EUREF 2018 SYMPOSIUM
AMSTERDAM 30 May – 1 June 2018

National Report of Spain

Instituto Geográfico Nacional

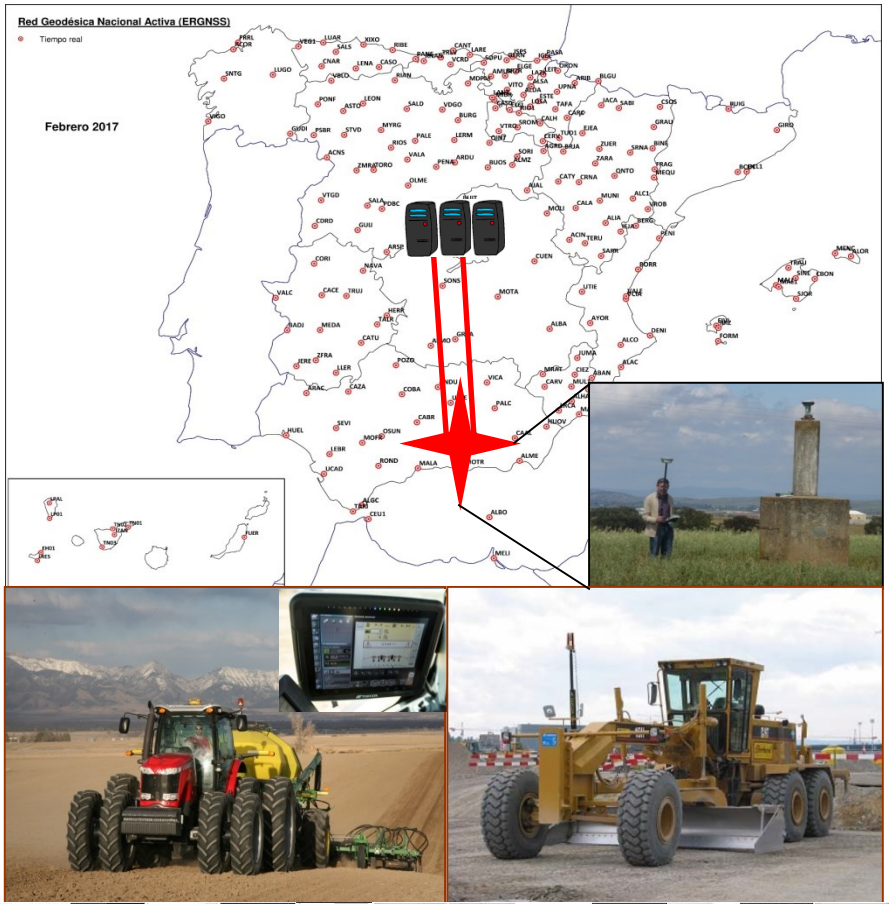
Spanish GNSS Reference Stations Network (ERGNSS)

- ERGNSS: 99 permanent stations:
  - 4 IGS/EPN + 25 EPN.
  - ≈ 70% GAL.
  - RINEX3 long names submission to EPN from most of them (21 out of 29).

- Local Data Center:
  - ftp://ftp.geodesia.ign.es
    - Daily 30 s.
    - Hourly 1, 5, 15, 30 s.
    - RINEX2 & RINEX3 files
    - 2017: ≈ 12Mill. downloads.

Real Time positioning GNSS Services

- Network-based RTK service (240 stations):
  - Service in collaboration with Autonomous Regions GNSS networks.
  - Homogeneous & updated ETRF00 frame.
  - Free of charge.
  - Network divided in clusters (10 servers, 20 overlaped subnetworks).
  - Solutions:
    - VRS, MAC, FKP network based.
    - Individual station and NEAREST.
  - PPP-RTK service under development.
  - ergnss-tr.ign.es:2101
  - http://www.ign.es/web/ign/portal/gds-gnss-tiempo-real

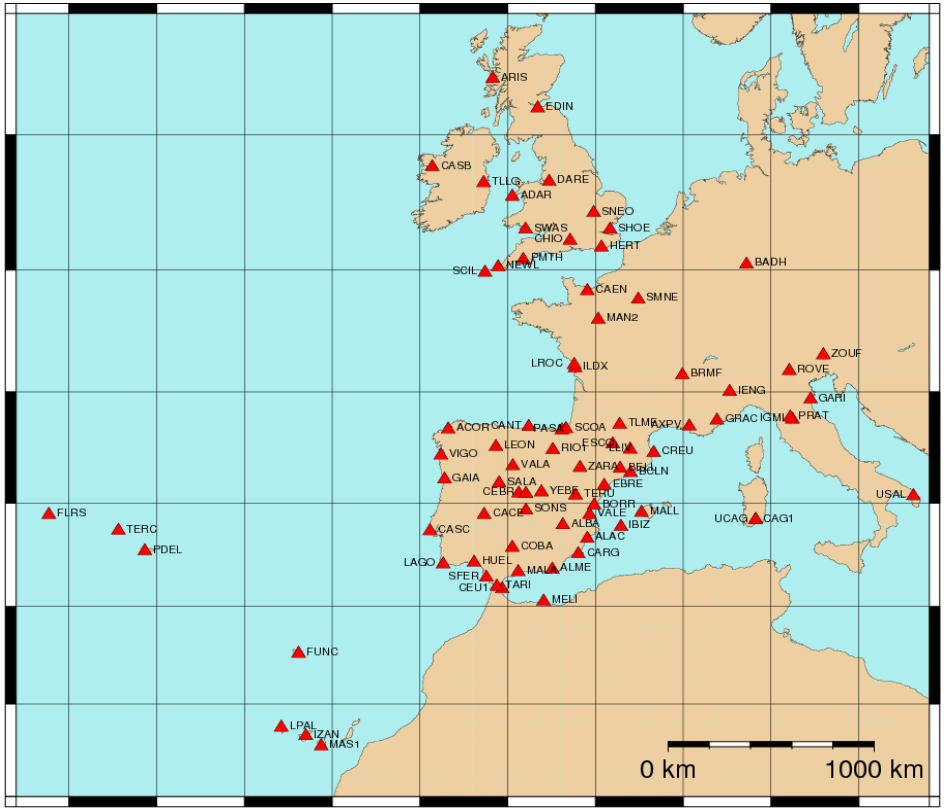


IGE Analysis Centre

- EUREF Analysis Center
  - LAC: EPN processing (final & rapid products) -> 86 stations.
  - DAC: EUREF Dense Velocity Field project (currently ~ 380 stations).
- Other GNSS processing projects
  - IBERRED Project (time series & velocities) → 380 stations.
  - E-GVAP Project (EUMETNET, ZTD) → 380 stations.
  - National coordinates ETRF00 → 240 stations.
  - Volcanic Monitoring System (Canary I.) → 40 stations.
  - Global GALILEO Rinex3 network (experim.) → 80 stations.
- VLBI processing
  - Coordinates, ZTD, EOP comparisons for one year sessions processing
  - VieVS & WHERE softwares

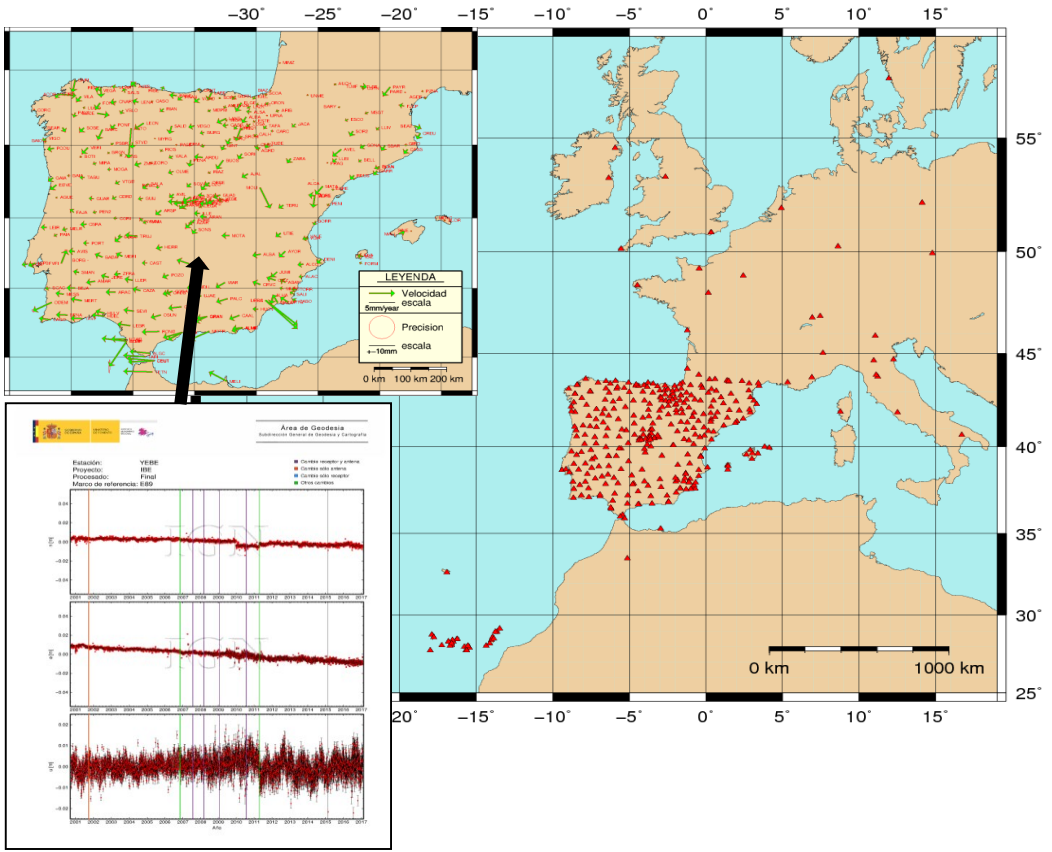
IGE EUREF LAC

- BSW 5.2.
- 86 EPN stations (29 IGN).
- 30 individual calibration.
- Final & rapid products.
- No significant changes since last year, only more new stations added.



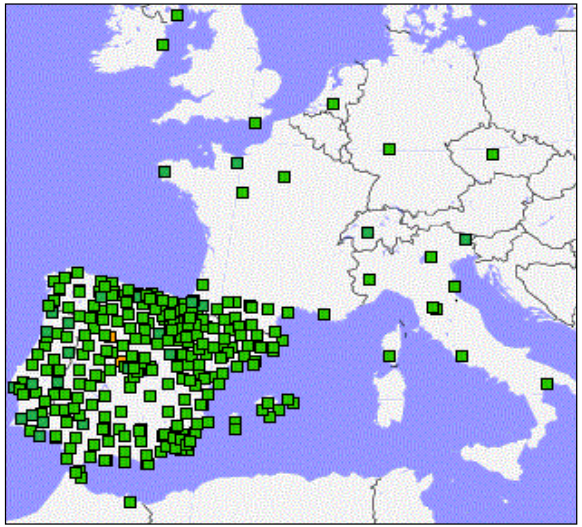
EPN-D & IBERED

- 380 EPN + non-EPN stations.
- EPN + IGN + 12 regional networks + Portugal (IGP)…
- Iberian velocities and time series estimation.
- Currently in reprocessing stage (BSW 5.2), 2006 backwards.
- Reprocessing will end after summer, having 2000 – 2018 time series & velocities.



E-GVAP proccessing

- EUMETNET project: IVW in «near real time» for meteorological forecast.
- Iberian area and «supersites» for validation.
- Almost same stations EPN-D (380).
- Hourly processing using coordinates from IBERRED process.
- Results: ZTD hourly files 15 min sampling in COST2.2 format.



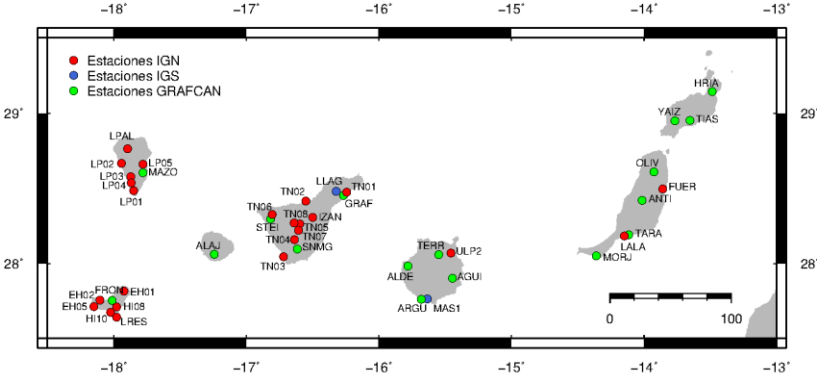
From: E-GVAP web (egvap.dmi.dk)

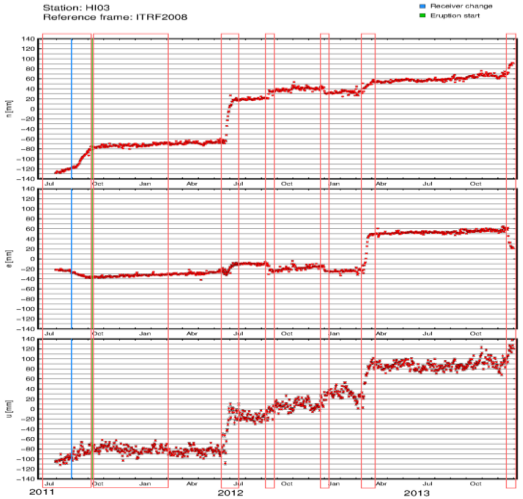
National ETRF00 coordinates

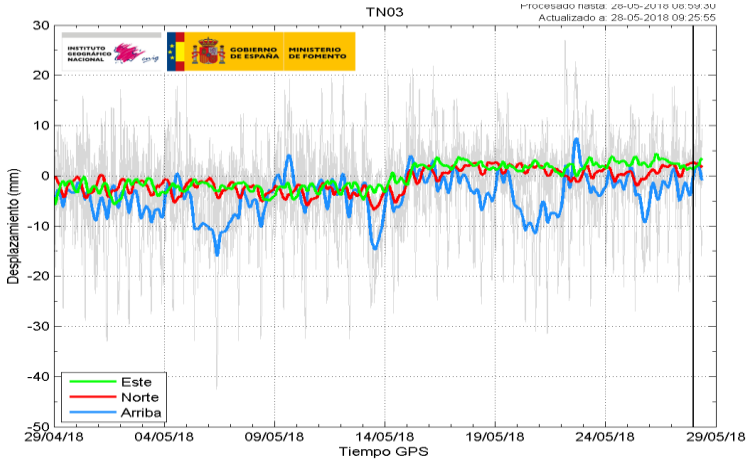
- Processing carried out by ICGC (Catalonia), IECA (Andalucia), ITACYL (C. Leon) and IGN.
- Objective: provide a common ETRF00 frame for all Spanish active networks (15 networks).
- Processing: Apr2011 – Jan2017 (IGb08).
- 240 public stations from IGN and autonomus regions networks.
- Final combination of about 8000 daily SNX files from the four ACs.
- Discontinuities & outliers determination.
- **Result: On 15th March, a new ETRF00 frame has been fully implemented.**

Canary Volcanic Monitoring Permanent GNSS Network

- Volcanic alarm purpose.
  - Daily processing, BSW5.2.
  - More than 40 stations in Canary I.
  - Hourly processing, RTKLIB SW.

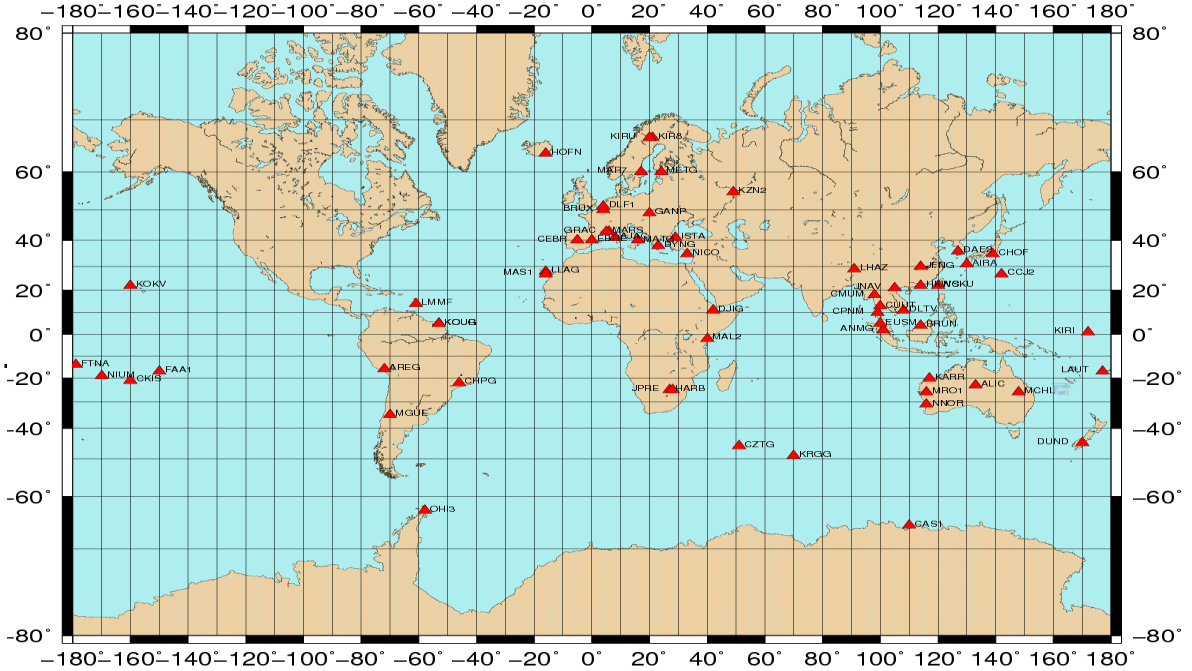






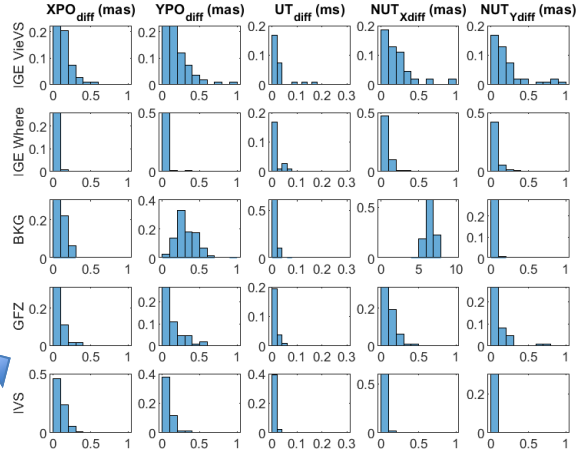
Global GALILEO Rinex3 network

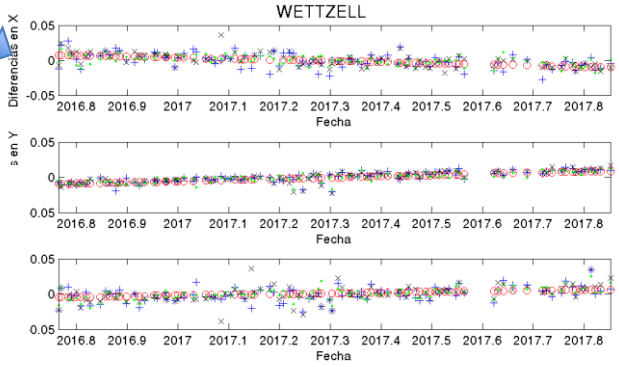
- Daily processing since Jan. 2017.
- About 80 stations.
- Experimental processing including GPS+GLO+GAL.
- CODE MGEX orbits are used.
- Comparisons with same network with GPS+GLO.

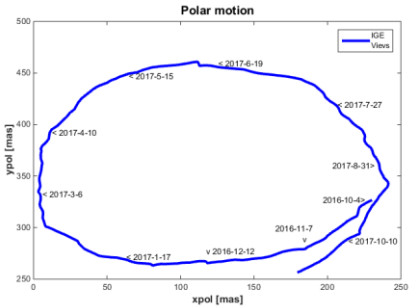


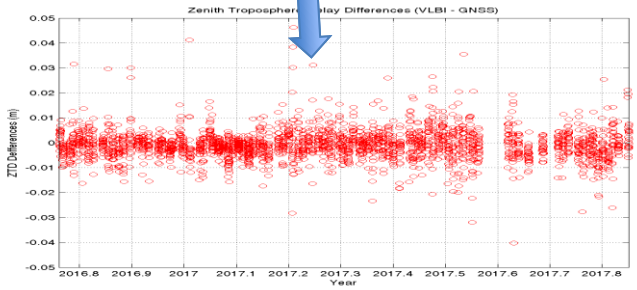
VLBI processing experiences

- Due to the existing VLBI infrastructure of IGN, interest in becoming AC.
- VLBI sessions for one year (Oct'16-Oct'17).
- VieVS 3.0 and WHERE softwares.
- Analyses & comparisons:
  - Estimated EOP compared to IERS Bulletin EOP.
  - Time series of station coordinates comparison to other Acs.
  - VLBI-based ZTD comparison to GNSS-based ZTD in co-located antennas.



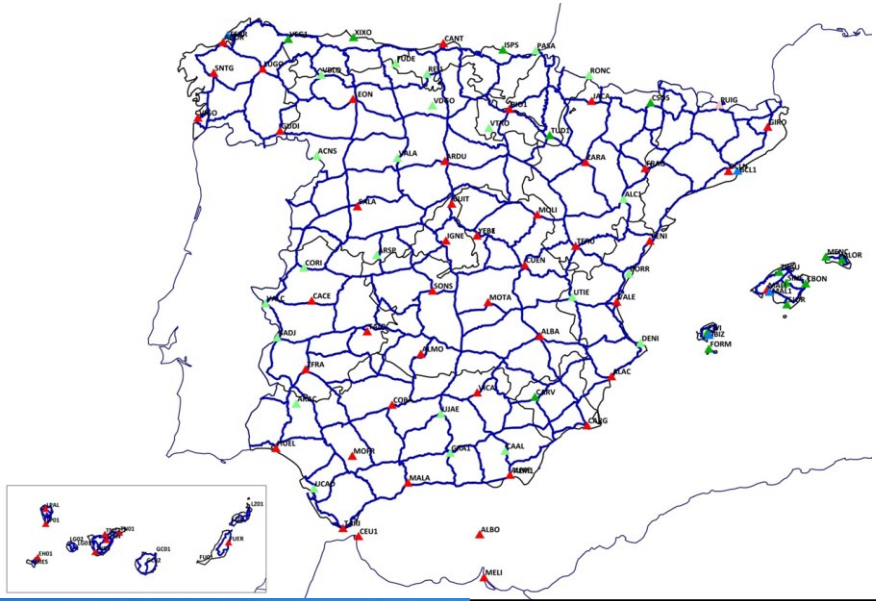


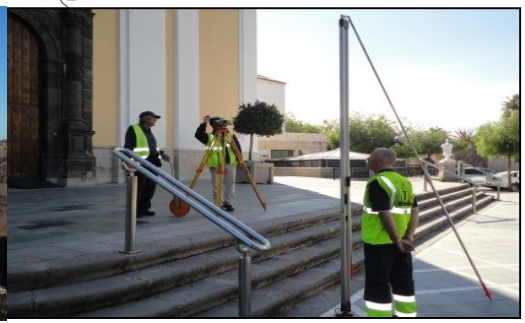




Other activities

- Precise levelling
  - REDNAP: high precission levelling network, 20.000 km, 25.000 benchmarks.
  - Current works: link GNSS permanent stations with REDNAP (ortom. height).
  - 60% of the GNSS stations are linked with REDNAP.
  - 80% of benchmarks with GNSS observations → geoid.
  - It is expected all the GNSS stations will be linked to REDNAP in 2 years.
- Tide Gauge Network (10 st.)
  - 2018-19: install new GNSS stations in all tide gauges.





GGOS infrastructure

- Yebes observatory.
  - 40 m and 13 m VLBI radiotelescopes in operation.
  - SLR project.
  - 2 GNSS stations (YEBE IGS).
- Azores observatory:
  - 13 m VLBI RT built (Santa Maria Island).
  - 2 GNSS stations (RAEG IGS).
- Gran Canaria observatory:
  - Works for the fourth radiotelescope in Gran Canaria Island have already been started.

Alicante tide gauge

Thank you for your attention

Teide: **3.718 m** height
(Canary Islands)

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