



Tuning ICON-LAM for South America Preliminary results



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Priority Project “C2I” - Transition of COSMO to ICON-LAM

Simulation ICON 7km - South America

Running every day at 00 and 12 UTC for 174 hours

Area Information: R03B07 ~ 6.6km

Latitude: 60S, 15N

Longitude: 95W, 20W

ie: 1200; **je:** 1200, **ke:** 50

Total number of points: ~ 72 million

Namelist information:

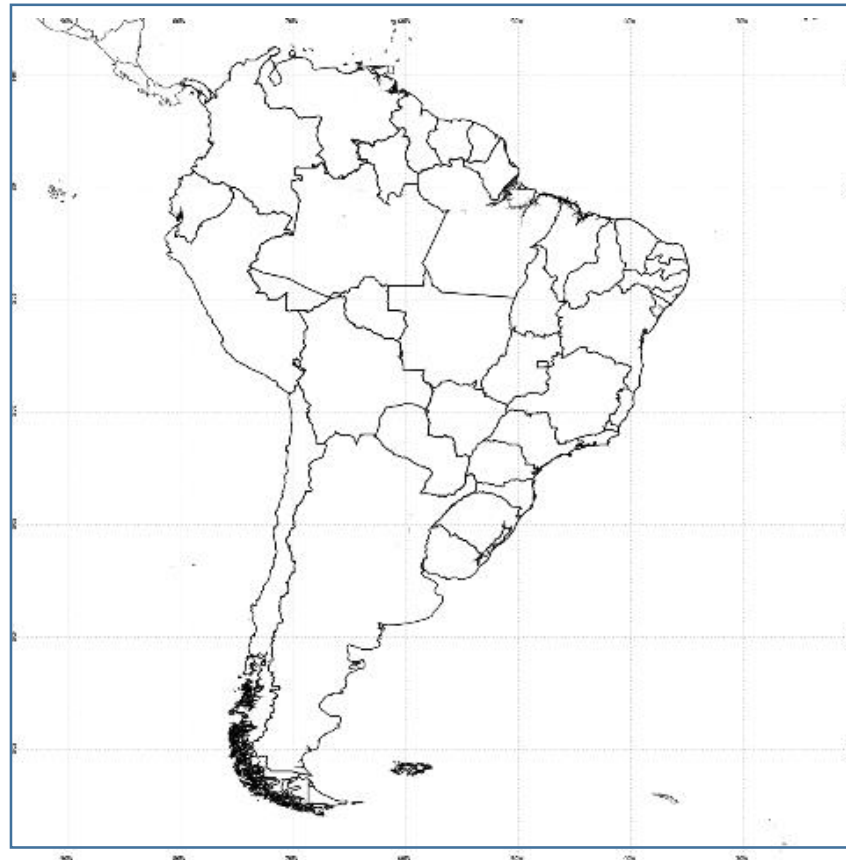
damp_height = 18000

top_height = 30000

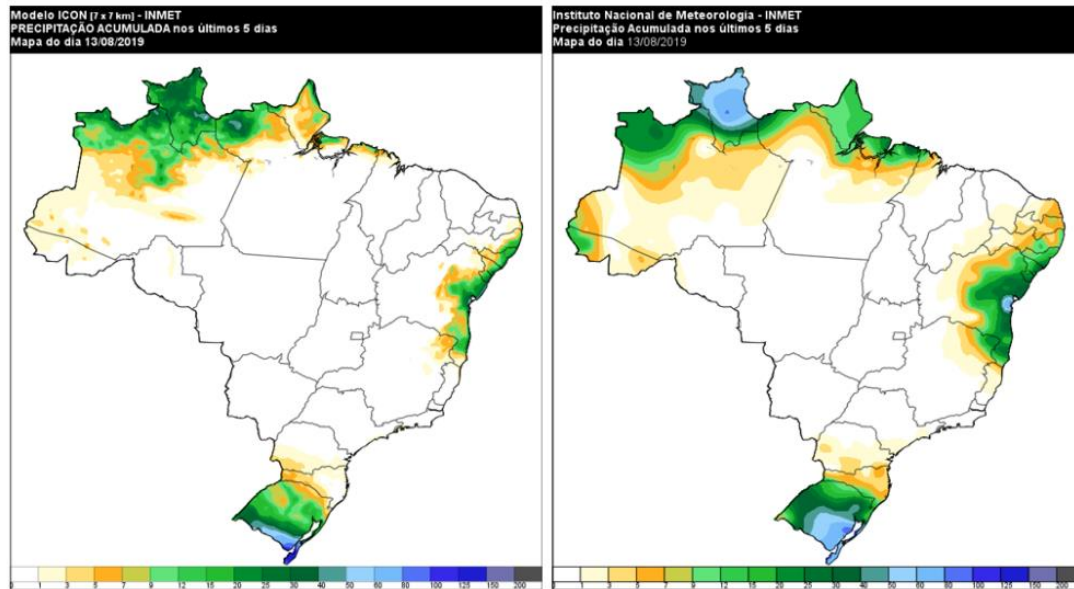
nsteps = 10440 !(174 hours forecast)

dtime = 60

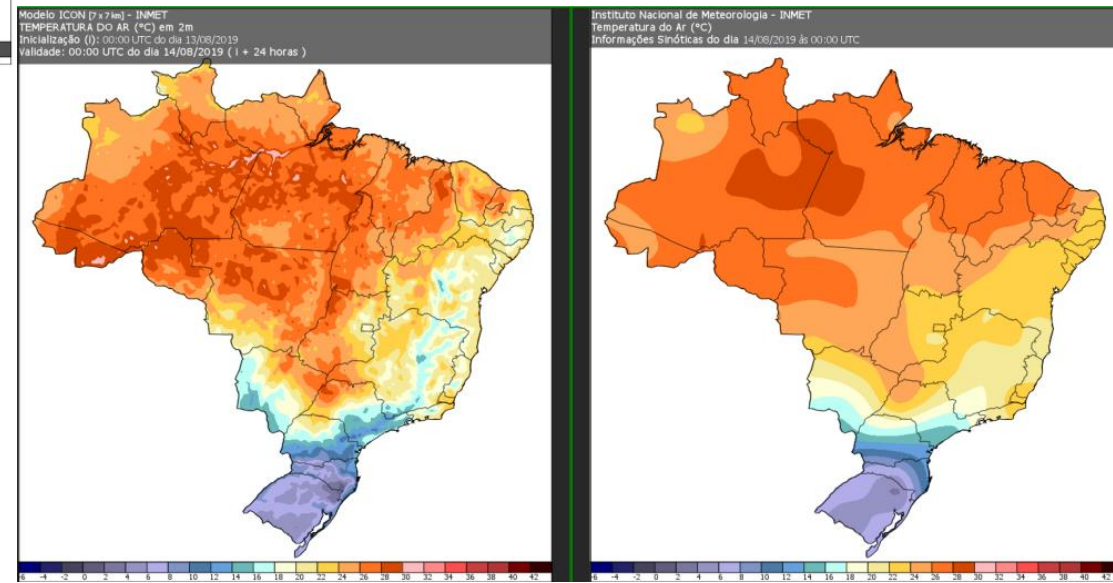
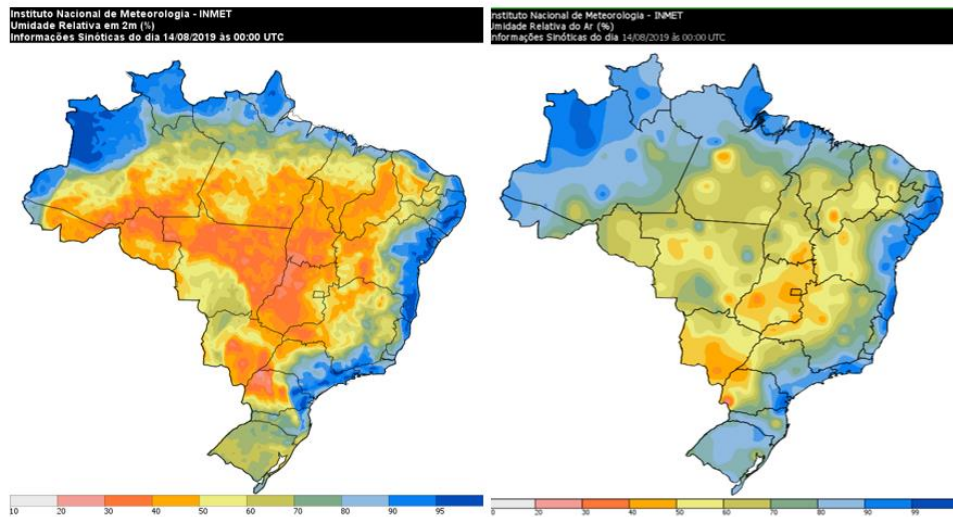
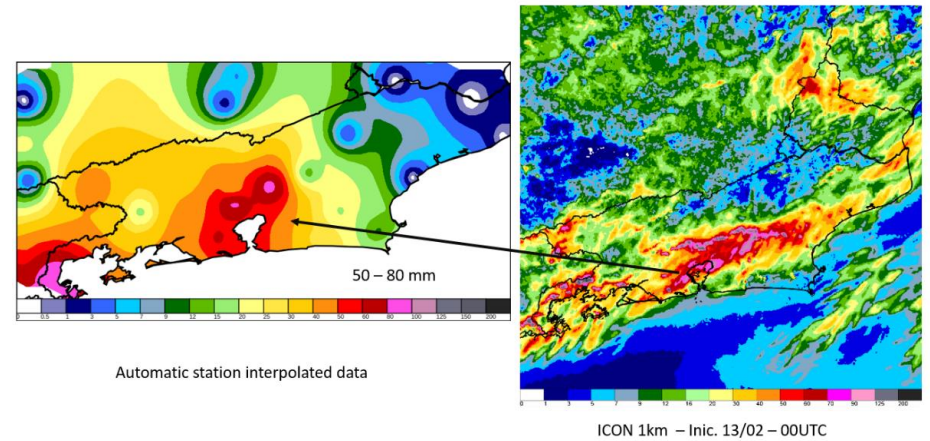
num_lev = 60



Model x Automatic Stations Interpolated Data



Zoom on Rio de Janeiro state



Namelist optimization

Namelist:

```
-dtime    = 60;  
-dt_rad   = 1080;  
-dt_conv  = 360;  
-dt_sso   = 360;
```

Compilation:

-Delete the **-traceback** flags (Makefile), this is for debugging and potentially slows down the simulation.

Time:

- **ICON 7km** (South America) to 24 hours forecast: **125** minutes;
- **COSMO 7km** (South America) to 24 hours forecast: **176** minutes (ICON runs 29% faster).
- **ICONTOOLS**: 26 minutes to preprocessing to 174 hours forecast (with 32 cores);
- **Pictures**: 33 minutes to generating almost 5000 pictures using Visual Weather software.

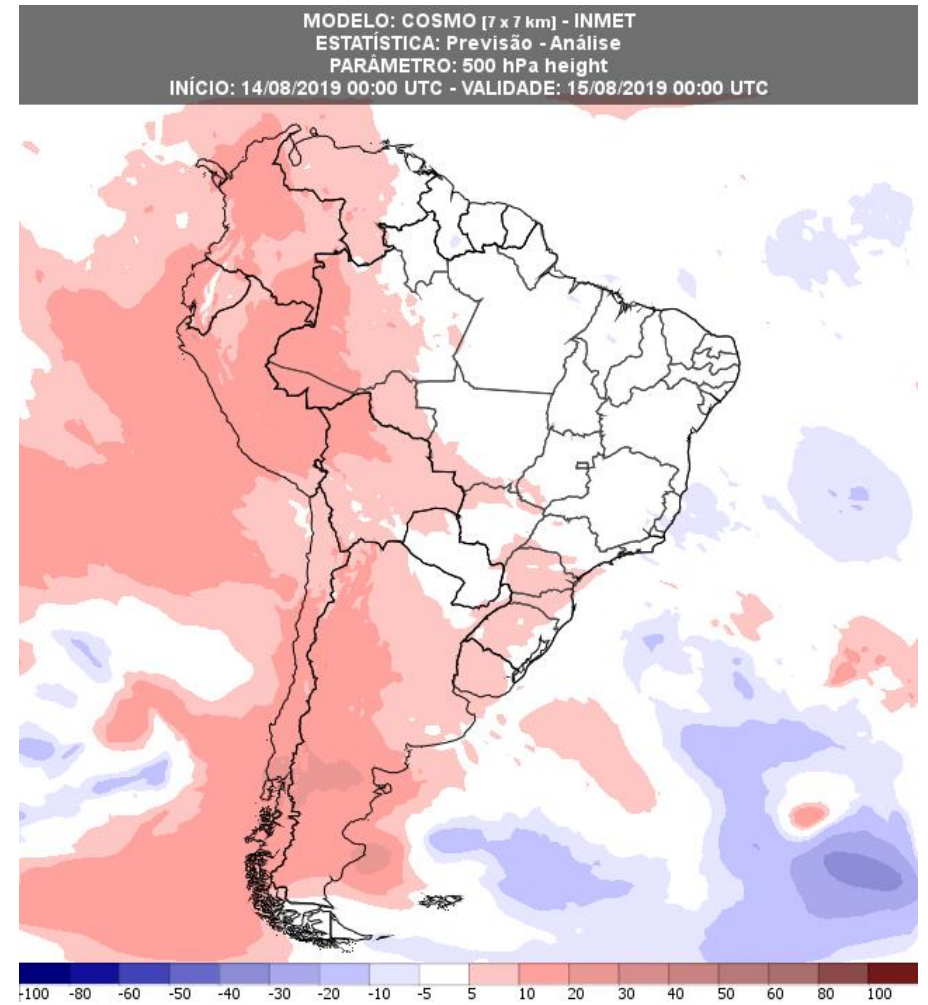
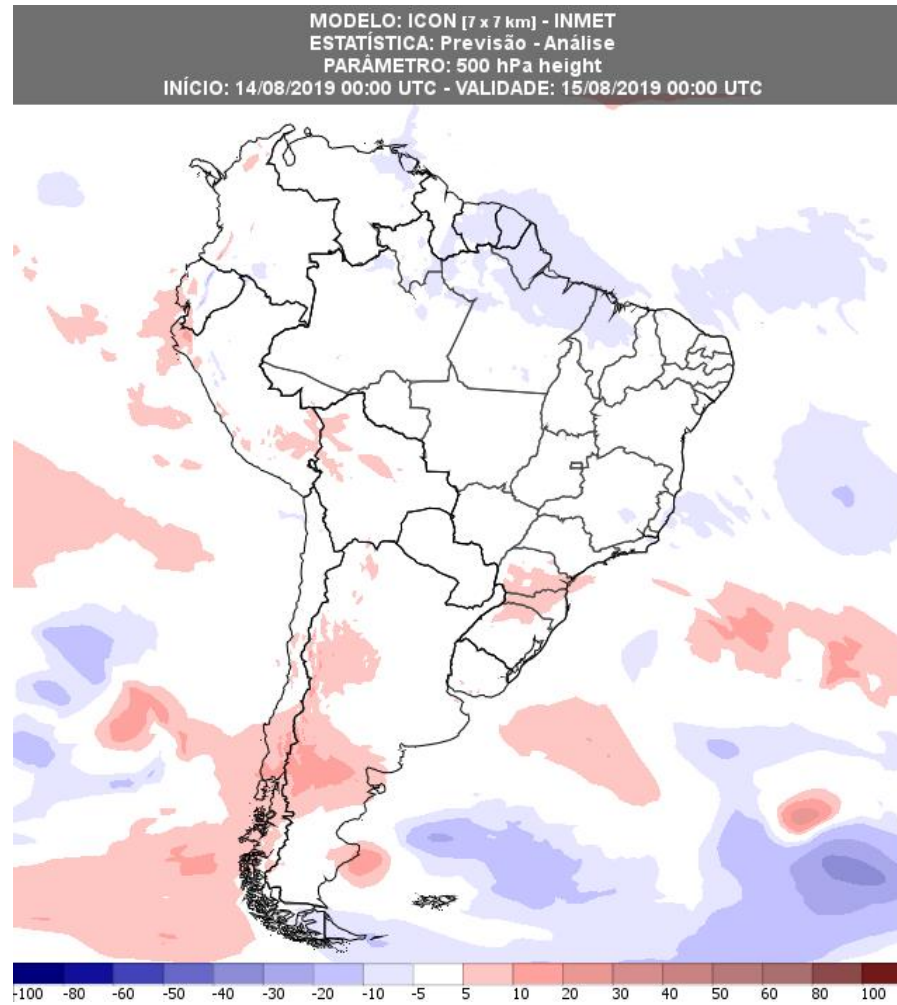
Data:

- Generating 696 GB of data per day (00 and 12 UTC) - for 174 hours.

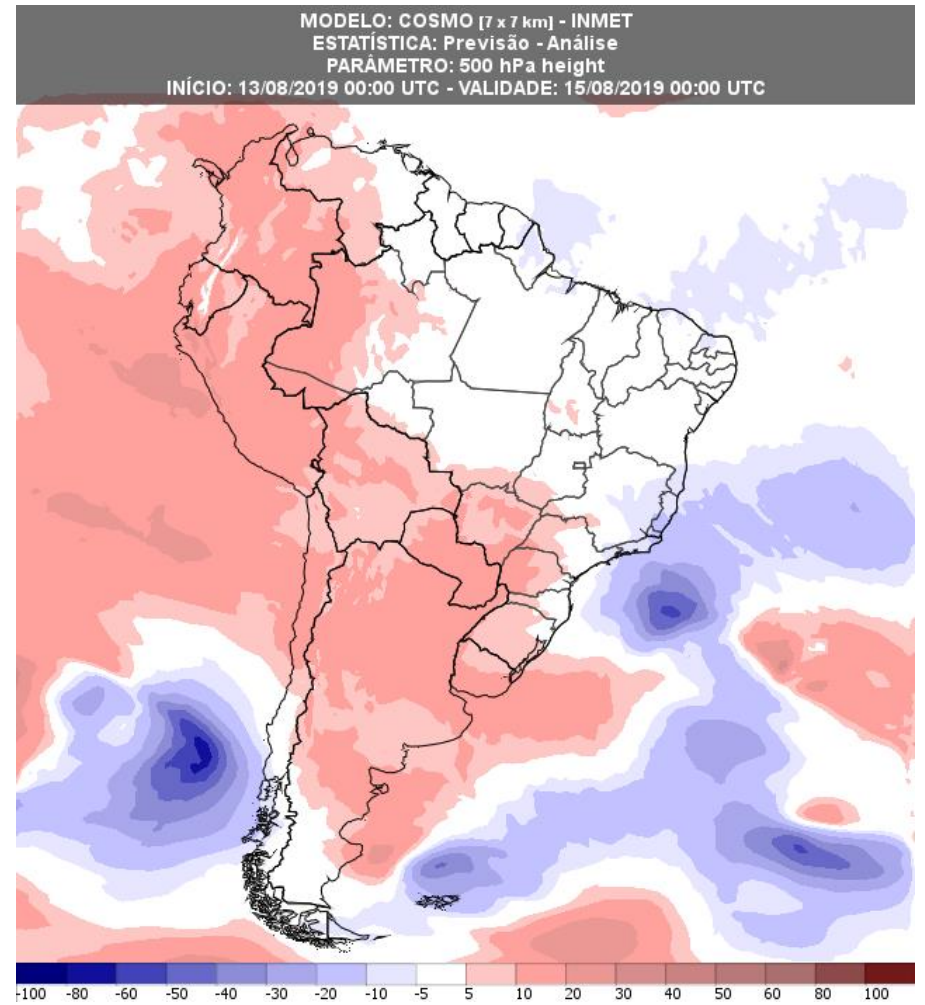
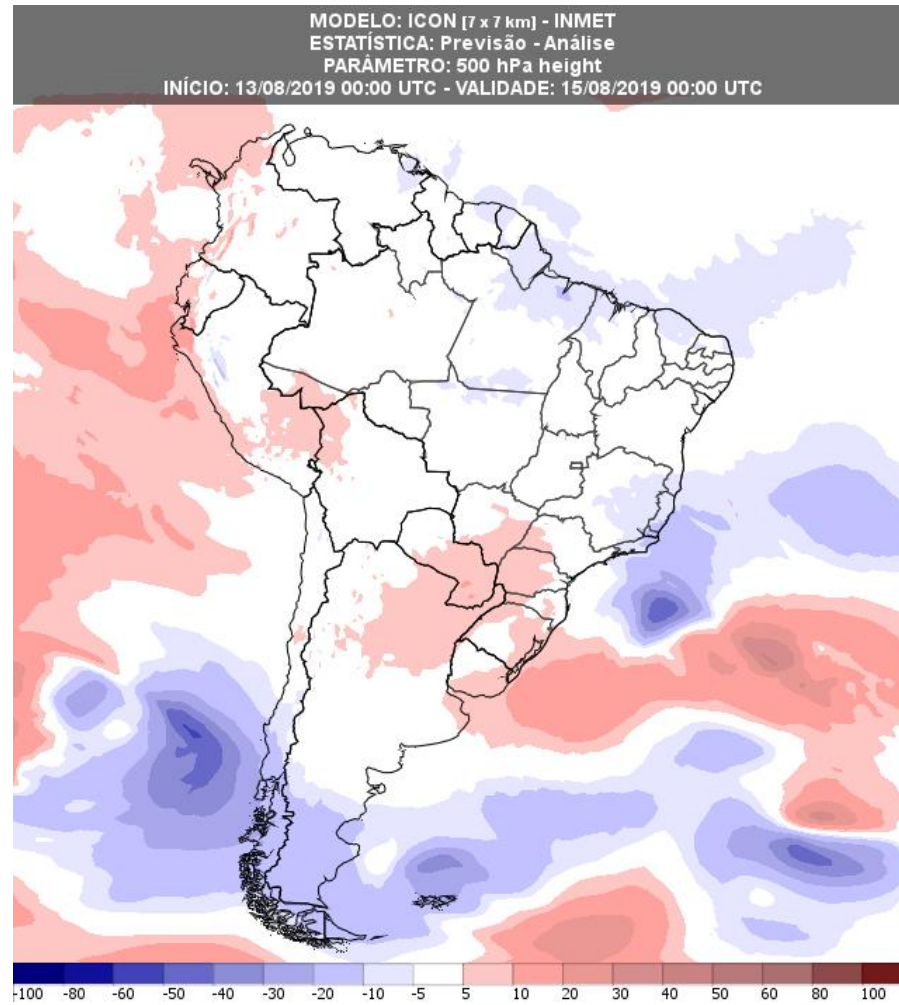
Strategy for verification of ICON outputs

- ÇComparison of predicted and corresponding analysis parameters - ICON and COSMO;
- ÇComparison of predicted rainfall and observed values - ICON and COSMO;
- ÇTime evolution of a comparison between model and observation for point meteogram outputs;
- ÇEstimation of bias and error of surface variables (in progress).

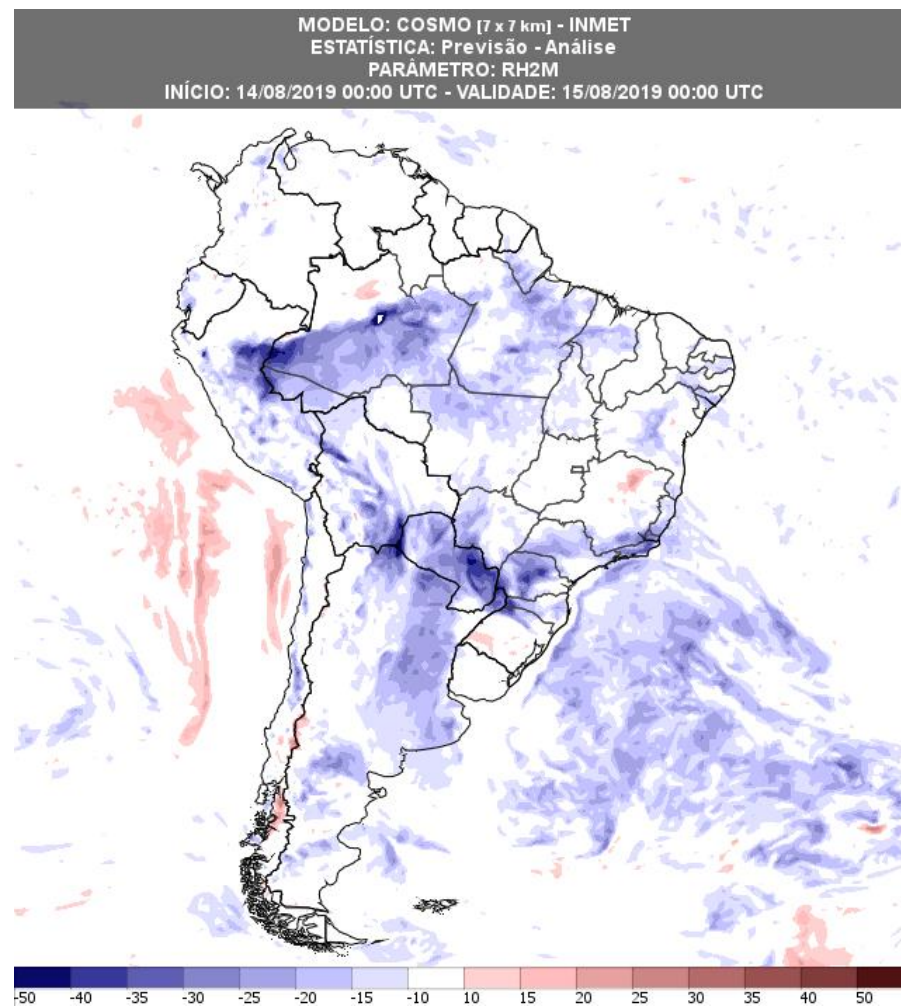
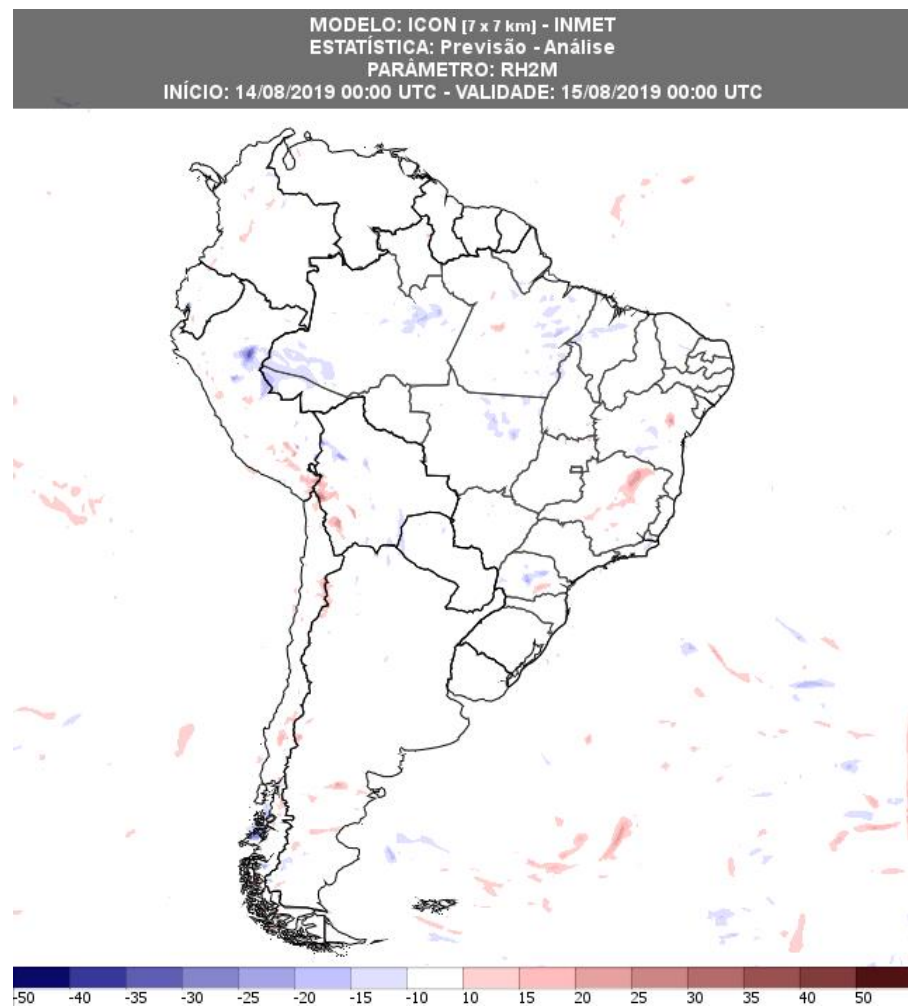
Geop Height 500 hPa – 24h



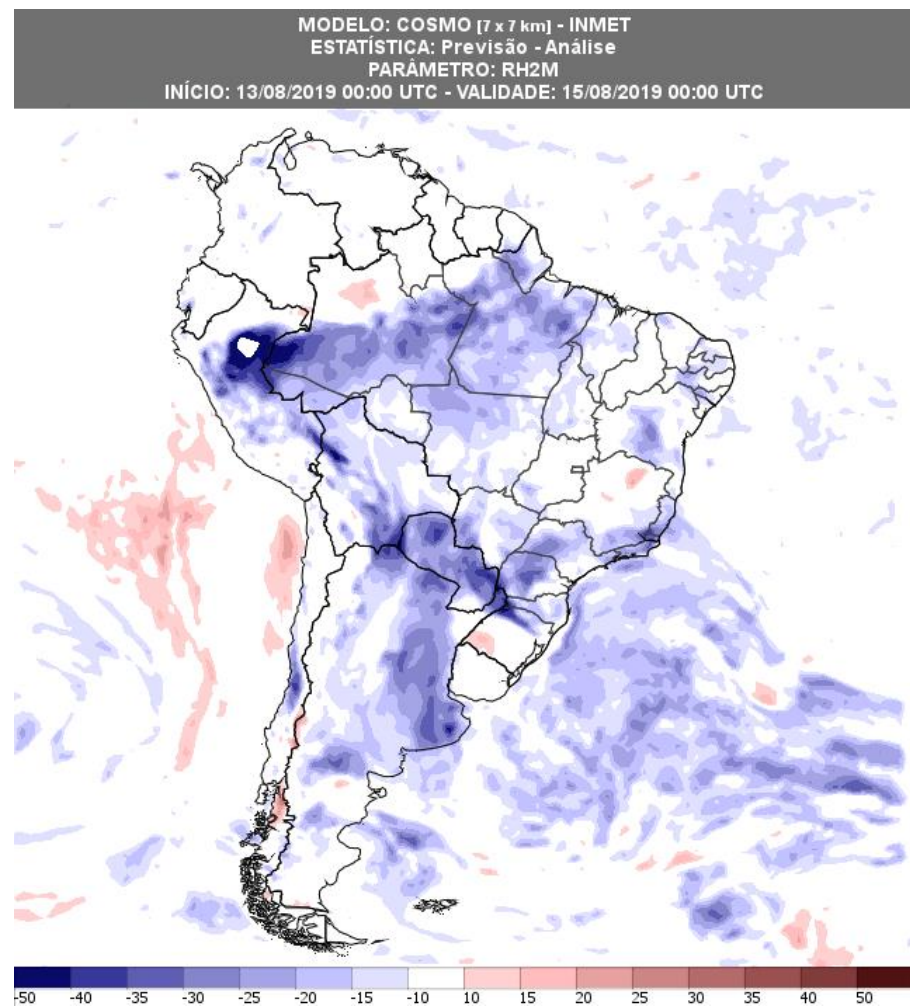
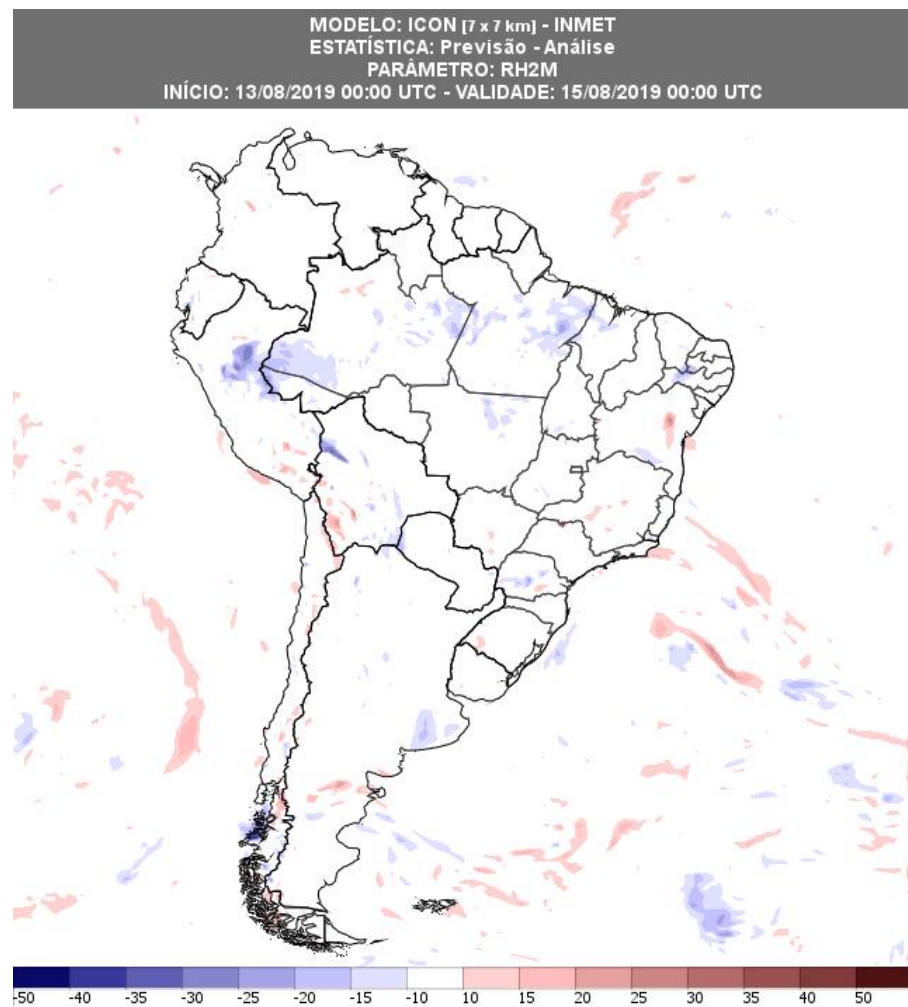
Geop Height 500 hPa – 48h



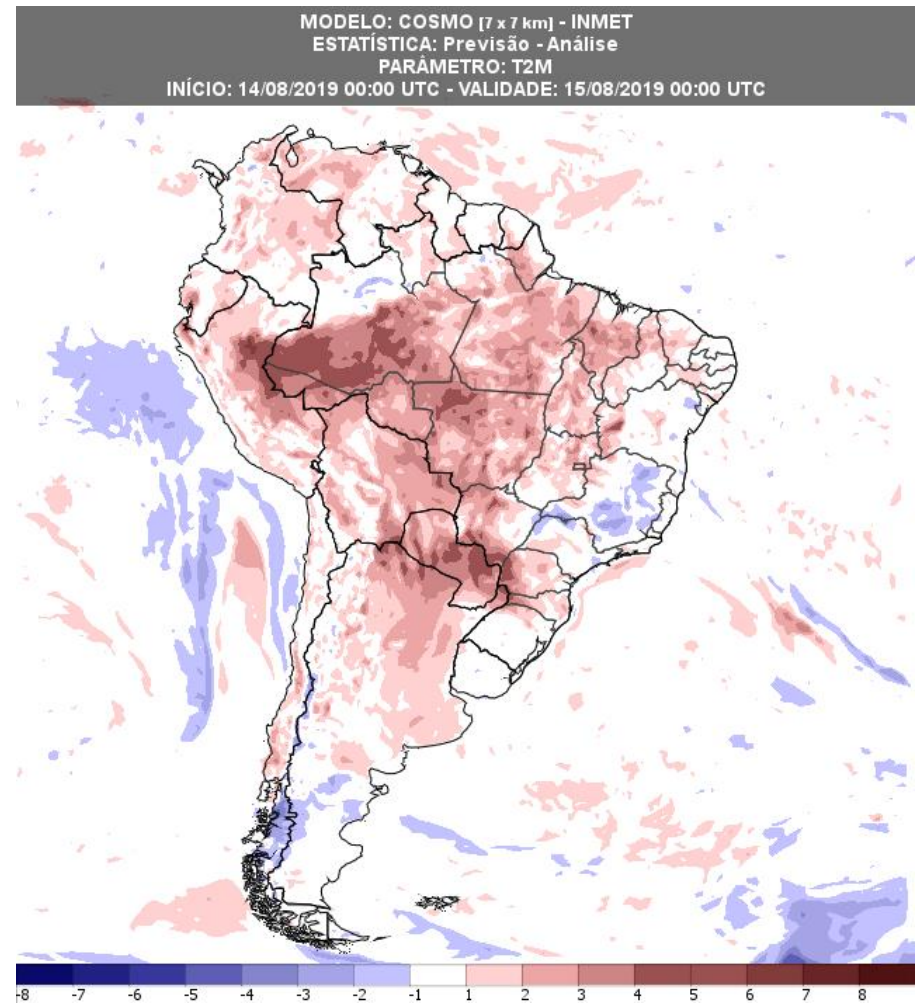
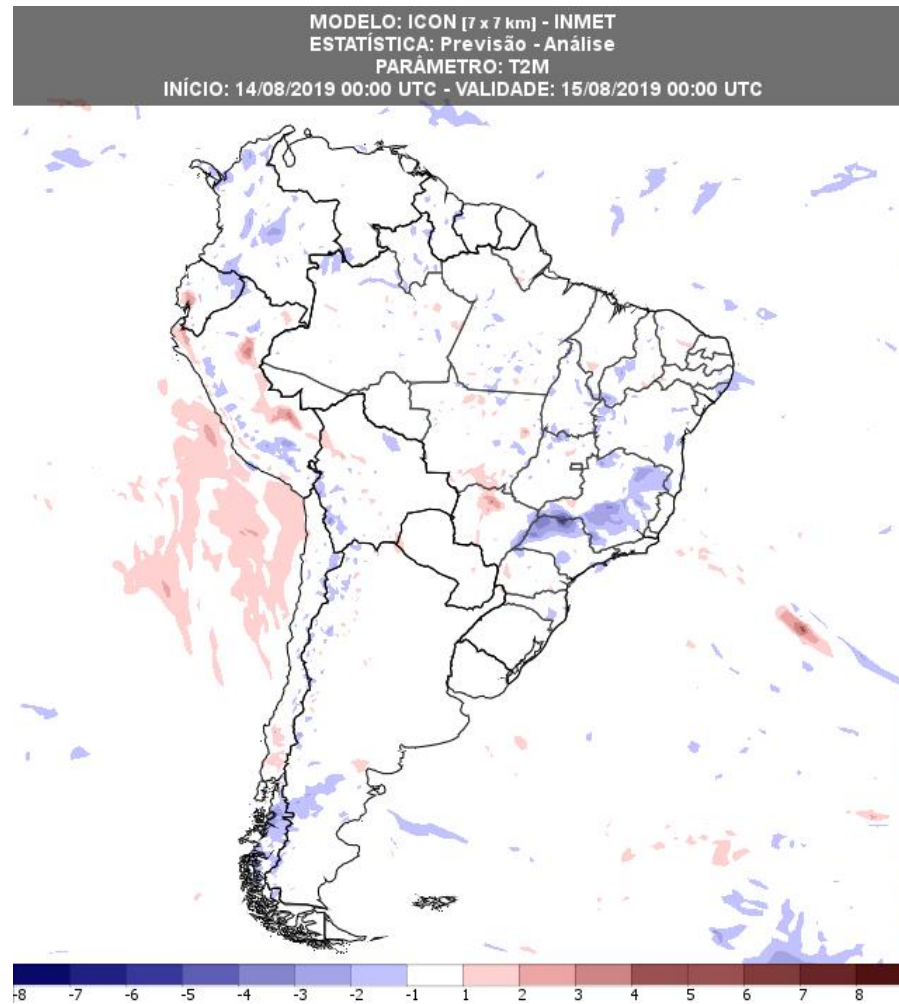
2m RH – 24h



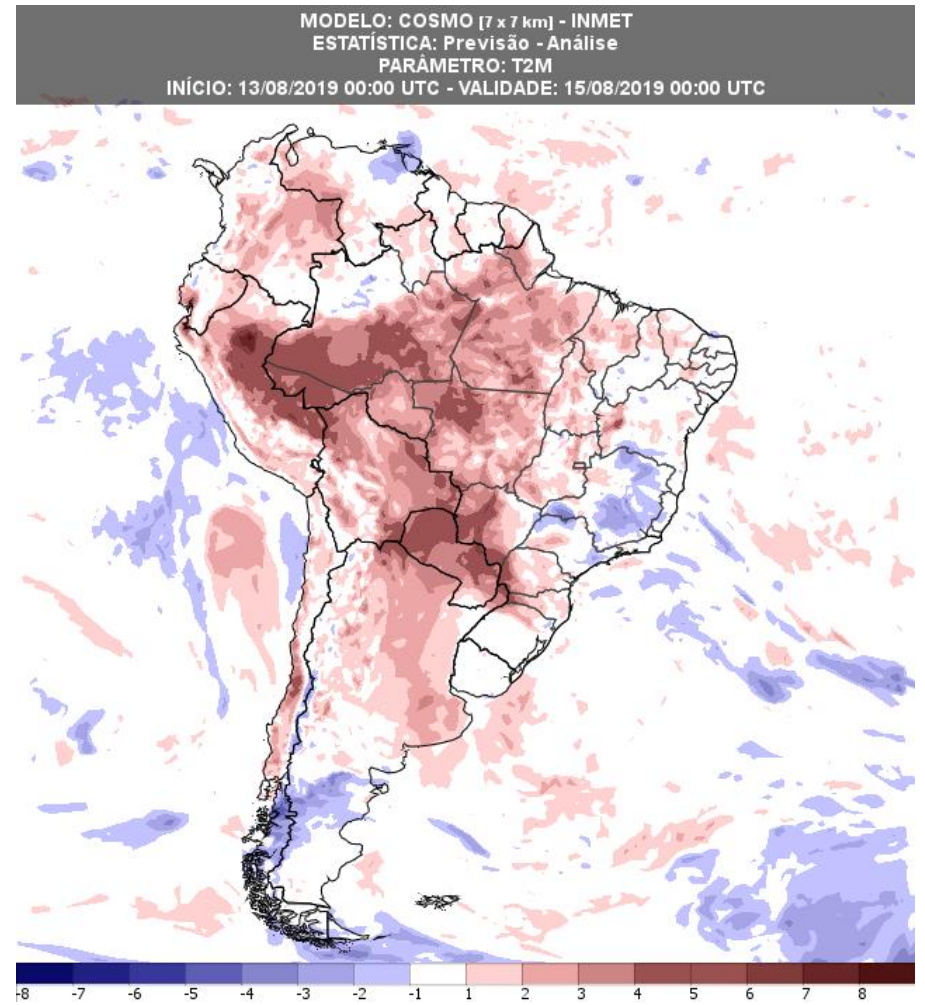
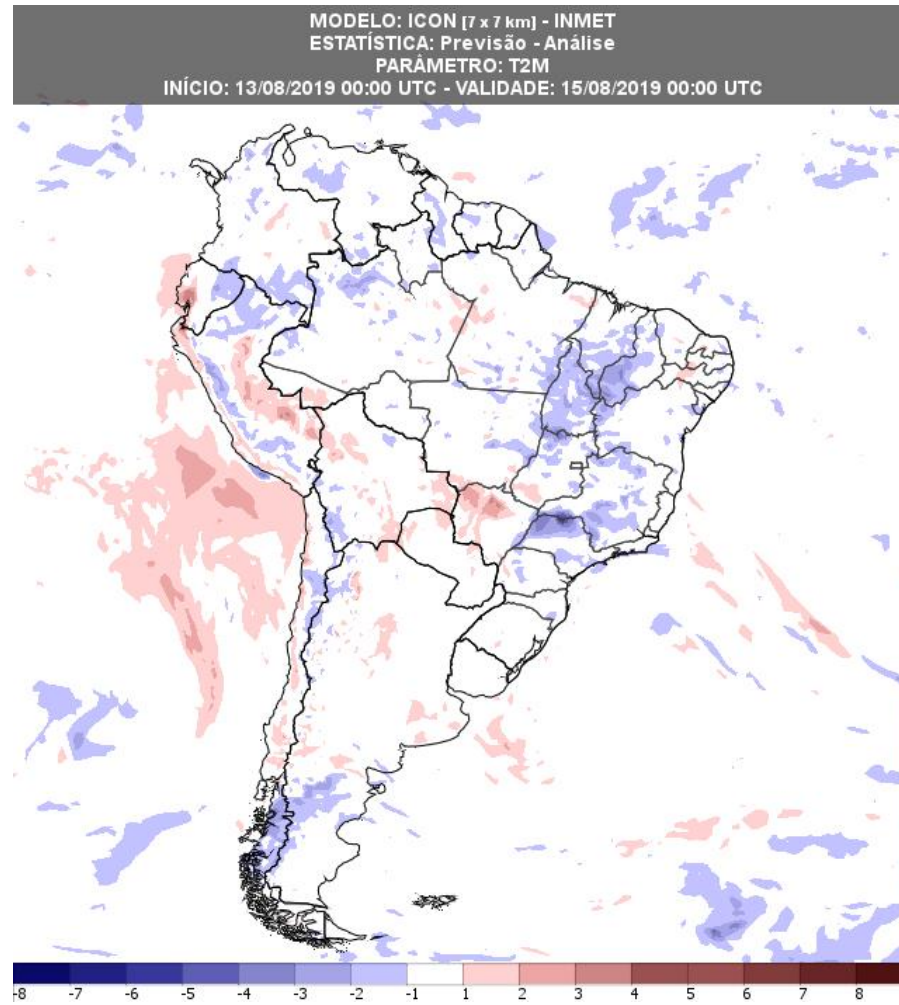
2m RH – 48h



2m T – 24h

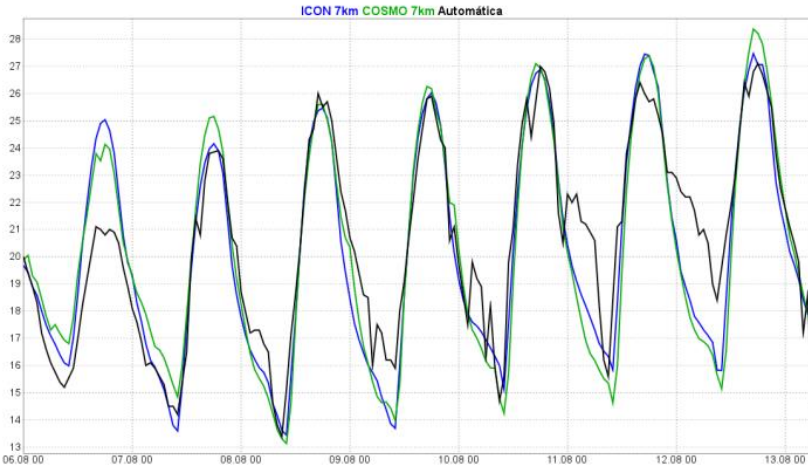


2m T – 48h

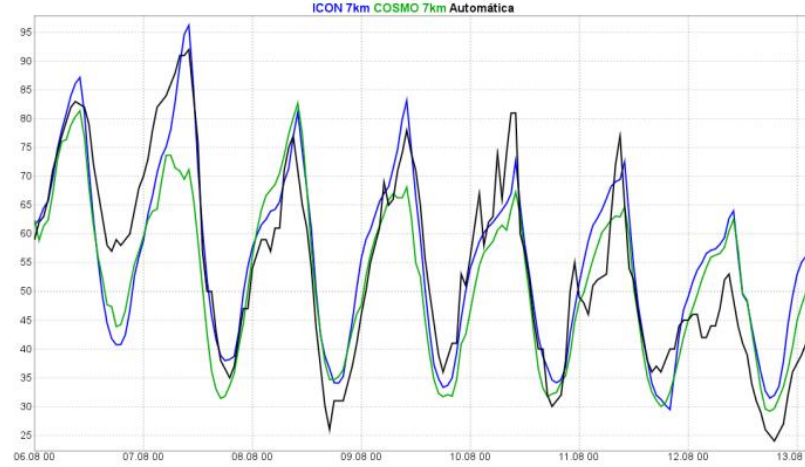


Comparison: ICON x COSMO x Automatic Stations (more than 500)

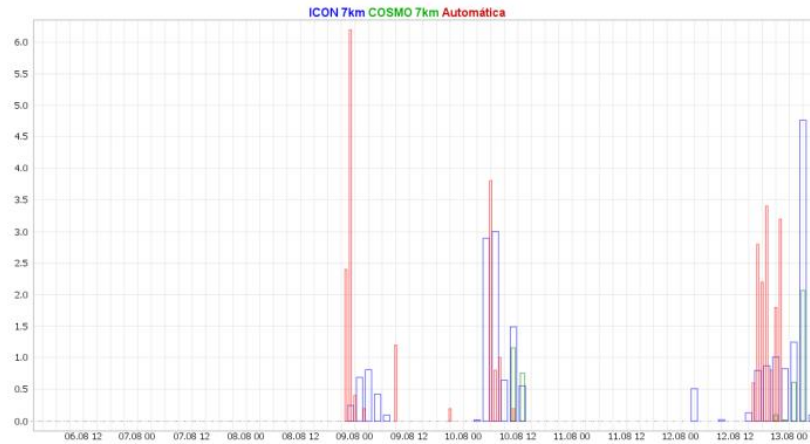
Temperatura 2m (°C)
Local: Brasília
Validade: 06.08.2019 00:00 - 13.08.2019 06:00



Umidade Relativa em 2m (%)
Local: Brasília
Validade: 06.08.2019 00:00 - 13.08.2019 06:00



Precipitação (mm/h)
Local: Porto Alegre
Validade: 06.08.2019 01:00 - 13.08.2019 06:00



Pressão Reduzida (hPa)
Local: Porto Alegre
Validade: 06.08.2019 00:00 - 13.08.2019 06:00

