dans le
fichier 'meteo.test.csv'.

```