



GOBIERNO
DE ESPAÑA

MINISTERIO
DE MEDIO AMBIENTE
Y MEDIO RURAL Y MARINO

AEMet
Agencia Estatal de Meteorología

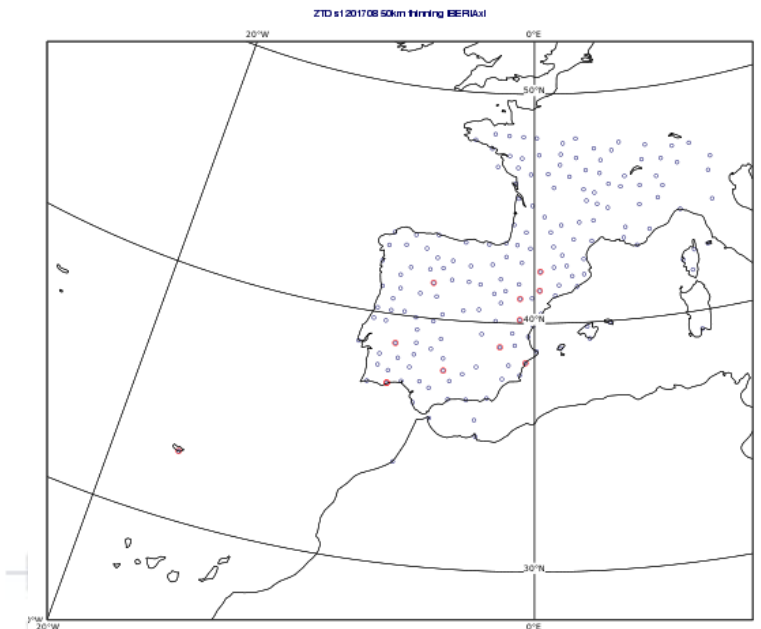
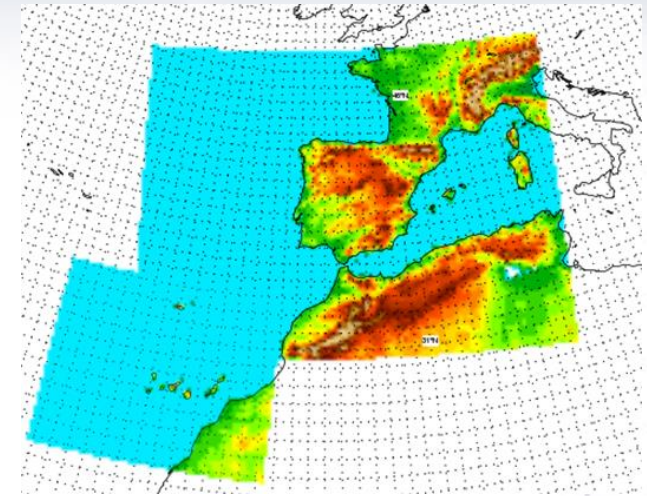
Status of the ASSIMILATION of GNSS ZTD observations AEMeT 2017

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- Cy40h11 Harmonie-AROME cycle in AEMet
- Domains: IBERIAxl_2.5,(and CANARY Islands 2.5 km), and 65 v.l.
- 3DVar 3h cycle: Conv obs: (TEMP, AIREP,AMDAR,SYNOP,BUOY,SHIP and Pilot) + ATOVS + GNSS ZTD
- ATOVS observations handling:
 - Variational Bias Correction , 5 predictors, each 24 h
- GNSS ZTD observations handling:
 - from E-GVAP Program (ASCII, via ftp):ASI_, ROBH, LPT_, SGN_, IGE2 and METO.
 - Cut-off time: at 0040 /0140 the files are taken
 - Use White list (179 sites after 50km thinning),
 - Temporal thinning (obs closest to an time),
 - Variational Bias Correction: cte offset, each 3h



1) Status of ZTD GNSS assimilation in AEMet

MONITORING of GNSS ZTD D.A.

Operational run

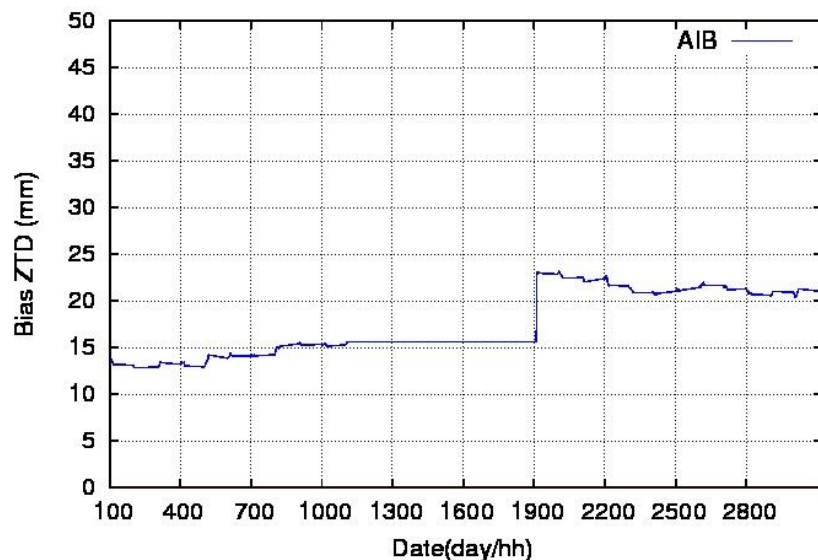


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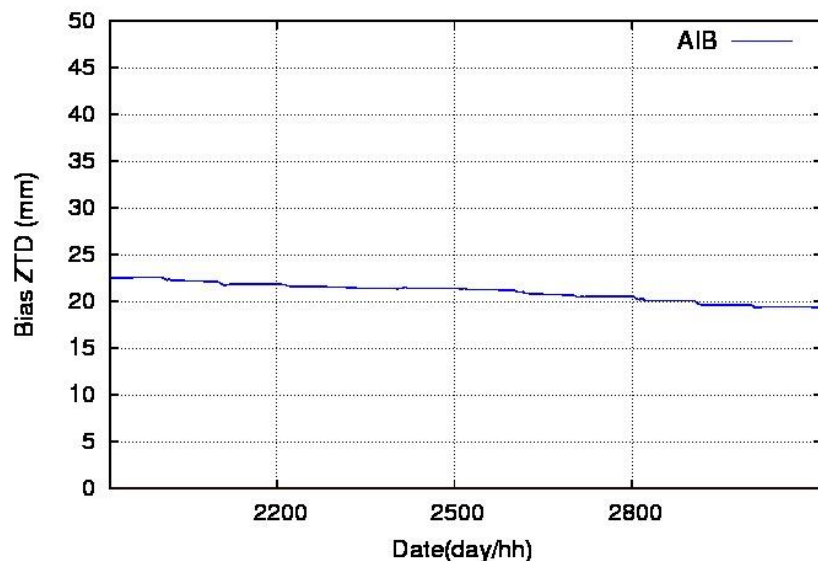
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Bias Time series for BIELROBH oct17



Bias Time series for AGRDIGE2 oct17

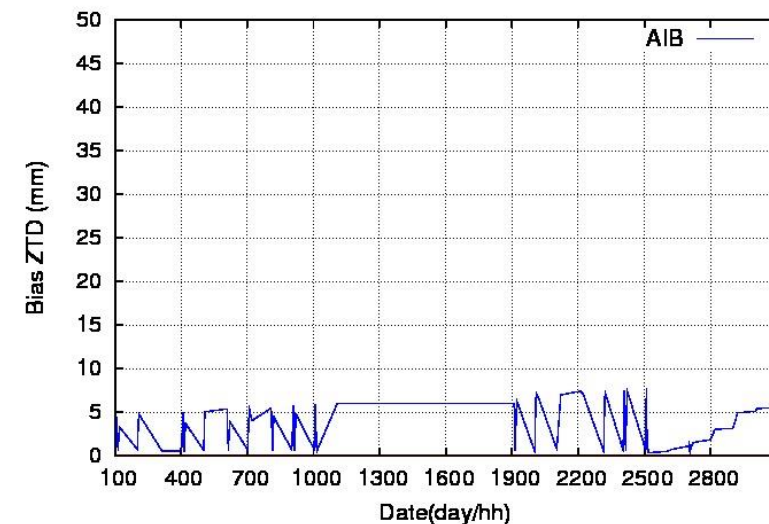


ASI_, ROBH, LPT_, SGN_, IGE2
and METO

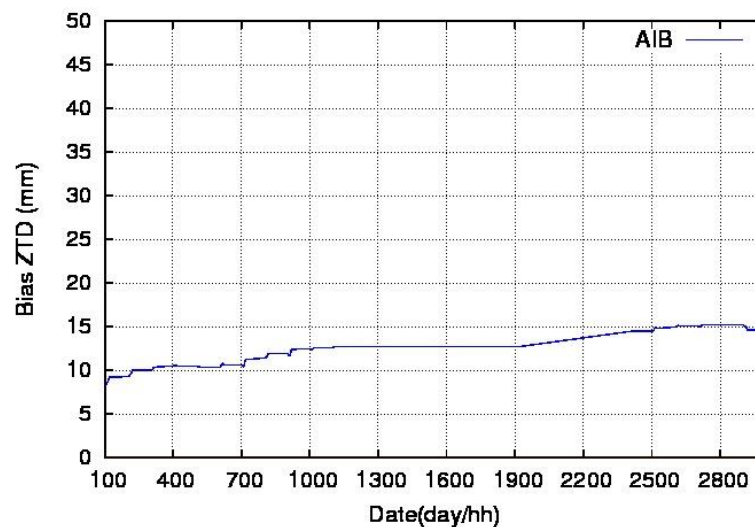
Monthly monitoring, for around 200
gnss sites: bias values (mm)

If any AC interested I could
send you some plots etc..

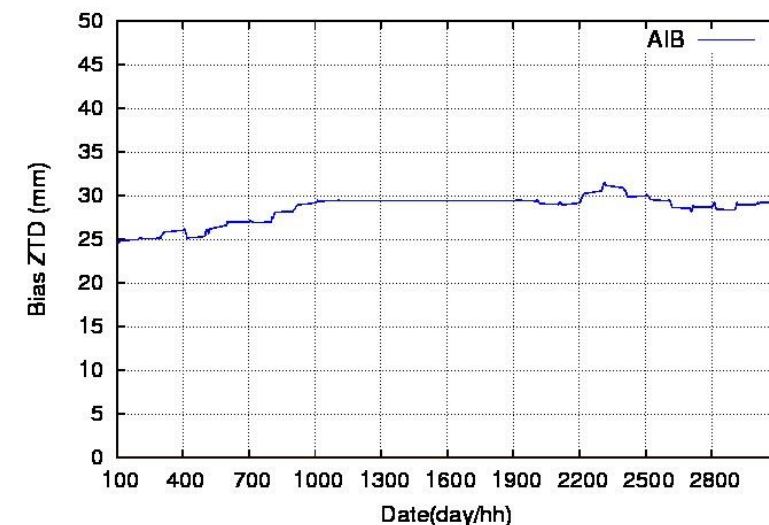
Bias Time series for AUTNSGN_ oct17



Bias Time series for ALACMETO oct17

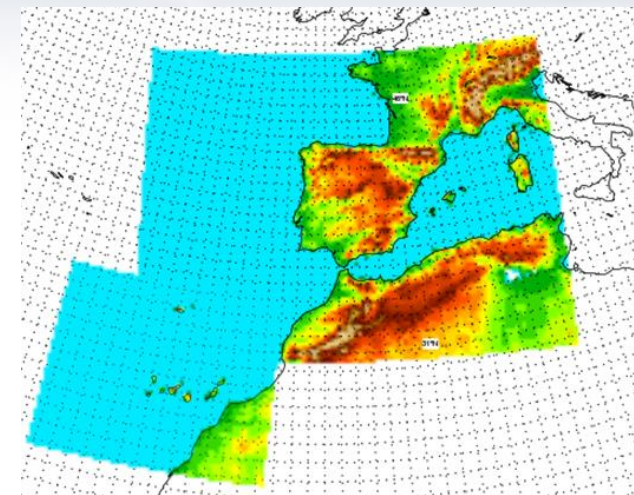


Bias Time series for ZERMLPT_ oct17



Assimilation of GNSS ZTD on the operational run has good impact but... is VARBC performing correctly?

- Cy40h11 Harmonie-AROME cycle in AEMet
- Period: 1-30 sep 2017
- 3DVar 3h cycle: Conv obs + ATOVS + GNSS ZTD
- GNSS ZTD VARBC: Other varbc configurations tested due to very little amount of obs...



CRL: cte offset, each **3h** (operational)

AlBa_vbc: cte offset, each **12 h**, nfsobs=15 days (default)

AlBa_vbc1: cte offset, each **12 h**, nfsobs=4 days

2) Recent Experiments performed at Aemet

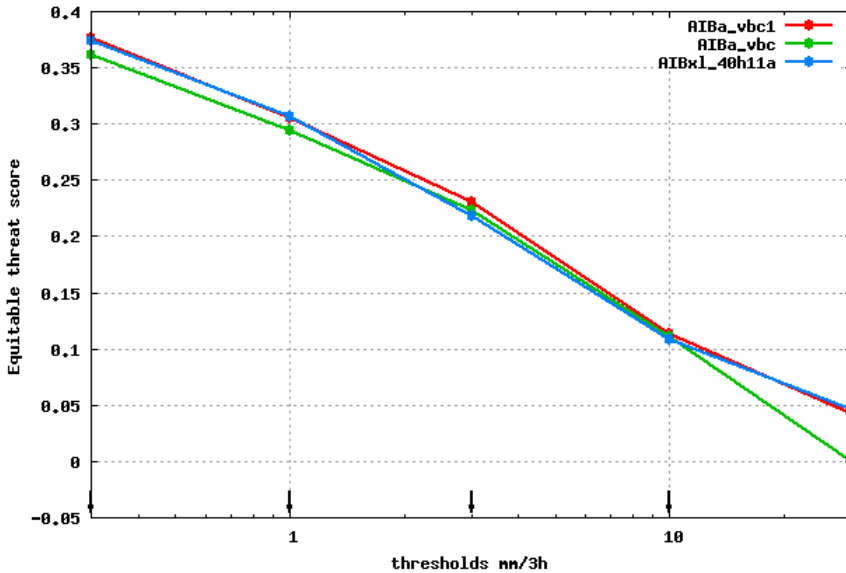
Verification plots

CRL: cte offset, each 3h

AlBa_vbc: cte offset, each 12 h, nfsobs=15 days

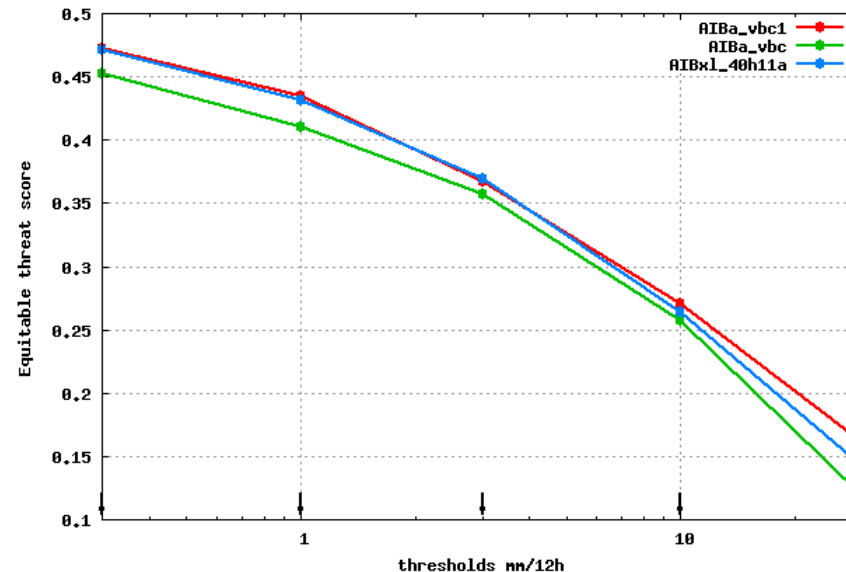
AlBa_vbc1: cte offset, each 12 h, nfsobs=4 days

Equitable threat score for 3h Precipitation (mm/3h)
Selection: ALL 652 stations
Period: 20170901-20170930
Used {00,03,...,21} + 03-00 06-03 09-06 12-09

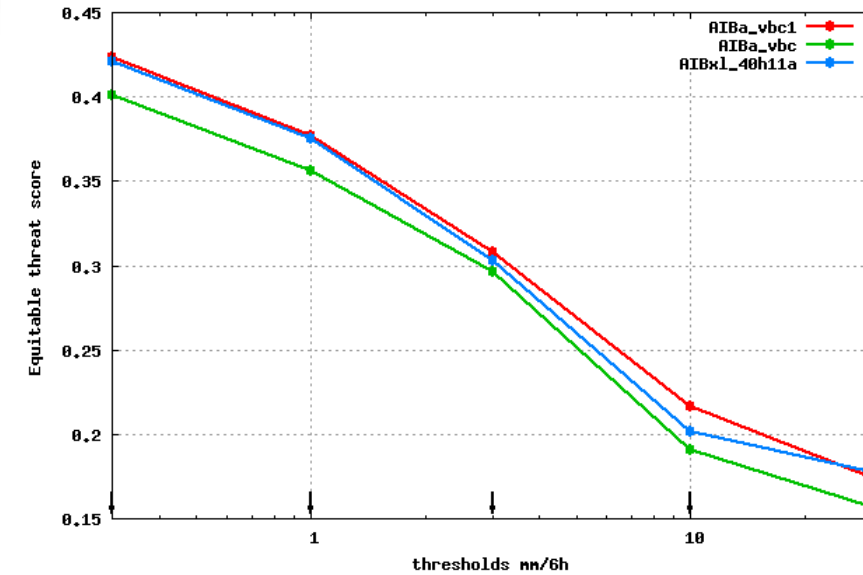


- ETS for 3, 6 and 12h accumulated precipitation :
vbc1 seems to have neutral to positive impact for 3h acc, 6h acc and 12h acc pcp.

Equitable threat score for 12h Precipitation (mm/12h)
Selection: ALL 982 stations
Period: 20170901-20170930
Used {00,03,...,21} + 12-00



Equitable threat score for 6h Precipitation (mm/6h)
Selection: ALL 988 stations
Period: 20170901-20170930
Used {00,03,...,21} + 06-00 09-03 12-06



2) Recent Experiments performed at Aemet

Verification plots

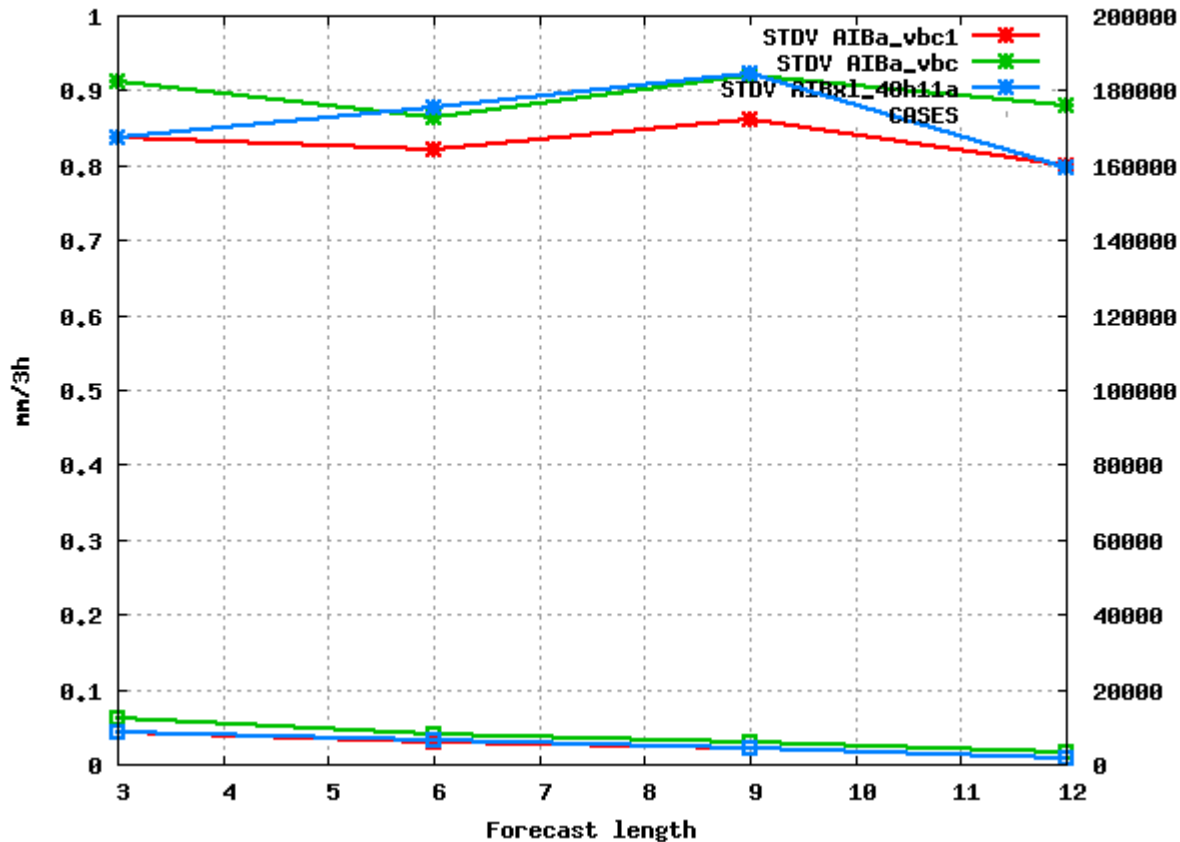
- 3 and 6h acc accumulated pcp:
VBC1 shows less SD than **CRL** and **VBC**.

CRL: cte offset, each 3h

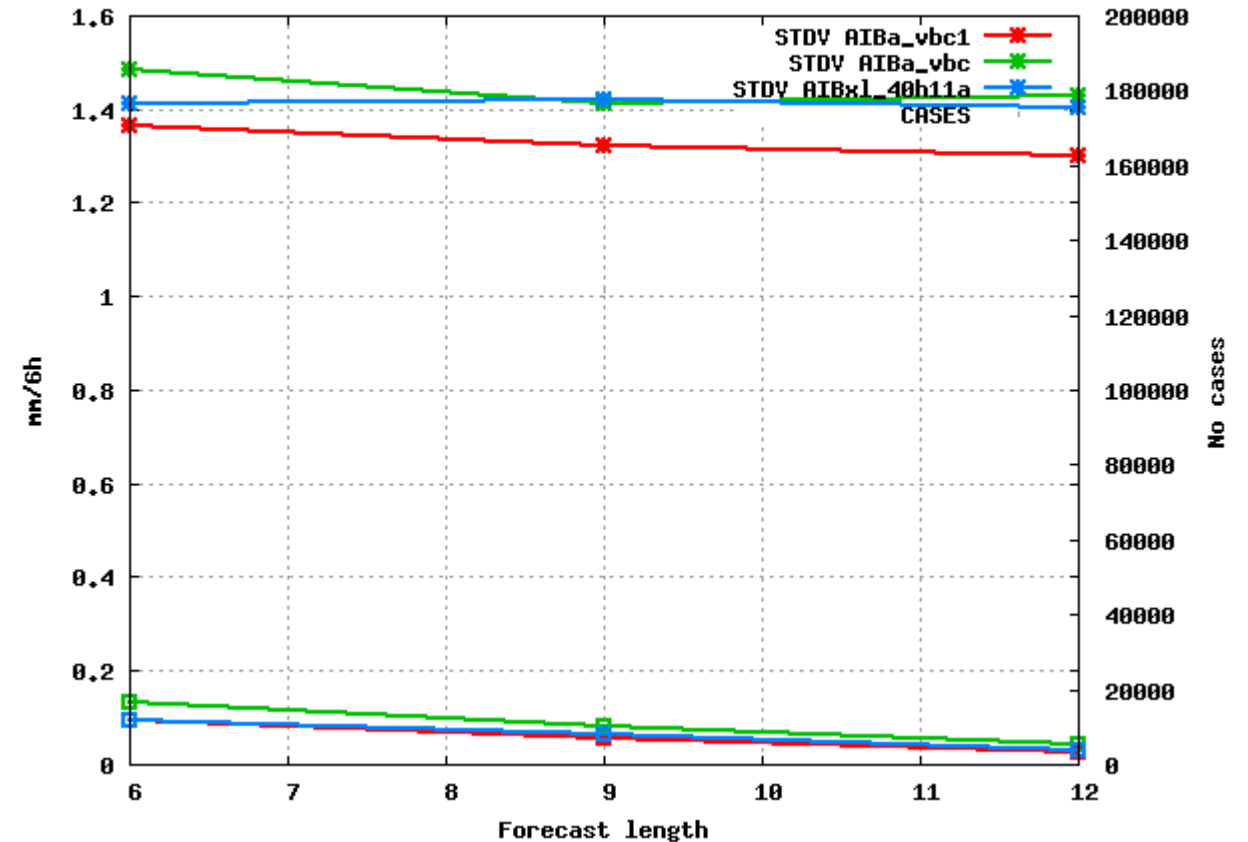
AlBa_vbc: cte offset, each 12 h, nfsobs=15 days

AlBa_vbc1: cte offset, each 12 h, nfsobs=4 days

Selection: ALL using 652 stations
3h Precipitation Period: 20170901-20170930
Hours: {00,03,...,21}



Selection: ALL using 908 stations
6h Precipitation Period: 20170901-20170930
Hours: {00,03,...,21}



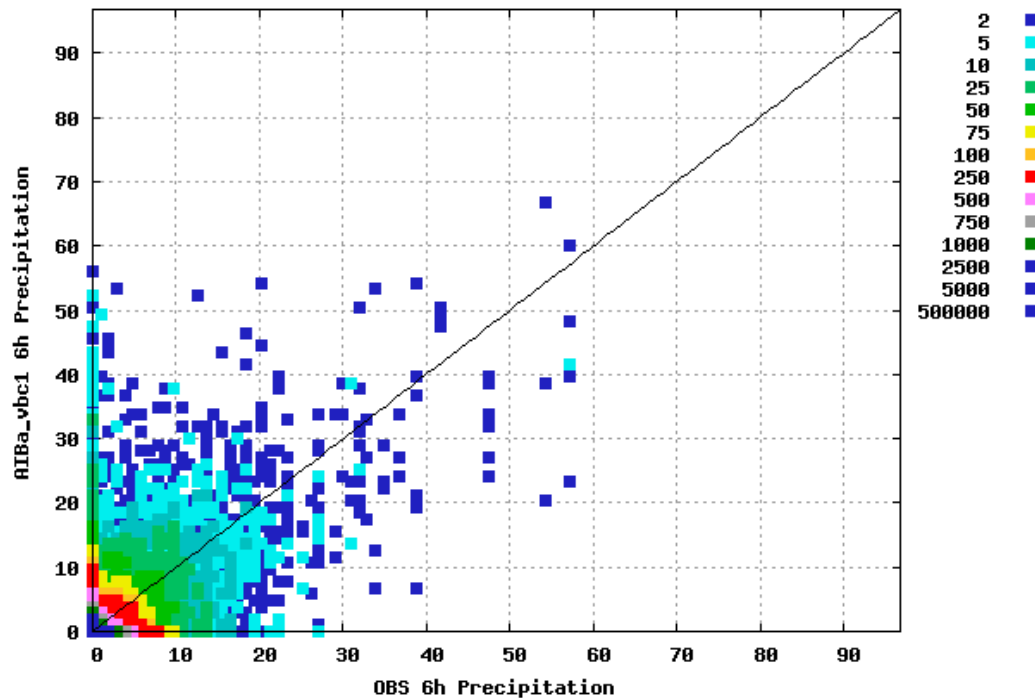
2) Recent Experiments performed at Aemet

Scatterplot for 06 acc pcp:

AlBa_vbc1 improves 6 h accumulated precipitation forecast skill

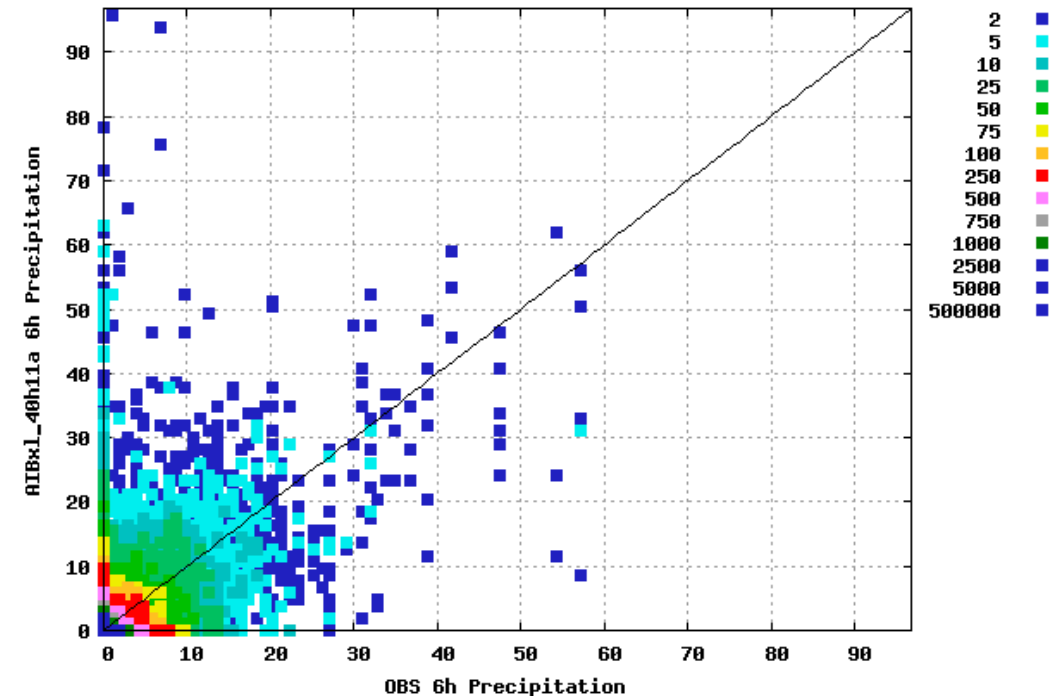
AlBa_vbc1

Scatterplot for 988 stations Selection: ALL
6h Precipitation [mm/6h]
Period: 20170901-20170930
Used {00,03,...,21} + 06-00 09-03 12-06



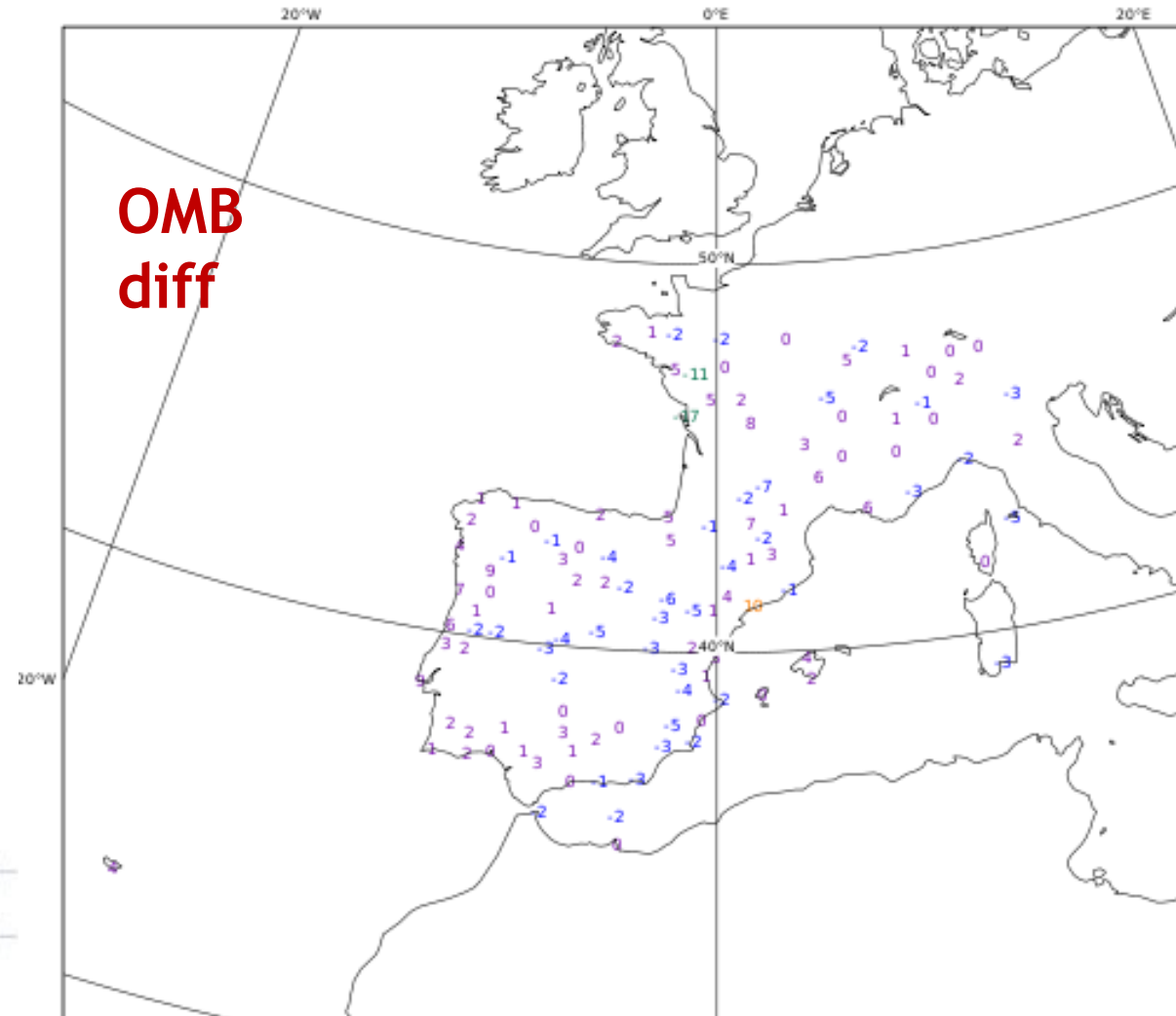
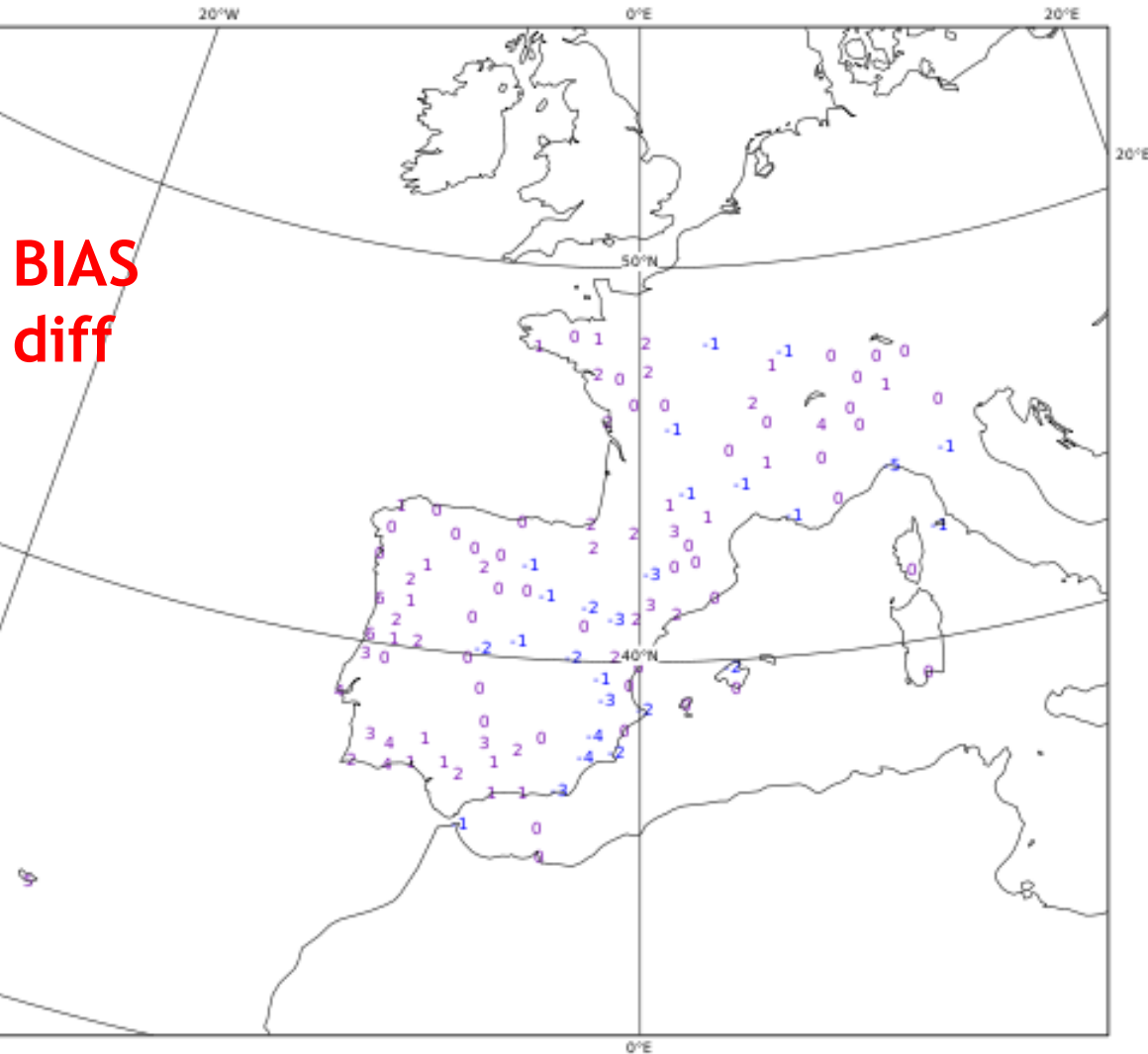
CRL

Scatterplot for 988 stations Selection: ALL
6h Precipitation [mm/6h]
Period: 20170901-20170930
Used {00,03,...,21} + 06-00 09-03 12-06



BIAS and RMS differences CRL- AIBa_vbc1 (mm) for 1 day: sep 25th at 12 UTC

Vbc1 bias are quite similar to CRL and higher in some places.



3) Summary

- GNSS ZTD observations from around 200 gnss sites are being assimilated at operational Cy40h11 HARMONIE-AROME suite at Aemet, and about 18 in Canary Islands domain (here still passive).
- The sites are chosen through **White Lists** that are built according to omb(ob-model) statistics periodically.
- Parallel runs have shown that in case not having many other satellite observations, reducing the frequency of varbc could be recommended.

THANKS!

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