

# Correction a posteriori de $t_{2m}/t_{2m\_max}$

Ionela Musat, Frédéric Hourdin,  
Frédérique Cheruy, Yann Meurdesoif

# Plan de la présentation

1. Instabilités des diagnostics à 2m
2. La détection des instabilités. Distribution et statistique des instabilités dans les simulations CMIP6
3. La méthode de correction
4. La validation
5. Les résultats CMIP6 avant et après correction

# 1. Instabilités des diagnostics à 2m (1/2)

## Comment ?

- $t2m\_max(j) \gg t2m\_max(j-1)$
- $t2m\_max(j) \gg t2m\_max(j+1)$
- $q2m < 0$

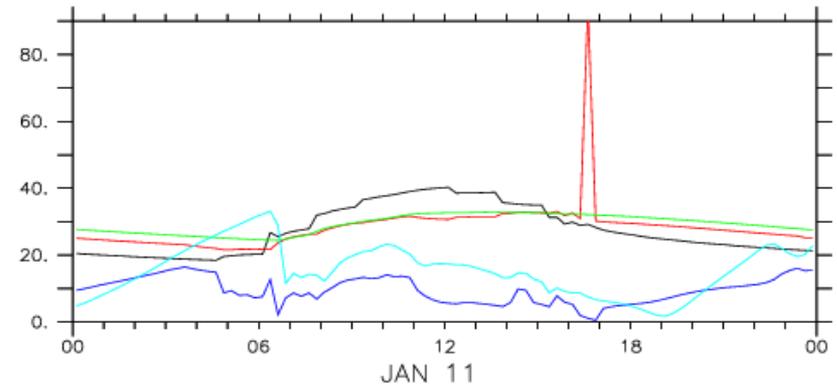
## Quand ?

- cas stables
- vent très faible
- $qsurf$  très élevé, près saturation
- $qair$  assez sec

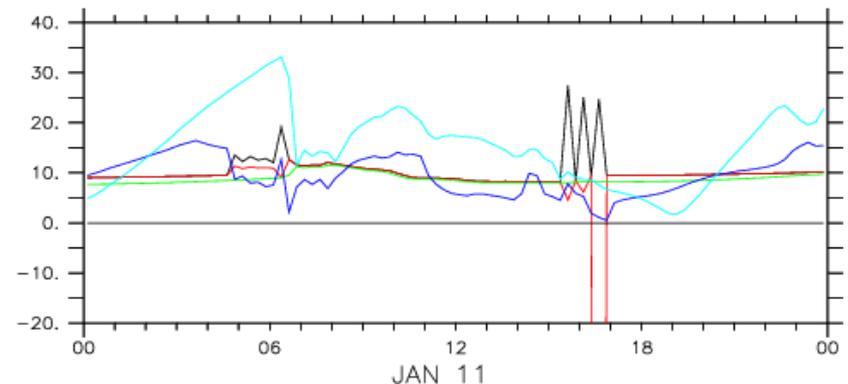
## Où?

- S/ continents!

tsol, t2m, tair, 10\*wind10m : 1979



qsurf, q2m, qair, 10\*wind10m : 1979



# 1 Instabilités des diagnostics à 2m (2/2)

## Comment ?

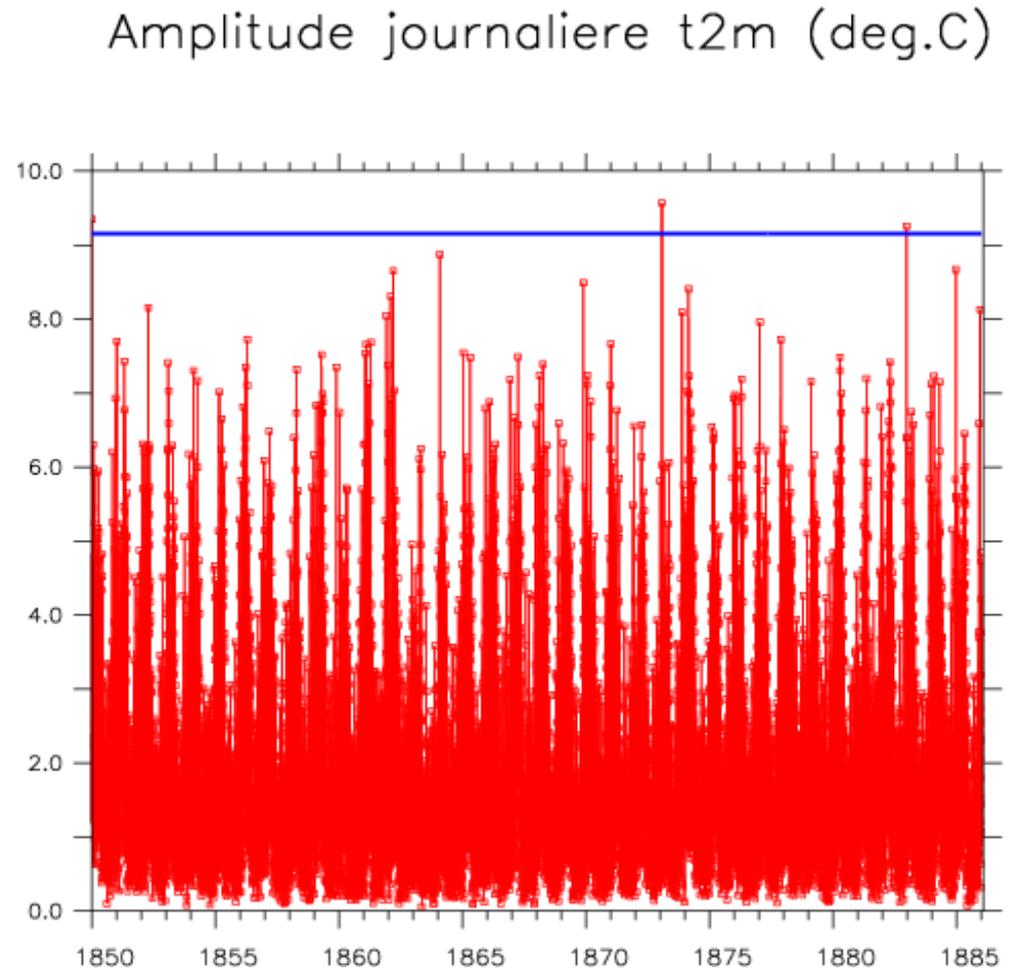
- $DAJ > \text{Seuil\_DAJ}$   
 $DAJ = t2m\_max - t2m$   
 $\text{Seuil\_DAJ} = \text{fact} * DAJmax ;$ 
  - $\text{fact}=1.2$
  - $DAJmax = \max(DAJ)$  sur 36 ans
- $q2m > 0$

## Quand ?

- cas stables
- vent très faible
- $q_{surf}$  très élevé, près saturation
- $q_{air}$  assez sec

## Où ?

- S/ mailles mixtes océan-continent !



## 2. La détection (1/5)

- Les critères :

$$q2m\_min < 0 \text{ ou } DAJ > \text{Seuil\_DAJ}$$

$$DAJ = t2m\_max - t2m$$

$$\text{Seuil\_DAJ} = \text{fact} * DAJmax$$

$$\text{fact} = 1.2$$

$$DAJmax = \text{maximum DAJ sur 36 ans d'une simulation AmipA-Limit}$$

- Les simulations supplémentaires sur ada :

- AmipA-Cmip6 : identique Amip Cmip6 effectuée sur curie

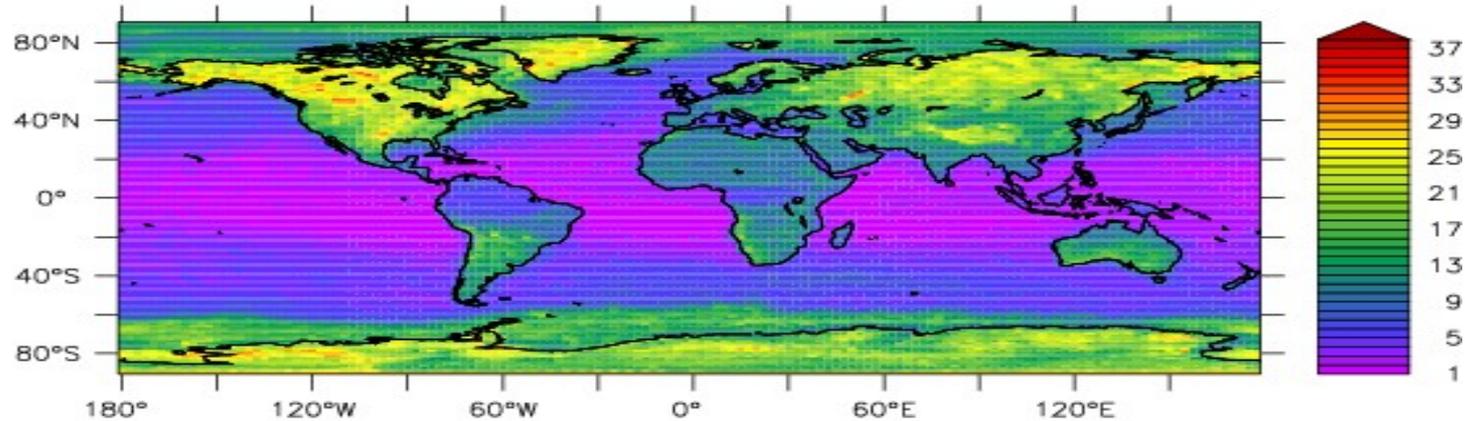
- AmipA-Limit : identique AmipA-Cmip6 + bornage t2m et q2m

$$t2m \in [tsol, temp]$$

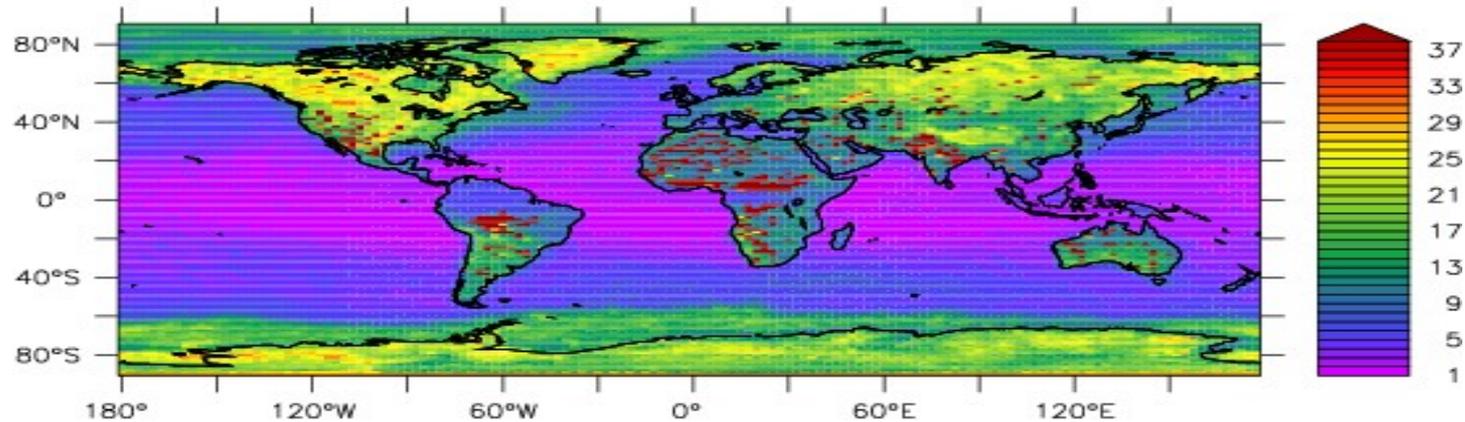
$$q2m \in [qsurf, ovap]$$

## 2. La détection (2/5)

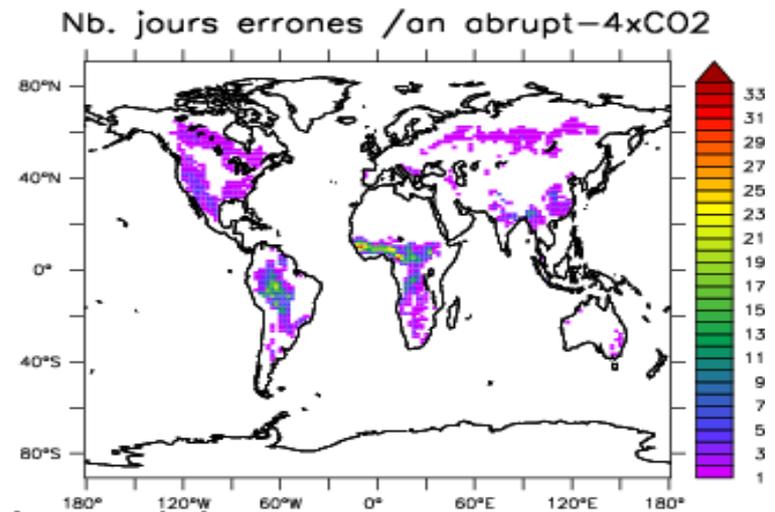
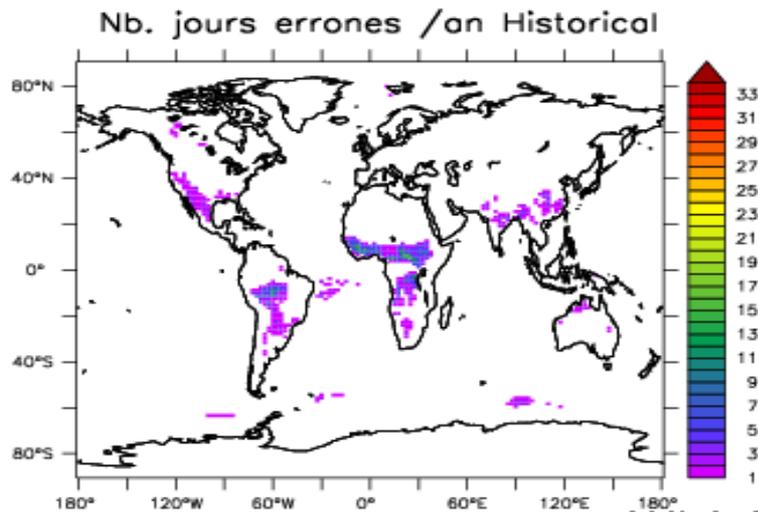
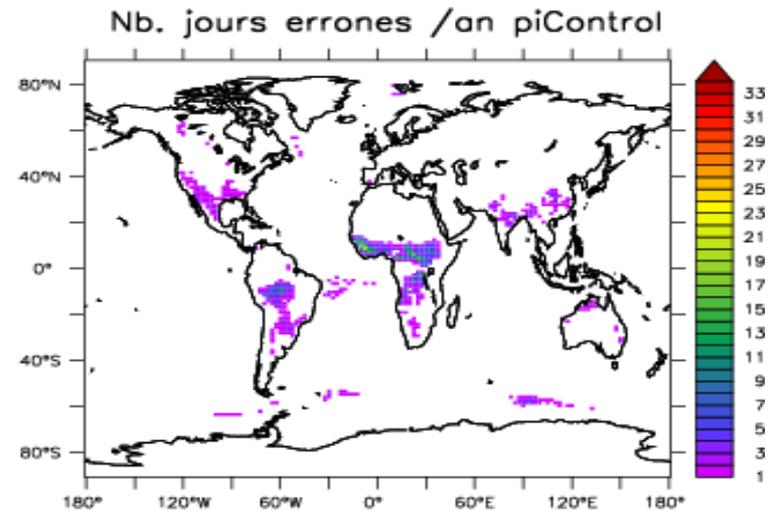
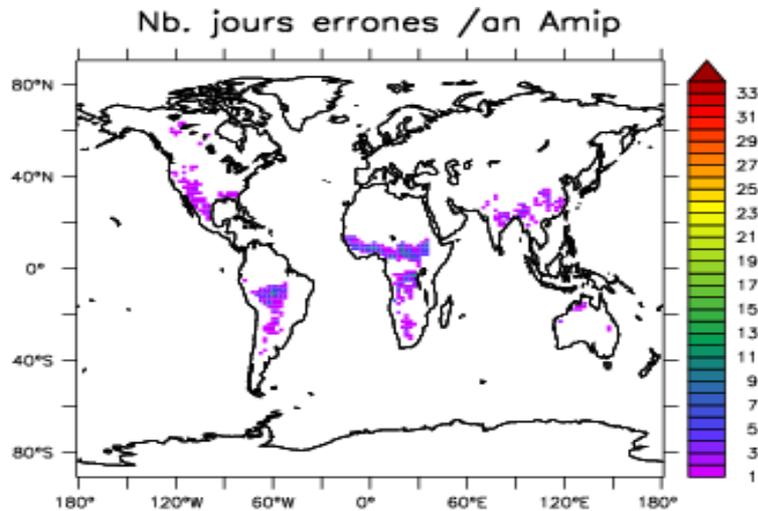
DAJ Maximale : AmipA–Limit, 1979–2014



DAJ Maximale : AmipA–Cmip6, 1979–2014

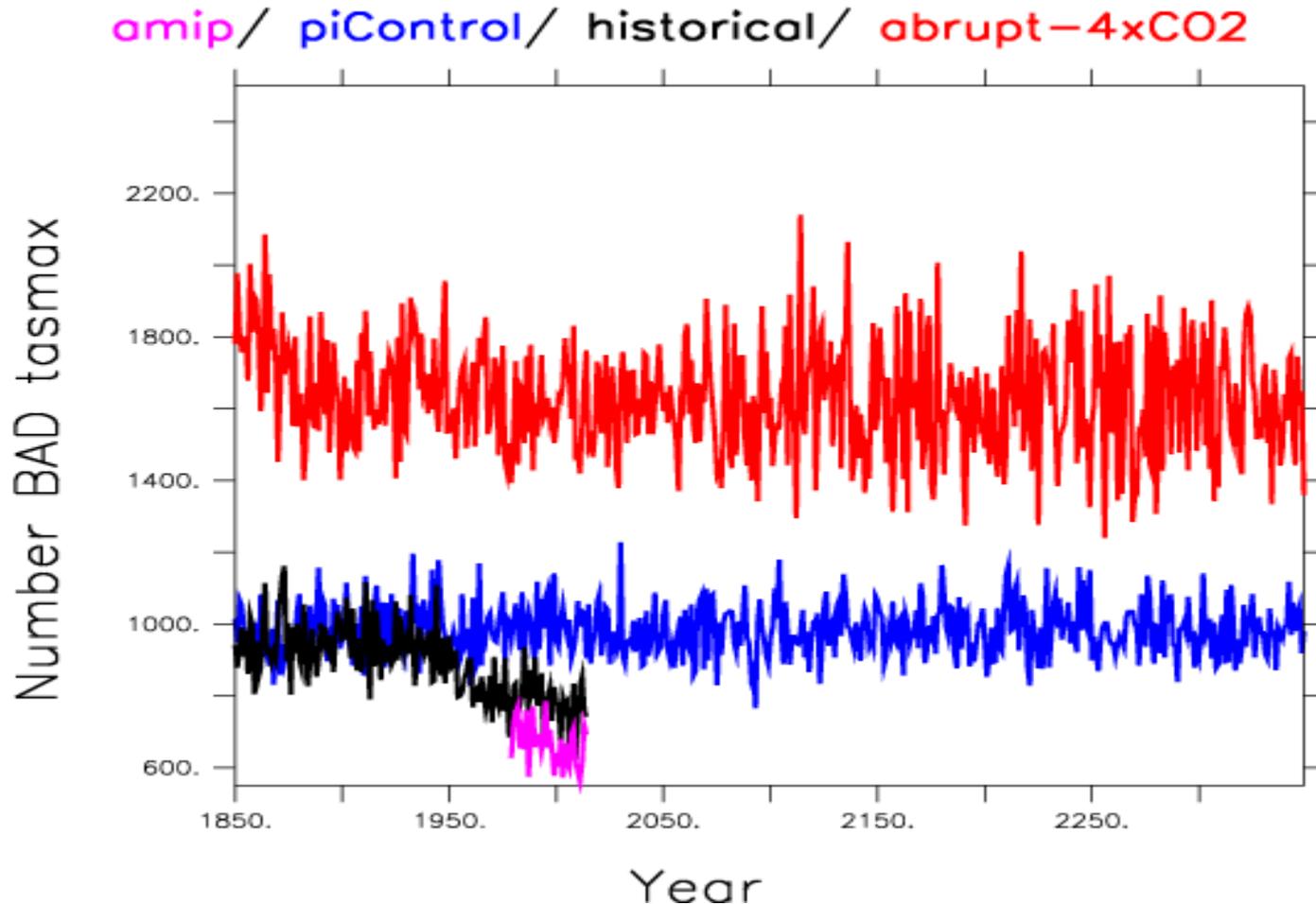


## 2. Distribution géographique des instabilités dans les simulations CMIP6 (3/5)

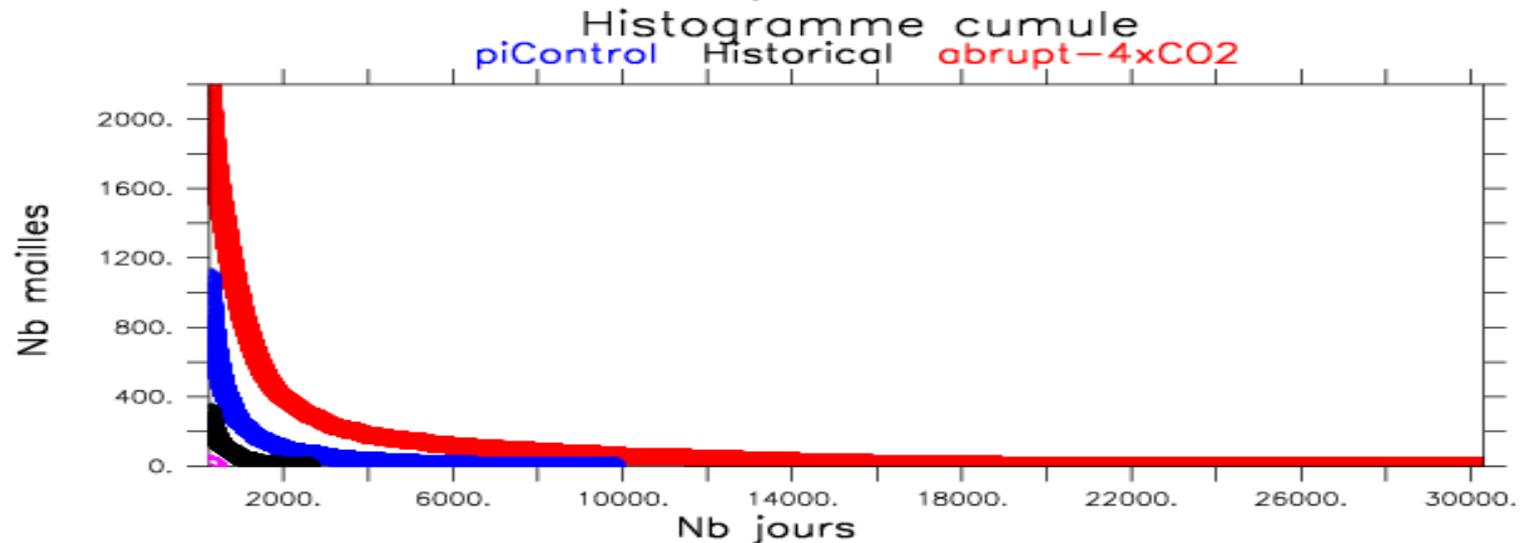
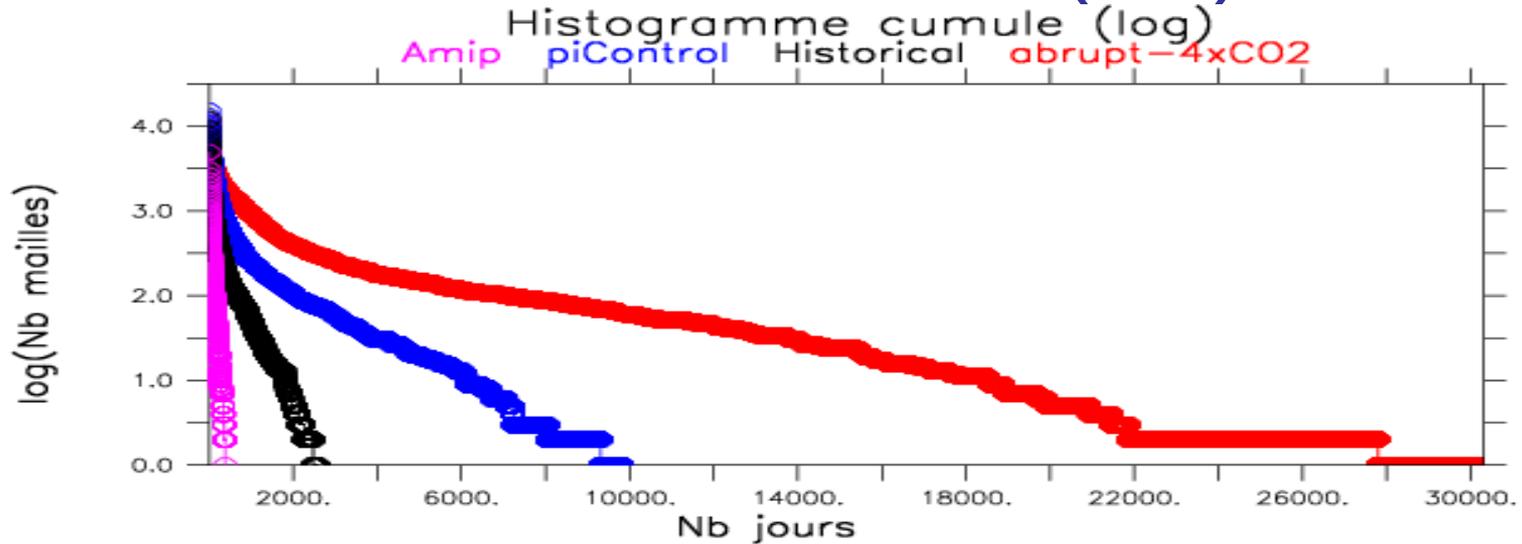


## 2. Statistique des instabilités dans les simulations CMIP6 (4/5)

Evolution BAD tasmax per year



## 2. Statistique des instabilités dans les simulations CMIP6 (5/5)



# 3. La méthode de correction

Les 3 étapes :

1/ DAJ corrigée :

1.1/ si 1 jour erroné :  $DAJ_{cor}(j) = ( DAJ(j-1) + DAJ(j+1) )/2$

1.2/ si 2 jours erronés :

$$DAJ_{cor}(j) = ( DAJ(j-1) + DAJ(j+2) )/2$$

$$DAJ_{cor}(j+1) = ( DAJ(j) + DAJ(j+2) )/2$$

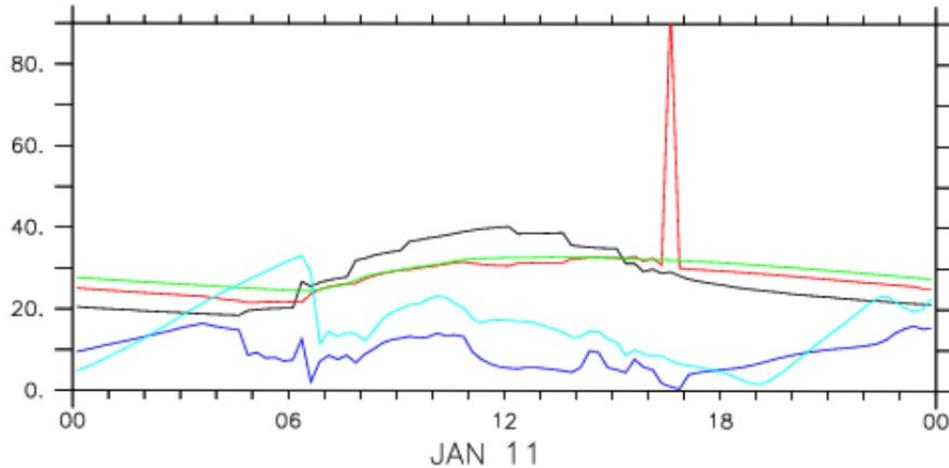
2/ tas corrigée :  $t2m_{cor}(j) = t2m(j) + ( DAJ_{cor}(j) - DAJ(j) )/(N-1)$ , N=96

3/  $t2m_{max}$  corrigée :

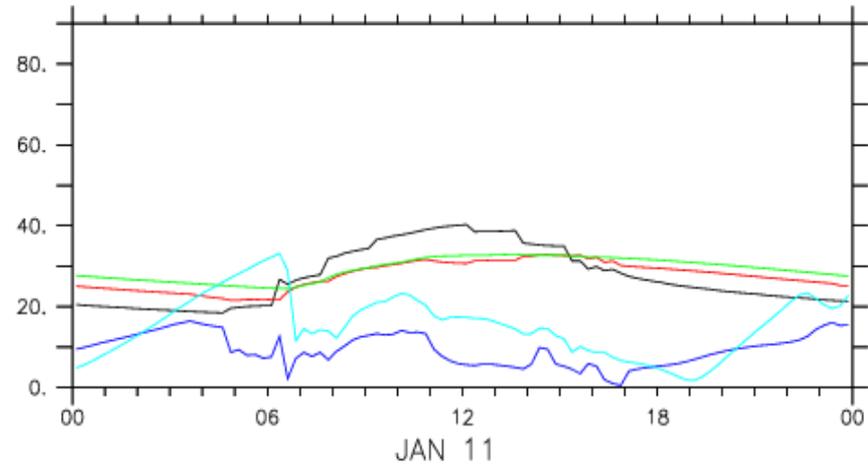
$$t2m_{max_{cor}}(j) = t2m_{cor}(j) + DAJ_{cor}(j)$$

# 4. La validation (1/8)

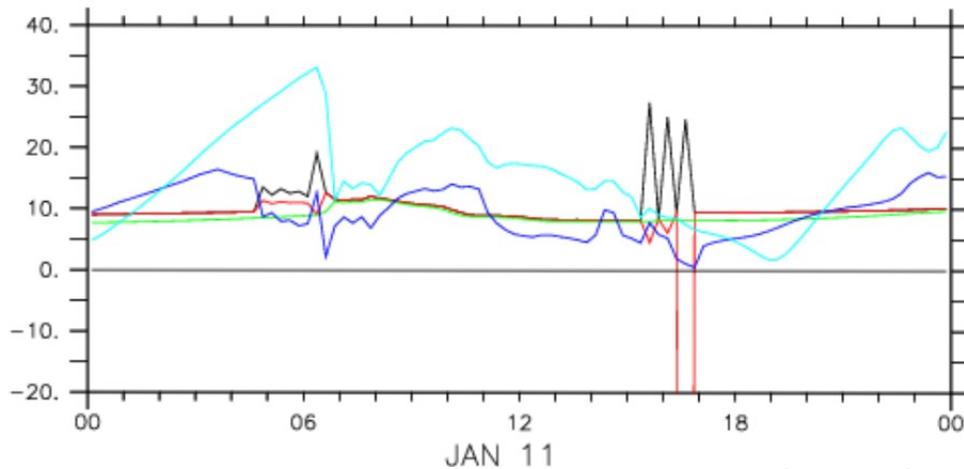
tsol, t2m, tair, 10\*wind10m : 1979



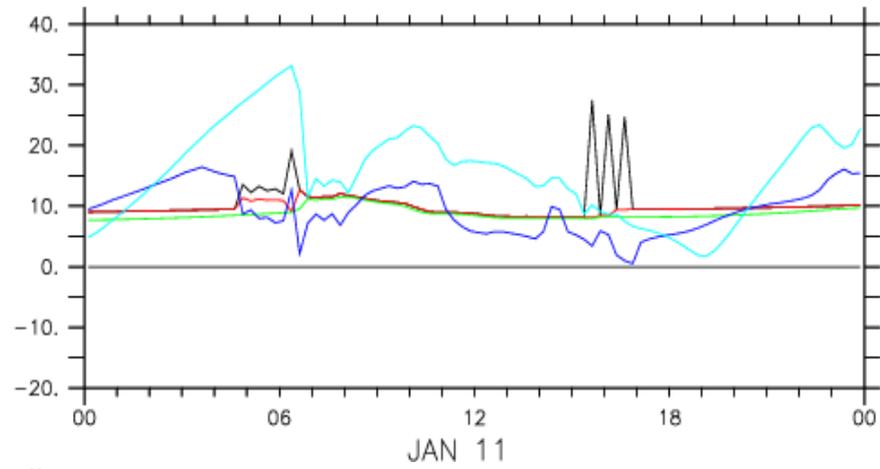
tsol, t2m, tair, 10\*wind10m : 1979



qsurf, q2m, qair, 10\*wind10m : 1979

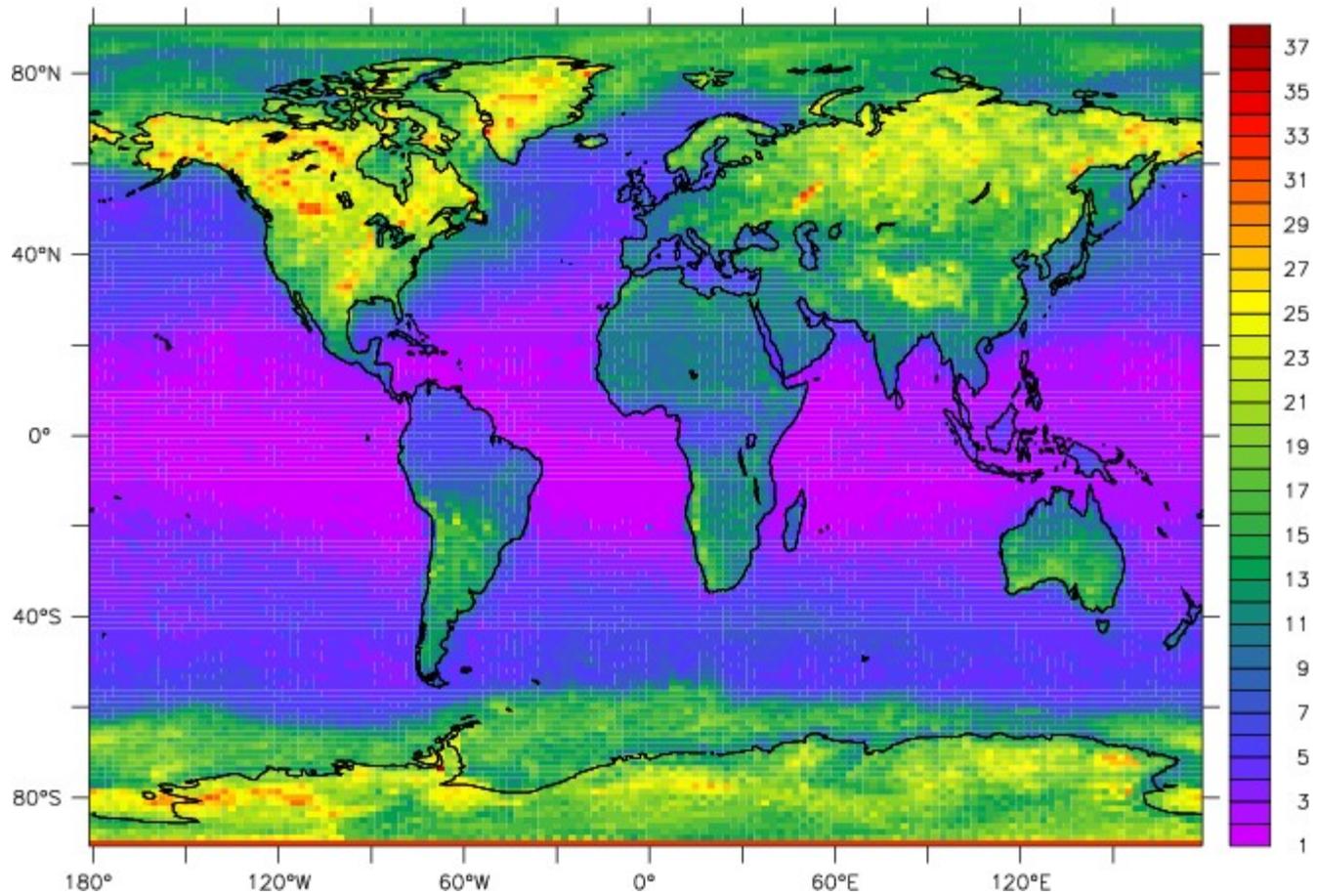


qsurf, q2m, qair, 10\*wind10m : 1979



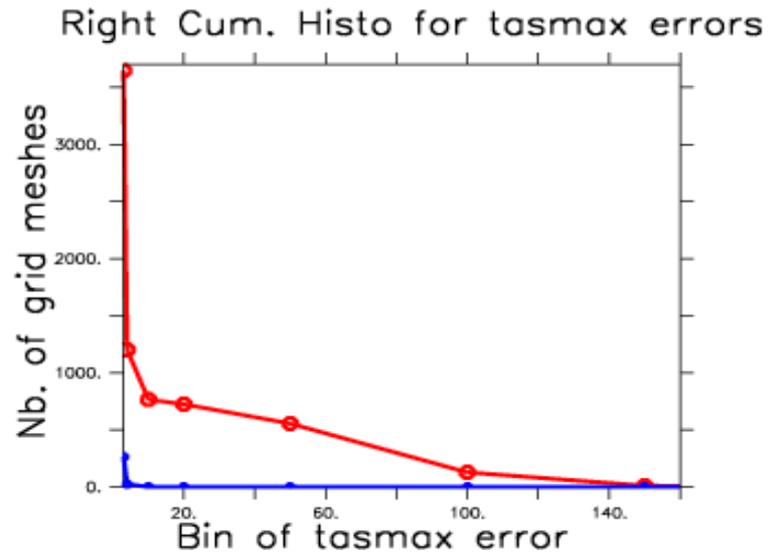
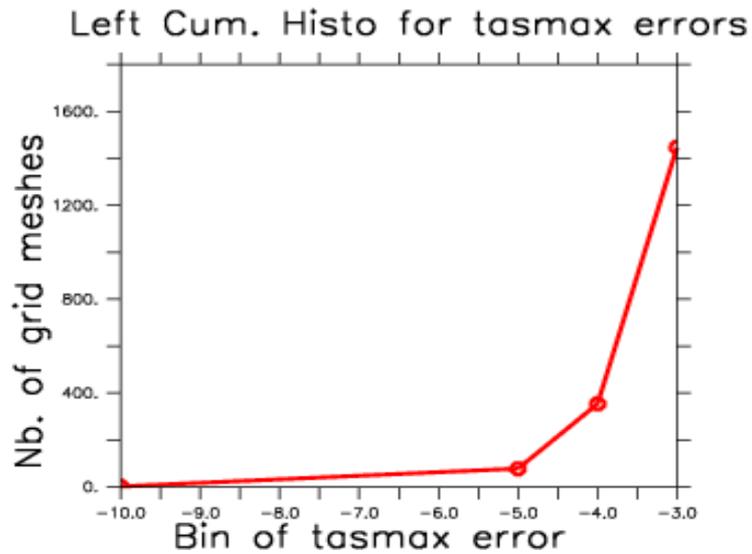
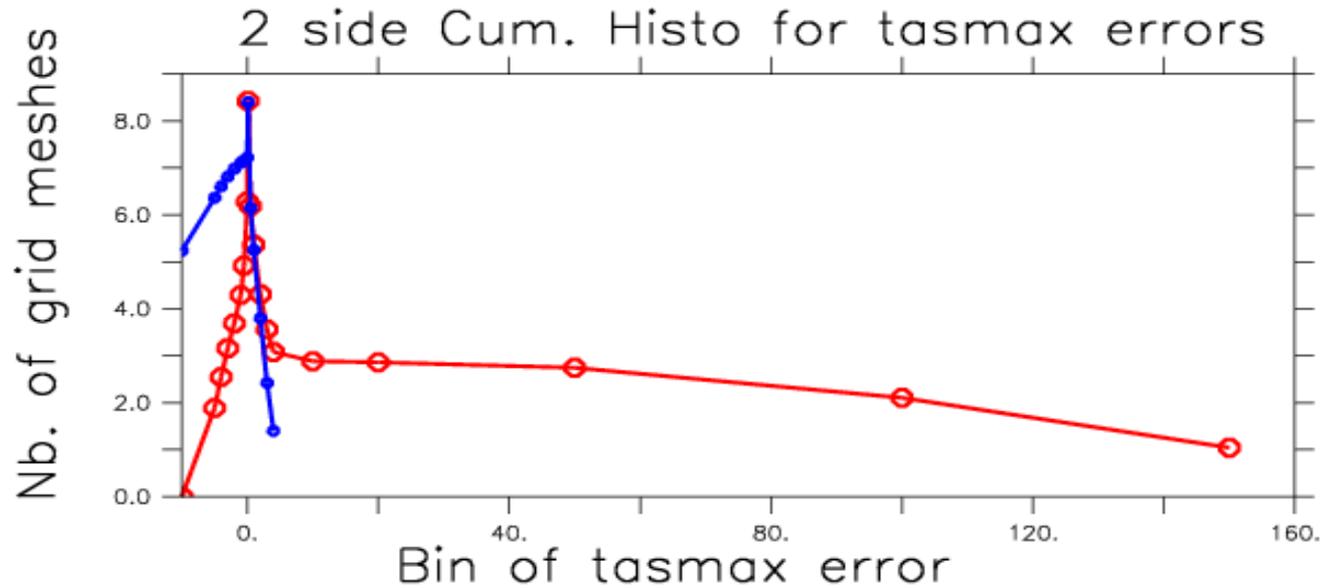
# 4. La validation (2/8)

DAJmax : AmipA-Cor

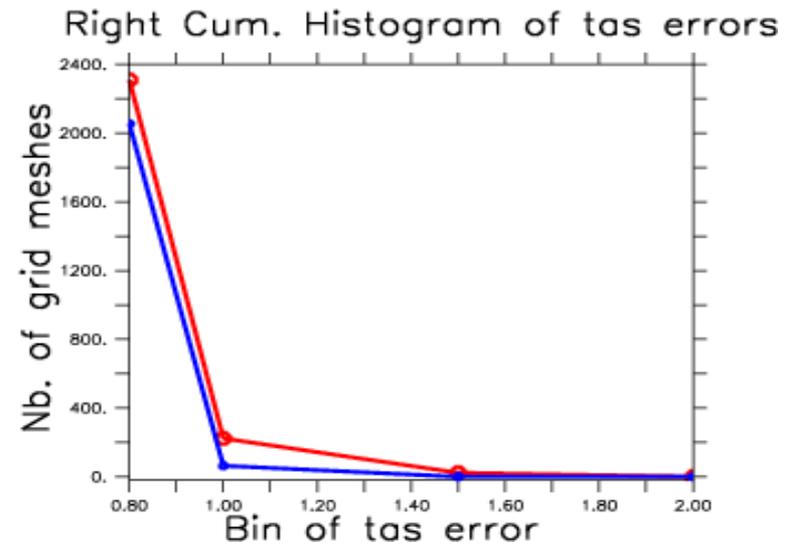
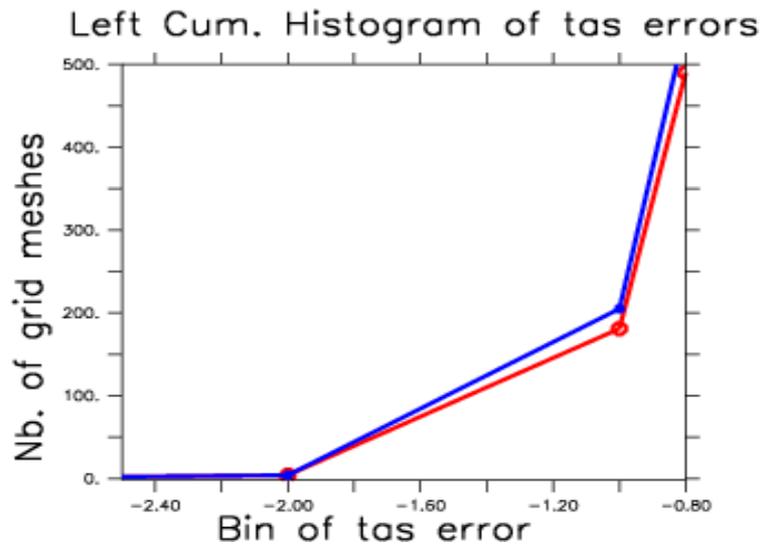
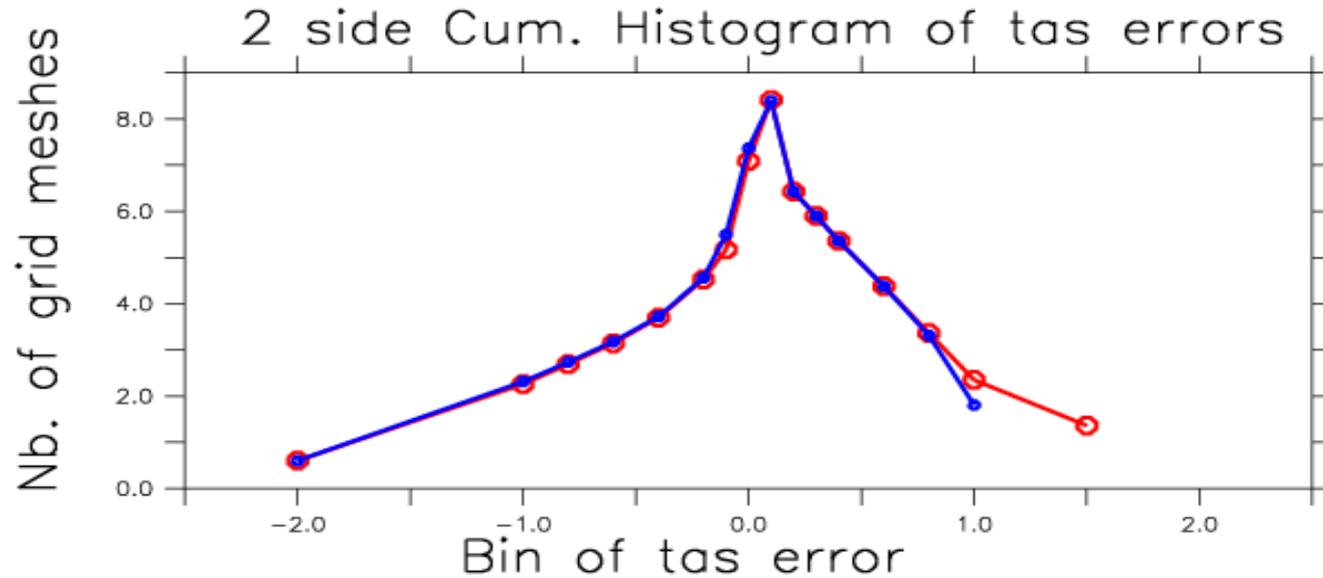


PedaLons le 1er Avril 2019

# 4. La validation (3/8)

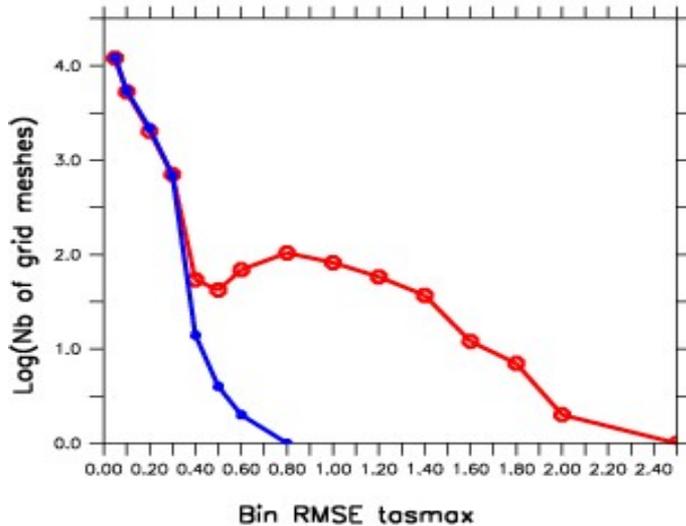


# 4. La validation (4/8)

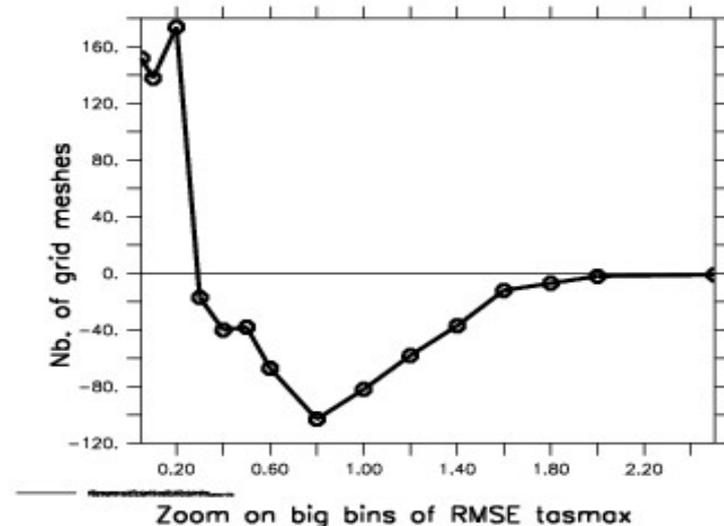


# 4. La validation (5/8)

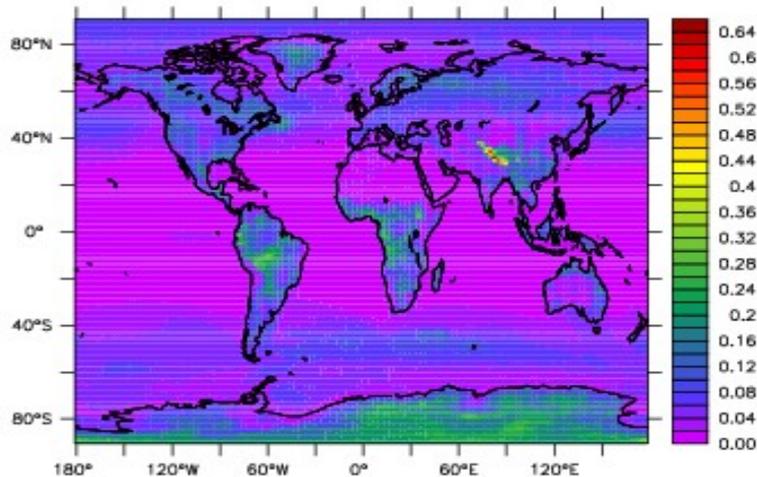
Histog.Log(RMSE tasmax)  
CMIP6/LIM vs Cor/LIM



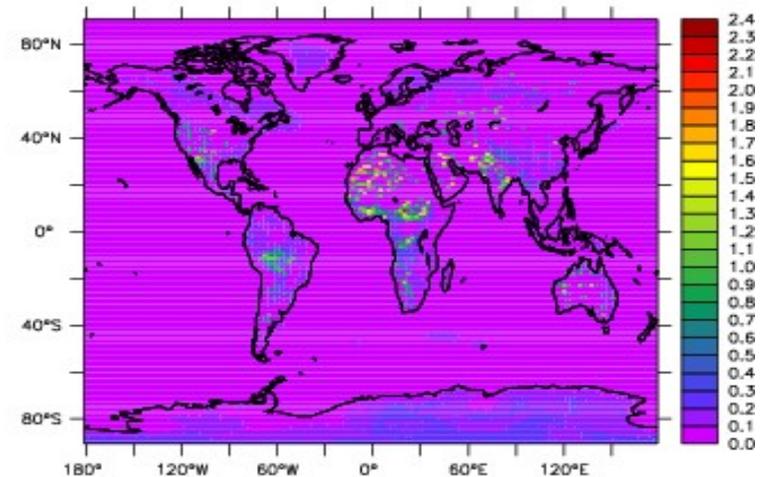
Histog. Difference for RMSE tasmax  
(Cor/LIM - CMIP6/LIM)



RMSE tasmax : Cor/LIM

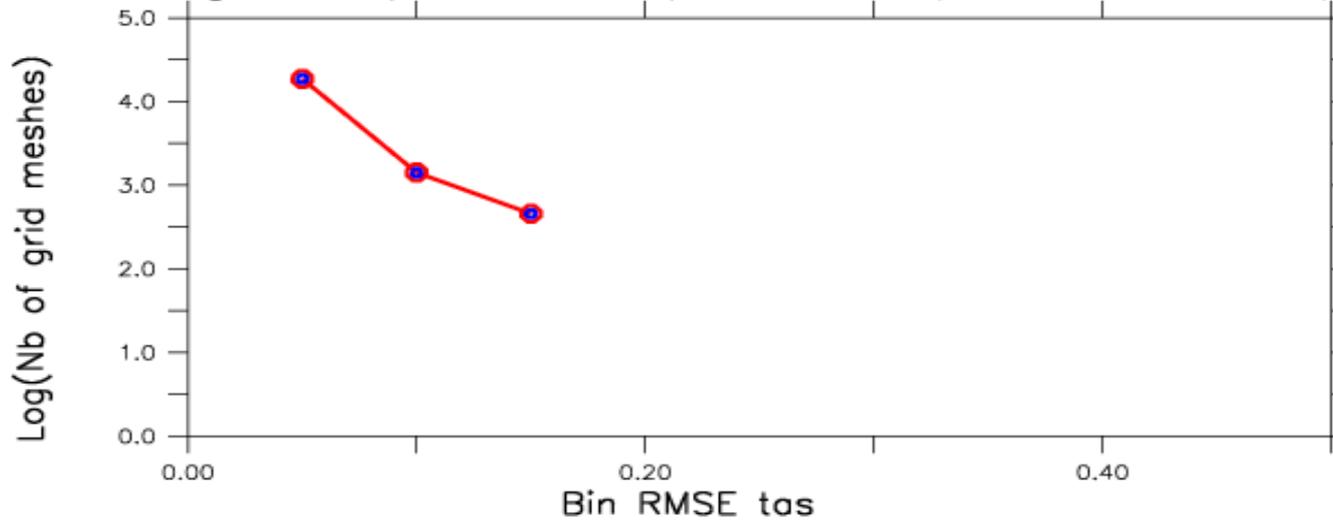


Diff. RMSE tasmax  
(Cor/LIM - CMIP6/LIM)

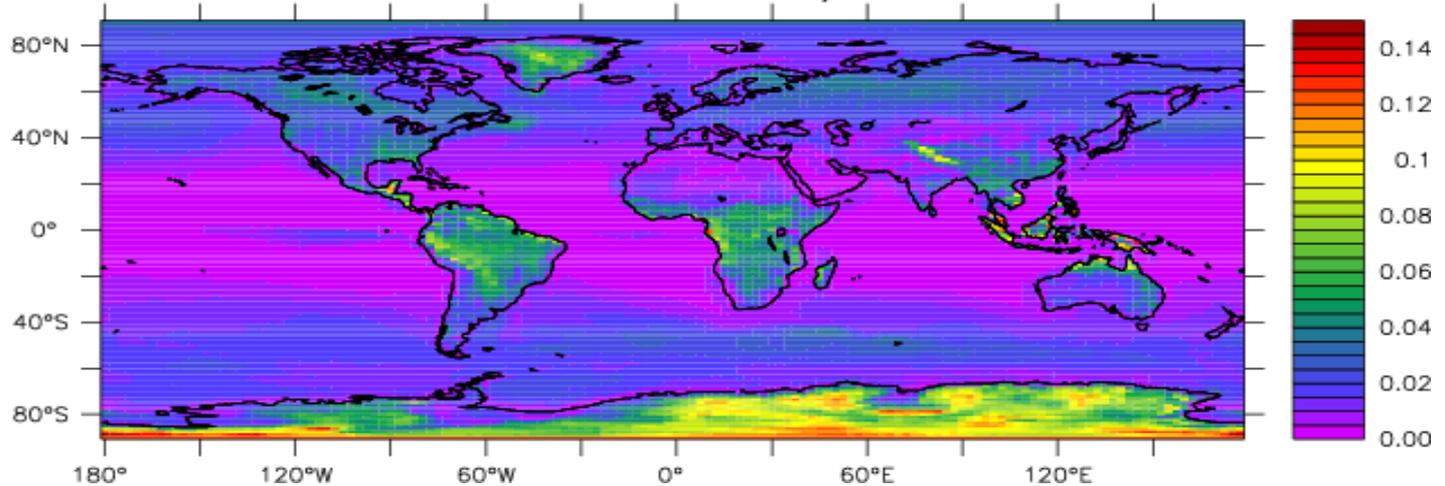


# 4. La validation (6/8)

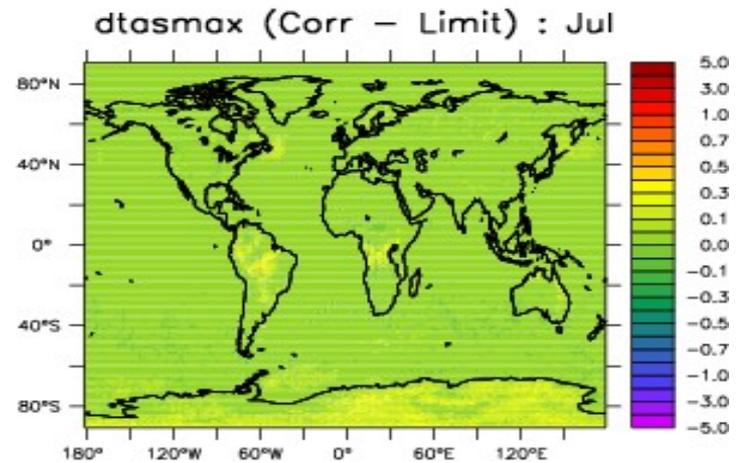
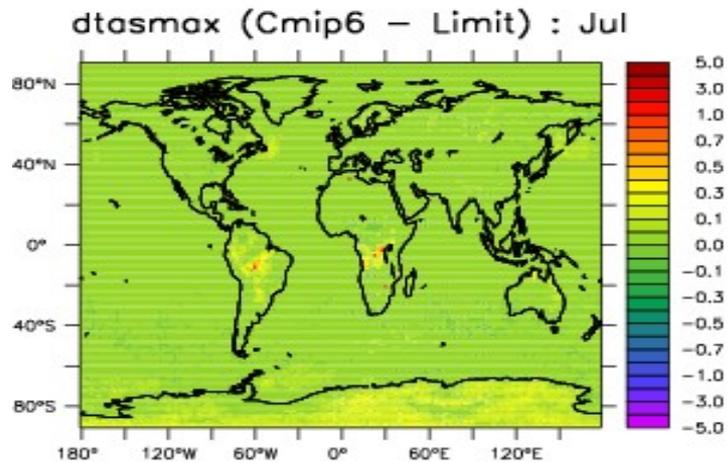
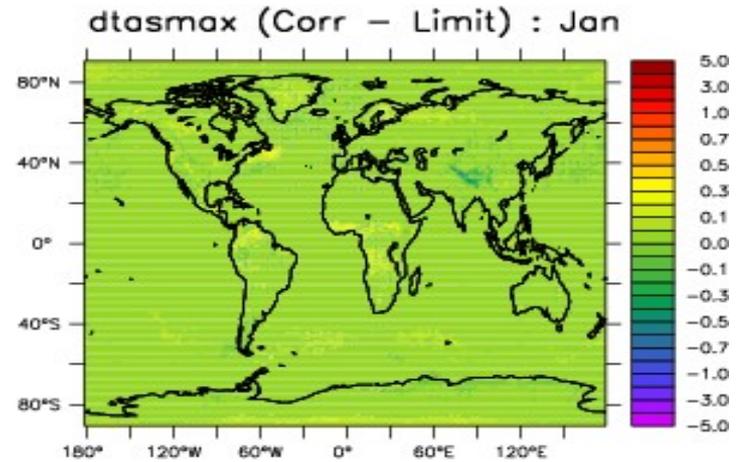
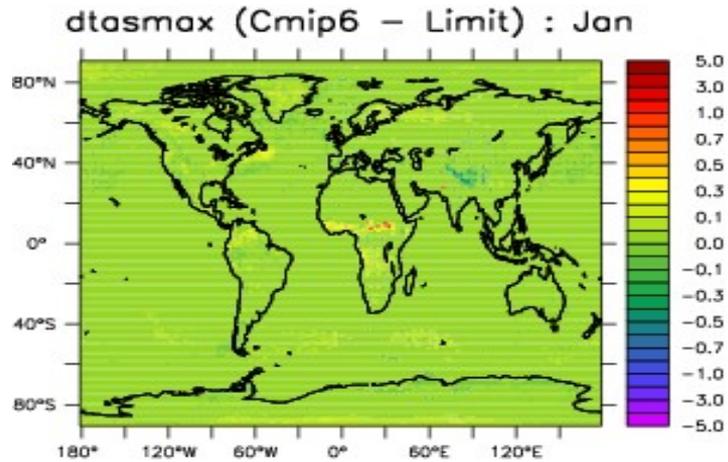
Histogram (RMSE tas) : CMIP6/LIMIT vs Cor/LIMIT



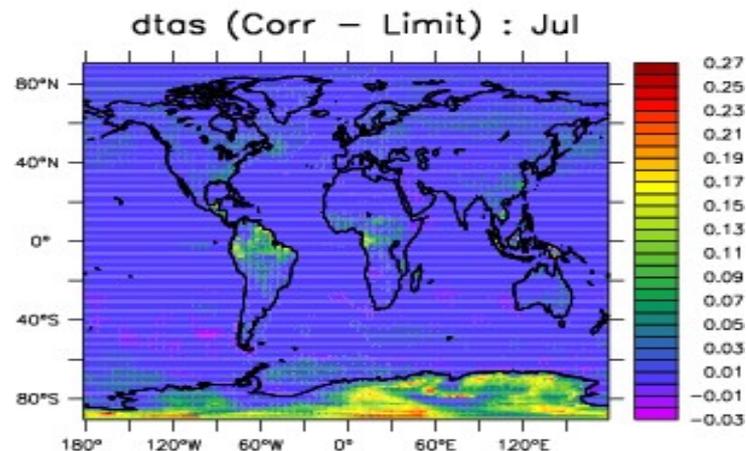
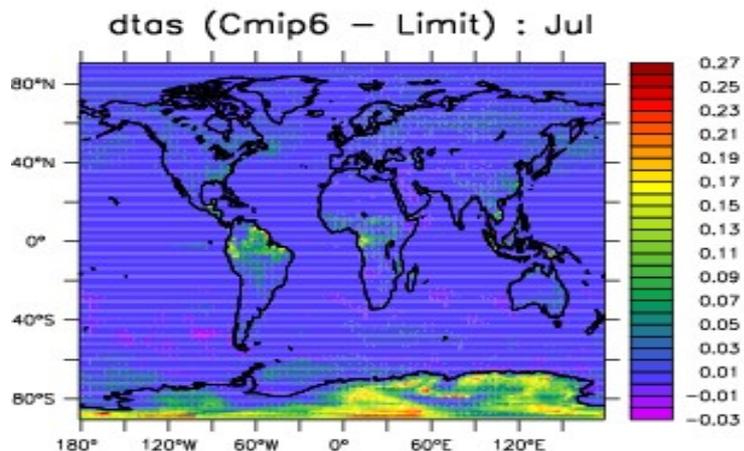
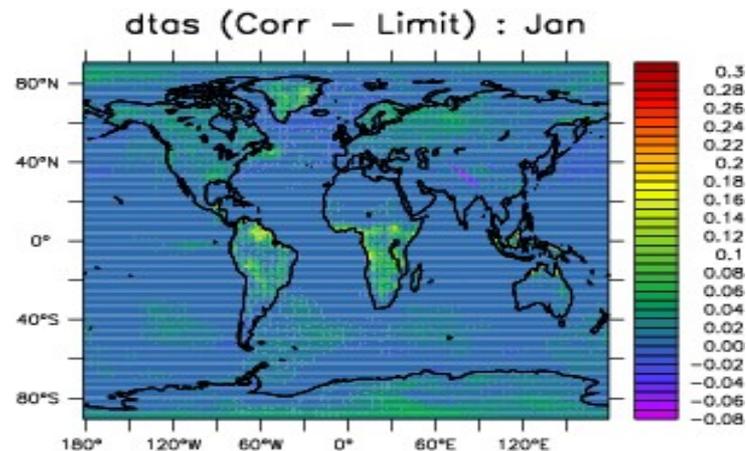
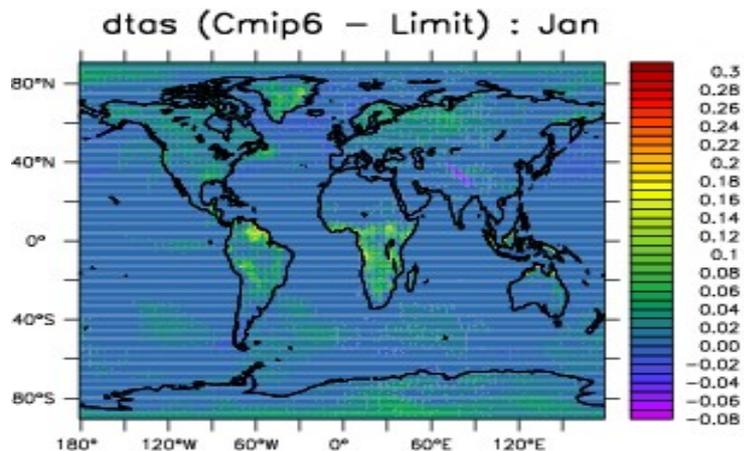
RMSE tas : Cor/LIMIT



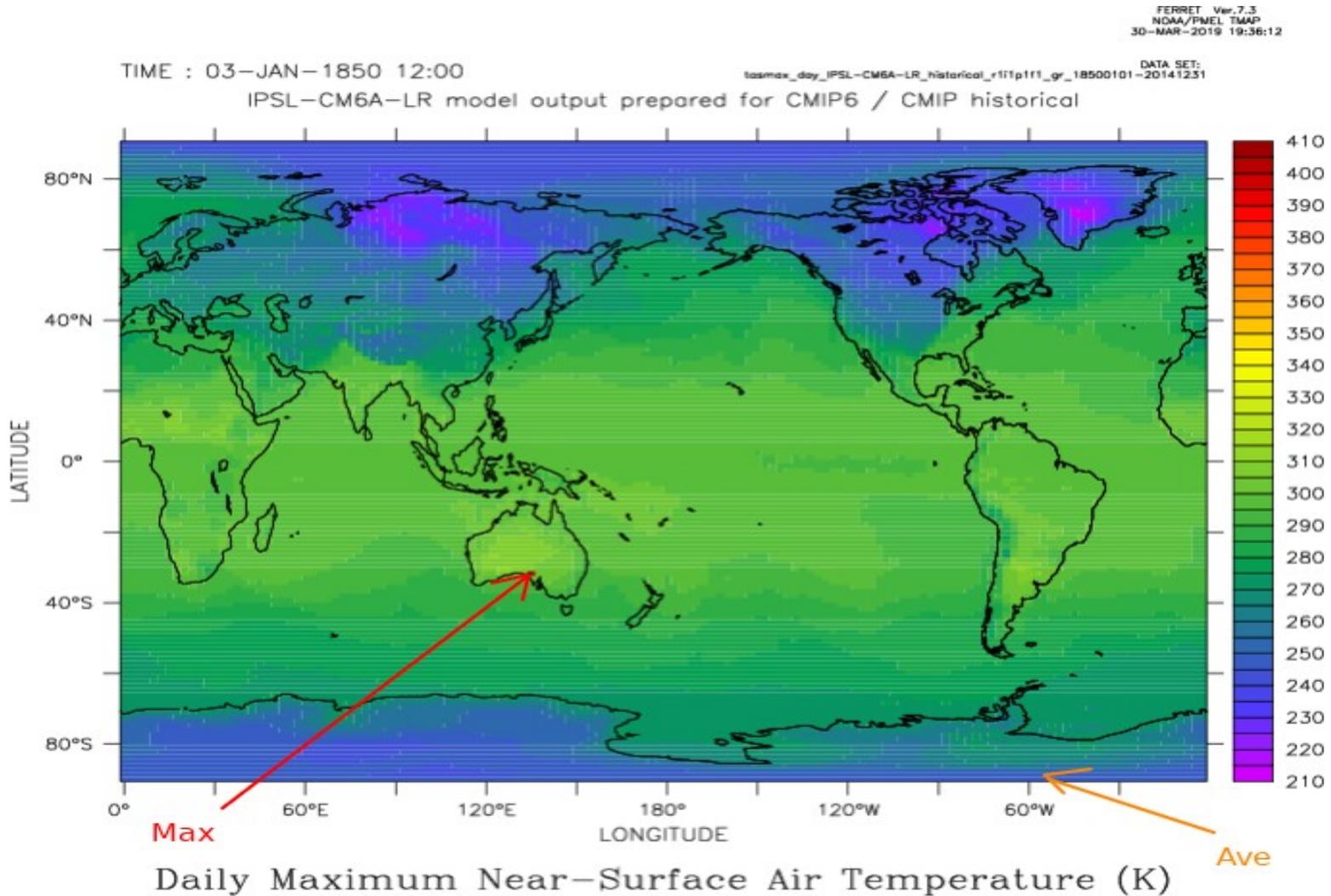
# 4. La validation : t2m\_max moy. mois 1979 (7/8)



# 4. La validation : t2m moy. mois 1979 (8/8)

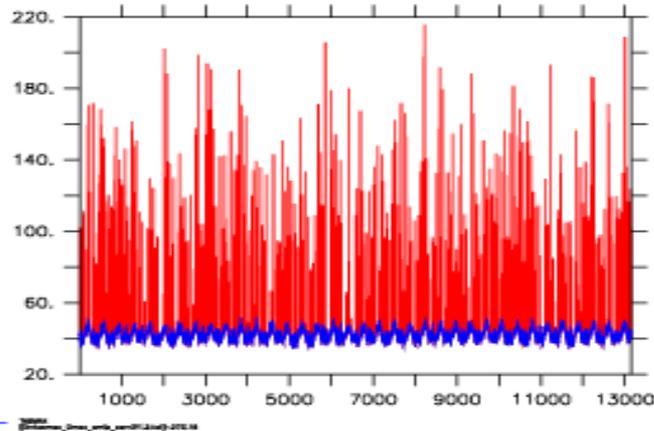


# 5. Les résultats CMIP6 avant/après correction

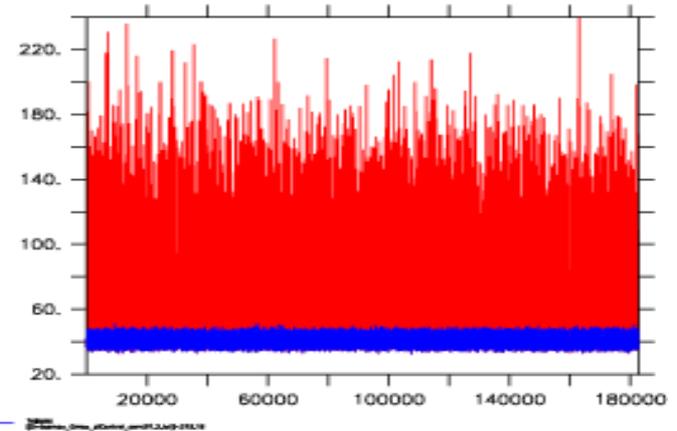


# 5. Les résultats CMIP6 avant/après correction (1/3)

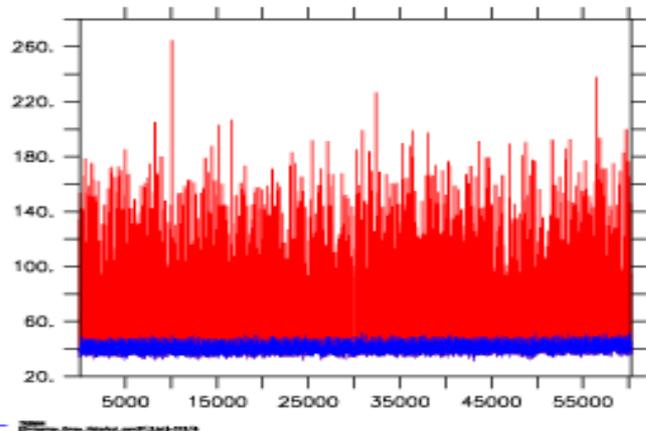
tasmax Max.Glob. amip



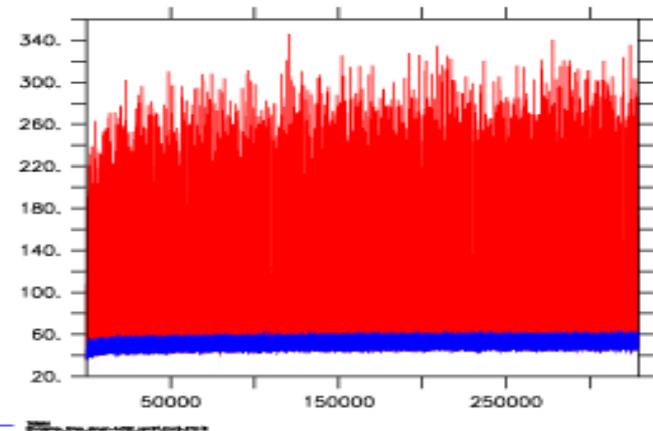
tasmax Max.Glob. piControl



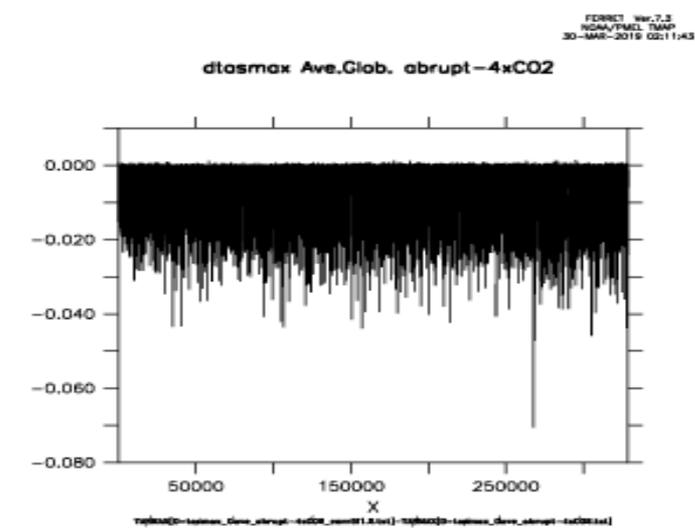
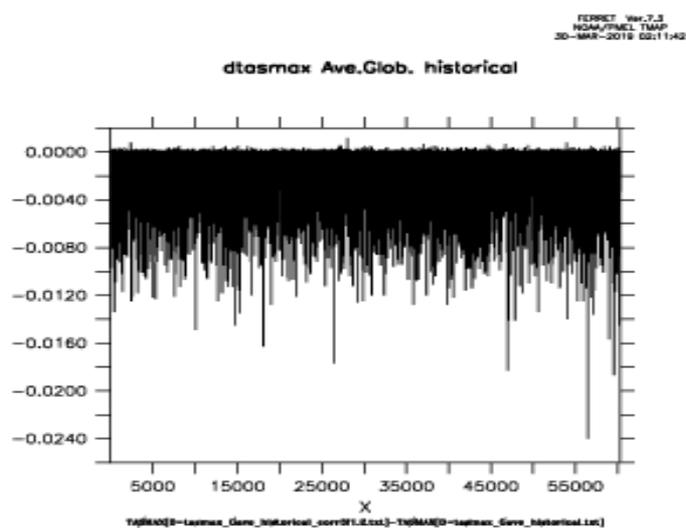
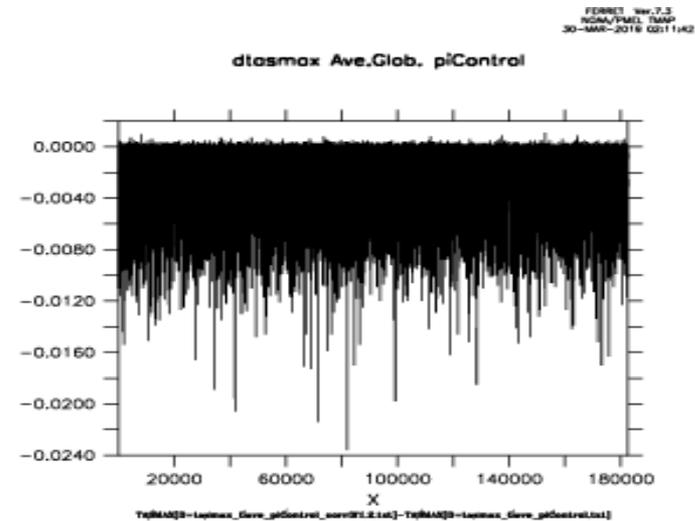
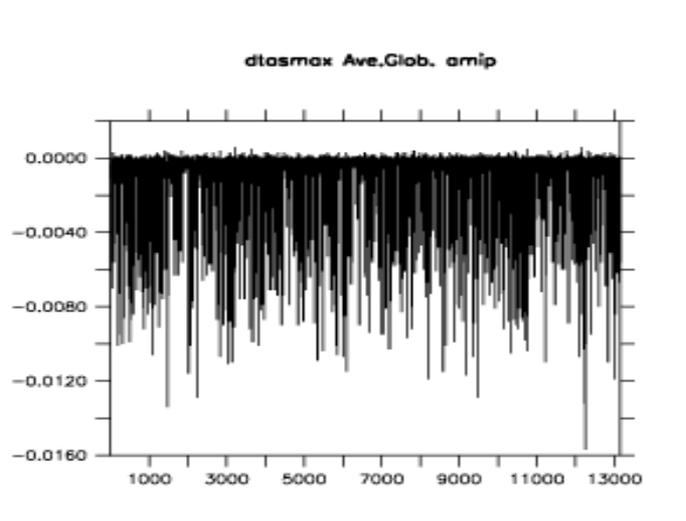
tasmax Max.Glob. historical



tasmax Max.Glob. abrupt-4xCO2



# 5. Les résultats CMIP6 avant/après correction (2/3)



# 5. Les résultats CMIP6 avant/après correction (3/3)

