



Zagreb, 2022, June 1 - 3



National Report of Spain

Instituto Geográfico Nacional

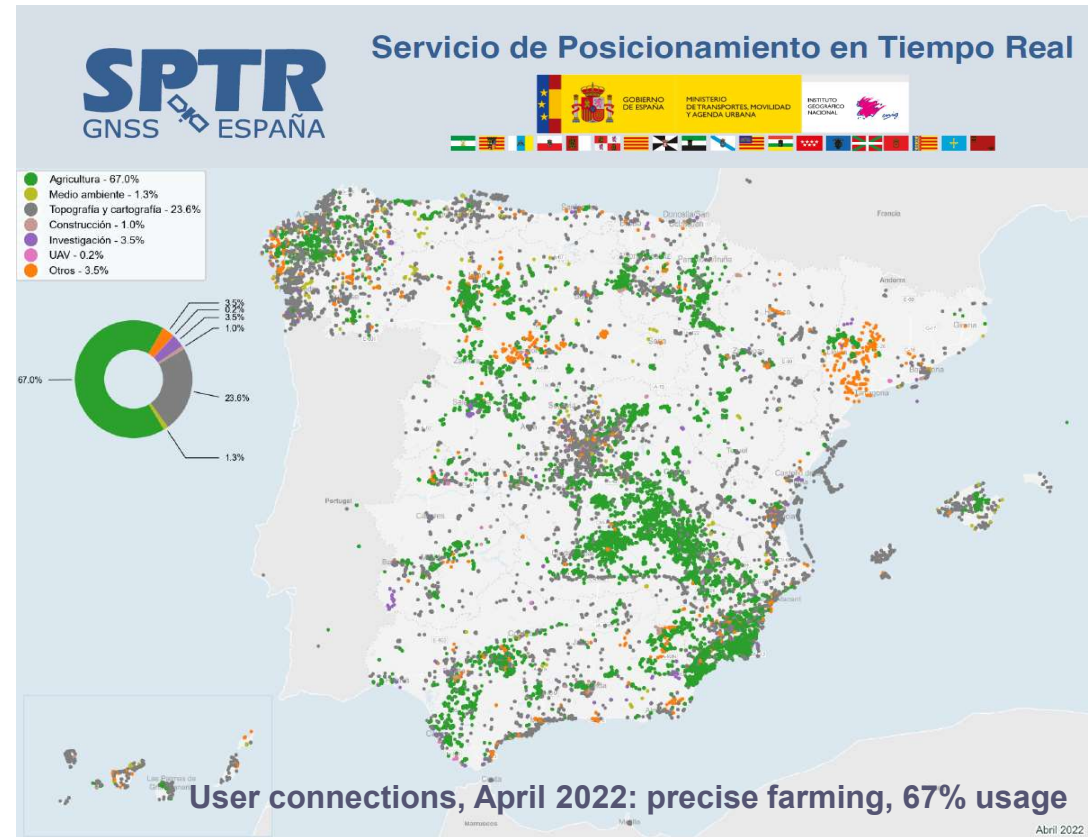


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Real Time positioning Service

- Network-based (245 stations):
 - IGN + Regional GNSS networks service
 - Homogeneous & updated ETRF00 frame.
 - Free of charge.
 - Solutions:
 - VRS, MAC, FKP network based.
 - Individual station and NEAREST.
 - From Jan 2022:
GPS+GLO+GAL+BDS
 - > 8,000 users





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High precisión levelling network & absolute gravimetry

- REDNAP: high precision levelling network: 25,000 km, 30,150 benchmarks.
- Current works: link all GNSS permanent stations to REDNAP (orthometric height, gravity measurements).
- FG5 maintenance works and A10 measurements.
- Superconductor gravimeters in VGOS stations: Yebes and Santa María (Azores).
- Works with Metrology Agency for achieve the national standar for gravimetry.
- Maintenance of 10 tide gauges in Peninsula and Islands.



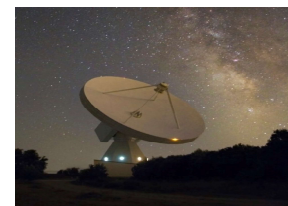
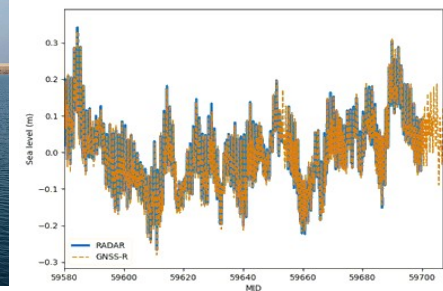
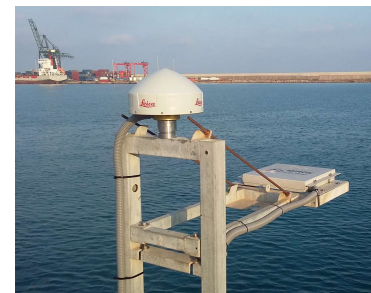
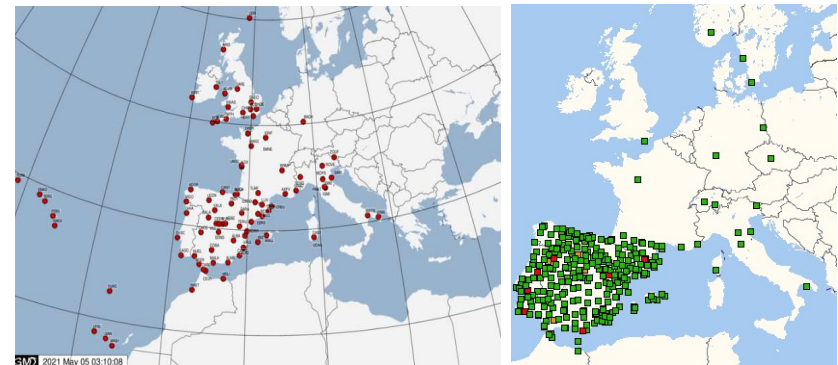


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IGE Analysis Centre - Summary

- EUREF Analysis Center
 - LAC: EPN processing (final & rapid) → 90 stations.
 - EPN-D & European Dense Velocities → 380 stations.
- Other GNSS processing projects
 - IBERRED Project (time series & velocities) → 380 st.
 - E-GVAP Project (EUMETNET, ZTD) → 380 st.
 - Rapid solution (< 15 min)
 - Dense solution (30 min)
 - Volcanic Monitoring System (Canary Islands) → 40 st.
 - Other singular projects: GNSS-R, tsunami alert.
- VLBI processing
 - IVS AC since 2020: operational analysis of R1/R4 sessions.
 - Reprocessing of historical VLBI data since 1979.
 - Operational analysis intensive sessions (UT1-UTC) testing.
 - Assessment of the performance of VGOS sessions.



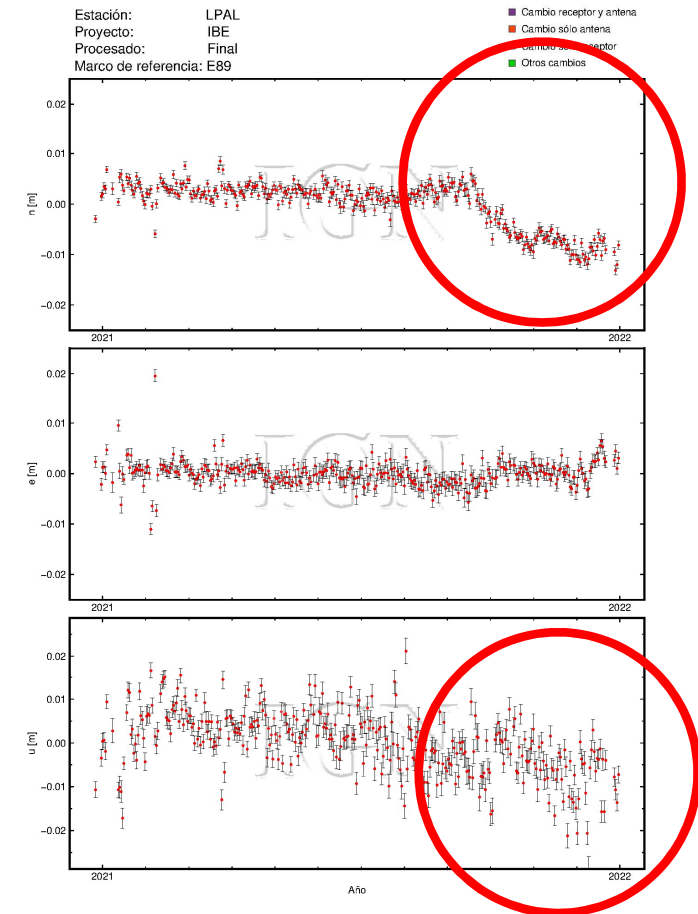


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What's happening to LPAL station?

- LPAL00ESP: IGS & EPN station in La Palma (Canary Islands).
- Trend in coordinates from September, 2021, mainly in the north component: some EUREF colleagues asked us about this behaviour...

... but the explanation was clear...





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...on September, 19th, started the eruption in La Palma island, until December, 13th

- 3000 buildings destroyed
- 74 km of roads destroyed
- 842 million euros damages



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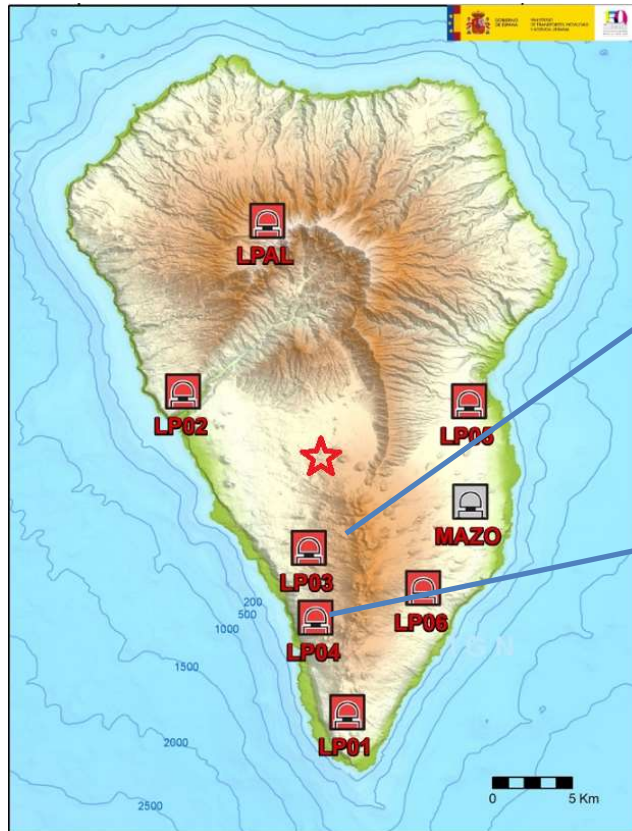
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Red de infraestructuras geodésicas
Subdirección General de Astronomía, Geodesia y Geofísica

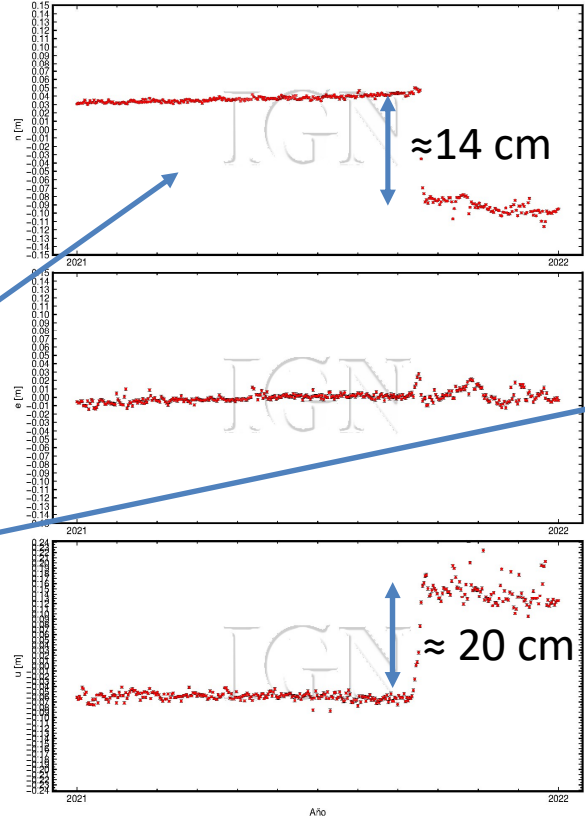


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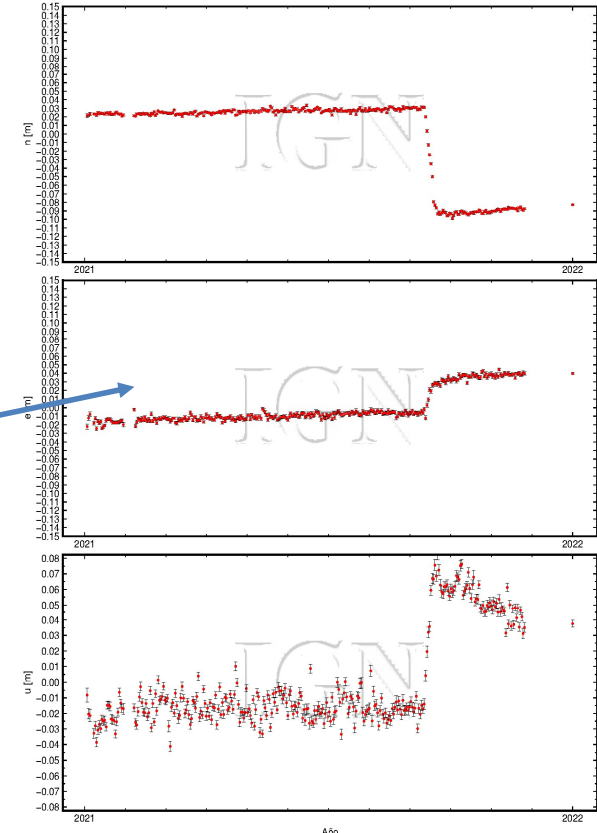
Estación: LP03
Proyecto: IBE
Procesado: Final
Marco de referencia: TRF

- Cambio receptor y antena
- Cambio sólo antena
- Cambio sólo receptor
- Otros cambios



Estación: LP04
Proyecto: IBE
Procesado: Final
Marco de referencia: TRF

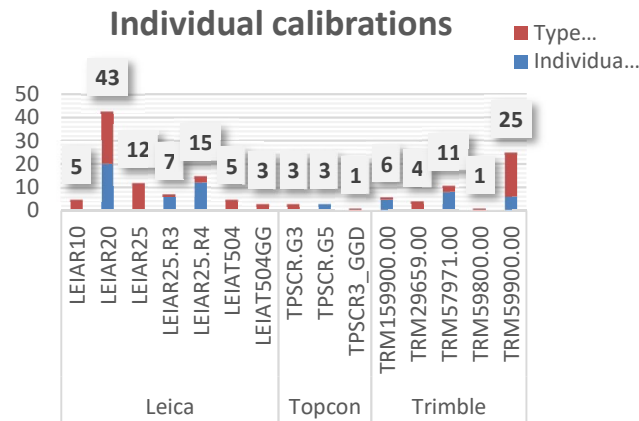
- Cambio receptor y antena
- Cambio sólo antena
- Cambio sólo receptor
- Otros cambios



Impact of antenna calibrations in ERGNSS coordinates

# of stations with type mean calibration	84	
# of stations with individual calibration	G	34
	R	
	G	26
	R	
	E	
Total # of stations	144 (may 2022)	

ERGNSS & SVV stations with Individual Calibration

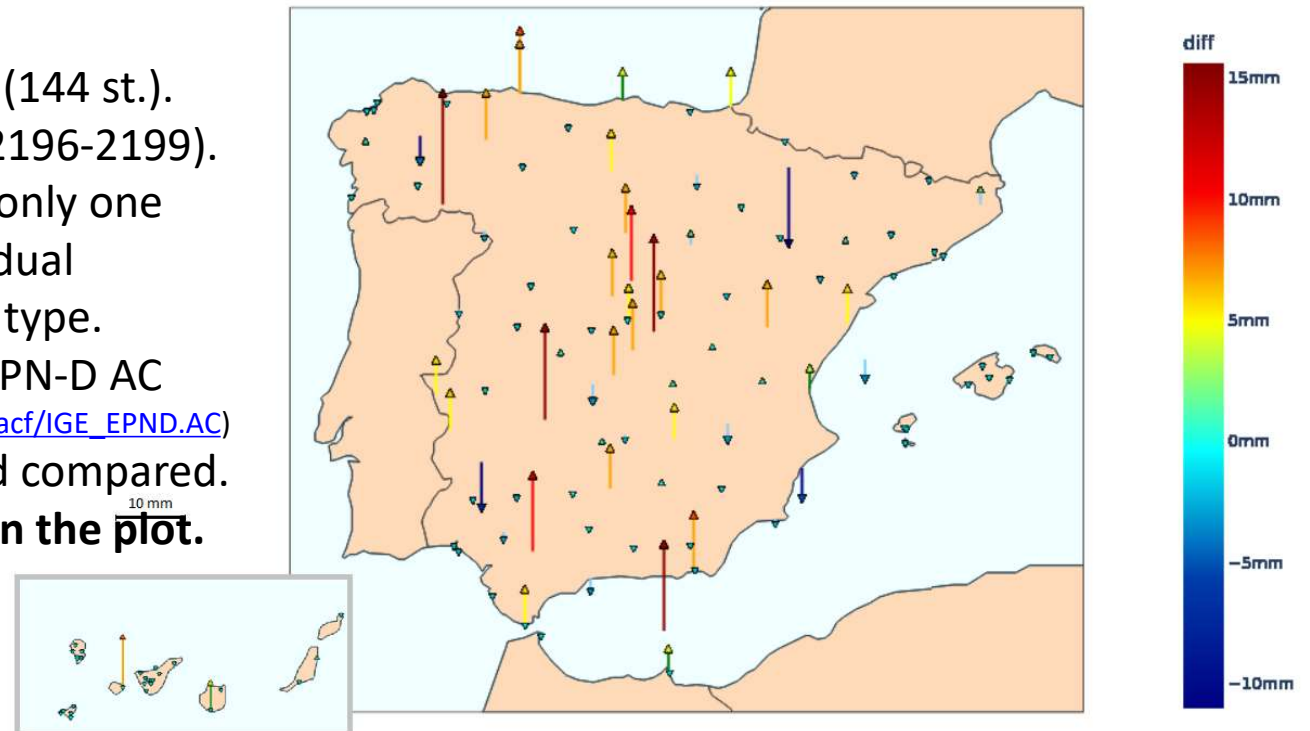


- 42 % of stations with indiv. calibration
- 18 % multi GNSS
- ~ 60.000 € invested

Processing test:

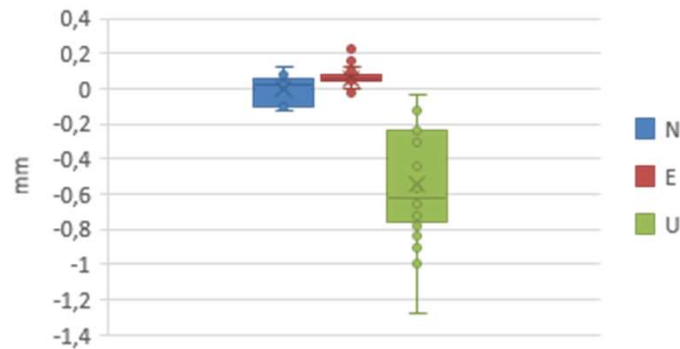
- ERGNSS & SVV network (144 st.).
- ~ 1 month of data (Wk 2196-2199).
- 2 identical processings, only one difference: use of individual calibrations vs. antenna type.
- Same configuration as EPN-D AC (https://epnd.sgo-penc.hu/centres/acf/IGE_EPND.AC).
- Coordinates stacked and compared.
- **Differences are shown in the plot.**

COMPARISON OF COORDINATES IN UP COMPONENT (mm) - with and without Individual calibration



Stations with type mean calibration: indirect impact

Box and Whisker Plot

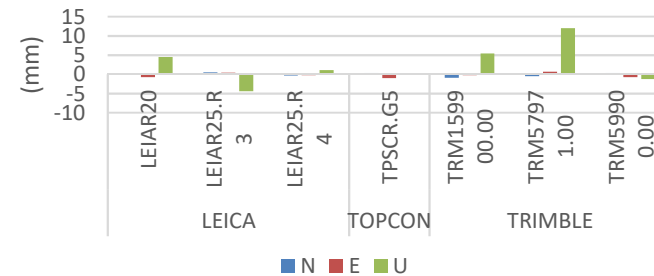


	N (mm)	E (mm)	U (mm)
Mean of the differences in the coordinates of the stations without IC	-0.002	0.058	-0.541

Not significant

Stations with Individual Calibration: direct impact

Mean differences in the coordinates of the stations with IC by brands



	N (mm)	E (mm)	U (mm)
LEICA LEIAR20	0.262	-0.730	4.457
LEICA LEIAR25.R3	0.497	0.373	-4.457
LEICA LEIAR25.R4	-0.307	-0.240	1.057
TOPCON TPSCR.G5	0.300	-1.020	-0.080
TRIMBLE TRM159900.00	-0.928	-0.240	5.364
TRIMBLE TRM57971.00	-0.525	0.652	11.995
TRIMBLE TRM59900.00	0.330	-0.733	-1.237

Significant: Mainly in up (several mm)



Thank you for your attention

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