

Supplement for:

Antenna environment's effects on elevation angle dependent ionosphere-free phase residuals, and geodetic monument noise in the Topo-Iberia CGPS network

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File description

This document provides additional information to the article *Antenna environment's effects on elevation angle dependent ionosphere-free phase residuals, and geodetic monument noise in the Topo-Iberia CGPS network*. The additional information contains figures and tables about results described in the article that could not be exposed in detail. These are provided in the order in which they were referenced. All abbreviations and nomenclatures are consistent with the main text.

Figs. S1–S5 show a compilation of all yearly graphs of the GAMIT-derived LC phase residuals from the Topo-Iberia GPS data processing by García-Armenteros (2023).

Table S1 shows the phase residuals pattern difference indices (PRPDI) of each Topo-Iberia station calculated according to Eq. (1) in the main text. Some years composed of a few weeks have been discarded.

Finally, Table S2 shows the weighted root-mean-square (WRMS) values estimated from the scatter of position time series residuals, and the equivalent horizontal random walk (HRW) values, both from the GAMIT/GLOBK processing. In addition, the part of the noise associated with periodic signals is shown.

References

García-Armenteros JA (2023) Topo-Iberia CGPS network: a new 3D crustal velocity field in the Iberian Peninsula and Morocco based on 11 years (2008–2019). GPS Solut (in press). Preprint at Res Sq. <https://doi.org/10.21203/rs.3.rs-1777869/v2>

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Fig. S1 Compilation of yearly graphs of the mean LC phase residuals from the Topo-Iberia CGPS stations ALJI, AREZ, ASIN, BENI, and CABU

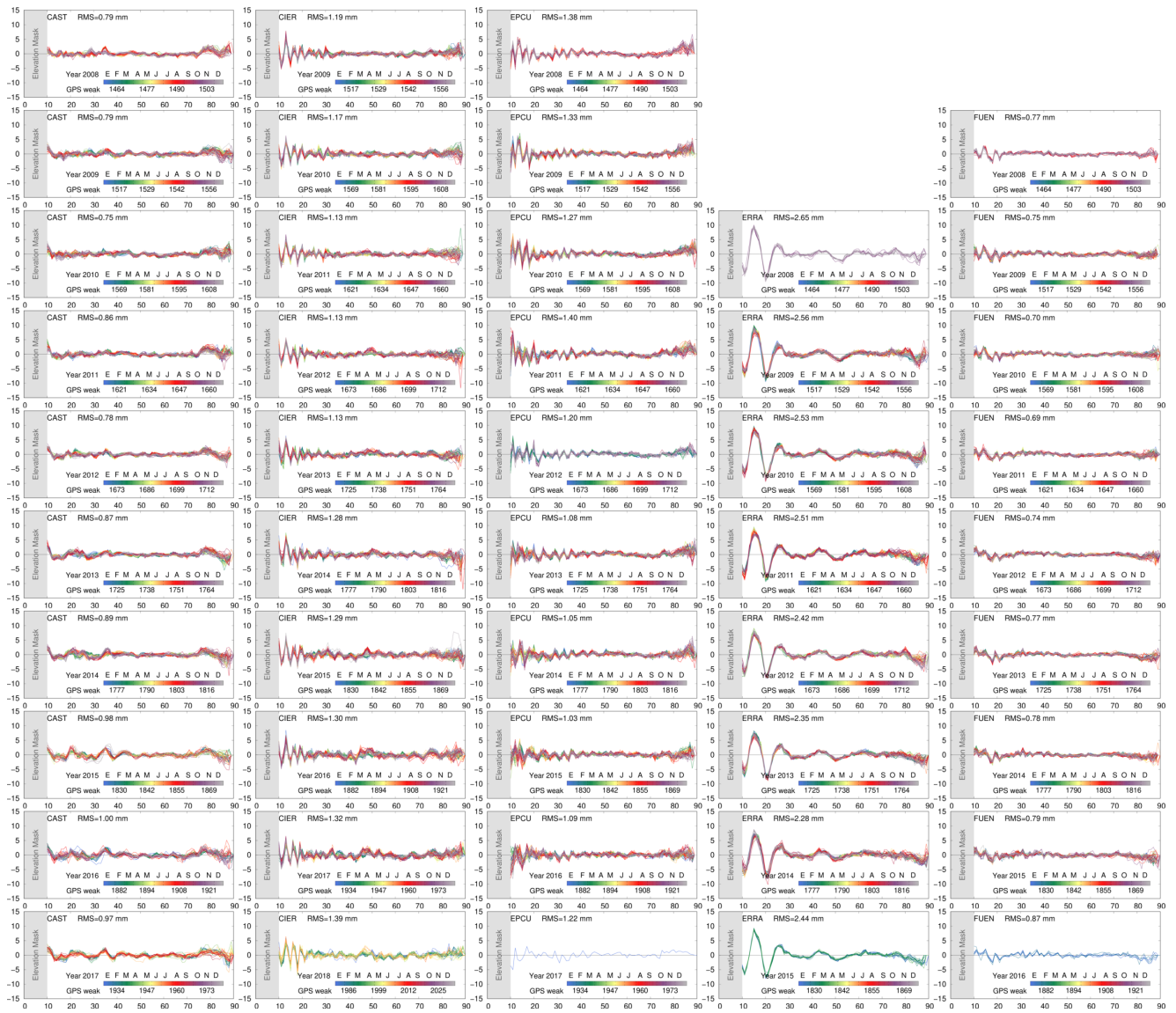


Fig. S2 Compilation of yearly graphs of the mean LC phase residuals from the Topo-Iberia CGPS stations CAST, CIER, EPCU, ERRA, and FUEN



Fig. S3 Compilation of yearly graphs of the mean LC phase residuals from the Topo-Iberia CGPS stations LUA, LNDA, LOBE, LOJA, and MAIL



Fig. S4 Compilation of yearly graphs of the mean LC phase residuals from the Topo-Iberia CGPS stations NEVA, PALM, PILA, REIN, and RUBI



Fig. S5 Compilation of yearly graphs of the mean LC phase residuals from the Topo-Iberia CGPS stations TAZA, TGIL, TIOU, TRIA, and UCMT

Table S1 Phase residuals pattern difference indices of the Topo-Iberia stations in the processed period (2008–2019). The unprocessed span is indicated with ----, and the discarded span is indicated with --

Site	PRPDI (mm)											Mean
	08–09	09–10	10–11	11–12	12–13	13–14	14–15	15–16	16–17	17–18	18–19	
ALJI	----	0.89	1.08	1.04	0.99	1.15	1.16	1.23	1.15	0.93	----	1.07
AREZ	0.81	0.78	0.79	0.78	0.75	0.77	0.86	0.82	0.76	0.67	----	0.78
ASIN	----	0.73	0.44	0.42	0.43	0.46	0.45	----	----	----	----	0.49
BENI	--	0.85	0.90	0.83	--	----	----	----	----	----	----	0.86
CABU	----	0.60	0.58	0.52	0.53	0.52	0.55	0.59	0.65	0.63	0.64	0.58
CAST	0.74	0.76	0.75	0.71	0.73	0.69	0.84	0.82	0.85	----	----	0.77
CIER	----	0.76	0.84	0.83	0.79	0.81	0.93	0.97	1.05	0.99	----	0.89
EPCU	0.94	0.99	1.13	1.13	0.97	1.01	1.13	1.16	--	----	----	1.06
ERRA	--	0.75	0.77	0.76	0.70	0.77	--	----	----	----	----	0.75
FUEN	0.53	0.56	0.54	0.55	0.51	0.53	0.58	--	----	----	----	0.54
LIJA	0.73	0.72	0.74	0.67	0.67	0.73	----	----	----	----	----	0.71
LNDA	0.51	0.50	0.66	1.04	--	----	----	----	----	----	----	0.68
LOBE	0.83	0.75	0.86	0.86	0.94	0.98	1.03	1.10	--	----	----	0.92
LOJA	0.65	0.73	0.73	0.68	0.67	0.66	0.79	0.81	0.78	----	----	0.72
MAIL	0.61	0.64	0.77	0.69	0.57	--	--	0.81	0.59	--	----	0.67
NEVA	----	0.82	0.91	0.71	1.14	0.98	0.82	0.75	0.70	0.81	0.74	0.84
PALM	0.61	0.55	0.56	0.52	0.55	0.56	0.57	0.55	0.54	0.53	----	0.55
PILA	0.60	0.54	0.57	0.56	0.58	0.59	0.59	0.56	0.52	0.54	----	0.56
REIN	--	0.57	0.58	0.57	0.68	0.68	0.61	0.62	0.53	--	----	0.60
RUBI	0.61	0.57	0.62	0.58	0.57	0.58	0.64	0.60	0.60	----	----	0.60
TAZA	0.84	0.72	0.73	0.62	0.71	--	----	----	----	----	----	0.72
TGIL	0.67	0.69	0.77	0.81	0.92	0.99	1.06	1.27	----	----	----	0.90
TIOU	--	1.81	1.90	1.71	2.81	4.25	4.10	5.44	--	----	----	3.15
TRIA	0.58	0.53	0.54	0.47	0.52	0.53	0.55	----	----	----	----	0.53
UCMT	0.73	0.78	0.79	0.76	0.76	0.77	--	----	----	----	----	0.77

Table S2 Topo-Iberia station 4-char ID, monument type used, WRMS values in the north, east and up components from position time series, HRW value, processed data-span length, seasonal HRW value, and seasonal vertical RW noise, sorted by increasing HRW value

Site	Monument type ¹	N WRMS (mm)	E WRMS (mm)	U WRMS (mm)	HRW (mm ² /yr)	Data span (yrs)	Seasonal HRW (mm ² /yr)	Seasonal U RW (mm ² /yr)
MAIL	CP	0.44	0.52	1.75	0.002	9.4	0.007	0.000
NEVA	CP	0.62	0.45	1.74	0.005	10.5	0.006	0.018
PILA	CP	0.61	0.59	1.52	0.005	10.5	0.003	0.000
FUEN	CP	0.57	0.53	1.97	0.006	7.5	0.008	0.022
REIN	CP	0.90	0.45	1.89	0.010	10.0	0.000	0.000
ERRA	SMR	0.95	0.48	2.00	0.011	6.5	0.011	0.000
PALM	CP	0.68	0.59	2.18	0.011	10.5	0.003	0.012
RUBI	CP	0.49	0.48	1.88	0.012	9.5	0.000	0.053
AREZ	CP	0.53	0.66	1.71	0.014	10.5	0.000	0.012
EPCU	CP	0.53	0.64	2.27	0.014	8.5	0.003	0.000
ASIN	SDBM	0.61	0.64	1.62	0.016	6.4	0.013	0.000
TRIA	CP	0.71	0.63	1.53	0.024	7.5	0.195	0.010
UCMT	CP	0.45	0.98	1.94	0.024	6.5	0.042	0.000
CABU	CP	0.92	0.57	1.62	0.026	10.5	0.005	0.012
CIER	CP	0.87	0.72	2.12	0.028	9.5	0.004	0.027
LOBE	CP	0.92	0.78	2.61	0.029	8.5	0.032	0.069
LNDA	CP	0.81	0.48	1.81	0.033	4.5	0.004	0.009
BENI	SMR	0.94	0.48	2.18	0.038	4.5	0.002	0.079
ALJI	CPL	0.78	1.03	2.46	0.047	9.4	0.112	0.113
LIJA	CPL	0.60	0.56	1.77	0.048	6.5	0.028	0.121
TGIL	CP	0.55	0.47	2.21	0.055	8.5	0.011	0.115
CAST	CPR	0.58	0.76	1.44	0.085	9.4	0.007	0.031
LOJA	CPL	0.85	0.58	1.77	0.110	9.5	0.034	0.000
TAZA	SMR	0.77	0.95	1.99	0.161	5.5	0.191	0.012
TIOU	CP	1.45	0.83	3.31	0.317	8.5	0.000	0.130

¹ Monument type: CP (Concrete pillar on bedrock. Standard height or greater); CPL (Little concrete pillar on bedrock. Two bodies, height of 0.344 m); CPR (Concrete pillar on building roof); SDBM (Shallow-drilled braced monument on bedrock); SMR (Steel mast on building roof)