

“2015 status of the Assimilation of GNSS observations in HARMONIE”

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HARMONIE Working Week on DA and Use of Observations

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OUTLINE

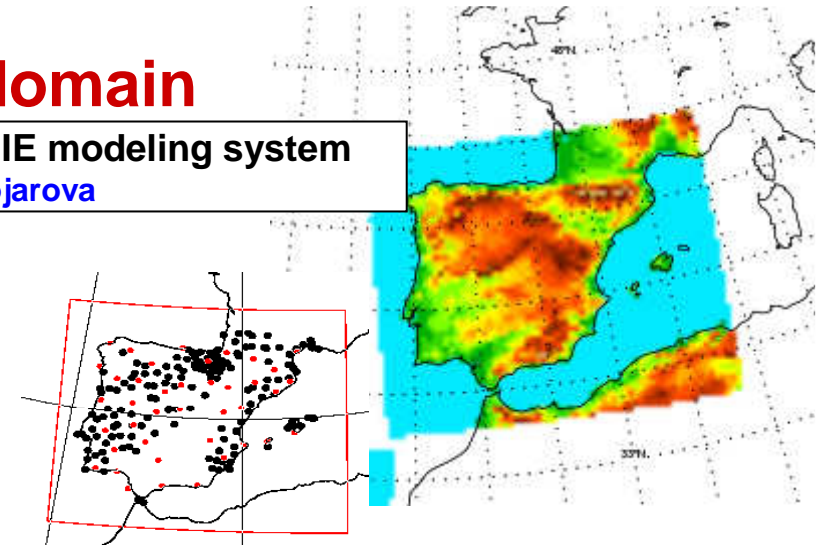
1. GNSS ZTD with IBE domain: “*Variational bias correction of GNSS ZTD in the HARMONIE modeling system*” paper results
2. GNSS ZTD in MetCoOp domain
3. GNSS ZTD in IBExl domain
4. Conclusions/Future work

1 GNSS ZTD with IBE domain

Variational bias correction of GNSS ZTD in the HARMONIE modeling system

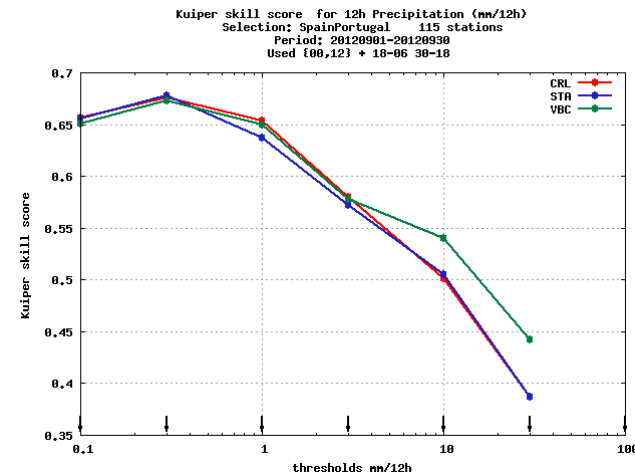
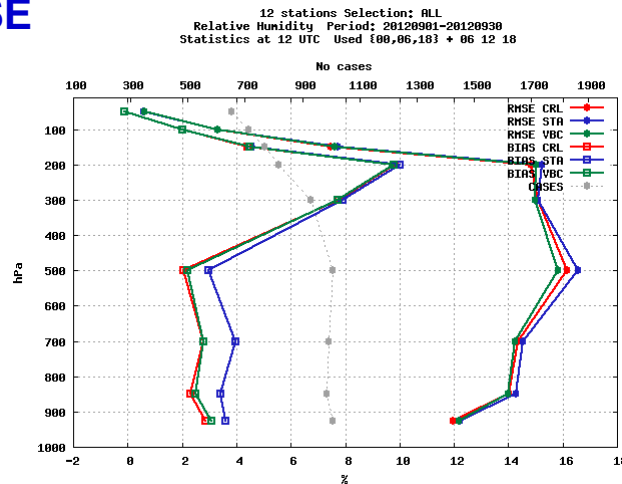
J. Sánchez, M. Lindskog, S. Thorsteinsson, J. Bojarova

- Cy38h1beta3, LSMIX=yes, BD 3h.
- 3DVar 3h cycle: conv obs
+ GNSS ZTD 80 km thinning , (STABC and VBC)
- Domain: IBERIA_2.5, 2.5 km, and 65 v.l.
- Period of study: 1-30 September 2012



KSS 12 h precipitation

RH bias and RMSE



✓ Use of GNSS ZTD observations together with a variational bias correction is shown to improve the short range weather forecasts, both in a statistical sense and in individual case studies.

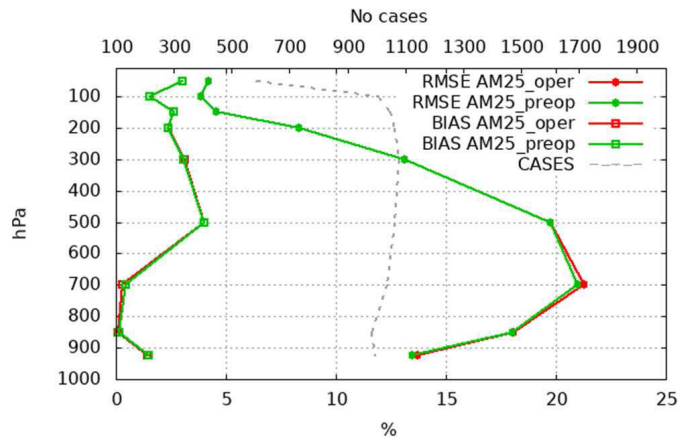
✓ For this domain, the improvement has been due to the ability of the GNSS ZTD observations to dry a too wet model state and therefore improve the precipitation scores.

2 GNSS ZTD with METCOOP domain

- Cy38h12, LSMIX=no, BD 3h
- **3DVar 3h cycle**: conv obs +AMSU-A,AMSU-B/MHS+ GNSS(ROBH, METO) 80 Km thinning , VBC
- **Domain**: MetCoOp, 2.5 km, and 65 v.l.
- **Period of study**: 10/dec/14-16/feb/15

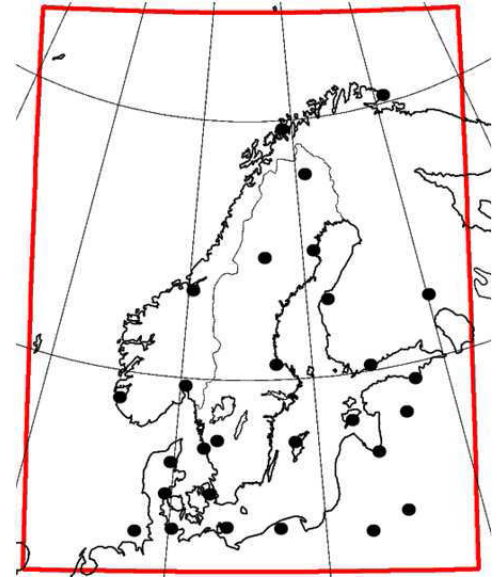
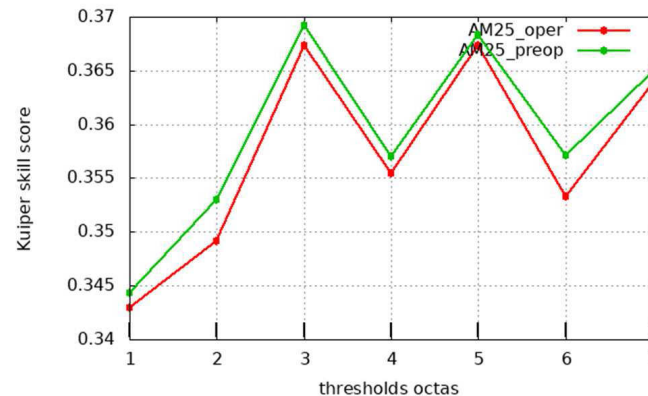
RH bias and RMSE

15 stations Selection: ALL
Relative Humidity Period: 20141218-20150113
Used {00,12} + 12 24



KSS cloud cover

Kuiper skill score for Cloud cover (octas)
Selection: ALL 349 stations
Period: 20141218-20150113
Used {00,12} + 06 18 30 42

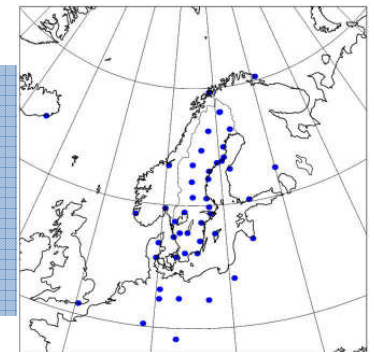


Oper no gnss

preop gnss.

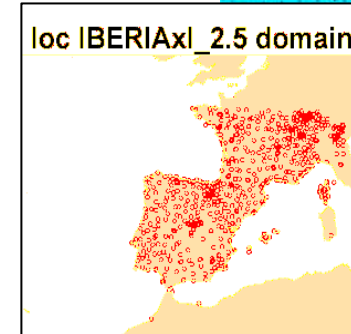
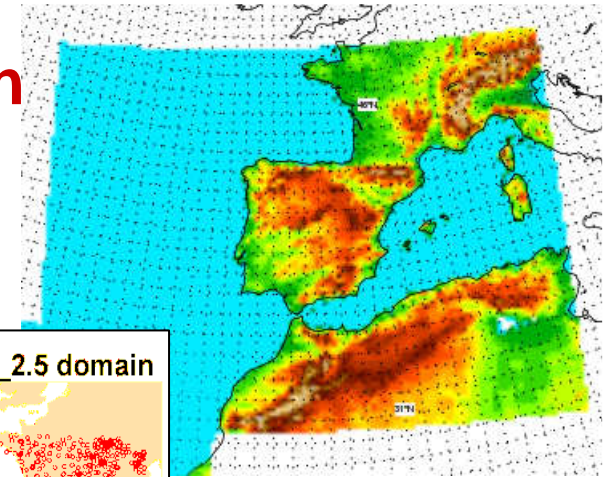
Assim ZTD GNSS
operational since 17
feb 2015

- ✓ Use of GNSS ZTD observations together with a variational bias correction improves the short range weather forecasts for MetCoOp domain.
- ✓ More NGAA data (around 50 sites) will be produced to be used on this operational suite.



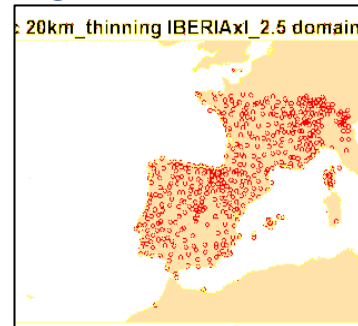
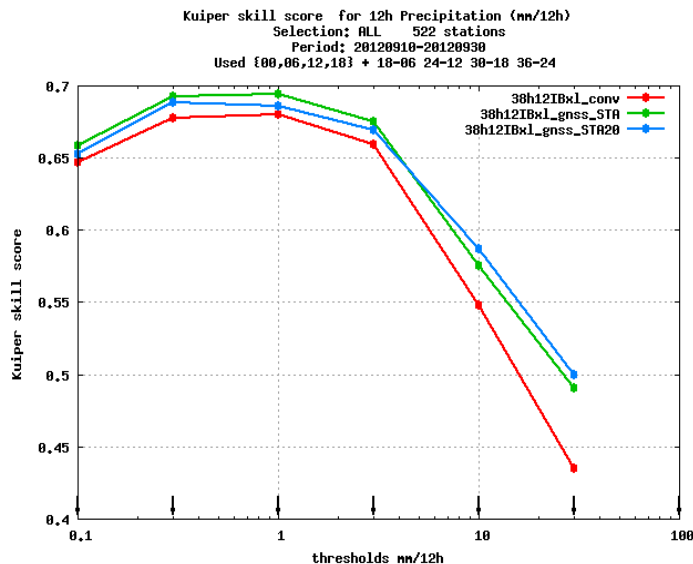
3 GNSS ZTD with IBExl domain

- Cy38h12, LSMIX=no, 3DVar, BD 3h,
- 3DVar 3h cycle: conv obs (+RS extra HYMEX 06 and 18)
+ GNSS ZTD 20 km thinning , (STABC and VBC)
- Domain: IBERIAxl_2.5, 2.5 km, and 65 v.l.
- New structure func. EDA-ECMWF
- Period of study: 10-30 September 2012



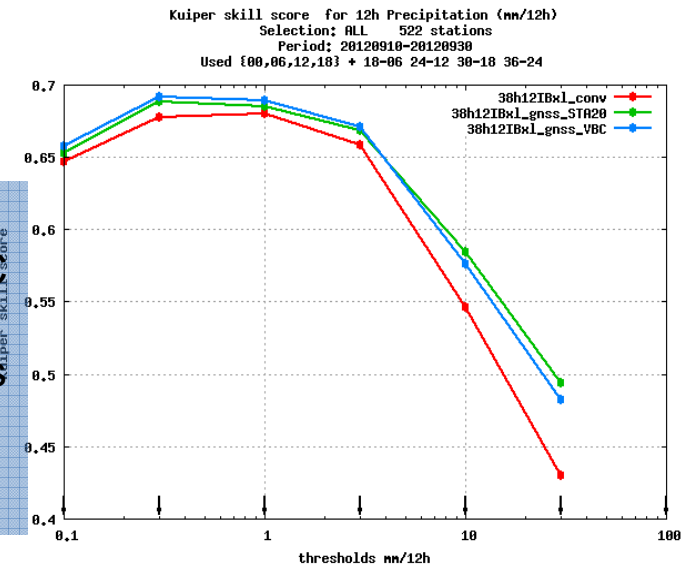
1) Thinning distance, which one ?

KSS 12 h precipitation



2) VABC tests...starting

KSS 12 h precipitation



✓ Use of GNSS ZTD
obs together with a VBC
improves the short
range weather forecasts
for this domain.

✓ Thinning is needed.

4 Conclusions/Future plans

- The possibility to further enhance the variational bias correction for GNSS ZTD by introducing more predictors, such as layer-thickness, will be considered. Also the effect on variational bias correction by introduction of more sources of humidity information will be investigated.
- Introduction of more flow dependency in the data assimilation procedure will be an important future challenge for the HARMONIE humidity data assimilation.
- **MetCoOp domain:** more sites from NGAA will be prepared and assimilated.
- **IBExI domain:** Tuning, scaling fact str func., improving VBC coeff... More predictors? (JS)

THANK YOU..