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GNSS and GNSS-met situations in SPAIN

Dr. Enrique Priego de los Santos

ORGANIZATIONS

- **IGN : WG-1**



- **AEMET: WG-2**



- **UNIVERSITY: WG-2 & 3**

- **U.P. VALENCIA**
- **U.P. NAVARRA**



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- IGN managing GNSS national network

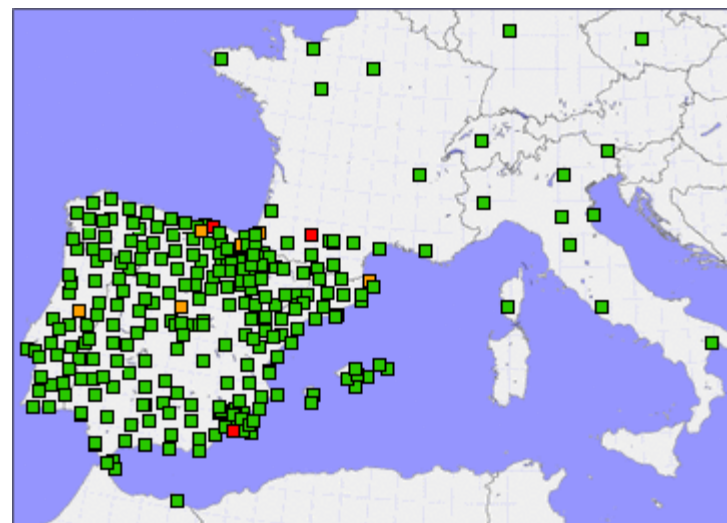
- ~50 stations
- 22 of them integrated in the EUREF PN

- Processing subnetwork 64 EPN stations
- Final and rapid solutions
- Updated to BSW 5.2, GPS+GLONASS

- EUMETNET GNSS Water Vapour Programme
- Providing ZTD from ~ 340 stations for Spain & Portugal in nrt



- Previous PP process ~ 350 stations
 - 72 IGS or EPN stations
 - 10 E-GVAP “supersites”
 - 19 IGB08 for Datum fixing
 - > 300 stations in the area:
 - Spain
 - Public (regional networks)
 - Private
 - Portugal and France (south)
 - Public stations (IGP & IGN)
 - From 22 different regional networks
- Not all the stations provide hourly data on time (limit < 25 min):
 - Normally, about 320 stations are nrt processed for E-GVAP



From: E-GVAP web (egvap.dmi.dk)

2014: submitting new E-GVAP solution

- From April, IGE migrates to BSW 5.2.
- Currently sending both solutions: BSW5.0 and BSW5.2.
- Main processing differences:

BSW 5.2	BSW 5.0
2010 IERS standards	Former IERS standards.
Dry GMF a priori / wet GMF estimation	Niell MF
Atmospheric Tidal Loading (ATL) applied	No ATL applied.
GPS + GLONASS	GPS
Small changes in FES2004 ocean loading coefficients	Former FES2004 model
CODE ultrarapid orbits and ERPs	IGS ultrarapid orbits (only for GPS)
6 hours NEQ combination	12 hours NEQ combination
14 minutes proccessing	25 minutes proccessing
Files in new COST 2.2 format	COST 2.0 files

Future plans

- Continue proccessing for EUREF, E-GVAP, Repro-2 projects in the south-west european area
- To improve ZTD estimation and quality analysis: impact of many factors (a priori models, coordinates, multi-GNSS, orbits...)
- Currently testing real-time ZTD estimation for RTK purposes

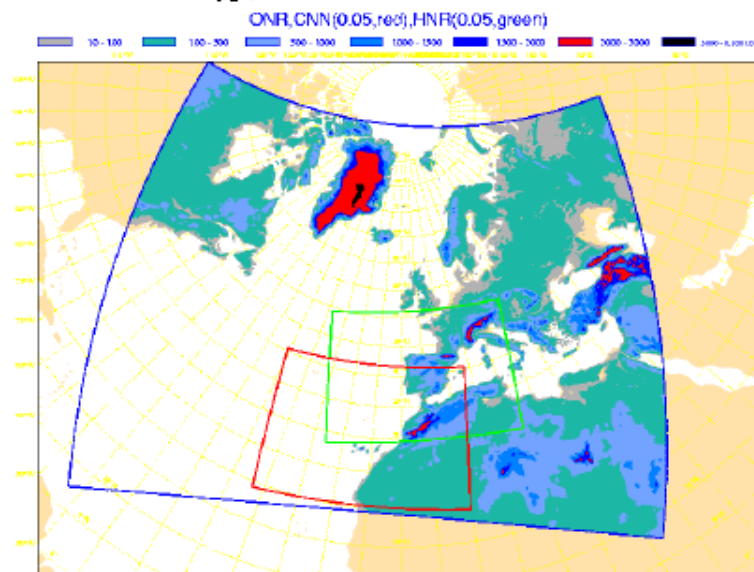
Currently AEMET is contributing to COST WG2 with:

- 1) Assimilation of GNSS observations in **HIRLAM** model at AEMET.
- 2) Assimilation of GNSS observations in **HARMONIE** high resolution model.
- 3) Contributing to **HyMEX Project** with the assimilation of GNSS observations

1) GNSS ZTD in HIRLAM model at AEMET.

- GNSS ZTD passive assimilation in AEMET HIRLAM parallel runs since 2012:
 - SK3 (0.16 resolution, **big blue area**)
 - SH3 (0.05 resolution, **green area**)

- Monthly statistics to study the quality of the observations and Analysis Centres.

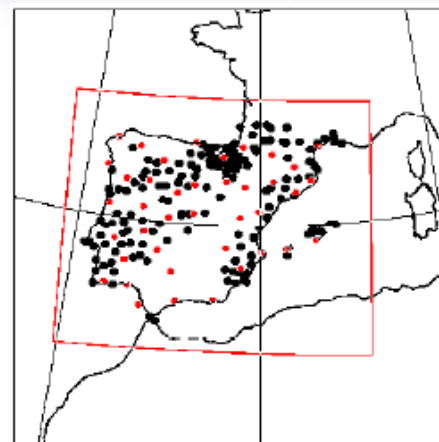


AEMET



2) GNSS ZTD in HARMONIE.

- Improving of the code related to assimilation of gnss ZTD observations in HARMONIE model.
- Impact studies (neutral to good impact!)
- Variational Bias correction development.
- Paper in progress

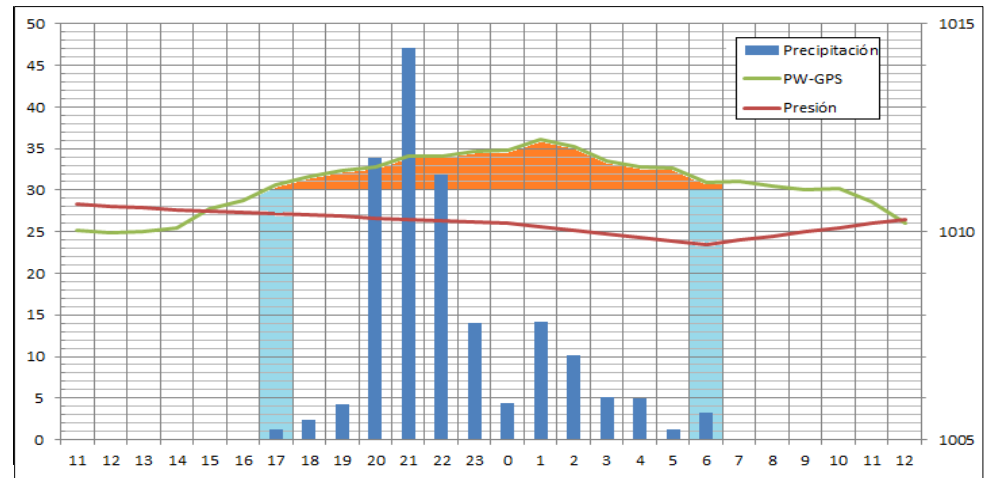
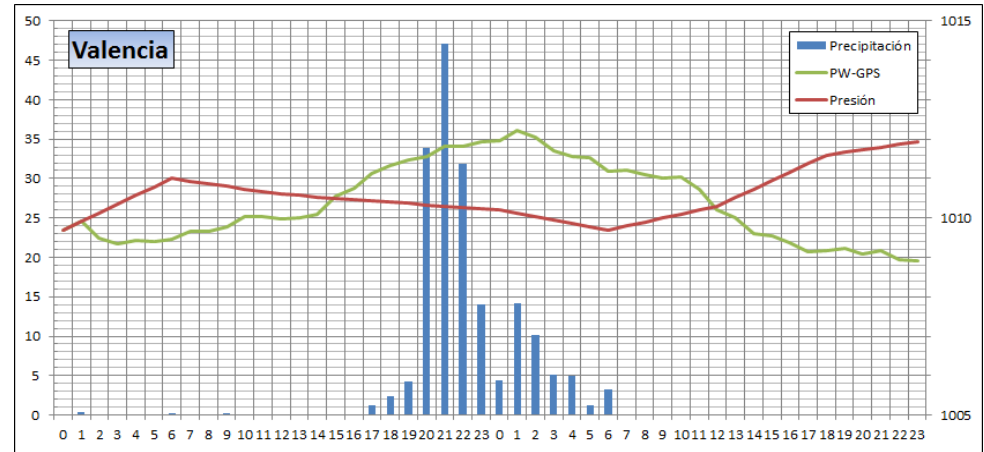
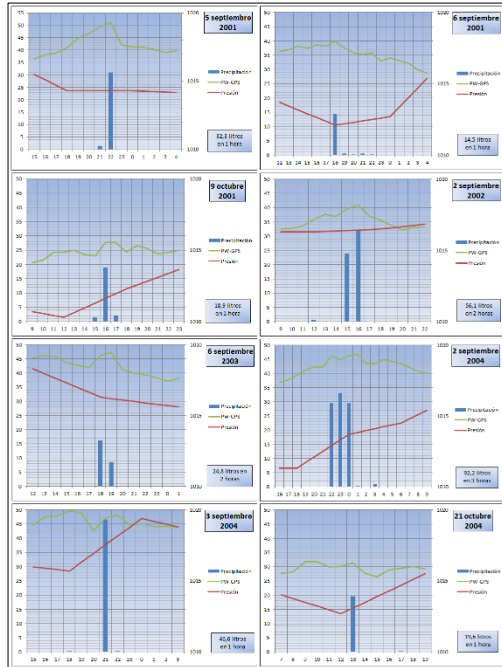


3)¹ HyMex project: GNSS ZTD assimilation.

Some impact studies are going to be performed in the framework of HyMex project assimilating GNSS ZTD observations together with Data Targeting of radiosondes on a serie of experiments over the Mediterranean area.



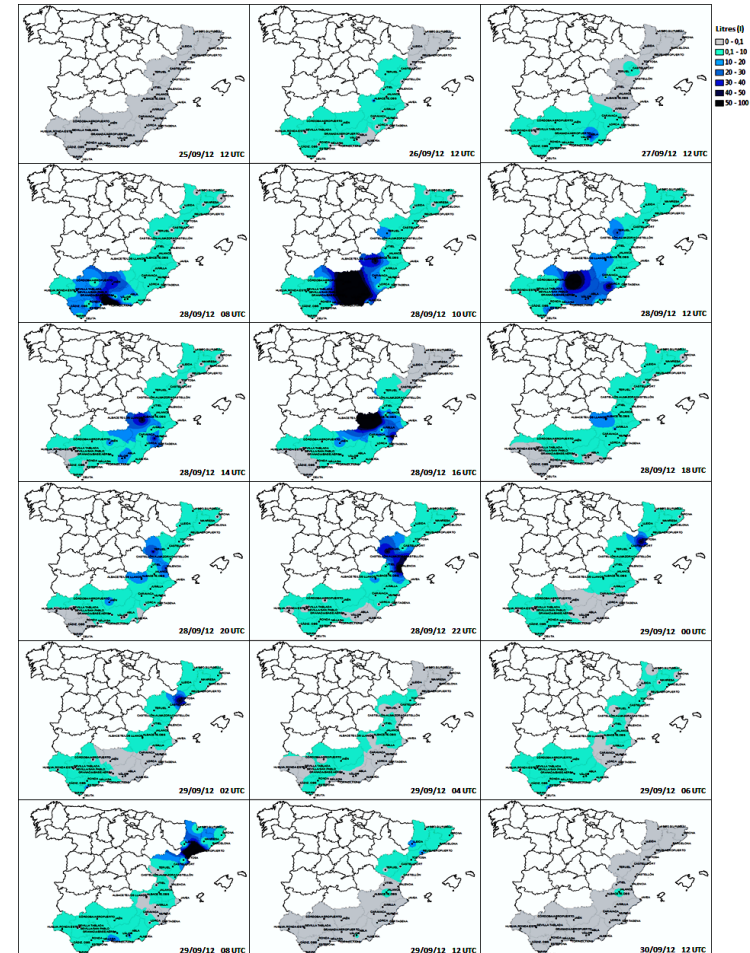
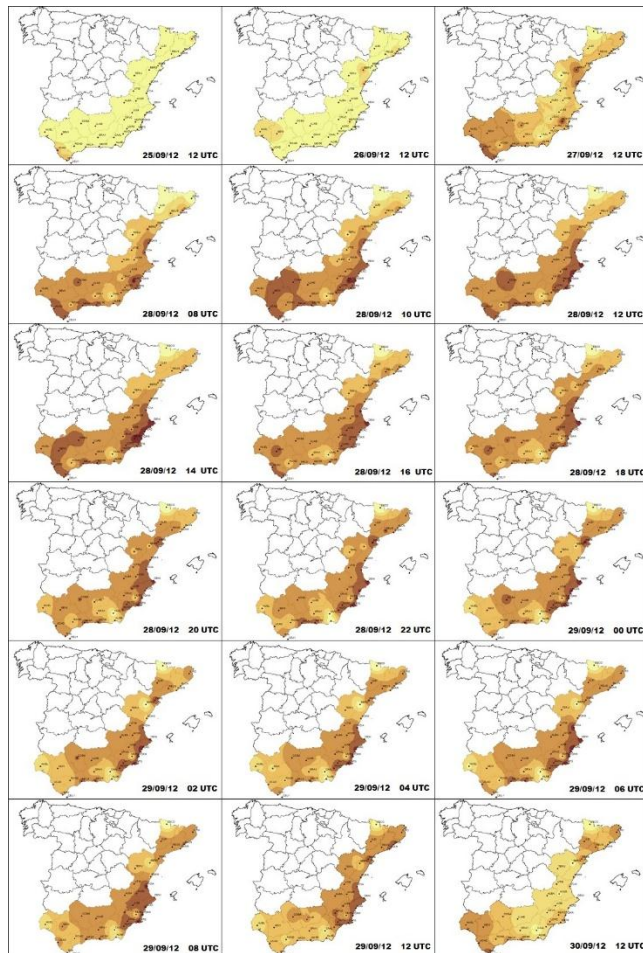
- Analysis of local heavy rainfalls with PW-GNSS
- Monitoring PW-GNSS in the Spanish Mediterranean Area
- Cartographic representation of ZTD or PW
- Graphical comparison between interpolation methods (GIS)



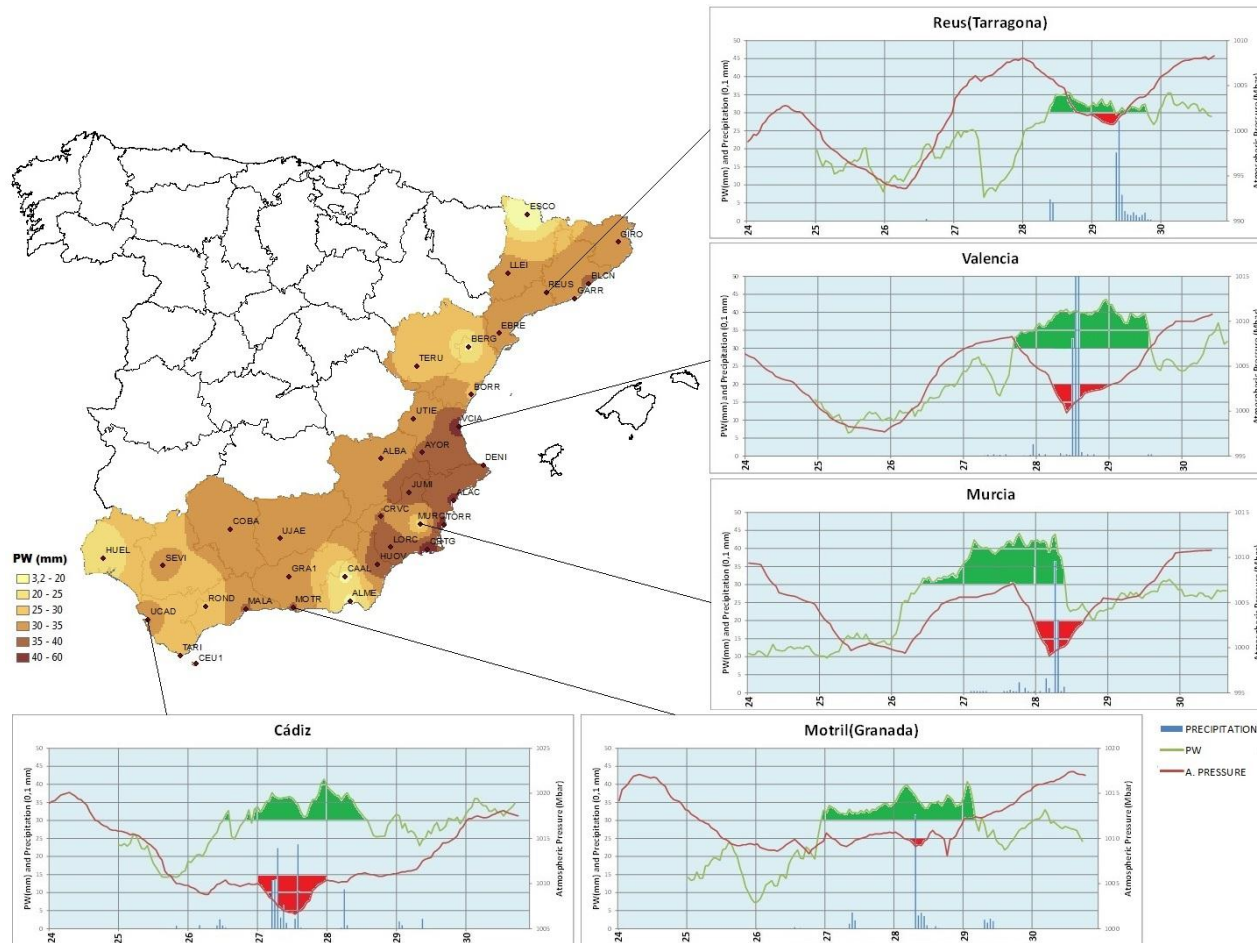
Relationship

- PW-GNSS
- pressure
- precipitation

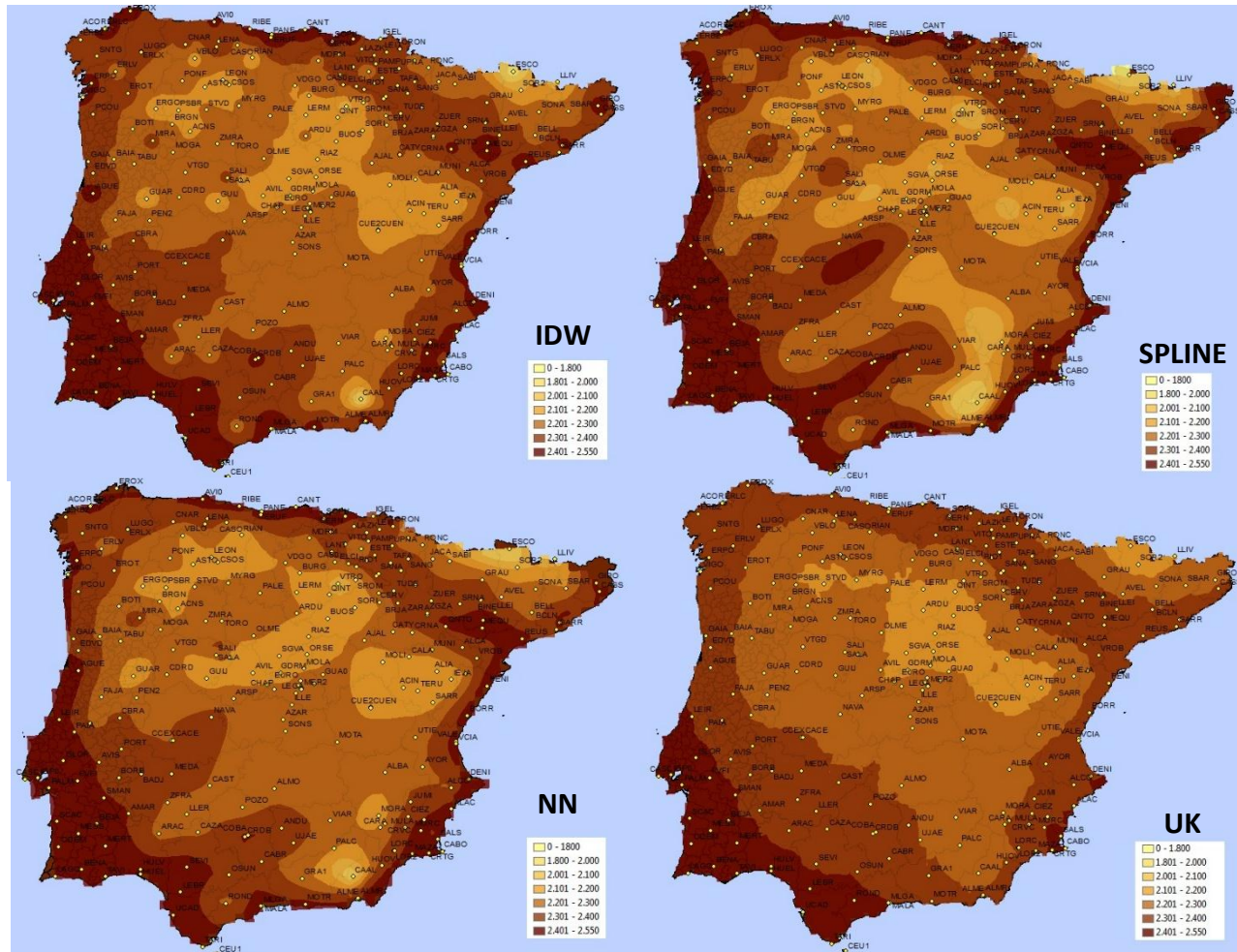
Monitoring PW-GNSS in Spanish Mediterranean Area



Monitoring PW-GNSS in Spanish Mediterranean Area



Cartographic representation (ZTD) Comparison between interpolation methods





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Agencia Estatal de Meteorología

THANK YOU for you attention!

SPAIN

