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AEMet
Agencia Estatal de Meteorología

Work in progress on Surface Assimilation in HIRLAM

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Homleid

2nd meeting of ET in Soil and Surface
processes, Sept/2010

Overview.

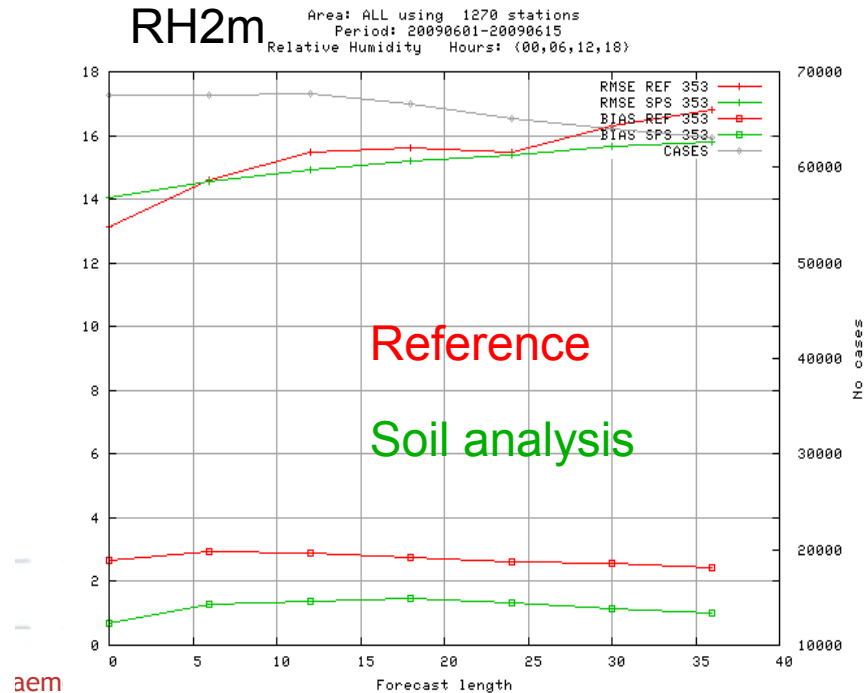
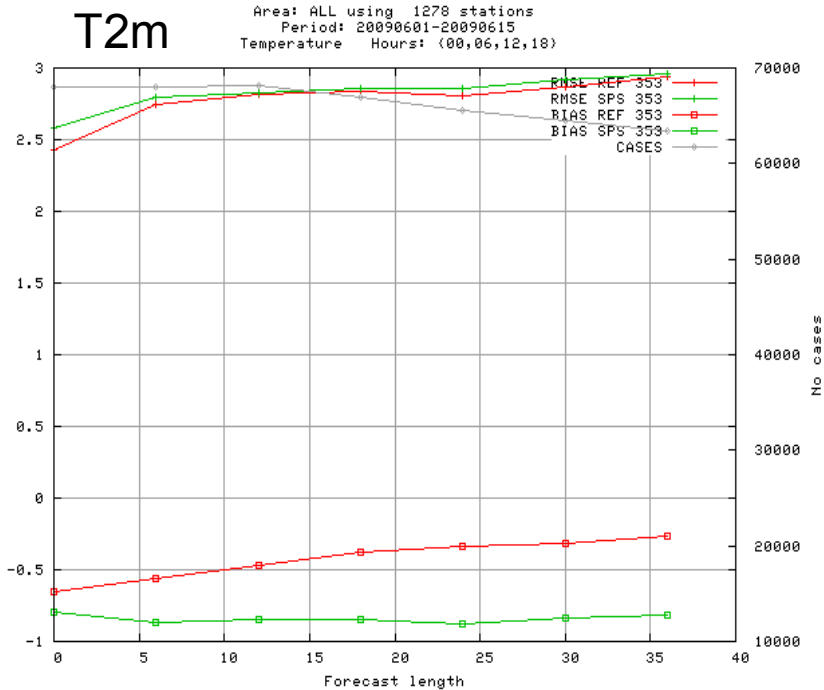
- Current status
- Some results
- Future plans

Introduction.

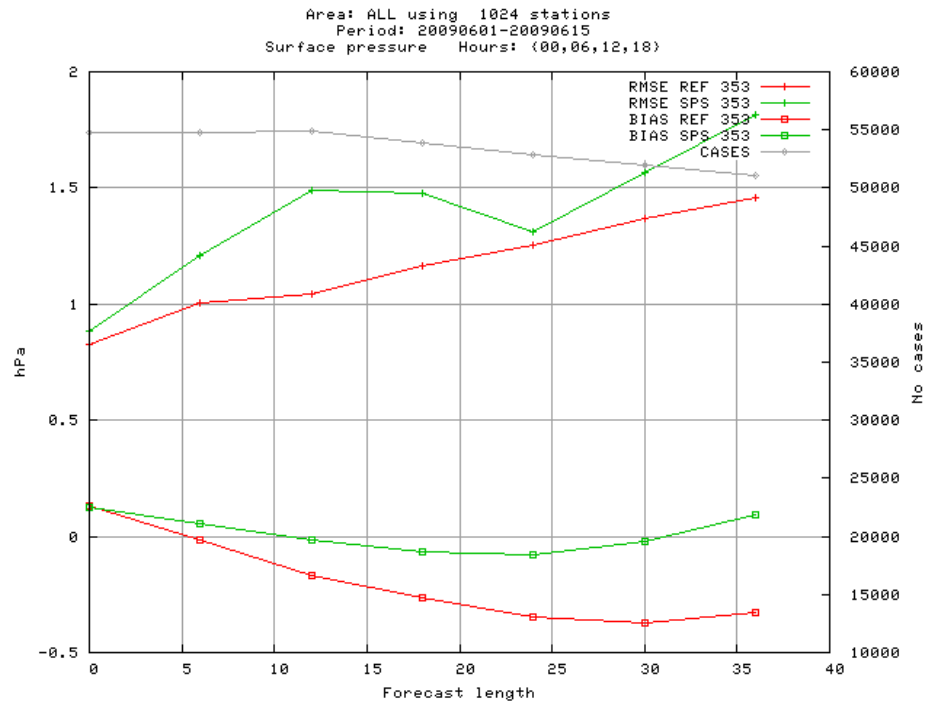
- During last year, we have installed in the HARMONIE model the program OI_MAIN (optimal interpolation soil analysis code for SURFEX physics).
- Most of the work this year was employed in testing OI_MAIN and trying to improve the scores of near surface parameters.
- These tests were made with the HARMONIE hydrostatic and non hydrostatic versions.

Hydrostatic test.

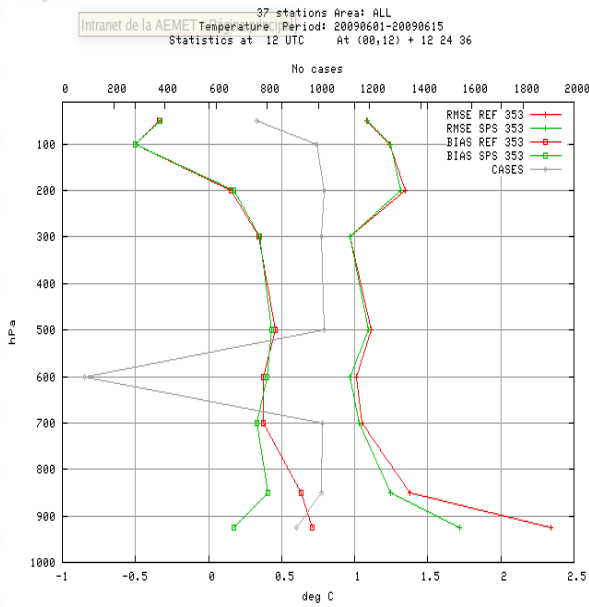
- We have been testing different soil physics with the hydrostatic version, and the most important conclusions are:
- Surface cold and wet bias for T2m and RH2m.



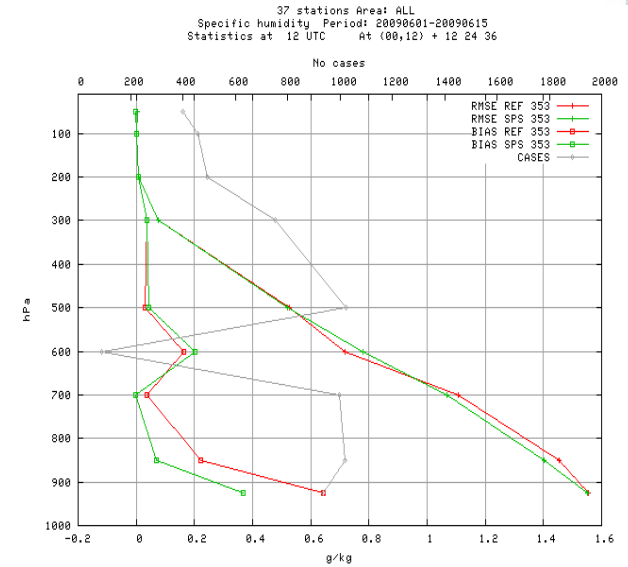
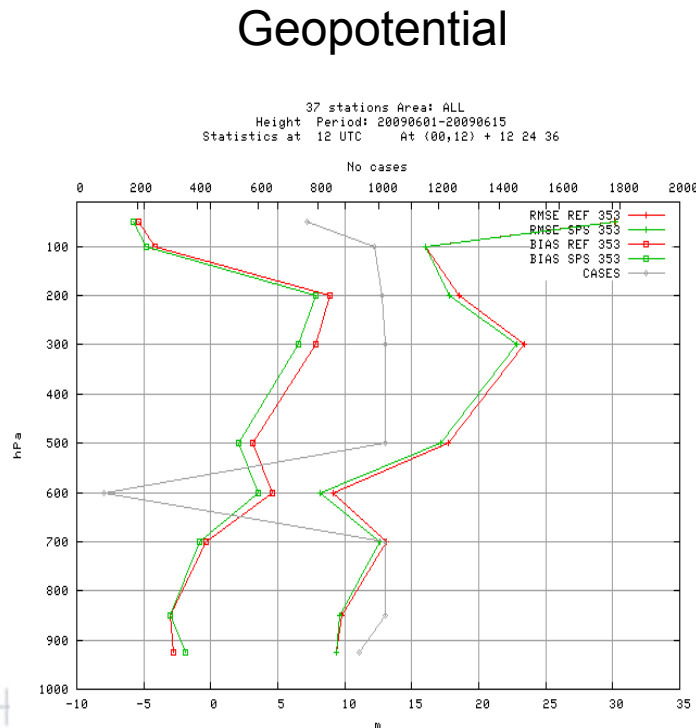
- Some problems with surface pressure.



• Good scores at high levels.



Temperature

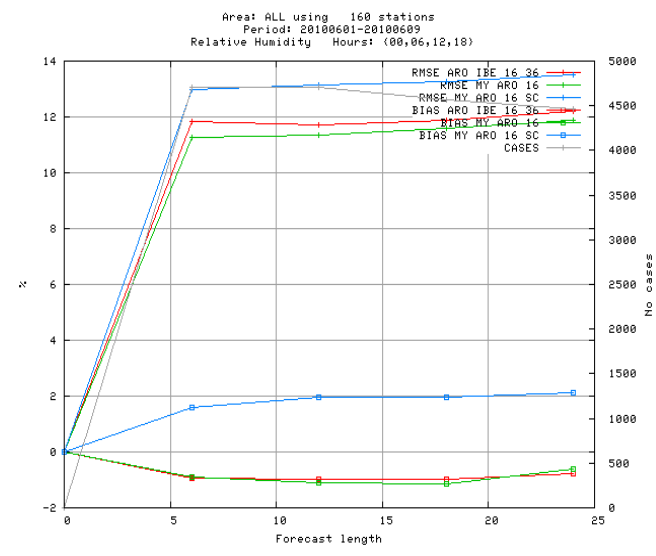
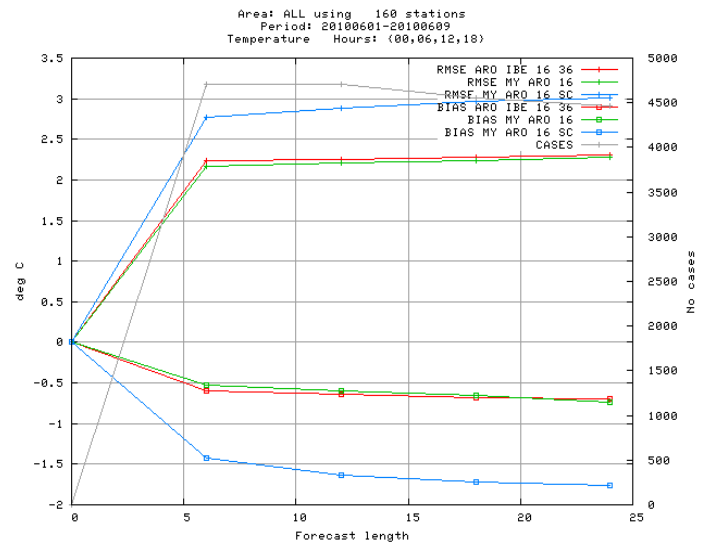
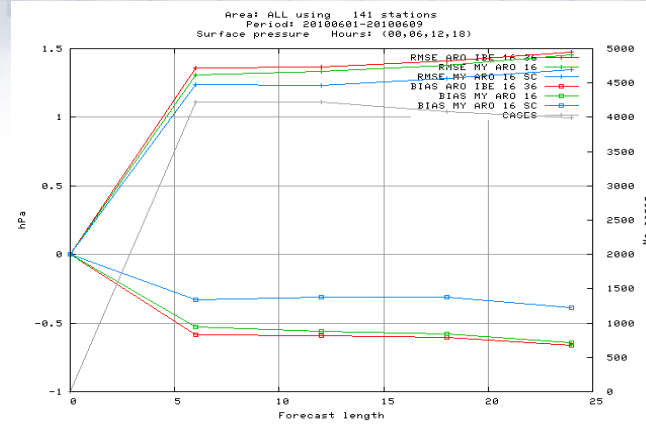


Specific humidity

- For the non hydrostatic version we still have the same problems:
 - Cold and wet near surface biases, “strange” scores for surface pressure
 - We noticed an improvement of skin parameters scores at using Upper Air Assimilation for high resolution (2.5 km over Iberia Peninsula).

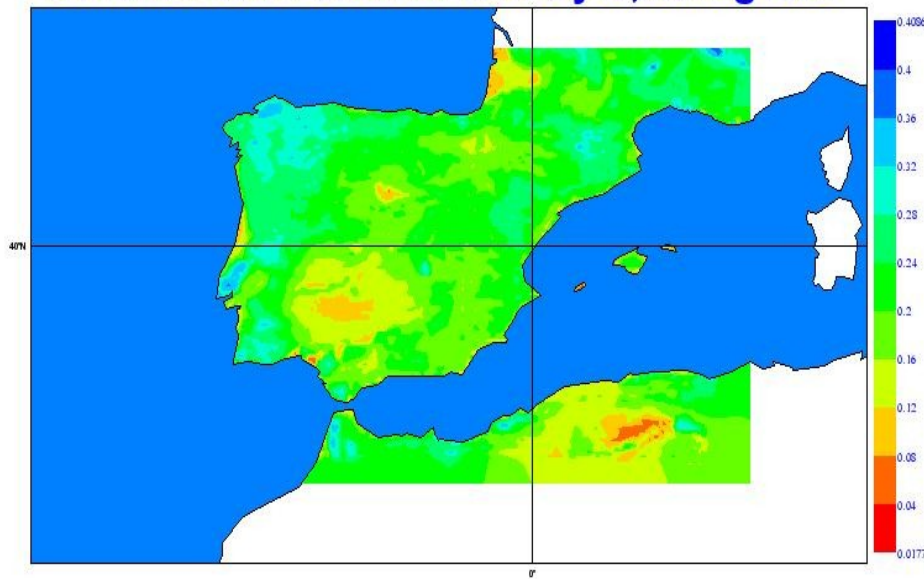
Non Hydrostatic test.

- Red : Soil Assim.
- Green : Soil + 3D-Var Assim.
- Blue : Only 3D-Var

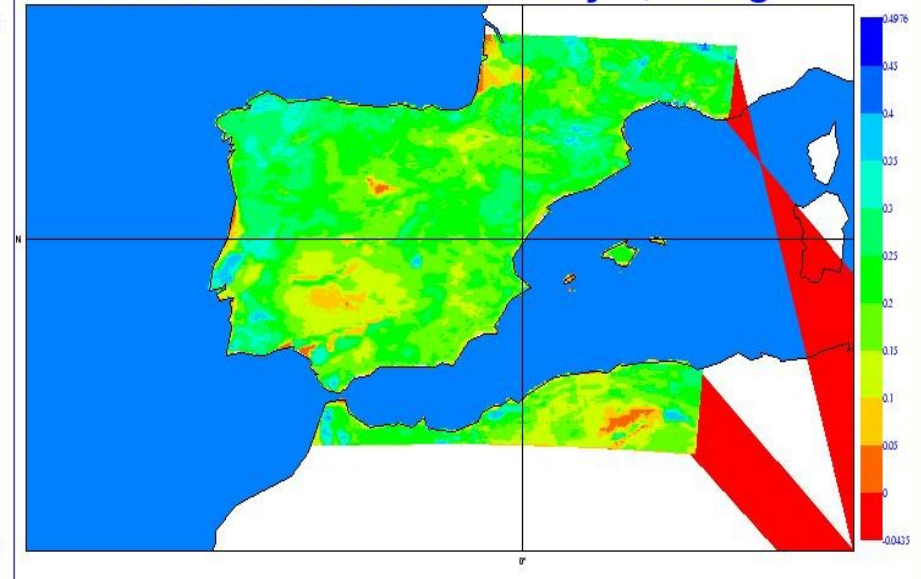


- We are working on the implementation of the SEKF inside the HARMONIE system. For the same day:

"soil moisture content 2nd layer, using EKF"



"soil moisture content 2nd layer, using OI"



- For one specific date, statistics are:

- **SEKF off-line :**

innovation statistics 1 5.17636077047289955 4.51126779465326688

innovation statistics 2 -0.532865714596732418E-01 0.206501930427963026

After analysis :

Mean increments for WG2= 1.49318370663541851E-03 (m3/m3)

Number of assimilated observations = 287478

- **Optimal interpolation:**

Mean T2m increments 0.525051966895810907

Mean HU2m increments -0.511460954615725813E-01

after analysis :

Mean WG2 increments over NATURE -2.95935707113734647 (mm)

Future activities

- Improve understanding of model low level biases
- Evaluate more extensively the soil analysis schemes (OI and SEKF)
- Continue snow analysis activities with CANARI and satellite products
- Include the double surface energy balance in SURFEX
- Lake modelling (coupling Flake with HARMONIE)
- Sea-ice modelling (to be included in SURFEX)



Thanks to Jean-François!!