

# Status of the ASSIMILATION of GNSS ZTD observations AEMeT 2019

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## Status of the ASSIMILATION of **GNSS ZTD** observations **EGVAP 2019**

### • **OUTLINE**

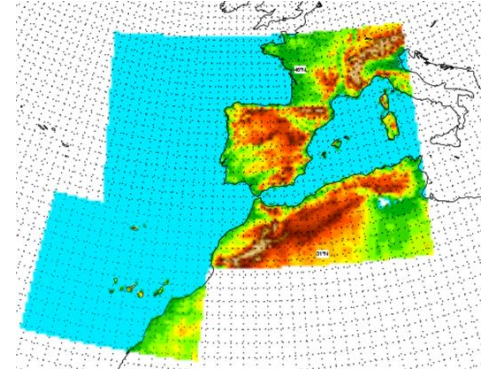
- 1) Status of ZTD GNSS assimilation in AEMet: **Iberian Peninsula domain**
- 2 ) Status of ZTD GNSS assimilation in AEMet: **Canary Islands domain**
- 3) Next steps in Aemet

# 1) Status of ZTD GNSS assimilation: Iberian Peninsula domain

Cy40h11

Operational run

- Cy40h11 Harmonie-AROME cycle in AEMet
- **Domains:** IBERIAxl\_2.5 and CANARY Islands 2.5 km, and 65 v.l.
- 3DVar 3h cycle: Conventional obs + ATOVS + GNSS ZTD



- GNSS ZTD observations handling:

- From E-GVAP Program (ASCII, via ftp): **ASI\_, ROBH, LPT\_, SGN\_, IGE2 and METO**
- Cut-off time: at 0110 the files are taken
- Temporal thinning ( obs closest to analysis time)
- Use White list + 50 km Thinning
- Variational Bias Correction : cte offset, **each 3h**

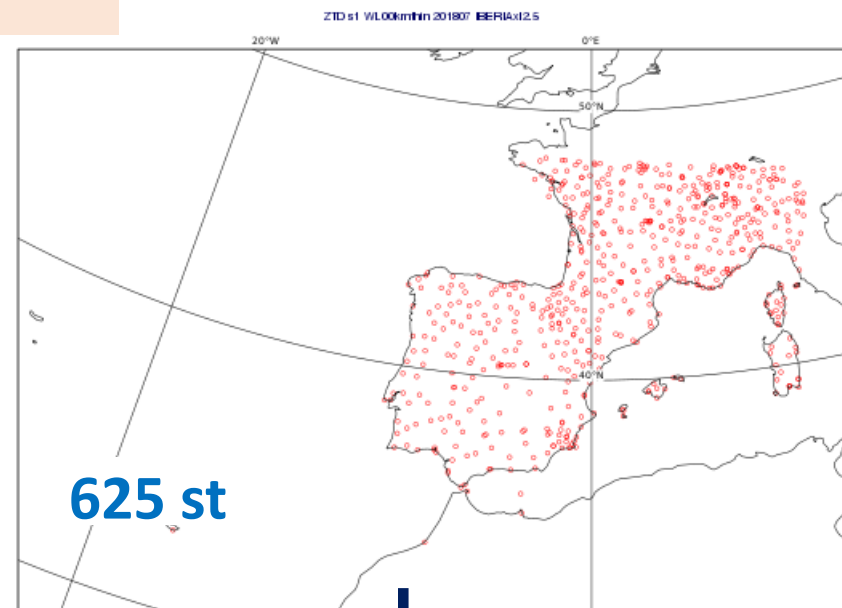
# 1) Status of ZTD GNSS assimilation in AEMet : Iberian Peninsula domain

Cy40h11

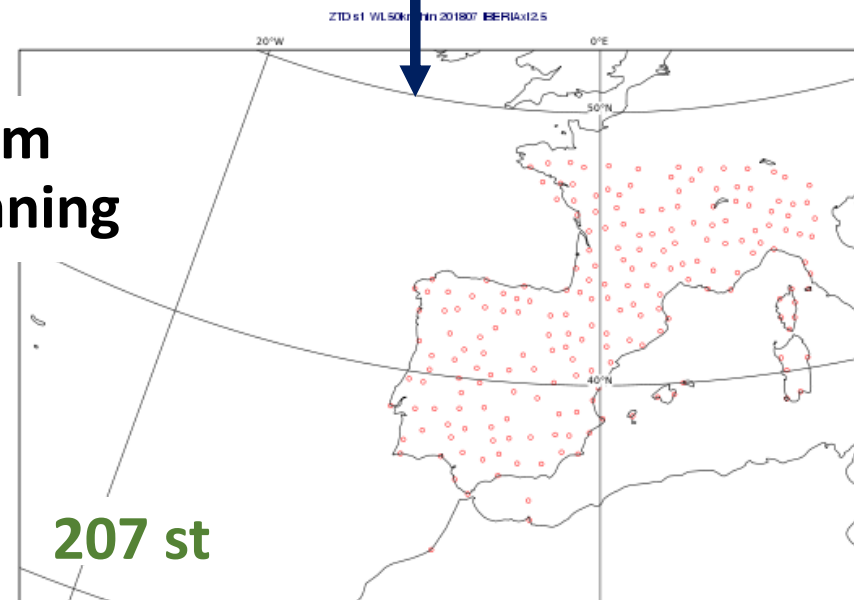
Operational run

GNSS ZTD observations handling:  
Use White list + 50 km Thinning

CP	No thinning	50 km Thinning
IGE2	224	84
SGN_	184	52
METO	19	14
ASI_	70	23
LPT_	66	17
ROBH	62	17



50 km  
Thinning



# 1) Status of ZTD GNSS assimilation: Iberian Peninsula don

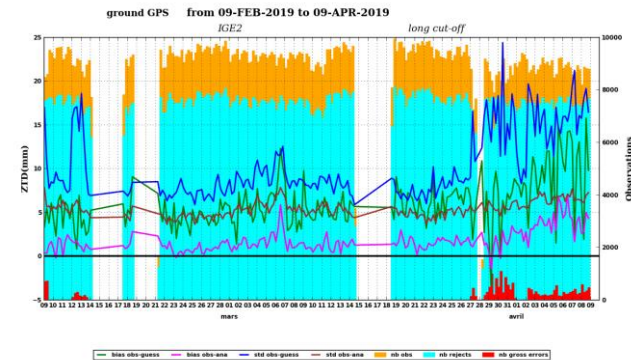
## Monitoring Operational run

**27 march 2019**

ASCII format data

**IGE2** change of machine: reduction of the quality of obs.

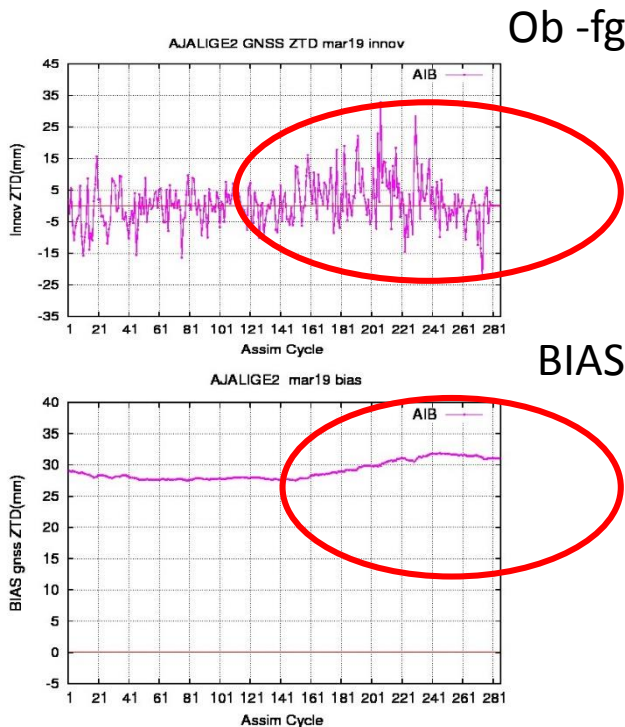
For us: Increase of gross errors, decrease of number of obs assimilated



From Hervé Bénichou

All sites

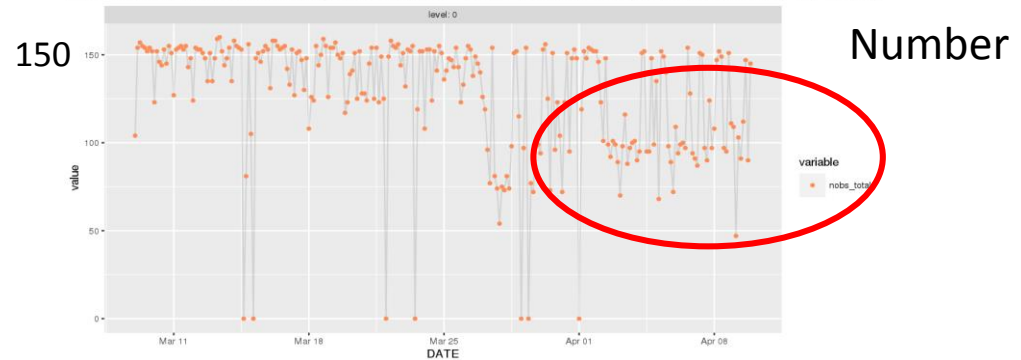
AJALIGE2 site



Ob -fg

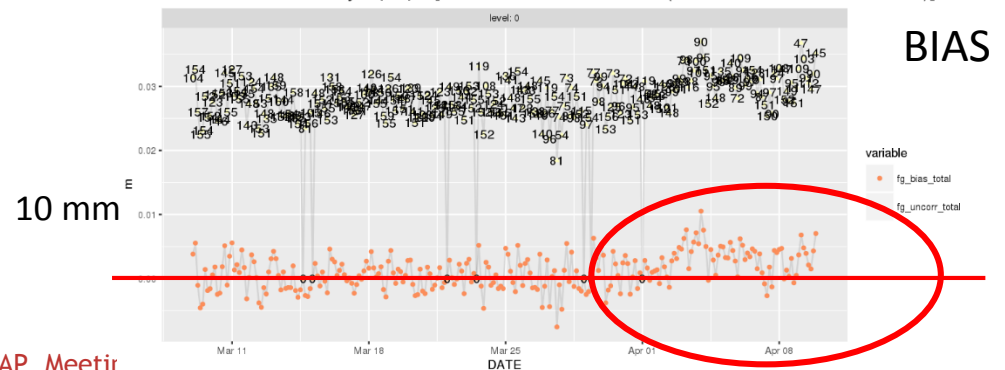
BIAS

AIB: Number of Observations synop apd [2019-03-09–2019-04-09, (00, 03, 06, 09, 12, 15, 18, 21)]



Number

AIB: Bias Correction synop apd [2019-03-09–2019-04-09, (00, 03, 06, 09, 12, 15, 18, 21)]



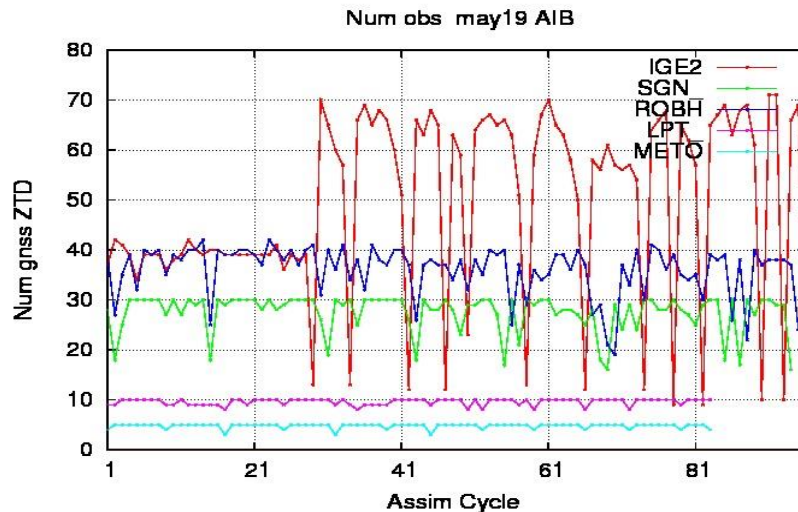
BIAS

# 1) Status of ZTD GNSS assimilation: Iberian Peninsula domain

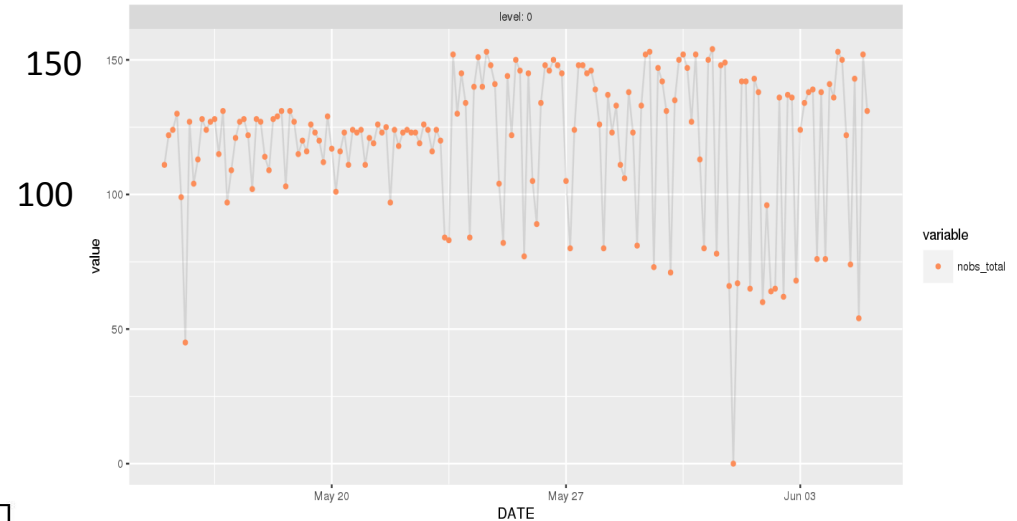
## Monitoring Operational run

**29 may 2019**

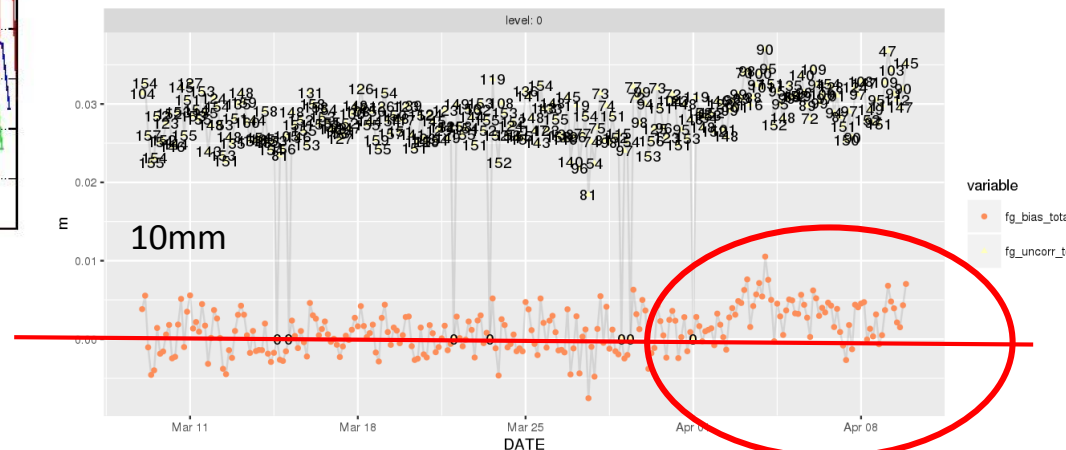
Degradation of gnss data : number and quality!!



AIB: Number of Observations synop apd [2019-05-15–2019-06-05, (00, 03, 06, 09, 12, 15, 18, 21)]



AIB: Bias Correction synop apd [2019-03-09–2019-04-09, (00, 03, 06, 09, 12, 15, 18, 21)]





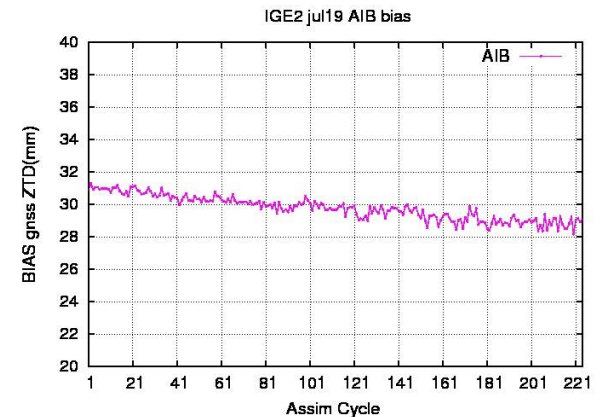
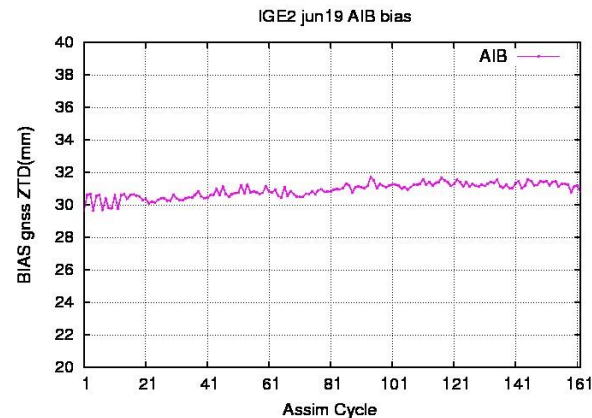
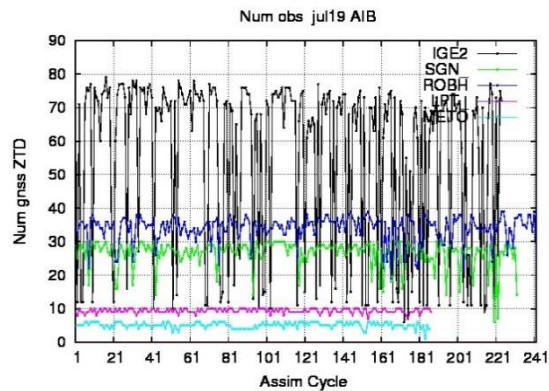
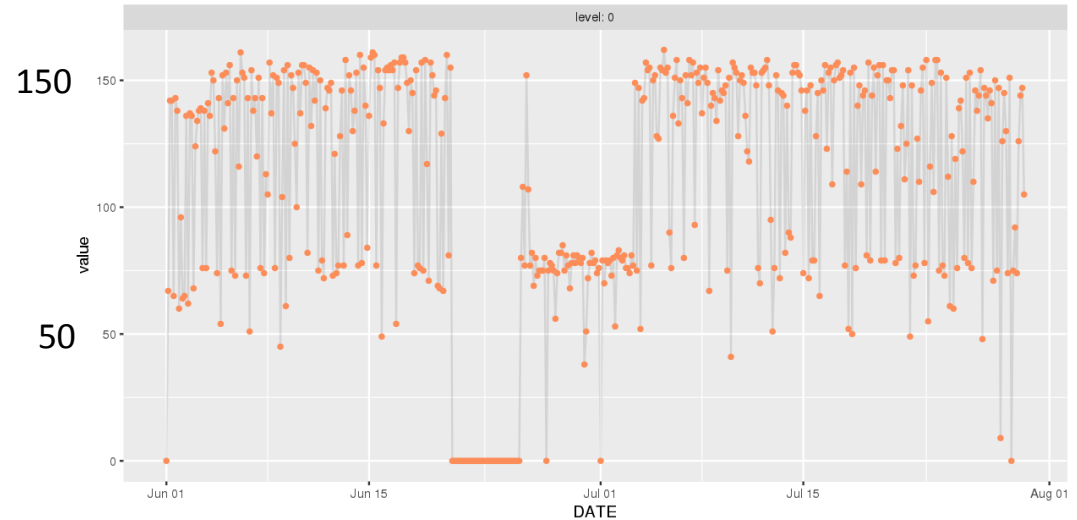
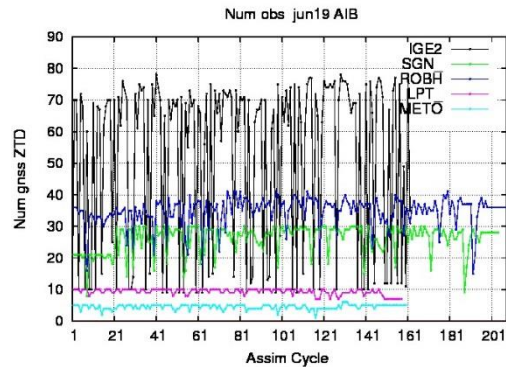
# 1) Status of ZTD GNSS assimilation: Iberian Peninsula domain

## Monitoring Operational run

June 2019

No data 20 June 2019

AIB: Number of Observations synop apd [2019-06-01–2019-07-31, (00, 03, 06, 09, 12, 15



# 1) Status of ZTD GNSS assimilation: Iberian Peninsula domain

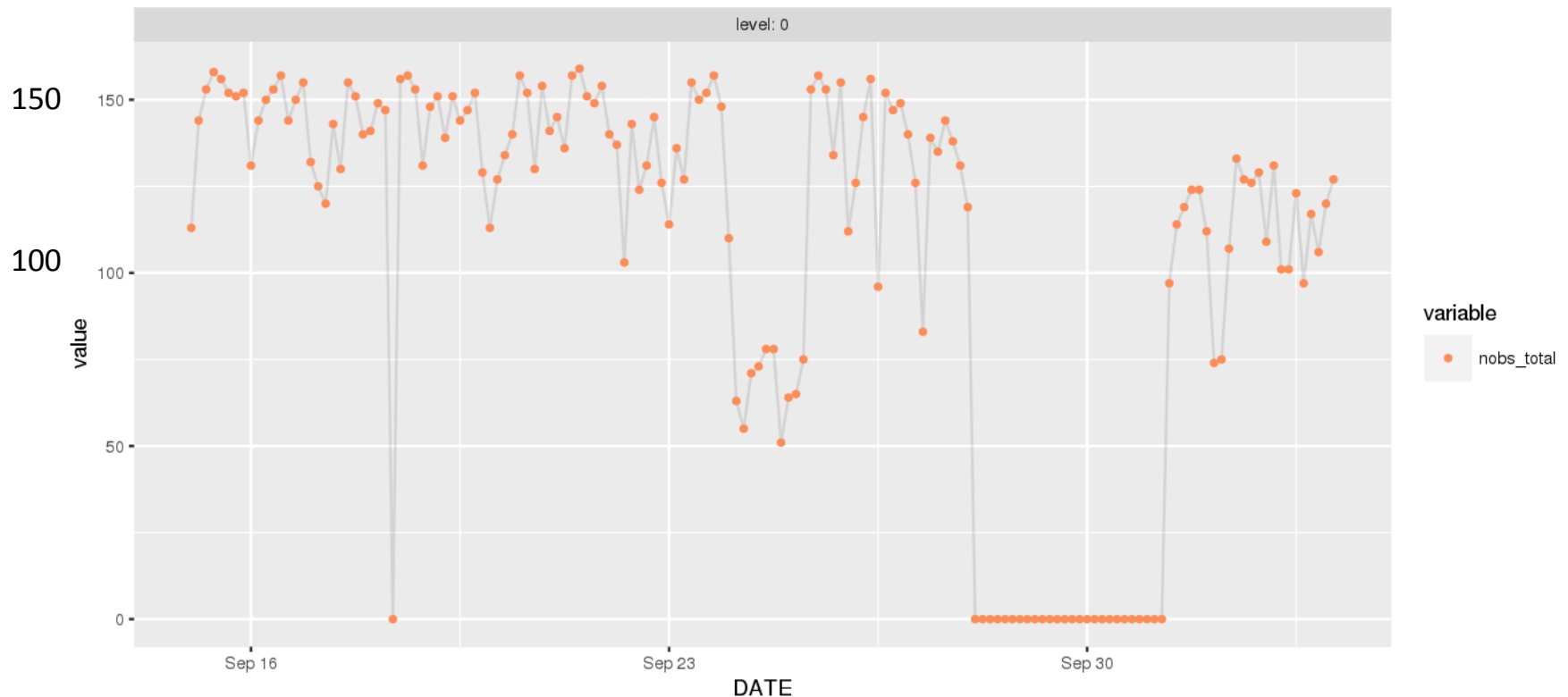
## Monitoring Operational run

**30 sep 19**

**No MetOffice connection**

No gnss data from 28 sep at 03h to oct 1st at 12h

AIB: Number of Observations synop apd [2019-09-15–2019-10-04, (00, 03, 06, 09, 12, 15, 18, 21)]

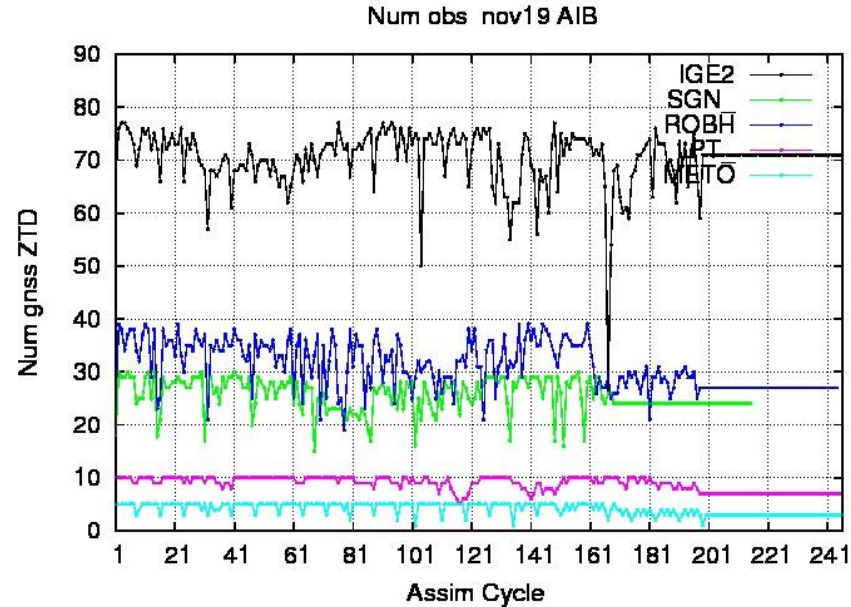




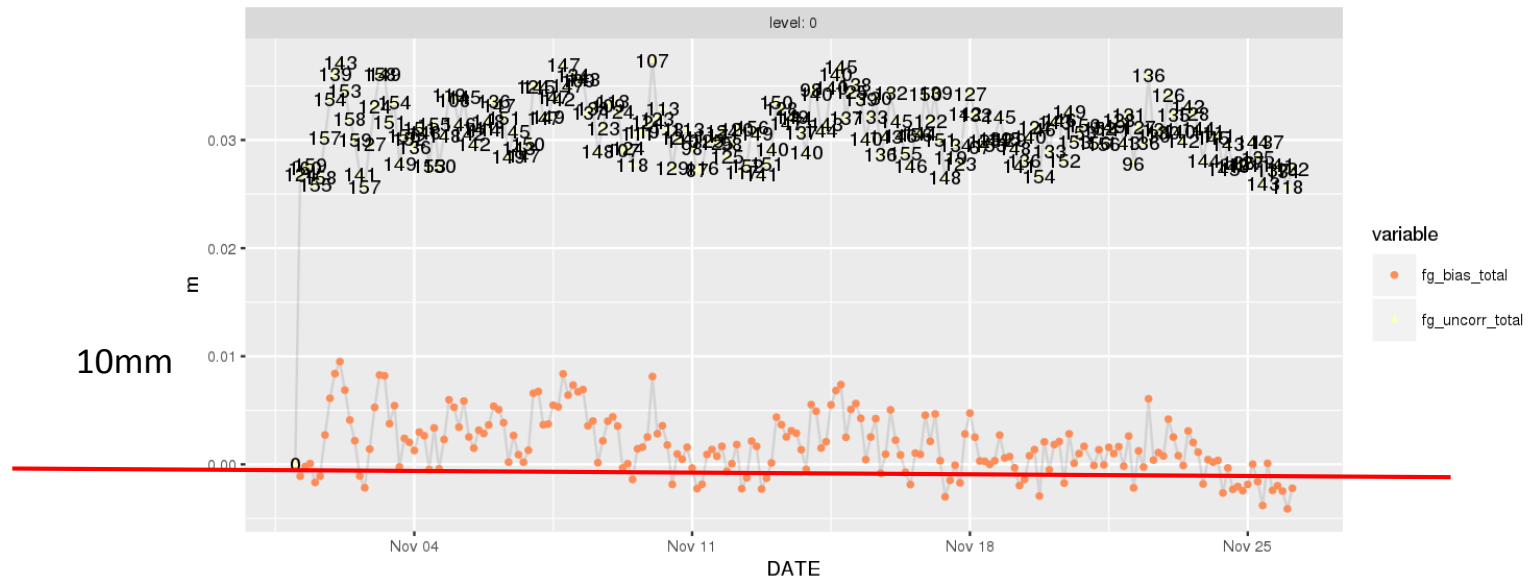
# 1) Status of ZTD GNSS assimilation: Iberian Peninsula domain

## Monitoring Operational run

Nov 2019



AIB: Bias Correction synop apd [2019-11-01–2019-11-26, (00, 03, 06, 09, 12, 15, 18, 21)]



# 1) Status of ZTD GNSS assimilation: Iberian Peninsula domain



GOBIERNO  
DE ESPAÑA

MINISTERIO  
PARA LA TRANSICIÓN ECOLÓGICA

AEMet  
Agencia Estatal de Meteorología

Cy40h11

NEW Operational run

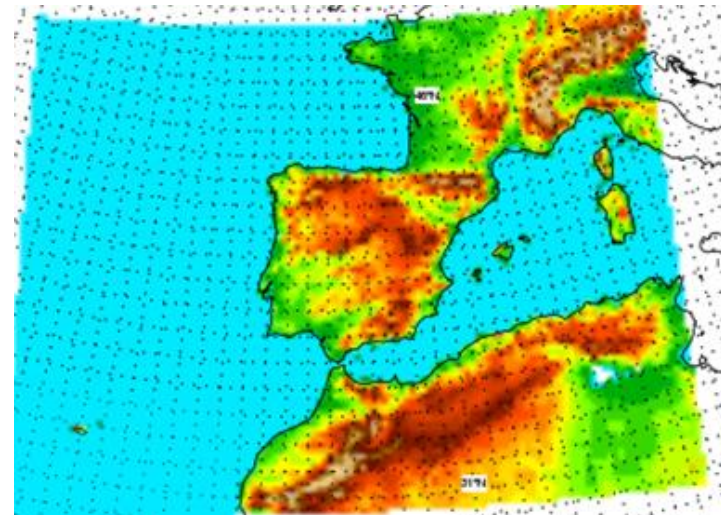
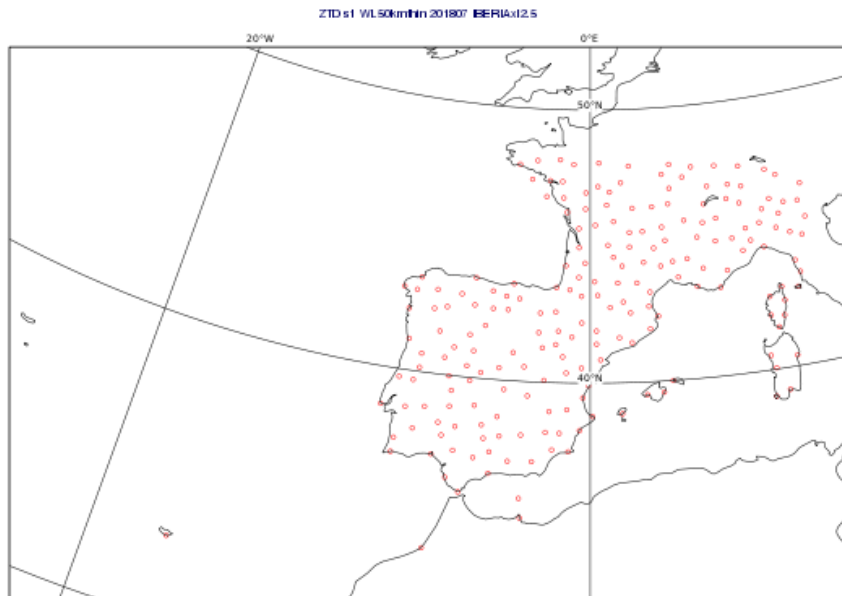
NEW Operational run in 2 weeks !!!

**AlBe:** 3DVar 3h cy, RADAR reflect (es,pt,fr) + T2m + RH2m , LSMIX-q=yes

CD=0.02 SURFEX, (const/sa\_const/POLYNOMES\_isba)

Increased GNSS obserr=0.030

Updated lists of GNSS and ATOVS



# 1) Status of ZTD GNSS assimilation: Iberian Peninsula domain



GOBIERNO  
DE ESPAÑA

MINISTERIO  
PARA LA TRANSICIÓN ECOLÓGICA



Cy40h11

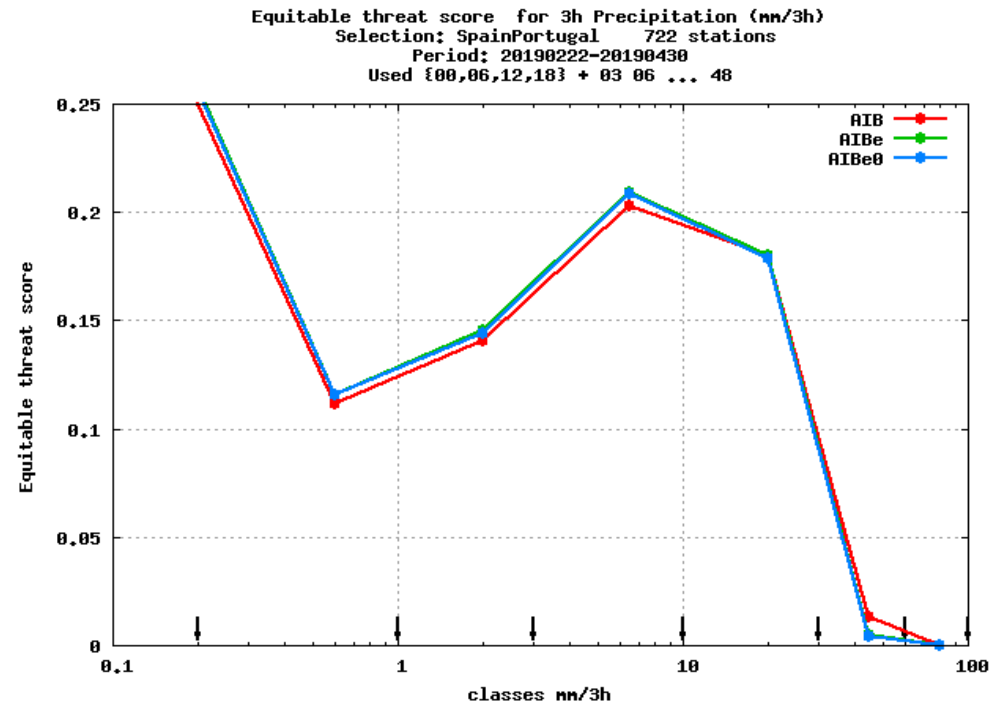
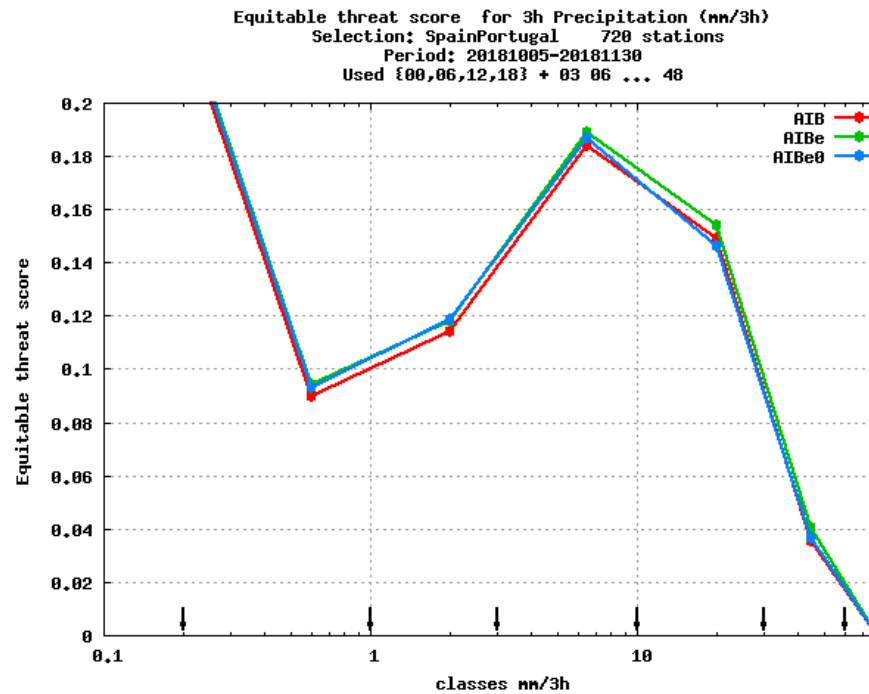
NEW Operational run

ETS index 3h accumulated precipitation

**AIBe** new  
operational  
run

Autumn 2018

Spring 2019



# 1) Status of ZTD GNSS assimilation: Iberian Peninsula domain

Cy40h11

NEW Operational run

Case study 2018 10 09 Mallorca Floodings

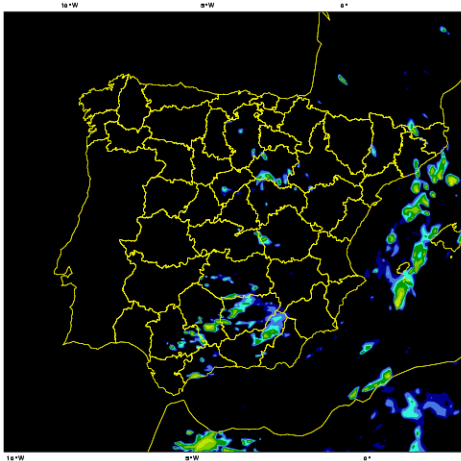
H+18 valid for 18Z

AIB

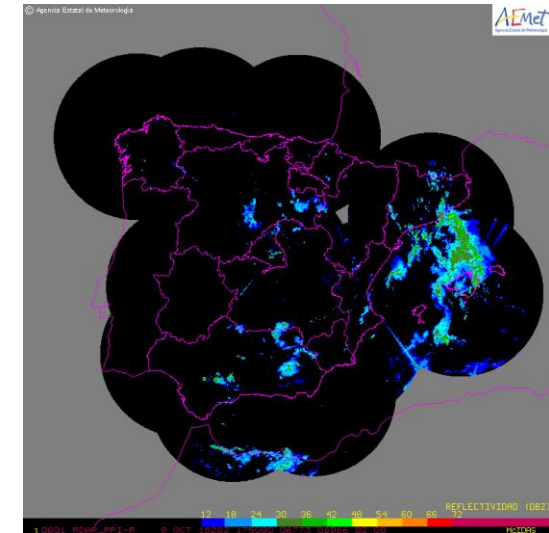
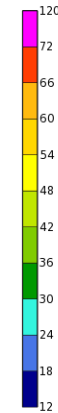
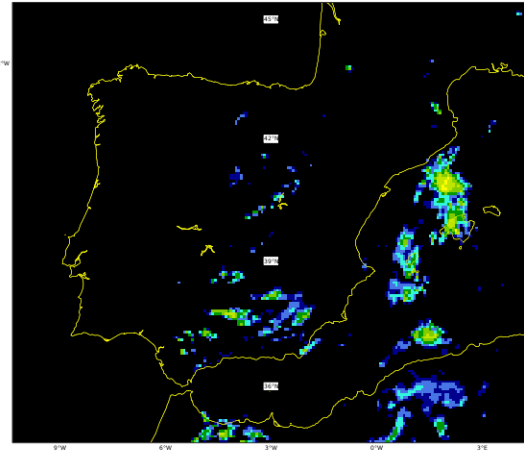
AIBe

Radar observation (reflectivity)

AIB Reflectividad 1000m (dBZ)  
09/10/2018 00z H+18 Valid: 09/10/2018 18z



AIBe Reflectividad 1000m (dBZ)  
09-10-2018 00z H+18 Valido: Tuesday 09-10-2018 18z



## Status of the ASSIMILATION of **GNSS ZTD** observations **EGVAP 2019**

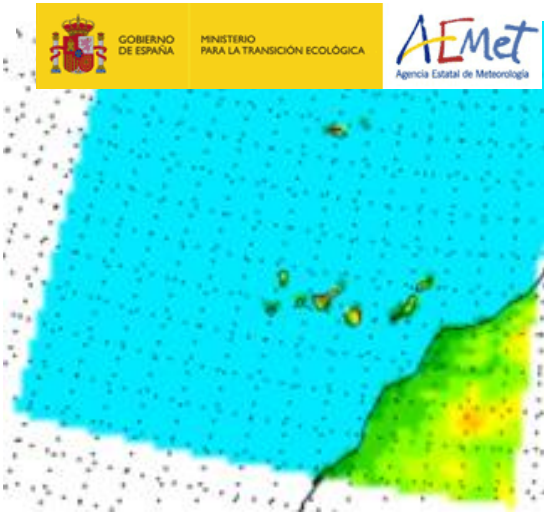
- **OUTLINE**

- 1) Status of ZTD GNSS assimilation in AEMet: **Iberian Peninsula domain**
- 2 ) **Status of ZTD GNSS assimilation in AEMet: Canary Islands domain**
- 3) Next steps in Aemet

2) Status of ZTD GNSS assimilation in AEMet: **Canary Islands domain**

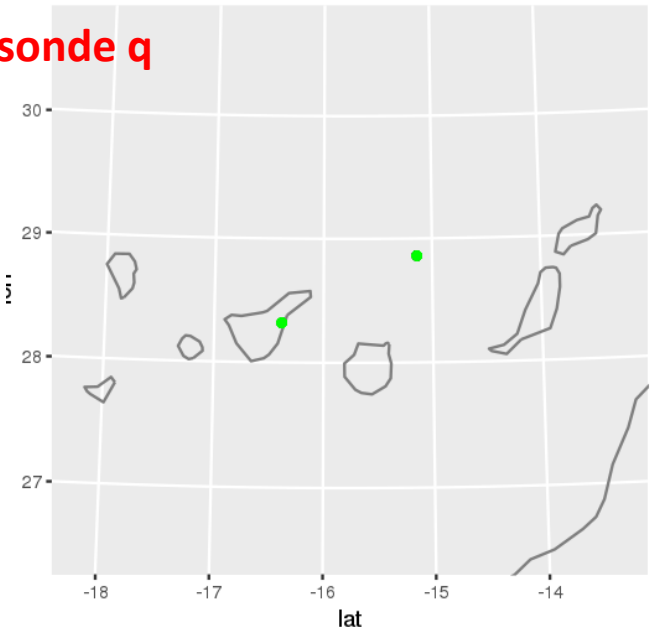
**Cy40h11**                      **Operational run**

- ✓ **CANARY ISLANDS:** conv obs+ ATOVS + GNSS ZTD
- ✓ Just one/two ANCHOR obs: RS and just in two places and each 12 hours.
- **White list updated** (18 june 2019) from 18 to 34 sites (from **IGE2**)



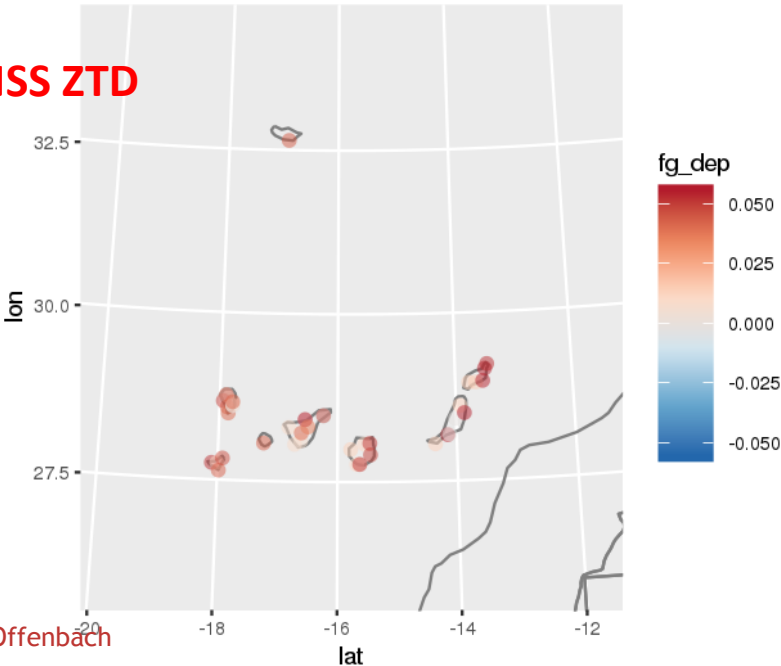
AIC: Observation Usage temp q 2019-1  
50930, 50940, 50950, 50960, 50970, 5

**Radiosonde q**



arture Map synop apd [2019-06-18–2019-07-30, ( levels: 0

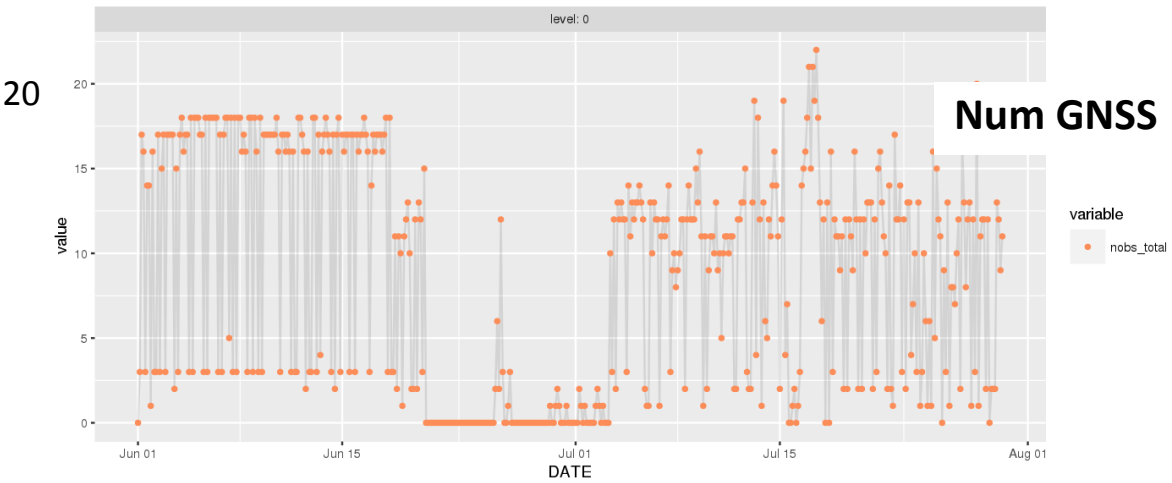
**GNSS ZTD**



Monitoring Operational run

Summer issue: Reduction of number of obs

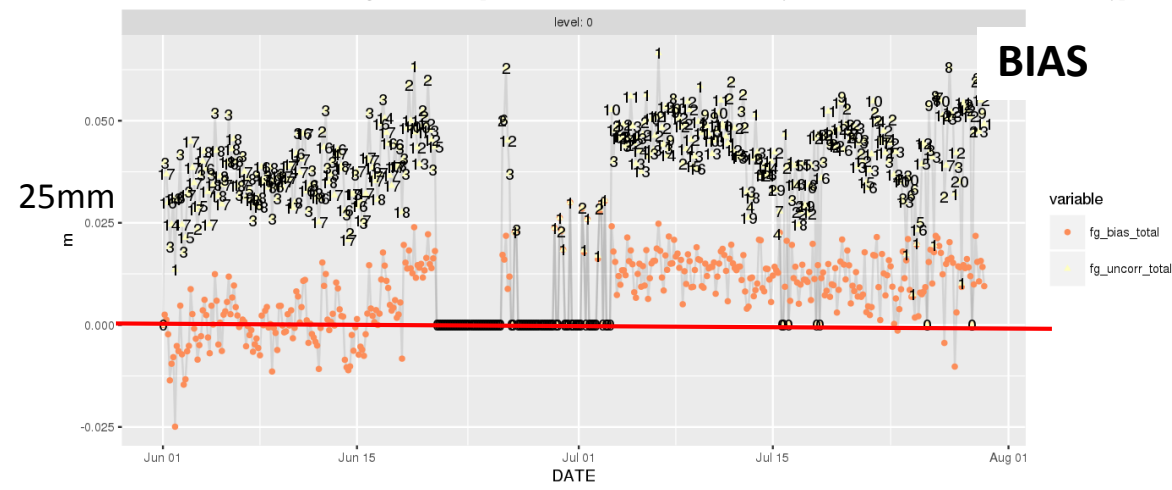
AIC: Number of Observations synop apd [2019-06-01–2019-07-30, (00, 03, 06, 09, 12, 15, 18, 21)]



- No obs from 20 june to 3 july 2019
- Then BIAS Increased and still positive

Currently they are being assimilated **PASSIVE** in this domain.

AIC: Bias Correction synop apd [2019-06-01–2019-07-30, (00, 03, 06, 09, 12, 15, 18, 21)]

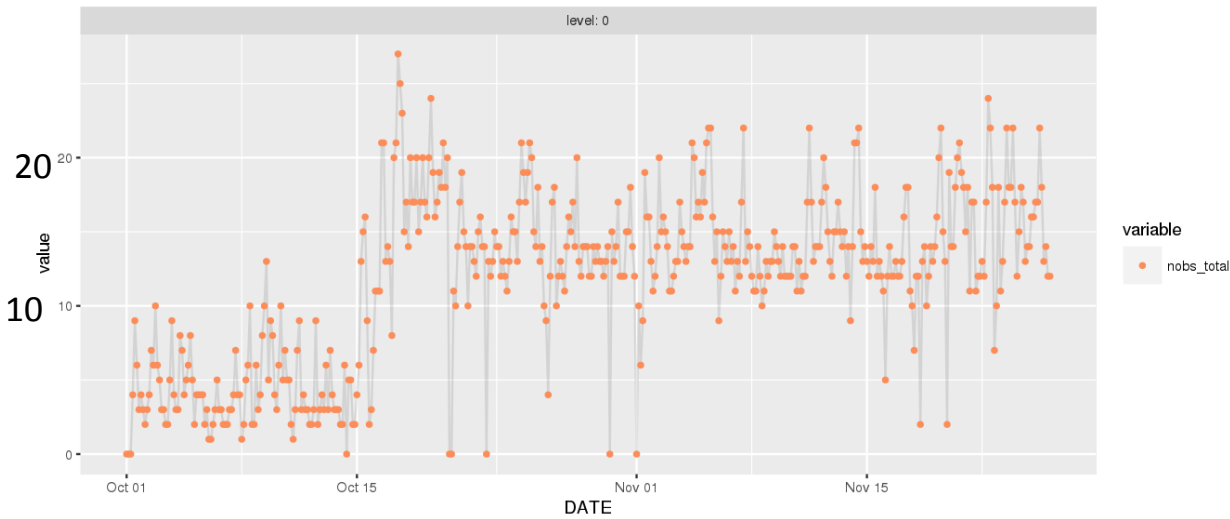




**Monitoring Operational run**

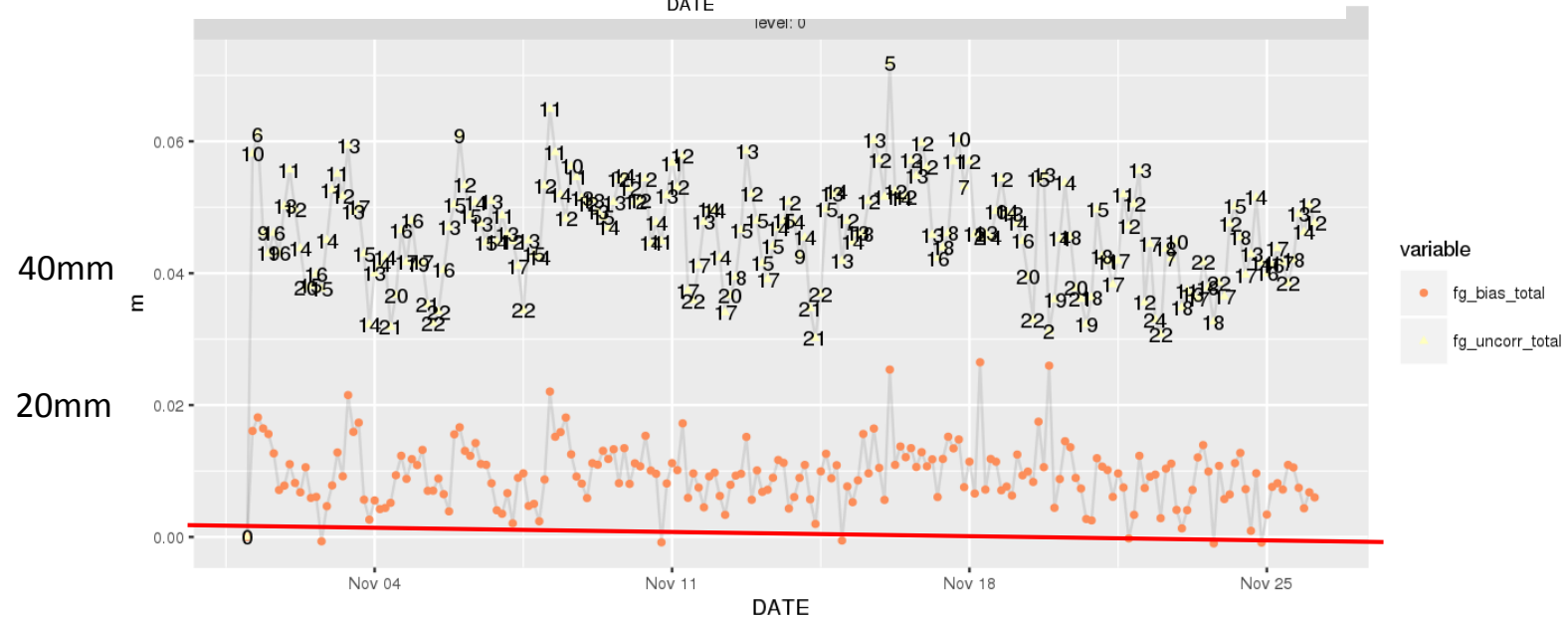
November 2019

AIC: Number of Observations synop apd [2019-10-01–2019-11-26, (00, 03, 06, 09, 12, 15, 18, 21)]



Num GNSS

15, 18, 21)]



## Summary of the current operational use of GNSS

### Iberian Peninsula Domain

- Some quantity & quality issues have occurred in 2019 with gnss obs
- A decrease of the weight of gnss obs has been needed to apply to the operational run due to
  - the decrease of quality of these data
  - the addition of other observations
- GOOD impact has been found on precipitation forecasts and humidity related variables.

### Canary Island domain

An increasing of the BIAS of the observations implies months to stabilize its value again...so still PASSIVE!

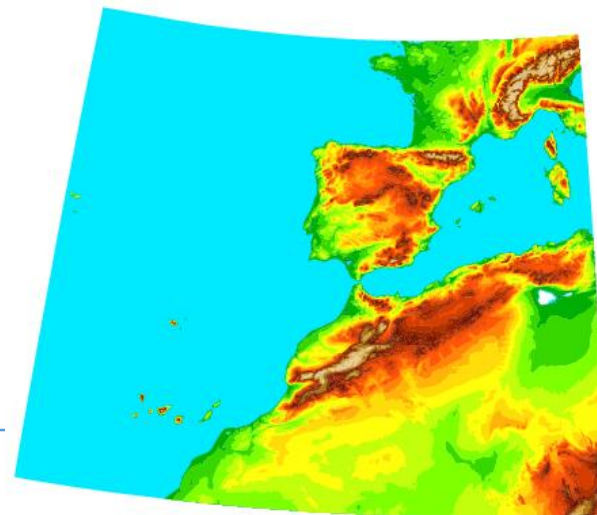
## Status of the ASSIMILATION of **GNSS ZTD** observations **EGVAP 2019**

- **OUTLINE**

- 1) Status of ZTD GNSS assimilation in AEMet for Iberian Peninsula domain
- 2 ) Status of ZTD GNSS assimilation in AEMet for Canary Islands domain
- 3) Next steps in Aemet**

### 3) Next steps in AEMET

- Scatterometer 10 m wind (METOP\_a, B, C), IASI, AMDAR q, SEVIRI, AMVs will be included in AEET operational suite !!
- A **new domain** will be implemented when we move to Cy43 that would include both Canary Island and the Iberian Peninsula!.



From Javier Calvo

**NOWCASTING** in Aemet will be implemented soon..

- GNSS and Radar refl each hour
- Cut-off time= 12 min
- H+12
- More often in the future...

THANK YOU...

jsancheza@aemet.es<sup>19</sup>