

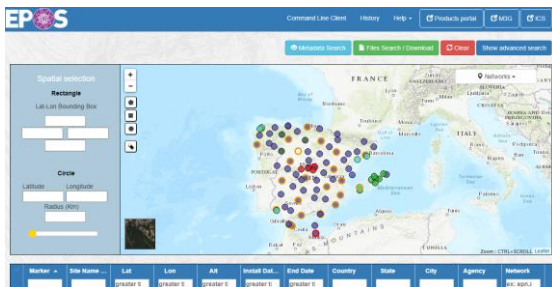
National Report of Spain

Instituto Geográfico Nacional



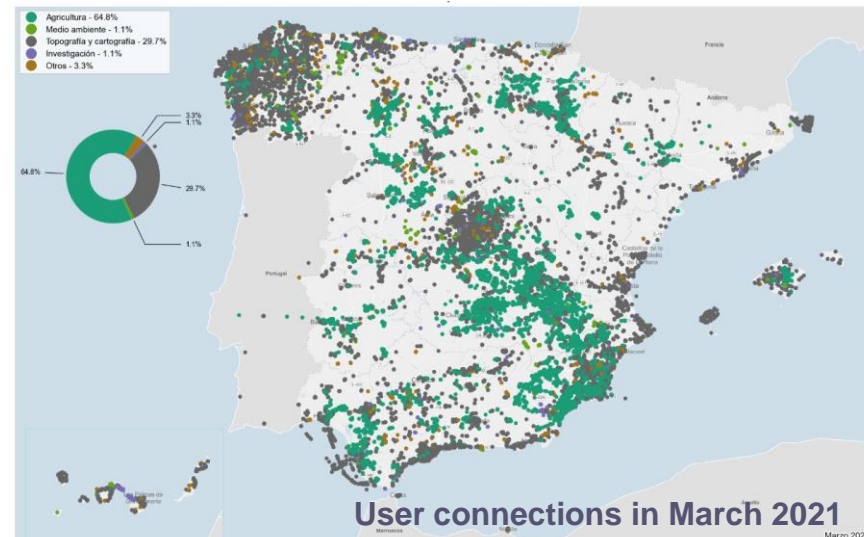
Spanish GNSS Reference Stations Network (ERGNSS)

- ERGNSS: 118 permanent stations:
 - 4 IGS + 25 EPN.
 - ≈ 92% tracking GALILEO
- Local Data Center migrating to https server.
 - Daily 30 s.
 - Hourly 1 s, 30 s.
 - Only RINEX3 files
- New EPOS GNSS data node



Real Time positioning GNSS Services

- Network-based RTK service (245 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.
 - ~ 6500 registered users
 - ~ 600-700 different users connected daily
 - ergnss-tr.ign.es:2101 / 2102

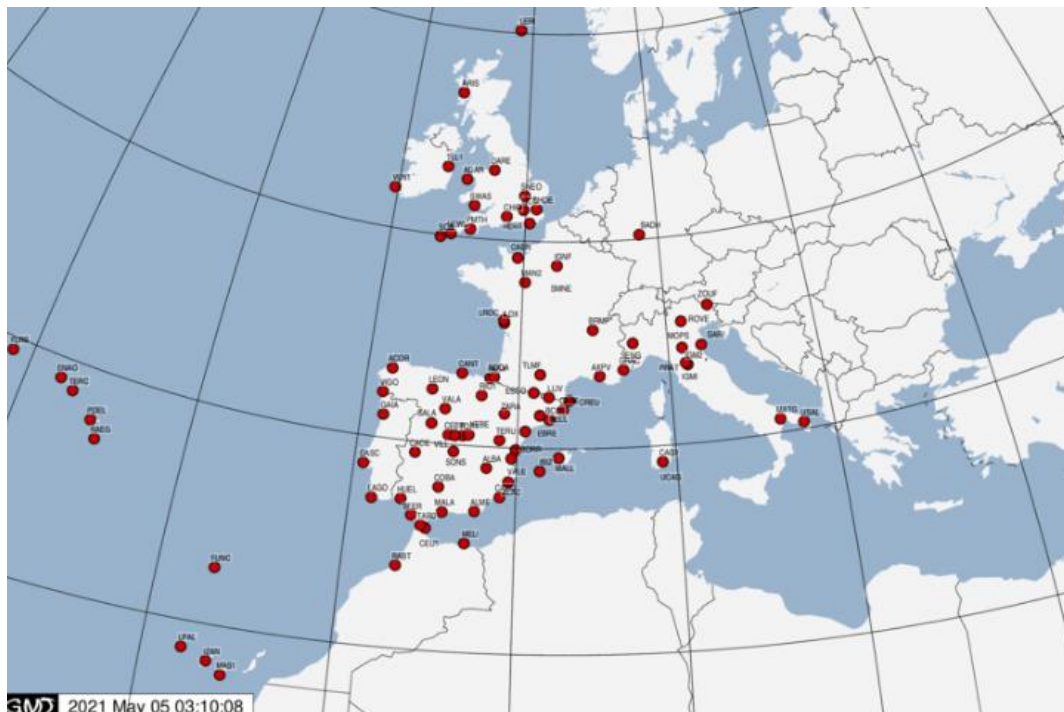


IGE Analysis Centre - Summary

- EUREF Analysis Center
 - LAC: EPN processing (final & rapid products) -> 90 stations.
 - DAC: EPN densification and EUREF Dense Velocity Field projects (~ 380 stations).
- Other GNSS processing projects
 - IBERRED Project (time series & velocities) → 380 stations.
 - E-GVAP Project (EUMETNET, ZTD) → 380 stations.
 - Volcanic Monitoring System (Canary I.) → 40 stations.
 - Experimental projects: GNSS-R, tsunami alert.
- VLBI processing
 - IVS Analysis Center since 2020.

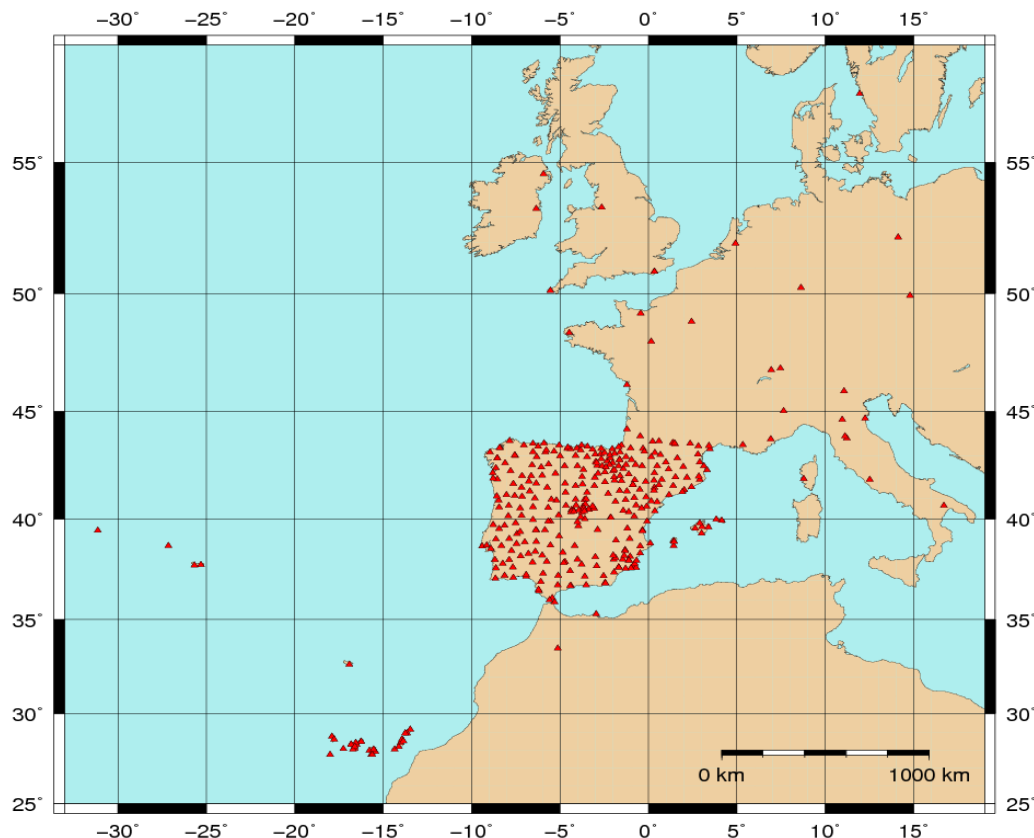
IGE EUREF LAC

- BSW 5.2.
- 91 EPN stations (29 IGN).
- 36 individual calibration.
- Final & rapid products.
- GALILEO observations included operationally since Wk 2044.



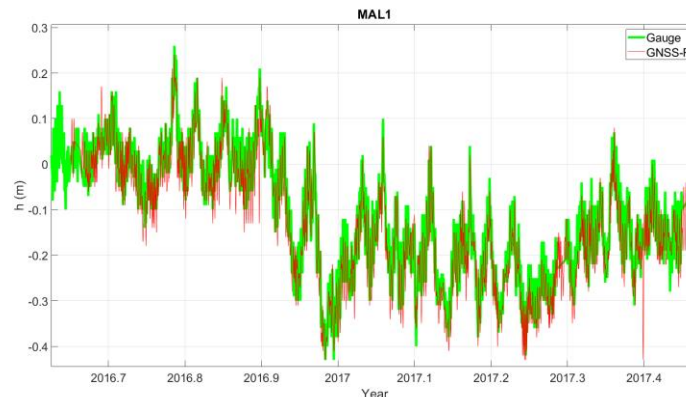
EPN-D & IBERRED

- Around 400 EPN + non-EPN stations.
- EPN + IGN + 12 regional networks + Portugal (IGP)...
- Iberian velocities and time series estimation.
- Reprocessed from 2000
- Products: national coordinates, time series, velocities.



GNSS-Reflectometry activities

- Application of GNSS-R for sea level retrieval.
- Different algorithms under testing in tide gauge co-located GNSS stations:
 - Lomb-Scargle periodogram method (Roesler & Larson, 2018)
 - Inverse Modelling method (Strandberg et al. 2016)
- RMS of the differences with respect to tide gauges records ~ 3-4 cm for a 5 year period.
- Future plans
 - Historical reprocessing of data and comparison to tide gauges records in the suitable stations in Spain (currently 12 IGE stations).
 - Set-up daily processing.



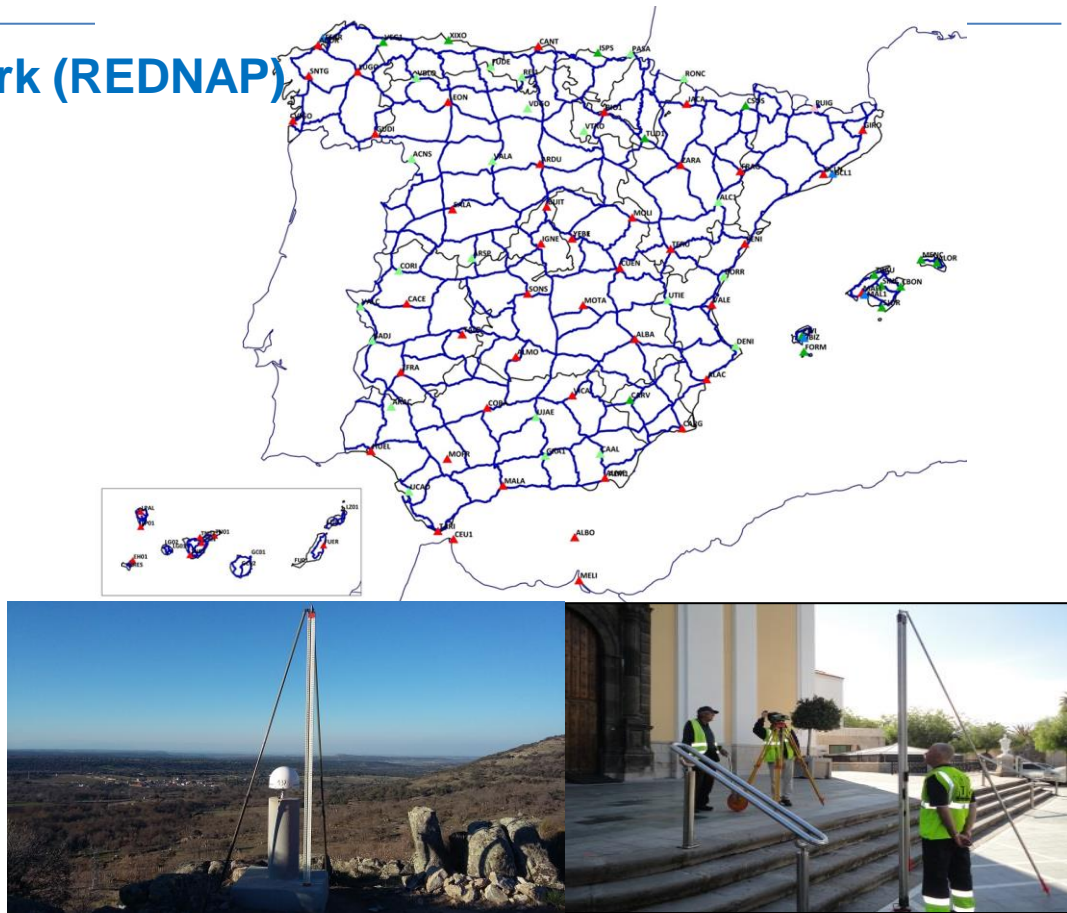
IVS Analysis Center

- IGE is official IVS AC as of March 2020
- Software package: Where (Norwegian Mapping Authority)
- Target sessions: R1/R4 IVS sessions (24 h sessions on Mondays and Thursdays)
- Session-based products:
 - Antenna coordinates
 - Source coordinates
 - Earth Orientation Parameters
- SINEX files should be submitted < 24 h since the data from the correlators is available. Manual supervision is needed.
- Future plans
 - Historical reprocessing to contribute to future realizations of the ITRS
 - Operational analysis of intensive sessions
 - Analysis of VGOS sessions



High precision levelling network (REDNAP)

- REDNAP: high precision levelling network: 25,000 km, 30,150 benchmarks.
- 90% of the GNSS stations are linked to REDNAP.
- Current works: link all GNSS permanent stations to REDNAP (orthometric height, gravity measurements).
- It is expected all GNSS stations will be linked to REDNAP in 2021-2022.



GGOS supersites

- Yebes: VLBI stations, 40 m and 13 m radiotelescopes, absolute gravimeters, laboratories, new SLR station in 2022.
- Santa Maria (Azores): VGOS tri-band 13 m radiotelescope.
- Gran Canaria (Canary Islands): third 13 m radiotelescope projected.



Other activities

- 2020: Installed GNSS permanent station in Antarctica
 - Located in Livingstone Island, Spanish base in Antarctica.
 - It is expected continuous communication next campaign in 2022.
 - Other stations will be installed in 2022 in the neighbor Deception Island for volcanic monitoring.



Other activities: 150 Anniversary of IGN

- Founded in 1870, IGN celebrates 150th anniversary:
 - Expositions
 - Publications
 - Conferences
 - Documentaries
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 - Many activities to disseminate information about IGN activities and the benefits of geographical information for society.



Thank you for your attention

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