

Projet GLM

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30 Juin 2024

Code ▾

I. EXPLORATION DES DONNEES

Hide

```
library(caret)
```

Hide

```
library(car)
```

1.

a. Chargement du jeu de données

Hide

```
d <- read.csv("C:/Users/rhhai/Documents/meteo.train.csv", header = TRUE, sep = ",", dec=".")
attach(d)
```

b. Visualisation des premières lignes

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```
head(d)
```

	X	Year	Mo...	D...	H...	Minute	Temperature.daily.mean..2.m.above.gnd.
	<int>	<int>	<int>	<int>	<int>	<int>	<dbl>
1	2	2010	6	2	0	0	14.99
2	4	2010	6	4	0	0	17.31
3	6	2010	6	6	0	0	21.62
4	8	2010	6	8	0	0	20.22
5	10	2010	6	10	0	0	22.64
6	12	2010	6	12	0	0	18.44

6 rows | 1-8 of 47 columns

c. Description statistique sommaire

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```
summary(d)
```

X	Year	Month	Day	Hour	Minute
Min. : 2.0	Min. :2010	Min. : 1.000	Min. : 1.0	Min. :0	Min. :0
1st Qu.: 721.5	1st Qu.:2012	1st Qu.: 3.000	1st Qu.: 8.0	1st Qu.:0	1st Qu.:0
Median :1451.0	Median :2014	Median : 6.000	Median :16.0	Median :0	Median :0
Mean :1459.8	Mean :2014	Mean : 6.436	Mean :15.8	Mean :0	Mean :0
3rd Qu.:2189.0	3rd Qu.:2016	3rd Qu.: 9.000	3rd Qu.:23.0	3rd Qu.:0	3rd Qu.:0
Max. :2940.0	Max. :2018	Max. :12.000	Max. :31.0	Max. :0	Max. :0
Temperature.daily.mean..2.m.above.gnd. Relative.Humidity.daily.mean..2.m.above.gnd.					
Min. :-7.63		Min. :38.33			
1st Qu.: 6.71		1st Qu.:64.82			
Median :12.08		Median :72.21			
Mean :12.23		Mean :71.40			
3rd Qu.:17.54		3rd Qu.:78.63			
Max. :29.45		Max. :95.54			
Mean.Sea.Level.Pressure.daily.mean..MSL. Total.Precipitation.daily.sum..sfc. Snowfall.amoun					
t.raw.daily.sum..sfc.					
Min. : 978.9		Min. : 0.000		Min. :0.00000	
1st Qu.:1012.4		1st Qu.: 0.000		1st Qu.:0.00000	
Median :1017.0		Median : 0.100		Median :0.00000	
Mean :1017.0		Mean : 2.085		Mean :0.04965	
3rd Qu.:1022.0		3rd Qu.: 2.300		3rd Qu.:0.00000	
Max. :1042.4		Max. :31.500		Max. :8.61000	
Total.Cloud.Cover.daily.mean..sfc. High.Cloud.Cover.daily.mean..high.cld.lay.					
Min. : 0.00		Min. : 0.000			
1st Qu.: 23.80		1st Qu.: 1.657			
Median : 51.67		Median : 11.880			
Mean : 50.76		Mean : 20.284			
3rd Qu.: 78.53		3rd Qu.: 33.260			
Max. :100.00		Max. :100.000			
Medium.Cloud.Cover.daily.mean..mid.cld.lay. Low.Cloud.Cover.daily.mean..low.cld.lay.					
Min. : 0.00		Min. : 0.00			
1st Qu.: 1.83		1st Qu.: 9.42			
Median : 24.98		Median : 36.35			
Mean : 31.50		Mean : 39.34			
3rd Qu.: 54.21		3rd Qu.: 65.76			
Max. :100.00		Max. :100.00			
Sunshine.Duration.daily.sum..sfc. Shortwave.Radiation.daily.sum..sfc. Wind.Speed.daily.me					
n..10.m.above.gnd.					
Min. : 0.0		Min. : 265.2		Min. : 1.260	
1st Qu.: 114.3		1st Qu.:2096.2		1st Qu.: 6.428	
Median : 366.8		Median :3675.3		Median : 9.195	
Mean : 373.1		Mean :3984.6		Mean :10.707	
3rd Qu.: 587.7		3rd Qu.:5723.6		3rd Qu.:12.977	
Max. :1015.8		Max. :8363.3		Max. :42.210	
Wind.Direction.daily.mean..10.m.above.gnd. Wind.Speed.daily.mean..80.m.above.gnd.					
Min. : 11.19		Min. : 1.34			
1st Qu.:152.40		1st Qu.: 8.68			
Median :206.36		Median :12.41			
Mean :201.82		Mean :14.28			
3rd Qu.:254.19		3rd Qu.:17.61			
Max. :331.67		Max. :54.03			
Wind.Direction.daily.mean..80.m.above.gnd. Wind.Speed.daily.mean..900.mb. Wind.Direction.dai					
ly.mean..900.mb.					
Min. : 12.18		Min. : 2.25		Min. : 17.37	
1st Qu.:157.42		1st Qu.:13.02		1st Qu.:144.02	

Median :213.78	Median :19.57	Median :233.47
Mean :206.23	Mean :24.57	Mean :206.22
3rd Qu.:259.06	3rd Qu.:32.10	3rd Qu.:265.93
Max. :333.43	Max. :97.06	Max. :344.82
Wind.Gust.daily.mean..sfc. Temperature.daily.max..2.m.above.gnd. Temperature.daily.min..2.m.above.gnd.		
Min. : 2.25	Min. :-3.84	Min. :-12.520
1st Qu.: 9.48	1st Qu.:10.58	1st Qu.: 3.350
Median :14.06	Median :16.54	Median : 8.005
Mean :16.69	Mean :16.54	Mean : 8.062
3rd Qu.:21.15	3rd Qu.:22.36	3rd Qu.: 13.092
Max. :79.38	Max. :35.77	Max. : 23.940
Relative.Humidity.daily.max..2.m.above.gnd. Relative.Humidity.daily.min..2.m.above.gnd.		
Min. : 59.00	Min. :19.00	
1st Qu.: 83.00	1st Qu.:45.00	
Median : 89.00	Median :54.00	
Mean : 87.69	Mean :54.04	
3rd Qu.: 94.00	3rd Qu.:63.00	
Max. :100.00	Max. :92.00	
Mean.Sea.Level.Pressure.daily.max..MSL. Mean.Sea.Level.Pressure.daily.min..MSL. Total.Cloud.Cover.daily.max..sfc.		
Min. : 981.900	Min. : 977	Min. : 0.
1st Qu.:1015.400	1st Qu.:1009	1st Qu.:100.
Median :1019.500	Median :1015	Median :100.
Mean :1019.923	Mean :1014	Mean : 88.
3rd Qu.:1024.700	3rd Qu.:1019	3rd Qu.:100.
Max. :1045.400	Max. :1039	Max. :100.
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. Medium.Cloud.Cover.daily.max..mid.cld.lay.		
Min. : 0.0000	Min. : 0.00	
1st Qu.: 0.0000	1st Qu.: 22.75	
Median : 0.0000	Median :100.00	
Mean : 0.9432	Mean : 70.94	
3rd Qu.: 0.0000	3rd Qu.:100.00	
Max. :100.0000	Max. :100.00	
Medium.Cloud.Cover.daily.min..mid.cld.lay. Low.Cloud.Cover.daily.max..low.cld.lay.		
Min. : 0.000	Min. : 0	
1st Qu.: 0.000	1st Qu.:100	
Median : 0.000	Median :100	
Mean : 2.097	Mean : 80	
3rd Qu.: 0.000	3rd Qu.:100	
Max. :100.000	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. Wind.Speed.daily.min..80.m.above.gnd.
Min.    : 0.00          Min.    : 3.98          Min.    : 0.000
1st Qu.: 1.14          1st Qu.:18.27          1st Qu.: 1.140
Median : 2.41          Median :23.85          Median : 2.600
Mean   : 3.57          Mean   :25.35          Mean   : 4.727
3rd Qu.: 4.45          3rd Qu.:29.92          3rd Qu.: 5.830
Max.   :27.73          Max.   :93.84          Max.   :37.700
Wind.Speed.daily.max..900.mb. Wind.Speed.daily.min..900.mb. Wind.Gust.daily.max..sfc. Wind.Gust.daily.min..sfc.
Min.    : 4.02          Min.    : 0.00          Min.    : 4.32          Min.
: 0.000
1st Qu.: 24.54          1st Qu.: 3.05          1st Qu.:19.08          1st Q
u.: 2.160
Median : 37.12          Median : 6.73          Median :26.10          Median
: 3.960
Mean   : 41.82          Mean   :11.09          Mean   :29.31          Mean
: 6.502
3rd Qu.: 54.37          3rd Qu.:15.31          3rd Qu.:37.08          3rd Q
u.: 8.280
Max.   :136.25          Max.   :76.13          Max.   :95.04          Max.
:57.960
pluie.demain
Mode :logical
FALSE:579
TRUE :601

```

Ce projet porte sur l'étude de la météorologie à Bâle (en Suisse) entre 2010 et 2018. La variable à expliquer est l'absence/présence de pluie du lendemain. Pour cela, nombreux sont les variables explicatives de notre donnée mais nous ne prenons que les variables pertinentes pour la modélisation. Ainsi, pour les étapes qui suivent, nous allons étudier les variables explicatives pour préparer la modélisation.

Le sommaire montre la présence de 3 colonnes numériques séparées (Year, Month, Day) qui peuvent être combinées en une seule (en date).

Les colonnes suivantes ne donnent pas beaucoup d'information pour notre modélisation car leurs valeurs sont constantes à 0 :

- Hour
- Minute

d. Etude des variables

- Transformation des 3 colonnes Year, Month, Day en une colonne Day

nous allons transformer la colonne Day en une colonne qui indique la date exacte du jour de prélèvement.

```
# Transformer les 3 colonnes Year, Month, Day en date
d1 <- d #afin de garder les données d originales
d1$Day <- as.Date(with(d, paste(d$Year, d$Month, d$Day, sep = "-")), format = "%Y-%m-%d")
```

- Suppression des variables explicatives non pertinentes

Nous pouvons maintenant supprimer les colonnes Year et Month car la date exacte du jour de prélèvement est combinée dans la colonne Day.

Hide

```
d2 <- d1[, -2] # enlever la colonne Year
d3 <- d2[, -2] # enlever la colonne Month
```

Le sommaire montre que la colonne Hour et Minute ne sont remplis que par des 0. Donc, ces colonnes n'apportent pas d'informations. Nous allons les supprimer de nos données.

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```
d4 <- d3[, -3] # enlever la colonne Hour
d5 <- d4[, -3] # enlever la colonne Minute
```

- Les variables sont-elles catégorielles ou quantitatives?

Hide

```
str(d5)
```

```

'data.frame':  1180 obs. of  43 variables:
 $ X                               : int  2 4 6 8 10 12 14 16 18 20 ...
 $ Day                             : Date, format: "2010-06-02" "2010-06-04" "201
0-06-06" "2010-06-08" ...
 $ Temperature.daily.mean..2.m.above.gnd.      : num  15 17.3 21.6 20.2 22.6 ...
 $ Relative.Humidity.daily.mean..2.m.above.gnd.: num  76.5 77.6 69.5 75.1 73.5 ...
 $ Mean.Sea.Level.Pressure.daily.mean..MSL.     : num  1015 1017 1015 1008 1004 ...
 $ Total.Precipitation.daily.sum..sfc.          : num  1 0 3.7 0.2 0 2.2 1.8 1.8 17.5 1.2 ...
 $ Snowfall.amount.raw.daily.sum..sfc.         : num  0 0 0 0 0 0 0 0 0 ...
 $ Total.Cloud.Cover.daily.mean..sfc.          : num  79.8 4.7 42.1 67.5 56.3 ...
 $ High.Cloud.Cover.daily.mean..high.cld.lay.   : num  3 0.67 21.21 54.71 50.25 ...
 $ Medium.Cloud.Cover.daily.mean..mid.cld.lay.  : num  31.6 0 25.9 65.8 55.3 ...
 $ Low.Cloud.Cover.daily.mean..low.cld.lay.     : num  79.2 4.5 35.3 18.9 34.2 ...
 $ Sunshine.Duration.daily.sum..sfc.           : num  287.2 821.4 441.3 41.9 473.2 ...
 $ Shortwave.Radiation.daily.sum..sfc.         : num  6710 7974 4834 5390 7216 ...
 $ Wind.Speed.daily.mean..10.m.above.gnd.       : num  11.64 6.34 8.4 5.4 9.16 ...
 $ Wind.Direction.daily.mean..10.m.above.gnd.   : num  275 230 215 205 179 ...
 $ Wind.Speed.daily.mean..80.m.above.gnd.       : num  14.99 8.92 10.38 6.53 11.91 ...
 $ Wind.Direction.daily.mean..80.m.above.gnd.   : num  268 199 208 206 186 ...
 $ Wind.Speed.daily.mean..900.mb.              : num  20.6 27.9 18.9 10.4 21.9 ...
 $ Wind.Direction.daily.mean..900.mb.          : num  180.4 93.7 250.1 238.6 153 ...
 $ Wind.Gust.daily.mean..sfc.                  : num  14.88 9.48 13.5 5.31 12.21 ...
 $ Temperature.daily.max..2.m.above.gnd.       : num  18.5 25 26.2 24.2 30.7 ...
 $ Temperature.daily.min..2.m.above.gnd.       : num  11.1 10.4 17.7 14.7 16.9 ...
 $ Relative.Humidity.daily.max..2.m.above.gnd.  : int  94 92 91 89 97 92 96 96 97 95 ...
 $ Relative.Humidity.daily.min..2.m.above.gnd.  : int  59 54 57 62 39 65 69 64 74 61 ...
 $ Mean.Sea.Level.Pressure.daily.max..MSL.     : num  1017 1019 1016 1010 1006 ...
 $ Mean.Sea.Level.Pressure.daily.min..MSL.     : num  1014 1016 1013 1006 1001 ...
 $ Total.Cloud.Cover.daily.max..sfc.          : num  100 28 100 100 100 100 100 100 100 100
...
 $ Total.Cloud.Cover.daily.min..sfc.          : num  0 0 0 0 0 0 100 0 0 ...
 $ High.Cloud.Cover.daily.max..high.cld.lay.   : int  16 11 100 100 100 28 100 100 100 24 ...
 $ High.Cloud.Cover.daily.min..high.cld.lay.   : int  0 0 0 0 0 0 0 0 0 ...
 $ Medium.Cloud.Cover.daily.max..mid.cld.lay.  : int  100 0 100 100 100 100 100 100 100 41
...
 $ Medium.Cloud.Cover.daily.min..mid.cld.lay.  : int  0 0 0 0 0 0 0 0 0 ...
 $ Low.Cloud.Cover.daily.max..low.cld.lay.     : int  100 28 100 100 100 100 100 100 100 100
...
 $ Low.Cloud.Cover.daily.min..low.cld.lay.     : int  0 0 0 0 0 0 29 0 0 ...
 $ Wind.Speed.daily.max..10.m.above.gnd.       : num  22 15.5 22.7 10.7 20.5 ...
 $ Wind.Speed.daily.min..10.m.above.gnd.       : num  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  23.8 18.7 32 10.2 23.4 ...
 $ Wind.Speed.daily.min..80.m.above.gnd.       : num  8.65 0 0.51 1.44 2.97 ...
 $ Wind.Speed.daily.max..900.mb.              : num  32.1 48.1 44 22.2 40.8 ...
 $ Wind.Speed.daily.min..900.mb.              : num  12.25 6.62 5.48 4.69 4.68 ...
 $ Wind.Gust.daily.max..sfc.                  : num  25.2 20.2 41.8 11.2 24.1 ...
 $ Wind.Gust.daily.min..sfc.                  : num  6.48 2.16 1.08 0.36 1.44 ...
 $ pluie.demain                               : logi  FALSE FALSE TRUE TRUE TRUE TRUE ...

```

Cela indique que toutes les variables explicatives sont numériques et la variable à expliquer est booléenne.

- Effectif de chaque variable booléenne

Hide

```
table(d5$pluie.demain)
```

```
FALSE  TRUE  
  579   601
```

Cela indique qu'il y avait plus de jour de pluie que de temps sec dans cette région entre 2010 et 2018.

2. Etude de la corrélation des variables explicatives

[Hide](#)

```
d6 <- d5[,-2]    #enlever la date car X représente déjà la date  
  
cor_matrice <- cor(d6) #matrice de corrélation  
options(max.print = 10000)  
symnum(cor_matrice, abbr.colnames = FALSE)
```

	X	Temperature.daily.mean..2.m.above.gnd.
X	1	
Temperature.daily.mean..2.m.above.gnd.	1	
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.	B	
Temperature.daily.min..2.m.above.gnd.	B	
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.		
pluie.demain		
		Relative.Humidity.daily.mean..2.m.above.gnd.
X		
Temperature.daily.mean..2.m.above.gnd.		
Relative.Humidity.daily.mean..2.m.above.gnd.	1	
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.
 pluie.demain

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

X

Temperature.daily.mean..2.m.above.gnd.
 Relative.Humidity.daily.mean..2.m.above.gnd.
 Mean.Sea.Level.Pressure.daily.mean..MSL. 1
 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. B

Mean.Sea.Level.Pressure.daily.min..MSL.	B
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.	
pluie.demain	.
	Total.Precipitation.daily.sum..sfc.

X

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.	1
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.	.	
pluie.demain		
	Snowfall.amount.raw.daily.sum..sfc.	Total.Cloud.
Cover.daily.mean..sfc.		
X		
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.	1	
Total.Cloud.Cover.daily.mean..sfc.		1
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.		.
pluie.demain		.
	High.Cloud.Cover.daily.mean..high.cld.lay.	
X		
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.		

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Total.Cloud.Cover.daily.mean..sfc.
High.Cloud.Cover.daily.mean..high.cld.lay. 1
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.
pluie.demain
Medium.Cloud.Cover.daily.mean..mid.cld.lay.

X
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. 1
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. .

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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.	.
pluie.demain	.
	Low.Cloud.Cover.daily.mean..low.cld.lay.

X

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.	1
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.	.	
pluie.demain		
	Sunshine.Duration.daily.sum..sfc.	Shortwave.Radi
ation.daily.sum..sfc.		
X		
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.	1	
Shortwave.Radiation.daily.sum..sfc.	,	1
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.	.	.
pluie.demain		
	Wind.Speed.daily.mean..10.m.above.gnd.	
X		

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.	1
Wind.Direction.daily.mean..10.m.above.gnd.	
Wind.Speed.daily.mean..80.m.above.gnd.	B
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.	,
pluie.demain	
	Wind.Direction.daily.mean..10.m.above.gnd.

X

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.	1

Wind.Speed.daily.mean..80.m.above.gnd.	
Wind.Direction.daily.mean..80.m.above.gnd.	B
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.	
pluie.demain	
	Wind.Speed.daily.mean..80.m.above.gnd.
X	
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.	1
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.	,
pluie.demain	
	Wind.Direction.daily.mean..80.m.above.gnd.
X	
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.	1
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.			
pluie.demain			
		Wind.Speed.daily.mean..900.mb.	Wind.Direction.da
ily.mean..900.mb.			
X			
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.	1		
Wind.Direction.daily.mean..900.mb.		1	
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.	,		
pluie.demain			
		Wind.Gust.daily.mean..sfc.	Temperature.daily.ma
x..2.m.above.gnd.			
X			
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.	1	
Temperature.daily.max..2.m.above.gnd.	.	1
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.	+	
pluie.demain		
	Temperature.daily.min..2.m.above.gnd.	
X		
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.	1	

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.
pluie.demain

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

X

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. 1
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.
pluie.demain

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

X

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. 1
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.
pluie.demain

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

X

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. 1
 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.
 pluie.demain .
 Mean.Sea.Level.Pressure.daily.min..MSL.

X
 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.	1
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.	
pluie.demain	.
	Total.Cloud.Cover.daily.max..sfc. Total.Cloud.Co
ver.daily.min..sfc.	
X	
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.	1
Total.Cloud.Cover.daily.min..sfc.	1
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.	
pluie.demain	
	High.Cloud.Cover.daily.max..high.cld.lay.
X	
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.	1
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.	
pluie.demain	.

High.Cloud.Cover.daily.min..high.cld.lay.

X

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. 1
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.
pluie.demain

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

X

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. 1
 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.
 pluie.demain .
 Medium.Cloud.Cover.daily.min..mid.cld.lay.

X

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. 1
 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.
 pluie.demain
 Low.Cloud.Cover.daily.max..low.cld.lay.

X

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. 1
 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.
pluie.demain
Low.Cloud.Cover.daily.min..low.cld.lay.

X
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.
pluie.demain

1

Wind.Speed.daily.max..10.m.above.gnd.

X
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. 1
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. ,
pluie.demain

Wind.Speed.daily.min..10.m.above.gnd.

X
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.	1
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.	+
pluie.demain	
	Wind.Speed.daily.max..80.m.above.gnd.

X

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.	1	
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.	,	
pluie.demain		
	Wind.Speed.daily.min..80.m.above.gnd.	Wind.Spee
d.daily.max..900.mb.		
X		
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.	1	
Wind.Speed.daily.max..900.mb.	.	1
Wind.Speed.daily.min..900.mb.	,	,
Wind.Gust.daily.max..sfc.	.	+
Wind.Gust.daily.min..sfc.	+	,
pluie.demain		
	Wind.Speed.daily.min..900.mb.	Wind.Gust.daily.ma
x..sfc.		
X		
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.	1		
Wind.Gust.daily.max..sfc.	,		1
Wind.Gust.daily.min..sfc.	,		,
pluie.demain			
	Wind.Gust.daily.min..sfc.	pluie.demain	
X			
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.
pluie.demain
attr("legend")
[1] 0 ' ' 0.3 '.' 0.6 ',' 0.8 '+' 0.9 '*' 0.95 'B' 1

```

Ce résultat indique les intervalles des coefficients de corrélation entre les variables et s'explique comme suit.

Pour les variables ayant les coefficients de corrélation :

- compris entre 0 et 0.3, R n'affiche pas d'indication " "
- compris entre 0.3 et 0.6, R indique "."
- compris entre 0.6 et 0.8, R indique ","
- compris entre 0.8 et 0.9, R indique "+"
- compris entre 0.9 et 0.95, R indique "*"
- compris entre 0.95 et 1, R indique "B"
- et R indique 1 pour le coefficient de corrélation égal 1.

Rappelons que le coefficient de corrélation calculé ici est obtenu à partir de la formule suivante :

$$r = \frac{\text{Cov}(X, Y)}{\sigma_X \sigma_Y}$$

C'est le rapport de la covariance des deux variables avec le produit de leur écart type.

Si r est compris entre -0.5 et 0.5, cela signifie que la corrélation entre les 2 variables est faible sinon, il y a une corrélation élevée.

Identifions donc les variables ayant de forte corrélation.

On remarque une forte corrélation entre les variables mini, max et moyenne. Ce qui est normal. Les variables à 80m et 10m sont aussi très corrélées entre eux.

Nous allons donc identifier les corrélations très élevées et supprimer une des 2 variables corrélées.

Hide

```
#Identification des corrélations très élevées, prenons à partir de 0.80
cor_elevee <- findCorrelation(cor_matrice, cutoff = 0.80)

# Afficher les indices des variables à supprimer
print(cor_elevee)
```

```
[1] 7 13 19 11 15 34 40 38 17 41 35 20 25 4 23 21 14
```

Hide

```
# Supprimer les variables fortement corrélées
d7 <- d6[, -cor_elevee]
```

Les indices cités ci-dessus sont celles des variables qui ont été supprimées en raison d'une forte corrélation avec les autres variables.

Il nous reste donc les variables dont les coefficients de corrélation sont inférieurs à 0.80.

II. MODELISATION

1. modèle initial

a. Création du modèle

La variable à expliquer étant une variable booléenne, une regression logistique suivant la loi binomiale sera adaptée la modélisation

Hide

```
reg_toutes <- glm(pluie.demain ~ ., data=d7, family= binomial) # modèle avec toutes les variables
summary(reg_toutes)
```

Call:

```
glm(formula = pluie.demain ~ ., family = binomial, data = d7)
```

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	5.301e+01	1.157e+01	4.580	4.65e-06	***
X	1.684e-04	8.466e-05	1.989	0.046647	*
Temperature.daily.mean..2.m.above.gnd.	2.155e-02	1.721e-02	1.252	0.210579	
Relative.Humidity.daily.mean..2.m.above.gnd.	-8.187e-03	1.655e-02	-0.495	0.620734	
Total.Precipitation.daily.sum..sfc.	1.950e-02	2.510e-02	0.777	0.437324	
Snowfall.amount.raw.daily.sum..sfc.	-2.390e-01	1.870e-01	-1.278	0.201141	
High.Cloud.Cover.daily.mean..high.cld.lay.	-1.242e-03	6.412e-03	-0.194	0.846424	
Medium.Cloud.Cover.daily.mean..mid.cld.lay.	6.954e-03	5.302e-03	1.312	0.189661	
Low.Cloud.Cover.daily.mean..low.cld.lay.	3.513e-03	4.377e-03	0.803	0.422141	
Shortwave.Radiation.daily.sum..sfc.	1.452e-04	7.101e-05	2.045	0.040900	*
Wind.Direction.daily.mean..80.m.above.gnd.	-3.715e-03	1.584e-03	-2.346	0.018992	*
Wind.Direction.daily.mean..900.mb.	4.961e-03	1.314e-03	3.777	0.000159	***
Relative.Humidity.daily.max..2.m.above.gnd.	1.803e-02	1.619e-02	1.114	0.265409	
Mean.Sea.Level.Pressure.daily.max..MSL.	-5.678e-02	1.127e-02	-5.037	4.72e-07	***
Total.Cloud.Cover.daily.max..sfc.	3.276e-03	4.580e-03	0.715	0.474503	
Total.Cloud.Cover.daily.min..sfc.	7.335e-03	6.089e-03	1.205	0.228323	
High.Cloud.Cover.daily.max..high.cld.lay.	3.646e-03	2.789e-03	1.308	0.191038	
High.Cloud.Cover.daily.min..high.cld.lay.	8.353e-03	1.972e-02	0.424	0.671858	
Medium.Cloud.Cover.daily.max..mid.cld.lay.	7.529e-03	3.044e-03	2.473	0.013388	*
Medium.Cloud.Cover.daily.min..mid.cld.lay.	-4.086e-03	8.778e-03	-0.466	0.641558	
Low.Cloud.Cover.daily.max..low.cld.lay.	2.979e-03	3.222e-03	0.924	0.355316	
Low.Cloud.Cover.daily.min..low.cld.lay.	9.031e-04	6.835e-03	0.132	0.894886	
Wind.Speed.daily.max..80.m.above.gnd.	3.450e-02	9.667e-03	3.568	0.000359	***
Wind.Speed.daily.min..80.m.above.gnd.	-1.501e-02	1.875e-02	-0.801	0.423414	
Wind.Speed.daily.min..900.mb.	4.885e-03	9.088e-03	0.538	0.590903	

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: 1286.8 on 1155 degrees of freedom

AIC: 1336.8

Number of Fisher Scoring iterations: 4

Une regression logistique avec toutes les variables de la donnée finale a été réalisée et on remarque qu'il y a des variables encore plus pertinentes que d'autres (celles ayant les p-values très faibles) et qu'on peut encore affiner le modèle obtenu et choisir le modèle le plus adapté aux données.

b. Examen des résidus

Pour examiner les résidus, nous allons calculer le ratio entre la déviance résiduelle et le nombre de degré de liberté Ratio = déviance résiduelle/nombre de degré de liberté

Hide

1286.8/1155

[1] 1.114113

Ce ratio est proche de 1 cela confirme que le modèle logistique correspond à notre donnée.

c. Vérification de la multicolinéarité

Hide

```
vif(reg_toutes)
```

	X	Temperature.daily.mean..2.m.above.gnd.
	1.110345	3.018658
Relative.Humidity.daily.mean..2.m.above.gnd.		Total.Precipitation.daily.sum..sfc.
	5.459335	1.807651
Snowfall.amount.raw.daily.sum..sfc.		High.Cloud.Cover.daily.mean..high.cld.lay.
	1.245516	3.922853
Medium.Cloud.Cover.daily.mean..mid.cld.lay.		Low.Cloud.Cover.daily.mean..low.cld.lay.
	4.766094	3.870268
Shortwave.Radiation.daily.sum..sfc.		Wind.Direction.daily.mean..80.m.above.gnd.
	5.197504	2.125081
Wind.Direction.daily.mean..900.mb.		Relative.Humidity.daily.max..2.m.above.gnd.
	1.980895	3.270166
Mean.Sea.Level.Pressure.daily.max..MSL.		Total.Cloud.Cover.daily.max..sfc.
	1.266057	2.829595
Total.Cloud.Cover.daily.min..sfc.		High.Cloud.Cover.daily.max..high.cld.lay.
	3.688509	3.018784
High.Cloud.Cover.daily.min..high.cld.lay.		Medium.Cloud.Cover.daily.max..mid.cld.lay.
	1.419729	3.171209
Medium.Cloud.Cover.daily.min..mid.cld.lay.		Low.Cloud.Cover.daily.max..low.cld.lay.
	1.674118	3.018682
Low.Cloud.Cover.daily.min..low.cld.lay.		Wind.Speed.daily.max..80.m.above.gnd.
	2.621480	2.057141
Wind.Speed.daily.min..80.m.above.gnd.		Wind.Speed.daily.min..900.mb.
	2.234722	2.254336

Avec une vif supérieure à 5, la variable Relative.Humidity.daily.mean..2.m.above.gnd. sera enlevée de la regression initiale.

Hide

```
reg_1 <- glm(pluie.demain ~ .-Relative.Humidity.daily.mean..2.m.above.gnd., data=d7, family=
binomial)
summary(reg_1)
```

Call:

```
glm(formula = pluie.demain ~ . - Relative.Humidity.daily.mean..2.m.above.gnd.,  
     family = binomial, data = d7)
```

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	5.301e+01	1.157e+01	4.580	4.64e-06	***
X	1.752e-04	8.355e-05	2.096	0.036063	*
Temperature.daily.mean..2.m.above.gnd.	2.063e-02	1.710e-02	1.207	0.227476	
Total.Precipitation.daily.sum..sfc.	1.855e-02	2.502e-02	0.741	0.458433	
Snowfall.amount.raw.daily.sum..sfc.	-2.421e-01	1.868e-01	-1.296	0.195005	
High.Cloud.Cover.daily.mean..high.cld.lay.	-1.106e-03	6.406e-03	-0.173	0.862930	
Medium.Cloud.Cover.daily.mean..mid.cld.lay.	6.977e-03	5.300e-03	1.316	0.188063	
Low.Cloud.Cover.daily.mean..low.cld.lay.	3.313e-03	4.358e-03	0.760	0.447106	
Shortwave.Radiation.daily.sum..sfc.	1.626e-04	6.172e-05	2.634	0.008431	**
Wind.Direction.daily.mean..80.m.above.gnd.	-3.855e-03	1.558e-03	-2.474	0.013364	*
Wind.Direction.daily.mean..900.mb.	5.031e-03	1.306e-03	3.853	0.000117	***
Relative.Humidity.daily.max..2.m.above.gnd.	1.201e-02	1.067e-02	1.126	0.260294	
Mean.Sea.Level.Pressure.daily.max..MSL.	-5.688e-02	1.127e-02	-5.048	4.47e-07	***
Total.Cloud.Cover.daily.max..sfc.	3.249e-03	4.581e-03	0.709	0.478223	
Total.Cloud.Cover.daily.min..sfc.	7.359e-03	6.087e-03	1.209	0.226646	
High.Cloud.Cover.daily.max..high.cld.lay.	3.643e-03	2.788e-03	1.307	0.191304	
High.Cloud.Cover.daily.min..high.cld.lay.	8.615e-03	1.972e-02	0.437	0.662247	
Medium.Cloud.Cover.daily.max..mid.cld.lay.	7.528e-03	3.043e-03	2.473	0.013382	*
Medium.Cloud.Cover.daily.min..mid.cld.lay.	-4.012e-03	8.778e-03	-0.457	0.647643	
Low.Cloud.Cover.daily.max..low.cld.lay.	2.996e-03	3.224e-03	0.929	0.352766	
Low.Cloud.Cover.daily.min..low.cld.lay.	8.233e-04	6.832e-03	0.121	0.904087	
Wind.Speed.daily.max..80.m.above.gnd.	3.460e-02	9.663e-03	3.581	0.000343	***
Wind.Speed.daily.min..80.m.above.gnd.	-1.606e-02	1.865e-02	-0.861	0.389033	
Wind.Speed.daily.min..900.mb.	5.539e-03	8.991e-03	0.616	0.537860	

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: 1287.1 on 1156 degrees of freedom
AIC: 1335.1

Number of Fisher Scoring iterations: 4

d. Revérification

Hide

1287.1/1156 #Ratio = déviance résiduelle/nombre de degré de liberté

[1] 1.113408

Hide

vif(reg_1) #Revérification de la multicolinéarité

	X	Temperature.daily.mean..2.m.above.gnd.
	1.081904	2.981165
Total.Precipitation.daily.sum..sfc.		Snowfall.amount.raw.daily.sum..sfc.
	1.796328	1.244699
High.Cloud.Cover.daily.mean..high.cld.lay.		Medium.Cloud.Cover.daily.mean..mid.cld.lay.
	3.917870	4.764323
Low.Cloud.Cover.daily.mean..low.cld.lay.		Shortwave.Radiation.daily.sum..sfc.
	3.836530	3.925356
Wind.Direction.daily.mean..80.m.above.gnd.		Wind.Direction.daily.mean..900.mb.
	2.056716	1.957306
Relative.Humidity.daily.max..2.m.above.gnd.		Mean.Sea.Level.Pressure.daily.max..MSL.
	1.420012	1.265818
Total.Cloud.Cover.daily.max..sfc.		Total.Cloud.Cover.daily.min..sfc.
	2.830232	3.685976
High.Cloud.Cover.daily.max..high.cld.lay.		High.Cloud.Cover.daily.min..high.cld.lay.
	3.017353	1.422939
Medium.Cloud.Cover.daily.max..mid.cld.lay.		Medium.Cloud.Cover.daily.min..mid.cld.lay.
	3.170637	1.676194
Low.Cloud.Cover.daily.max..low.cld.lay.		Low.Cloud.Cover.daily.min..low.cld.lay.
	3.020342	2.621493
Wind.Speed.daily.max..80.m.above.gnd.		Wind.Speed.daily.min..80.m.above.gnd.
	2.054759	2.205606
Wind.Speed.daily.min..900.mb.		
	2.203574	

Le problème de multicollinéarité est résolu (vif < 5) en enlevant la variable
 Relative.Humidity.daily.mean..2.m.above.gnd. On peut donc garder ce modèle comme modèle initial.

d. Rapports de cote

Le rapport de cote entre les deux individus suivants :

$$x \text{ et } \tilde{x}$$

se calcule comme suit :

$$\text{OR}(x, \tilde{x}) = \frac{\text{odds}(x)}{\text{odds}(\tilde{x})} = \frac{\frac{p(x)}{1-p(x)}}{\frac{p(\tilde{x})}{1-p(\tilde{x})}}$$

Ce qui revient à calculer l'exponentiel des coefficients.

Hide

```
exp(coef(reg_1))
```

	(Intercept)	X
	1.050525e+23	1.000175e+00
Temperature.daily.mean..2.m.above.gnd.	1.020849e+00	1.018720e+00
Snowfall.amount.raw.daily.sum..sfc.	7.849633e-01	9.988946e-01
Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1.007001e+00	1.003319e+00
Shortwave.Radiation.daily.sum..sfc.	1.000163e+00	9.961524e-01
Wind.Direction.daily.mean..900.mb.	1.005044e+00	1.012078e+00
Mean.Sea.Level.Pressure.daily.max..MSL.	9.447031e-01	1.003254e+00
Total.Cloud.Cover.daily.min..sfc.	1.007386e+00	1.003649e+00
High.Cloud.Cover.daily.min..high.cld.lay.	1.008652e+00	1.007556e+00
Medium.Cloud.Cover.daily.min..mid.cld.lay.	9.959959e-01	1.003000e+00
Low.Cloud.Cover.daily.min..low.cld.lay.	1.000824e+00	1.035208e+00
Wind.Speed.daily.min..80.m.above.gnd.	9.840641e-01	1.005554e+00
Total.Precipitation.daily.sum..sfc.		
High.Cloud.Cover.daily.mean..high.cld.lay.		
Low.Cloud.Cover.daily.mean..low.cld.lay.		
Wind.Direction.daily.mean..80.m.above.gnd.		
Relative.Humidity.daily.max..2.m.above.gnd.		
Total.Cloud.Cover.daily.max..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..80.m.above.gnd.		
Wind.Speed.daily.min..900.mb.		

Un rapport de cotes > 1 indique que la probabilité augmente, et < 1 indique qu'elle diminue. S'il est égal à 1, la variable ne change pas la probabilité.

e. Déviance

La déviance d'un modèle s'écrit M_{β} s'écrit :

$$D_{M_{\beta}} = 2 \left(\mathcal{L}_{\text{sat}} - \mathcal{L}_n(\hat{\beta}) \right)$$

La déviance est égale à 2 fois une différence de log-vraisemblance. Elle constitue un écart en terme de log-vraisemblance entre le modèle saturé d'ajustement maximum et le modèle considéré.

Hide

```
reg_1$deviance
```

```
[1] 1287.074
```

2. Deuxième modèle

a. Création du modèle

Nous avons vu que le modèle initial peut être amélioré. Nous allons proposer un deuxième modèle. Nous allons donc choisir les variables pertinentes pour le modèle.

Hide

```
reg_2 <- glm(pluie.demain ~ X + Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.me
an..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. + Mean.Sea.Level.Pressure.daily.ma
x..MSL. + Medium.Cloud.Cover.daily.max..mid.cld.lay. + Wind.Speed.daily.max..80.m.above.gnd.
, data=d7, family= binomial)
summary(reg_2)
```

Call:

```
glm(formula = pluie.demain ~ X + Shortwave.Radiation.daily.sum..sfc. +
    Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. +
    Mean.Sea.Level.Pressure.daily.max..MSL. + Medium.Cloud.Cover.daily.max..mid.cld.lay. +
    Wind.Speed.daily.max..80.m.above.gnd., family = binomial,
    data = d7)
```

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	7.268e+01	1.058e+01	6.872	6.32e-12	***
X	1.287e-04	7.902e-05	1.628	0.10348	
Shortwave.Radiation.daily.sum..sfc.	9.095e-05	3.506e-05	2.594	0.00948	**
Wind.Direction.daily.mean..80.m.above.gnd.	-1.614e-03	1.348e-03	-1.197	0.23128	
Wind.Direction.daily.mean..900.mb.	4.724e-03	1.190e-03	3.971	7.17e-05	***
Mean.Sea.Level.Pressure.daily.max..MSL.	-7.417e-02	1.031e-02	-7.197	6.15e-13	***
Medium.Cloud.Cover.daily.max..mid.cld.lay.	1.469e-02	1.901e-03	7.728	1.09e-14	***
Wind.Speed.daily.max..80.m.above.gnd.	2.910e-02	7.271e-03	4.003	6.25e-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: 1326.0 on 1172 degrees of freedom
 AIC: 1342

Number of Fisher Scoring iterations: 4

b. Examen des résidus

Ratio = déviance résiduelle/nombre de degré de liberté

Hide

1326/1172

[1] 1.131399

c. Vérification de la multicolinéarité

Hide

vif(reg_2)

	X	
	1.011631	Shortwave.Radiation.daily.sum..sfc. 1.291633
Wind.Direction.daily.mean..80.m.above.gnd.		Wind.Direction.daily.mean..900.mb. 1.658910
	1.587747	
Mean.Sea.Level.Pressure.daily.max..MSL.		Medium.Cloud.Cover.daily.max..mid.cld.lay. 1.248793
	1.087519	
Wind.Speed.daily.max..80.m.above.gnd.		
	1.185568	

Les coefficients indiqués étant tous proche de 1 donc il n'y a pas de multicolinéarité.

d. Rapports de cote

Hide

```
exp(coef(reg_2))
```

	(Intercept)	X
	3.654826e+31	1.000129e+00
Shortwave.Radiation.daily.sum..sfc.		Wind.Direction.daily.mean..80.m.above.gnd. 9.983877e-01
	1.000091e+00	
Wind.Direction.daily.mean..900.mb.		Mean.Sea.Level.Pressure.daily.max..MSL. 9.285133e-01
	1.004735e+00	
Medium.Cloud.Cover.daily.max..mid.cld.lay.		Wind.Speed.daily.max..80.m.above.gnd. 1.029532e+00
	1.014796e+00	

e. Déviance

Hide

```
reg_2$deviance
```

```
[1] 1326.047
```

3. Comparaison du modèle réduit avec le modèle complet

Hide

```
anova(reg_2, reg_1, test = "Chisq")
```

Analysis of Deviance Table

```
Model 1: pluie.demain ~ X + Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..
80.m.above.gnd. +
  Wind.Direction.daily.mean..900.mb. + Mean.Sea.Level.Pressure.daily.max..MSL. +
  Medium.Cloud.Cover.daily.max..mid.cld.lay. + Wind.Speed.daily.max..80.m.above.gnd.
Model 2: pluie.demain ~ (X + Temperature.daily.mean..2.m.above.gnd. +
  Relative.Humidity.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sfc. +
  Snowfall.amount.raw.daily.sum..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. +
  Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. +
  Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. +
  Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd. +
  Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.min..900.mb.) -
  Relative.Humidity.daily.mean..2.m.above.gnd.
Resid. Df Resid. Dev Df Deviance Pr(>Chi)
1      1172      1326.0
2      1156      1287.1 16    38.973 0.001097 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

La déviance consitue un écart en terme de log-vraisemblance entre le modèle réduit et complet.

$$-2 \left(\mathcal{L}_n \left(\hat{\mathcal{M}}_1 \right) - \mathcal{L}_n \left(\hat{\mathcal{M}}_2 \right) \right) \xrightarrow{\mathcal{L}} \chi_{p_2 - p_1}^2$$

Le test indique que la p-value est inférieur à 0.05, ce qui indique que les variables du modèle complet apportent une amélioration à l'ajustement du modèle. Ainsi, on garde le modèle initiale.

Nous avons fait une sélection de modèle manuelle mais que propose la sélection automatique de modèle ?

4. Sélection automatique de modèle

a. Création du modèle

Nous allons utiliser la méthode descendante pour la sélection automatique du modèle.

```
model_desc <- step(reg_1, direction = "backward")
```

Hide

Start: AIC=1335.07

```
pluie.demain ~ (X + Temperature.daily.mean..2.m.above.gnd. +  
  Relative.Humidity.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sfc. +  
  Snowfall.amount.raw.daily.sum..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. +  
  Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. +  
  Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. +  
  Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd. +  
  Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.min..900.mb.) -  
  Relative.Humidity.daily.mean..2.m.above.gnd.
```

	Df	Deviance	AIC
- Low.Cloud.Cover.daily.min..low.cld.lay.	1	1287.1	1333.1
- High.Cloud.Cover.daily.mean..high.cld.lay.	1	1287.1	1333.1
- Medium.Cloud.Cover.daily.min..mid.cld.lay.	1	1287.3	1333.3
- High.Cloud.Cover.daily.min..high.cld.lay.	1	1287.3	1333.3
- Wind.Speed.daily.min..900.mb.	1	1287.5	1333.5
- Total.Cloud.Cover.daily.max..sfc.	1	1287.6	1333.6
- Total.Precipitation.daily.sum..sfc.	1	1287.6	1333.6
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1287.7	1333.7
- Wind.Speed.daily.min..80.m.above.gnd.	1	1287.8	1333.8
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1287.9	1333.9
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1288.3	1334.3
- Temperature.daily.mean..2.m.above.gnd.	1	1288.5	1334.5
- Total.Cloud.Cover.daily.min..sfc.	1	1288.6	1334.6
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1288.8	1334.8
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1288.8	1334.8
- Snowfall.amount.raw.daily.sum..sfc.	1	1288.8	1334.8
<none>		1287.1	1335.1
- X	1	1291.5	1337.5
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1293.3	1339.3
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1293.3	1339.3
- Shortwave.Radiation.daily.sum..sfc.	1	1294.1	1340.1
- Wind.Speed.daily.max..80.m.above.gnd.	1	1300.3	1346.3
- Wind.Direction.daily.mean..900.mb.	1	1302.2	1348.2
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1313.7	1359.7

Step: AIC=1333.09

```
pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sf  
c. +  
  Snowfall.amount.raw.daily.sum..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. +  
  Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. +  
  Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. +  
  Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd. + Wind.Speed.daily.min..80.m.above.gnd. +  
  Wind.Speed.daily.min..900.mb.
```

	Df	Deviance	AIC
- High.Cloud.Cover.daily.mean..high.cld.lay.	1	1287.1	1331.1
- High.Cloud.Cover.daily.min..high.cld.lay.	1	1287.3	1331.3
- Medium.Cloud.Cover.daily.min..mid.cld.lay.	1	1287.3	1331.3
- Wind.Speed.daily.min..900.mb.	1	1287.5	1331.5
- Total.Cloud.Cover.daily.max..sfc.	1	1287.6	1331.6
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1287.7	1331.7
- Total.Precipitation.daily.sum..sfc.	1	1287.7	1331.7
- Wind.Speed.daily.min..80.m.above.gnd.	1	1287.8	1331.8
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1288.0	1332.0
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1288.3	1332.3
- Temperature.daily.mean..2.m.above.gnd.	1	1288.5	1332.5
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1288.8	1332.8
- Snowfall.amount.raw.daily.sum..sfc.	1	1288.8	1332.8
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1288.8	1332.8
<none>		1287.1	1333.1
- Total.Cloud.Cover.daily.min..sfc.	1	1290.2	1334.2
- X	1	1291.5	1335.5
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1293.3	1337.3
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1293.4	1337.4
- Shortwave.Radiation.daily.sum..sfc.	1	1294.1	1338.1
- Wind.Speed.daily.max..80.m.above.gnd.	1	1300.4	1344.4
- Wind.Direction.daily.mean..900.mb.	1	1302.2	1346.2
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1313.8	1357.8

Step: AIC=1331.12

pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sfc. +

Snowfall.amount.raw.daily.sum..sfc. + Medium.Cloud.Cover.daily.mean..mid.cld.lay. + Low.Cloud.Cover.daily.mean..low.cld.lay. + Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. + Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd. + Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.min..900.mb.

	Df	Deviance	AIC
- High.Cloud.Cover.daily.min..high.cld.lay.	1	1287.3	1329.3
- Medium.Cloud.Cover.daily.min..mid.cld.lay.	1	1287.3	1329.3
- Wind.Speed.daily.min..900.mb.	1	1287.5	1329.5
- Total.Cloud.Cover.daily.max..sfc.	1	1287.6	1329.6
- Total.Precipitation.daily.sum..sfc.	1	1287.7	1329.7
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1287.8	1329.8
- Wind.Speed.daily.min..80.m.above.gnd.	1	1287.9	1329.9
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1288.0	1330.0
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1288.4	1330.4
- Temperature.daily.mean..2.m.above.gnd.	1	1288.5	1330.5
- Snowfall.amount.raw.daily.sum..sfc.	1	1288.8	1330.8
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1289.1	1331.1
<none>		1287.1	1331.1
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1289.4	1331.4
- Total.Cloud.Cover.daily.min..sfc.	1	1290.2	1332.2
- X	1	1291.6	1333.6
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1293.3	1335.3

- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1293.9	1335.9
- Shortwave.Radiation.daily.sum..sfc.	1	1294.5	1336.5
- Wind.Speed.daily.max..80.m.above.gnd.	1	1300.5	1342.5
- Wind.Direction.daily.mean..900.mb.	1	1302.3	1344.3
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1313.8	1355.8

Step: AIC=1329.29

pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sf
c. +

Snowfall.amount.raw.daily.sum..sfc. + Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. + Shortwave.Radiation.daily.sum..sfc. +
Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. +
Relative.Humidity.daily.max..2.m.above.gnd. + Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd. + Wind.Speed.daily.min..80.m.above.gnd. +
Wind.Speed.daily.min..900.mb.

	Df	Deviance	AIC
- Medium.Cloud.Cover.daily.min..mid.cld.lay.	1	1287.4	1327.4
- Wind.Speed.daily.min..900.mb.	1	1287.7	1327.7
- Total.Cloud.Cover.daily.max..sfc.	1	1287.8	1327.8
- Total.Precipitation.daily.sum..sfc.	1	1287.8	1327.8
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1287.9	1327.9
- Wind.Speed.daily.min..80.m.above.gnd.	1	1288.0	1328.0
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1288.1	1328.1
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1288.6	1328.6
- Temperature.daily.mean..2.m.above.gnd.	1	1288.7	1328.7
- Snowfall.amount.raw.daily.sum..sfc.	1	1289.1	1329.1
<none>		1287.3	1329.3
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1289.4	1329.4
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1289.7	1329.7
- Total.Cloud.Cover.daily.min..sfc.	1	1290.4	1330.4
- X	1	1291.8	1331.8
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1293.5	1333.5
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1294.0	1334.0
- Shortwave.Radiation.daily.sum..sfc.	1	1294.5	1334.5
- Wind.Speed.daily.max..80.m.above.gnd.	1	1300.5	1340.5
- Wind.Direction.daily.mean..900.mb.	1	1302.6	1342.6
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1314.1	1354.1

Step: AIC=1327.41

pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sf
c. +

Snowfall.amount.raw.daily.sum..sfc. + Medium.Cloud.Cover.daily.mean..mid.cld.lay. +
Low.Cloud.Cover.daily.mean..low.cld.lay. + Shortwave.Radiation.daily.sum..sfc. +
Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. +
Relative.Humidity.daily.max..2.m.above.gnd. + Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.min..900.mb.

	Df	Deviance	AIC
- Wind.Speed.daily.min..900.mb.	1	1287.8	1325.8

- Total.Cloud.Cover.daily.max..sfc.	1	1287.9	1325.9
- Total.Precipitation.daily.sum..sfc.	1	1288.0	1326.0
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1288.1	1326.1
- Wind.Speed.daily.min..80.m.above.gnd.	1	1288.2	1326.2
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1288.2	1326.2
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1288.7	1326.7
- Temperature.daily.mean..2.m.above.gnd.	1	1288.8	1326.8
<none>		1287.4	1327.4
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1289.4	1327.4
- Snowfall.amount.raw.daily.sum..sfc.	1	1289.5	1327.5
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1289.8	1327.8
- Total.Cloud.Cover.daily.min..sfc.	1	1290.5	1328.5
- X	1	1291.9	1329.9
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1293.6	1331.6
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1294.5	1332.5
- Shortwave.Radiation.daily.sum..sfc.	1	1294.6	1332.6
- Wind.Speed.daily.max..80.m.above.gnd.	1	1300.7	1338.7
- Wind.Direction.daily.mean..900.mb.	1	1302.7	1340.7
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1314.2	1352.2

Step: AIC=1325.82

pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sfc. +

Snowfall.amount.raw.daily.sum..sfc. + Medium.Cloud.Cover.daily.mean..mid.cld.lay. + Low.Cloud.Cover.daily.mean..low.cld.lay. + Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. + Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd. + Wind.Speed.daily.min..80.m.above.gnd.

	Df	Deviance	AIC
- Wind.Speed.daily.min..80.m.above.gnd.	1	1288.2	1324.2
- Total.Cloud.Cover.daily.max..sfc.	1	1288.3	1324.3
- Total.Precipitation.daily.sum..sfc.	1	1288.3	1324.3
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1288.4	1324.4
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1288.7	1324.7
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1289.0	1325.0
- Temperature.daily.mean..2.m.above.gnd.	1	1289.4	1325.4
<none>		1287.8	1325.8
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1289.9	1325.9
- Snowfall.amount.raw.daily.sum..sfc.	1	1290.1	1326.1
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1290.2	1326.2
- Total.Cloud.Cover.daily.min..sfc.	1	1290.8	1326.8
- X	1	1292.2	1328.2
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1293.8	1329.8
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1294.7	1330.7
- Shortwave.Radiation.daily.sum..sfc.	1	1294.7	1330.7
- Wind.Direction.daily.mean..900.mb.	1	1303.1	1339.1
- Wind.Speed.daily.max..80.m.above.gnd.	1	1304.5	1340.5
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1314.2	1350.2

Step: AIC=1324.23

pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sfc. +

Snowfall.amount.raw.daily.sum..sfc. + Medium.Cloud.Cover.daily.mean..mid.cld.lay. + Low.Cloud.Cover.daily.mean..low.cld.lay. + Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. + Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd.

	Df	Deviance	AIC
- Total.Precipitation.daily.sum..sfc.	1	1288.7	1322.7
- Total.Cloud.Cover.daily.max..sfc.	1	1288.7	1322.7
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1288.7	1322.7
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1289.2	1323.2
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1289.6	1323.6
- Temperature.daily.mean..2.m.above.gnd.	1	1290.0	1324.0
<none>		1288.2	1324.2
- Snowfall.amount.raw.daily.sum..sfc.	1	1290.4	1324.4
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1290.4	1324.4
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1290.8	1324.8
- Total.Cloud.Cover.daily.min..sfc.	1	1291.1	1325.1
- X	1	1292.6	1326.6
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1294.3	1328.3
- Shortwave.Radiation.daily.sum..sfc.	1	1295.0	1329.0
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1295.0	1329.0
- Wind.Direction.daily.mean..900.mb.	1	1303.2	1337.2
- Wind.Speed.daily.max..80.m.above.gnd.	1	1307.4	1341.4
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1314.7	1348.7

Step: AIC=1322.7

pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Snowfall.amount.raw.daily.sum..sf
c. +

Medium.Cloud.Cover.daily.mean..mid.cld.lay. + Low.Cloud.Cover.daily.mean..low.cld.lay. + Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. + Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd.

	Df	Deviance	AIC
- Total.Cloud.Cover.daily.max..sfc.	1	1289.2	1321.2
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1289.5	1321.5
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1289.6	1321.6
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1290.4	1322.4
- Snowfall.amount.raw.daily.sum..sfc.	1	1290.6	1322.6
<none>		1288.7	1322.7
- Temperature.daily.mean..2.m.above.gnd.	1	1291.0	1323.0
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1291.3	1323.3
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1291.5	1323.5
- Total.Cloud.Cover.daily.min..sfc.	1	1291.6	1323.6
- X	1	1293.1	1325.1
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1294.7	1326.7
- Shortwave.Radiation.daily.sum..sfc.	1	1295.2	1327.2
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1295.3	1327.3
- Wind.Direction.daily.mean..900.mb.	1	1304.1	1336.1
- Wind.Speed.daily.max..80.m.above.gnd.	1	1309.9	1341.9

- Mean.Sea.Level.Pressure.daily.max..MSL. 1 1315.6 1347.6

Step: AIC=1321.17

pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Snowfall.amount.raw.daily.sum..sf
c. +

Medium.Cloud.Cover.daily.mean..mid.cld.lay. + Low.Cloud.Cover.daily.mean..low.cld.lay. +
Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. + 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..80.m.above.gnd.

	Df	Deviance	AIC
- Low.Cloud.Cover.daily.mean..low.cld.lay.	1	1290.0	1320.0
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1291.0	1321.0
- Snowfall.amount.raw.daily.sum..sfc.	1	1291.1	1321.1
<none>		1289.2	1321.2
- Temperature.daily.mean..2.m.above.gnd.	1	1291.4	1321.4
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1291.6	1321.6
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1292.0	1322.0
- Total.Cloud.Cover.daily.min..sfc.	1	1292.1	1322.1
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1292.1	1322.1
- X	1	1293.6	1323.6
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1295.2	1325.2
- Shortwave.Radiation.daily.sum..sfc.	1	1295.8	1325.8
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1300.1	1330.1
- Wind.Direction.daily.mean..900.mb.	1	1304.5	1334.5
- Wind.Speed.daily.max..80.m.above.gnd.	1	1310.0	1340.0
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1316.0	1346.0

Step: AIC=1319.96

pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Snowfall.amount.raw.daily.sum..sf
c. +

Medium.Cloud.Cover.daily.mean..mid.cld.lay. + Shortwave.Radiation.daily.sum..sfc. +
Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. +
Relative.Humidity.daily.max..2.m.above.gnd. + Mean.Sea.Level.Pressure.daily.max..MSL. +
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..80.m.above.gnd.

	Df	Deviance	AIC
- Snowfall.amount.raw.daily.sum..sfc.	1	1291.8	1319.8
<none>		1290.0	1320.0
- Temperature.daily.mean..2.m.above.gnd.	1	1292.3	1320.3
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1292.3	1320.3
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1292.4	1320.4
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1292.8	1320.8
- X	1	1294.5	1322.5
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1295.3	1323.3
- Total.Cloud.Cover.daily.min..sfc.	1	1295.3	1323.3
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1295.5	1323.5
- Shortwave.Radiation.daily.sum..sfc.	1	1295.9	1323.9
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1301.1	1329.1
- Wind.Direction.daily.mean..900.mb.	1	1305.3	1333.3
- Wind.Speed.daily.max..80.m.above.gnd.	1	1311.2	1339.2
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1317.3	1345.3

Step: AIC=1319.81

```
pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Medium.Cloud.Cover.daily.mean..mid.cld.lay. +  
  Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. +  
  Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. +  
  Mean.Sea.Level.Pressure.daily.max..MSL. + 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..80.m.above.gnd.
```

	Df	Deviance	AIC
<none>		1291.8	1319.8
- Relative.Humidity.daily.max..2.m.above.gnd.	1	1293.9	1319.9
- High.Cloud.Cover.daily.max..high.cld.lay.	1	1294.4	1320.4
- Medium.Cloud.Cover.daily.mean..mid.cld.lay.	1	1294.5	1320.5
- Temperature.daily.mean..2.m.above.gnd.	1	1294.8	1320.8
- X	1	1296.6	1322.6
- Total.Cloud.Cover.daily.min..sfc.	1	1296.7	1322.7
- Shortwave.Radiation.daily.sum..sfc.	1	1297.4	1323.4
- Wind.Direction.daily.mean..80.m.above.gnd.	1	1297.5	1323.5
- Low.Cloud.Cover.daily.max..low.cld.lay.	1	1297.8	1323.8
- Medium.Cloud.Cover.daily.max..mid.cld.lay.	1	1302.9	1328.9
- Wind.Direction.daily.mean..900.mb.	1	1307.6	1333.6
- Wind.Speed.daily.max..80.m.above.gnd.	1	1311.9	1337.9
- Mean.Sea.Level.Pressure.daily.max..MSL.	1	1319.0	1345.0

Ici, la sélection automatique se fait en fonction du critère AIC :

$$AIC(\mathcal{M}) = -2\mathcal{L}_n(\hat{\mathcal{M}}) + 2p$$

Ayant le critère AIC le plus faible, modèle proposé par la sélection automatique est le suivant :

Hide

```
reg3 <- glm(pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Medium.Cloud.Cover.daily.mean..mid.cld.lay. +  
  Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. +  
  Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. +  
  Mean.Sea.Level.Pressure.daily.max..MSL. + 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..80.m.above.gnd., data=d7,  
family= binomial)  
summary(reg3)
```

Call:

```
glm(formula = pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. +  
  Medium.Cloud.Cover.daily.mean..mid.cld.lay. + Shortwave.Radiation.daily.sum..sfc. +  
  Wind.Direction.daily.mean..80.m.above.gnd. + Wind.Direction.daily.mean..900.mb. +  
  Relative.Humidity.daily.max..2.m.above.gnd. + Mean.Sea.Level.Pressure.daily.max..MSL. +  
  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..80.m.above.gnd., family = binomial,  
  data = d7)
```

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	5.291e+01	1.148e+01	4.610	4.02e-06	***
X	1.811e-04	8.316e-05	2.177	0.029460	*
Temperature.daily.mean..2.m.above.gnd.	2.760e-02	1.610e-02	1.715	0.086420	.
Medium.Cloud.Cover.daily.mean..mid.cld.lay.	6.847e-03	4.195e-03	1.632	0.102609	
Shortwave.Radiation.daily.sum..sfc.	1.344e-04	5.698e-05	2.359	0.018334	*
Wind.Direction.daily.mean..80.m.above.gnd.	-3.569e-03	1.502e-03	-2.376	0.017496	*
Wind.Direction.daily.mean..900.mb.	5.085e-03	1.295e-03	3.928	8.57e-05	***
Relative.Humidity.daily.max..2.m.above.gnd.	1.461e-02	1.007e-02	1.451	0.146732	
Mean.Sea.Level.Pressure.daily.max..MSL.	-5.688e-02	1.115e-02	-5.100	3.40e-07	***
Total.Cloud.Cover.daily.min..sfc.	8.123e-03	3.744e-03	2.170	0.030026	*
High.Cloud.Cover.daily.max..high.cld.lay.	3.479e-03	2.161e-03	1.610	0.107384	
Medium.Cloud.Cover.daily.max..mid.cld.lay.	8.453e-03	2.560e-03	3.302	0.000961	***
Low.Cloud.Cover.daily.max..low.cld.lay.	5.498e-03	2.262e-03	2.431	0.015065	*
Wind.Speed.daily.max..80.m.above.gnd.	3.328e-02	7.658e-03	4.345	1.39e-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: 1291.8 on 1166 degrees of freedom
AIC: 1319.8

Number of Fisher Scoring iterations: 4

b. Ratio entre la déviance résiduelle et le nombre de degré de liberté

Ratio = déviance résiduelle/nombre de degré de liberté

Hide

1291.8/1166

[1] 1.10789

c. Vérification de la multicolinéarité

Hide

```
vif(reg3)
```

	X	
	1.075663	Temperature.daily.mean..2.m.above.gnd.
Medium.Cloud.Cover.daily.mean..mid.cld.lay.		2.640202
	2.997979	Shortwave.Radiation.daily.sum..sfc.
Wind.Direction.daily.mean..80.m.above.gnd.		3.363917
	1.914434	Wind.Direction.daily.mean..900.mb.
Relative.Humidity.daily.max..2.m.above.gnd.		1.912005
	1.267601	Mean.Sea.Level.Pressure.daily.max..MSL.
Total.Cloud.Cover.daily.min..sfc.		1.246028
	1.396625	High.Cloud.Cover.daily.max..high.cld.lay.
Medium.Cloud.Cover.daily.max..mid.cld.lay.		1.818411
	2.253537	Low.Cloud.Cover.daily.max..low.cld.lay.
Wind.Speed.daily.max..80.m.above.gnd.		1.516104
	1.289902	

Les coefficients indiqués étant tous inférieur à 5 donc il n'y a pas de multicollinéarité.

d. Rapports de cote

[Hide](#)

```
exp(coef(reg3))
```

	(Intercept)	X
	9.490354e+22	1.000181e+00
Temperature.daily.mean..2.m.above.gnd.		Medium.Cloud.Cover.daily.mean..mid.cld.lay.
	1.027986e+00	1.006870e+00
Shortwave.Radiation.daily.sum..sfc.		Wind.Direction.daily.mean..80.m.above.gnd.
	1.000134e+00	9.964371e-01
Wind.Direction.daily.mean..900.mb.		Relative.Humidity.daily.max..2.m.above.gnd.
	1.005098e+00	1.014714e+00
Mean.Sea.Level.Pressure.daily.max..MSL.		Total.Cloud.Cover.daily.min..sfc.
	9.447079e-01	1.008156e+00
High.Cloud.Cover.daily.max..high.cld.lay.		Medium.Cloud.Cover.daily.max..mid.cld.lay.
	1.003485e+00	1.008489e+00
Low.Cloud.Cover.daily.max..low.cld.lay.		Wind.Speed.daily.max..80.m.above.gnd.
	1.005513e+00	1.033836e+00

On remarque des variables augmentent (>1) et diminuent (<1) la probabilité que alors que d'autres (proche de 1) pour le modèle.

e. Déviance

[Hide](#)

```
reg3$deviance
```

```
[1] 1291.813
```

5. Choix du modèle

a. Comparaison des modèles

[Hide](#)

```
anova(reg_1, reg3, test = "Chisq")
```

Analysis of Deviance Table

Model 1: pluie.demain ~ (X + Temperature.daily.mean..2.m.above.gnd. +
Relative.Humidity.daily.mean..2.m.above.gnd. + Total.Precipitation.daily.sum..sfc. +
Snowfall.amount.raw.daily.sum..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. +
Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..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..80.m.above.gnd. +
Wind.Speed.daily.min..80.m.above.gnd. + Wind.Speed.daily.min..900.mb.) -
Relative.Humidity.daily.mean..2.m.above.gnd.

Model 2: pluie.demain ~ X + Temperature.daily.mean..2.m.above.gnd. + Medium.Cloud.Cover.daily.mean..mid.cld.lay. +

Shortwave.Radiation.daily.sum..sfc. + Wind.Direction.daily.mean..80.m.above.gnd. +
Wind.Direction.daily.mean..900.mb. + Relative.Humidity.daily.max..2.m.above.gnd. +
Mean.Sea.Level.Pressure.daily.max..MSL. + 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..80.m.above.gnd.

Resid. Df Resid. Dev Df Deviance Pr(>Chi)

1	1156	1287.1			
2	1166	1291.8	-10	-4.7392	0.9079

Le test indique que la p-value est supérieure à 0.05, ce qui indique que le modèle proposé par la sélection automatique (reg3) propose un meilleur ajustement.

III. PREDICTION

Afin de vérifier l'ajustement de la prédiction du modèle retenu, nous allons d'abord faire une prédiction avec les données d'entraînement et tester ses résultats avec les vrais résultats, puis réaliser la prédiction avec les données tests.

1. Test de de la prédiction sur les données d'apprentissage

a. Prédiction

[Hide](#)

```
pred1_proba <- predict(reg3, type= "response", newdata = d7)
head(pred1_proba)
```

```
      1      2      3      4      5      6
0.5479581 0.1734917 0.7734440 0.7395644 0.8497004 0.6251055
```

Hide

```
d8 <- cbind(d7, pred1_proba)
```

b. Résultat de la prédiction en variable booléenne

Hide

```
pred1_bool <- ifelse(pred1_proba < 0.5, FALSE, TRUE)
table(pred1_bool)
```

```
pred1_bool
FALSE  TRUE
  545   635
```

c. Matrice de confusion

Hide

```
tab1 <- table(Predicted = pred1_bool, actual = d8$pluie.demain)
tab1
```

```
      actual
Predicted FALSE TRUE
  FALSE    403  142
  TRUE     176  459
```

Ce matrice indique les erreurs du modèle : les “faux positifs” et les “faux négatifs”.

d. Taux de faux prédiction du modèle

Hide

```
(176+142)/(403+176+142+459)*100
```

```
[1] 26.94915
```

Le modèle fait 26% d'erreurs de prédiction. Ce qui est acceptable.

2. Prédiction sur les données d'apprentissage

a. Chargement du jeu de données

Hide

```
d_test <- read.csv("C:/Users/rhhai/Documents/meteo.test.csv", header = TRUE, sep = ",", dec = ".")
```

b. Prédiction

Hide

```
pred2_proba <- predict(reg3, type= "response", newdata = d_test)
head(pred2_proba)
```

```
      1      2      3      4      5      6
0.5264929 0.6918529 0.5142011 0.6410095 0.5235535 0.4276068
```

c. Résultat de la prédiction en variable booléenne

Hide

```
pred2_bool <- ifelse(pred2_proba < 0.5, FALSE, TRUE)
table(pred2_bool)
```

```
pred2_bool
FALSE  TRUE
  124   166
```

d. Données avec le résultat de la prédiction

Hide

```
d_test_pred <- cbind(d_test, pred2_bool)
head(d_test_pred)
```

	X	Year	Mo...	D...	H...	Minute	Temperature.daily.mean..2.m.above.gnd.
	<int>	<int>	<int>	<int>	<int>	<int>	<dbl>
1	36	2010	7	6	0	0	19.36
2	44	2010	7	14	0	0	25.74
3	54	2010	7	24	0	0	16.42
4	58	2010	7	28	0	0	17.96
5	74	2010	8	13	0	0	17.93
6	86	2010	8	25	0	0	18.02

6 rows | 1-8 of 47 columns

e. Téléchargement du fichier csv

Hide

```
write.table(d_test_pred, "C:/Users/rhhai/Documents/d_test_pred.csv", row.names = FALSE, sep =
",", dec="." )
```

IV. CONCLUSION

Le logit de la probabilité de chaque observation est le suivant : $\text{logit}(p(x)) = 52.9071479179 + 0.0001810591xX$
+ 0.0276011590xTemperature.daily.mean..2.m.above.gnd. +
0.0068468594xMedium.Cloud.Cover.daily.mean..mid.cld.lay. +
0.0001343945xShortwave.Radiation.daily.sum..sfc.
-0.0035692942xWind.Direction.daily.mean..80.m.above.gnd. +
0.0050847060xWind.Direction.daily.mean..900.mb + 0.0146065818xTotal.Cloud.Cover.daily.min..sfc.
-0.0568795079xMean.Sea.Level.Pressure.daily.max..MSL. + 0.0081227067xTotal.Cloud.Cover.daily.min..sfc. +
0.0034793362xHigh.Cloud.Cover.daily.max..high.cld.lay. +
0.0084534157xMedium.Cloud.Cover.daily.max..mid.cld.lay. +
0.0054980902xLow.Cloud.Cover.daily.max..low.cld.lay. +
0.0332759280xWind.Speed.daily.max..80.m.above.gnd.

Le modèle avec que les variables significatives, ayant les p-values très basses, n'est pas forcément le meilleur modèle qui s'ajuste bien aux données. Les variables qui semblent avoir un rapport de cote proche de 1 peuvent être utiles à l'ajustement du modèle.

Par rapport à la regression linéaire, plusieurs notions ont été apprises comme la cote anglaise (qui est une autre expression de la probabilité), le rapport de cote, la déviance, ... mais la méthode générale reste inchangée comme la vérification de la multicolinéarité, examen du résidu.

Enfin, le modèle linéaire généralisé offre plusieurs possibilités de modélisation (Bernouilli/binomiale, Poisson, Gamma) et y compris le modèle linéaire (gaussien) avec la fonction glm().