

ARA-DAC Weekly Analysis Result: 2391 (GFA)

Technical Report

GPS Week: 2391 (GFA)

<http://geolabpasaia.org/gnss/ARA-euref/>

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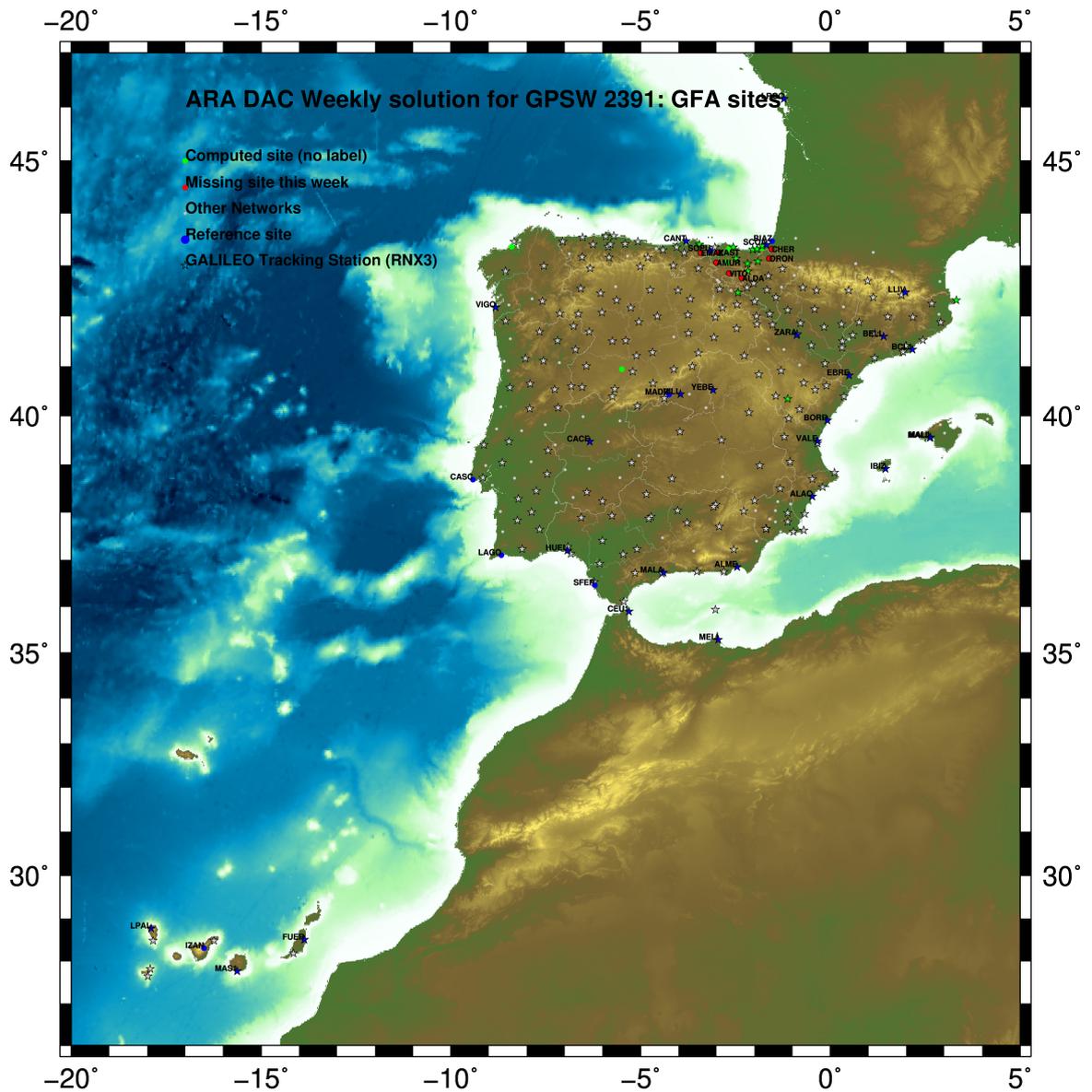
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1 Introduction

In may 2015 ARA (EUREF’s acronym of the ARANZADI’s Department of Applied Geodesy), kicks off as a EUREF’s Operational Center. In July 2015, the Densification solutions ARA computes routinely in a weekly basis start being submitted to the EUREF’s EPN Densification Project.

2 Map of Computed Sites



GM 2025 Nov 25 04:18:59

Fig.1: Computed Sites for GPS Week2391 (GFA)

3 Main Computation Parameters

The main parameters considered in the ARA analysis follow strictly the EPN recommendations.

- Preprocessing: Independent baselines are defined by the criterion of maximum common observations. Cycle slips are fixed with the MAUPRP program, analysing triple phase differences for each independent baseline. If MAUPRP does not fix all slips for one station, that station is edited out.
- Basic Observable : Carrier phase, L_1 and L_2 ; a priori sigma of single differences: 0.002 m.
 - sampling (for ambiguity resolution): 30 s
 - sampling (for final processing): 180 s
 - Systems: GPS+GLONASS observations are used (Galileo is used if available starting GPS week 1986)
- Modelled observable: Double differences of carrier phase using different combinations based on the distance.
- Ground antenna phase center calibrations: Group APCV used from the PCV_COD.I20 file and individual calibrations from EPNC_20.ATX. In case no calibration values of an antenna/radome pairs are not available for a certain GNSS system at some station, the observation of this/these GNSS/GNSSs are excluded from the analysis of that station.
- Reference sites: the latest IGS cumulative solution is used to align our solution to the latest IGS20 release, regularly updated and available at: IGS0OPSSNX_1994002_00U_00U_CRD.SNX.gz. Following the EUREF guidelines, no other individual calibrations are included in the analysis starting GPSW 2238 (IGS20); also applies to repro3 solutions, which are based on IGS20 standards.
- Troposphere:
 - minimum elevation is 3 deg.; elevation dependent weighting.
 - VMF3 mapping function. ZPD parameters are estimated using the VMF3 mapping function.
 - CHENHER gradient estimation model.
- Ionosphere: no a priori model, ionospheric effect almost removed by iono free combination.
- Ocean Loading: FES2014b (Scherneck).
- Atmospheric loading: not corrected, following the latest recommendations for IGS20 products.
- Tidal displacements:
 - Mean pole model : IERS2010_v1.2.0
 - Subdaily pole model: DESAI2016
 - Nutation model : IAU2000R06

4 Estimated Parameters

- Adjustment: Least Squares
- Rejection Criteria: 3σ rms of single differences, in the weekly combination of daily normal equations (ADDNEQ)
- Station coordinates: minimum constraints (MC) to IGS sites (only translations).
- Troposphere: 3 deg. After having obtained coordinates valid for the entire week, tropospheric zenith delay is solved at each site at intervals of 1 hour throughout the week, holding the coordinates constrained at the weekly values.

- Ionospheric: second and third "High Order Ionosphere (HOI)" corrections used, using CODE files, to improve Ambiguity Resolution.
- Satellite clock bias: not estimated because are eliminated by double differencing the phase data.
- Receiver clock bias: not estimated because are eliminated by double differencing the phase data.
- Orbits and ERPs: CODE's orbits and ERP for both rapid and final solutions. DE421 planetary ephemeris and JGM3 Earth geopotential model is used.
- Ambiguity: an advanced ambiguity resolution (AR) scheme is included:
 - Code-Based Widelane (WL) and Narrow Line (NR) AR for baselines shorter than 6000km, a Melbourne-Wuebbena wide-lane and narrow-lane AR is computed.
 - Phase-Based Widelane (L_5) AR for baselines shorter than 200km, the code-based wide-lane AR is replaced by a phase-only wide-lane with a subsequent narrow-lane AR.
 - Quasi-Ionosphere-Free (QIF) AR for the remaining real-valued ambiguities for baselines shorter than 2000km.
 - Direct L_1/L_2 AR for baselines shorter than 20km
- AR Verification: Each baseline is processed by introducing the resolved integer ambiguities and checking the residuals. If there is any problem, the ambiguities are re-initialized.

5 Computed Coordinates

In this section the adjusted coordinates are summarized. Note that the sites with an A flag are the computed ones, whereas sites flagged as W (IGS cumulative solution) are the ones used in the Minimal Constraints condition.

5.1 IGS20

The Reference Frame considered in this section is the IGS20 (IGS cumulative solution), mapped from 2015.0 to the observation epoch.

ARA FINAL WEEKLY COMBINATION: FINAL ORBITS 25-NOV-25 02:39

LOCAL GEODETIC DATUM: IGS20 EPOCH: 2025-11-05 11:59:45

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	SYSTEM
111	ACOR 13434M001	4594489.47298	-678367.24309	4357066.33261	A	G
50	ALSA 19419M001	4677250.76638	-176770.27158	4319079.94774	A	GRE
384	BIAZ 10074M002	4634455.98242	-124344.85079	4365785.53379	W	GR
101	BIDA 00000M000	4644177.75066	-145778.19882	4354832.55344	A	GR
113	BRZR 19387M001	4662220.92125	-220769.77597	4333309.51067	A	GR
573	CACE 13447M001	4899866.45055	-544566.91200	4033770.28708	W	GRE
592	CANT 13438M001	4625924.25074	-307096.11328	4365771.63575	W	GRE
908	CREU 13432M001	4715420.05579	273178.18454	4271946.91717	A	GRE
135	EBRE 13410M001	4833519.92284	41537.51889	4147461.79806	W	GRE
180	ELGE 19353S001	4657557.32921	-202241.34652	4338991.96591	A	GRE
209	GERN 19389M001	4642811.25283	-217222.80141	4353278.95392	A	GR
257	HOND 15012M002	4640529.24875	-145676.86320	4358761.83128	A	GRE
235	IGEL 19352S001	4645951.35409	-165574.38042	4352550.49861	A	GRE
240	ISPS 19484M001	4640596.41083	-206963.65618	4356391.99158	A	GRE
252	LARE 19440M001	4632831.88853	-279026.02330	4360314.50189	A	GRE
256	LAZK 19354S001	4666098.27556	-178186.06938	4330463.74734	A	GRE
261	LEIT 19428M001	4663520.86794	-155858.59584	4334519.96289	A	GRE
345	PASZ 19351S001	4644908.99100	-156644.94669	4353623.15226	A	GRE
493	PASA 19351S001	4644908.99095	-156644.94675	4353623.15252	A	GRE
553	RID1 13448M002	4708447.76117	-199490.15941	4284089.81139	A	GRE
558	SALA 13469M001	4803054.42491	-462130.94630	4158379.15561	A	GR
526	SCDA 10088M002	4639940.43504	-136224.82066	4359552.49776	W	GRE
715	SOPU 19386M001	4643997.83975	-255913.78374	4350063.21391	W	GR
443	TERU 13487M001	4867391.25307	-95523.21982	4108341.76087	A	GRE
616	YEBE 13420M001	4848724.50501	-261631.80345	4123094.40751	W	GRE
655	ZARA 13462M001	4773803.10011	-73505.86228	4215454.17122	W	GRE

5.2 ETRF2000 (ETRS89) Coordinates

European Terrestrial Reference System, 1989 (ETRS89) is realized by ETRF2000 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

CONVERT TO ETRF2000 25-NOV-25 02:39

LOCAL GEODETIC DATUM: ETRF2000 EPOCH: 2025-11-05 11:59:45

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	SYSTEM
111	ACOR 13434M001	4594489.82910	-678367.90672	4357065.83498	A	
50	ALSA 19419M001	4677251.19043	-176770.94464	4319079.44999	A	
384	BIAZ 10074M002	4634456.41783	-124345.51829	4365785.04071	W	
101	BIDA 00000M000	4644178.18211	-145778.86761	4354832.05916	A	
113	BRZR 19387M001	4662221.34027	-220770.44726	4333309.01365	A	
573	CACE 13447M001	4899866.79835	-544567.61369	4033769.76354	W	
592	CANT 13438M001	4625924.66026	-307096.78020	4365771.14077	W	
908	CREU 13432M001	4715420.53950	273177.50831	4271946.42243	A	
135	EBRE 13410M001	4833520.36329	41536.82696	4147461.28920	W	
180	ELGE 19353S001	4657557.75133	-202242.01717	4338991.46959	A	
209	GERN 19389M001	4642811.67403	-217223.47023	4353278.45872	A	
257	HOND 15012M002	4640529.68055	-145676.53153	4358781.33733	A	
235	IGEL 19352S001	4645951.78254	-165575.04950	4352550.00388	A	
240	ISPS 19484M001	4640596.83375	-206964.32470	4356391.49673	A	
252	LARE 19440M001	4632832.30157	-279026.69102	4360314.00669	A	
256	LAZK 19354S001	4666098.70036	-178186.74103	4330463.25059	A	
261	LEIT 19428M001	4663521.29625	-155859.26711	4334519.46670	A	
345	PASZ 19351S001	4644909.42081	-156645.61561	4353622.65775	A	
493	PASA 19351S001	4644909.42076	-156645.61567	4353622.65801	A	
553	RID1 13448M002	4708447.17905	-199490.83646	4284089.31046	A	
558	SALA 13469M001	4803054.79495	-462131.63582	4158378.64217	A	
526	SCDA 10088M002	4639940.86824	-136225.48889	4359552.00400	W	
715	SOPU 19386M001	4643998.25520	-255914.45282	4350062.71803	W	
443	TERU 13487M001	4867391.67082	-95523.91645	4108341.24693	A	
616	YEBE 13420M001	4848724.90049	-261632.49823	4123093.89285	W	
655	ZARA 13462M001	4773803.53003	-73506.54715	4215453.66616	W	

5.3 ETRF2014 (ETRS89) Coordinates

European Terrestrial Reference System, 1989 (ETRS89) is realized by ETRF2014 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

CONVERT TO ETRF2014 25-NOV-25 02:39

LOCAL GEODETIC DATUM: ETRF2014 EPOCH: 2025-11-05 11:59:45

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	SYSTEM
111	ACOR 13434M001	4594489.78964	-678367.94294	4357065.88822	A	
50	ALSA 19419M001	4677251.14840	-176770.98245	4319079.50314	A	
384	BLAZ 10074M002	4634456.37610	-124345.56560	4365785.09402	W	
101	BIDA 00000M000	4644178.14035	-145778.90569	4354832.11243	A	
113	BRZR 19387M001	4662221.29858	-220770.48497	4333309.06682	A	
573	CACE 13447M001	4899866.75482	-544567.64900	4033769.81589	W	
592	CANT 13438M001	4625924.61929	-307096.81774	4365771.19402	W	
908	CREU 13432M001	4715420.49522	273177.46895	4271946.47580	A	
135	EBRE 13410M001	4833520.31855	41536.78904	4147461.34202	W	
180	ELGE 19353S001	4657557.70962	-202242.05497	4338991.52278	A	
209	GERN 19389M001	4642811.63255	-217223.50804	4353278.51195	A	
257	HOND 15012M002	4640529.63883	-145676.56963	4358781.39061	A	
235	IHEL 19352S001	4645951.74084	-165575.08749	4352550.05713	A	
240	ISPS 19484M001	4640596.79225	-206964.36256	4356391.54998	A	
252	LARE 19440M001	4632832.26042	-279026.72864	4360314.05993	A	
256	LAZK 19354S001	4666098.65847	-178186.77888	4330463.30377	A	
261	LEIT 19428M001	4663521.25431	-155859.30506	4334519.51990	A	
345	PAS2 19351S001	4644909.37908	-156645.65364	4353622.71101	A	
493	PASA 19351S001	4644909.37903	-156645.65370	4353622.71127	A	
558	RI01 13448M002	4708447.13673	-199490.87403	4284089.36350	A	
558	SALA 13469M001	4803054.75238	-462131.67191	4158378.69481	A	
526	SC0A 10088M002	4639940.82649	-136225.52703	4359552.05729	W	
715	SOPU 19386M001	4643998.21384	-255914.49047	4350062.77124	W	
443	TERU 13487M001	4867391.62620	-95523.95368	4108341.29955	A	
616	YEBE 13420M001	4848724.85670	-261632.53489	4123093.94543	W	
655	ZARA 13462M001	4773803.48647	-73506.58490	4215453.71907	W	

5.4 ETRF2020 (ETRS89) Coordinates

European Terrestrial Reference System, 1989 (ETRS89) is realized by ETRF2020 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

CONVERT TO ETRF2020 25-NOV-25 02:39

LOCAL GEODETIC DATUM: ETRF2020 EPOCH: 2025-11-05 11:59:45

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	SYSTEM
111	ACOR 13434M001	4594489.78569	-678367.92806	4357065.89621	A	
50	ALSA 19419M001	4677251.14304	-176770.96710	4319079.51137	A	
384	BLAZ 10074M002	4634456.37047	-124345.54127	4365785.10220	W	
101	BIDA 00000M000	4644178.13481	-145778.89044	4354832.12062	A	
113	BRZR 19387M001	4662221.29331	-220770.46969	4333309.07502	A	
573	CACE 13447M001	4899866.75129	-544567.63309	4033769.82442	W	
592	CANT 13438M001	4625924.61420	-307096.80262	4365771.20214	W	
908	CREU 13432M001	4715420.48861	273177.48461	4271946.48418	A	
135	EBRE 13410M001	4833520.31296	41536.80498	4147461.35056	W	
180	ELGE 19353S001	4657557.70429	-202242.03970	4338991.53098	A	
209	GERN 19389M001	4642811.62722	-217223.49283	4353278.52013	A	
257	HOND 15012M002	4640529.63328	-145676.55439	4358781.39880	A	
235	IHEL 19352S001	4645951.73536	-165575.07225	4352550.06532	A	
240	ISPS 19484M001	4640596.78689	-206964.34735	4356391.55815	A	
252	LARE 19440M001	4632832.25526	-279026.71348	4360314.06807	A	
256	LAZK 19354S001	4666098.65309	-178186.76358	4330463.31199	A	
261	LEIT 19428M001	4663521.24885	-155859.28975	4334519.52812	A	
345	PAS2 19351S001	4644909.37352	-156645.63845	4353622.71946	A	
493	PASA 19351S001	4644909.37352	-156645.63845	4353622.71946	A	
553	RI01 13448M002	4708447.13153	-199490.85859	4284089.37178	A	
558	SALA 13469M001	4803054.74829	-462131.65628	4158378.70320	A	
526	SC0A 10088M002	4639940.82091	-136225.51179	4359552.06548	W	
715	SOPU 19386M001	4643998.20864	-255914.47527	4350062.77941	W	
443	TERU 13487M001	4867391.62112	-95523.93768	4108341.30812	A	
616	YEBE 13420M001	4848724.85209	-261632.51903	4123093.95394	W	
655	ZARA 13462M001	4773803.48106	-73506.56920	4215453.72749	W	

6 Quality Control

6.1 Mean and Daily Repeatabilities

In this section, the mean and daily repeatabilities of the sites are shown. Repeatabilities refer to the IGS20 solution and are given with respect to the Local frame (North-East-Up).

GFA FINAL WEEKLY COMBINATION: FINAL ORBITS				25-NOV-25 02:39		
Station	#Days	Weekday 0123456	Repeatability (mm)			
			N	E	U	
ACOR 13434M001	7	XXXXXX	0.93	1.95	6.13	
ALSA 19419M001	7	XXXXXX	4.95	1.84	5.83	
BLAZ 10074M002	7	XXXXXX	1.33	1.95	5.73	
BIDA 00000M000	7	XXXXXX	1.50	0.81	5.86	
BRZR 19387M001	7	XXXXXX	1.49	1.57	4.82	
CACE 13447M001	7	XXXXXX	1.06	0.60	3.68	
CANT 13438M001	7	XXXXXX	0.60	0.85	4.52	
CREU 13432M001	7	XXXXXX	1.01	1.70	6.79	
EBRE 13410M001	6	XXX XX	1.36	1.06	7.85	
ELGE 19353S001	7	XXXXXX	1.36	1.09	5.09	
GERN 19389M001	6	XXXXX	0.96	0.95	5.64	
HOND 15012M002	7	XXXXXX	0.83	0.67	5.44	
IGEL 19352S001	7	XXXXXX	1.03	0.53	6.34	
ISPS 19484M001	7	XXXXXX	1.29	1.19	5.69	
LARE 19440M001	7	XXXXXX	1.80	0.80	3.96	
LAZK 19354S001	7	XXXXXX	1.90	1.01	8.16	
LEIT 19428M001	7	XXXXXX	1.49	1.51	4.90	
PAS2 19351S001	7	XXXXXX	1.56	0.92	4.52	
PASA 19351S001	7	XXXXXX	1.52	0.80	4.82	
RI01 13448M002	7	XXXXXX	0.78	0.79	6.39	
SALA 13469M001	7	XXXXXX	0.28	0.62	3.61	
SCDA 10088M002	7	XXXXXX	1.95	0.72	4.55	
SOPU 19386M001	7	XXXXXX	1.22	1.84	7.43	
TERU 13487M001	7	XXXXXX	0.81	0.50	4.42	
YEBE 13420M001	7	XXXXXX	0.44	0.66	2.24	
ZARA 13462M001	7	XXXXXX	0.77	0.99	5.44	

Comparison of individual solutions:

ACOR 13434M001	N	0.93	0.77	0.99	0.48	0.21	-0.53	-1.37	1.11
ACOR 13434M001	E	1.95	-0.67	0.69	4.02	-1.67	0.42	-0.68	-1.48
ACOR 13434M001	U	6.13	-3.97	3.90	10.30	-6.35	1.56	-0.40	-6.74
ALSA 19419M001	N	4.95	2.76	-2.22	-9.58	4.71	3.01	1.50	3.02
ALSA 19419M001	E	1.84	0.11	-0.11	3.70	0.62	-0.07	-1.07	-2.23
ALSA 19419M001	U	5.83	3.42	3.10	-4.80	5.02	-8.45	3.80	6.99
BLAZ 10074M002	N	1.33	-0.56	0.31	0.34	3.12	0.53	0.30	0.22
BLAZ 10074M002	E	1.95	1.46	-1.02	-1.96	-2.63	1.49	0.42	2.64
BLAZ 10074M002	U	5.73	3.11	1.36	-4.15	1.88	-4.75	-1.65	11.80
BIDA 00000M000	N	1.50	2.10	0.31	-1.36	-1.22	1.60	1.01	1.44
BIDA 00000M000	E	0.81	-1.31	0.72	0.63	0.81	0.07	0.49	-0.67
BIDA 00000M000	U	5.86	-0.12	6.23	-1.29	-5.19	-4.44	3.00	10.49
BRZR 19387M001	N	1.49	1.62	1.09	-1.71	2.37	0.63	0.63	-0.47
BRZR 19387M001	E	1.57	1.04	0.09	-0.51	-2.70	2.10	1.14	-0.59
BRZR 19387M001	U	4.82	2.65	3.31	-2.81	-4.36	-3.58	5.40	7.24
CACE 13447M001	N	1.06	-0.26	0.31	-1.69	-0.08	-1.92	0.19	-0.16
CACE 13447M001	E	0.60	-0.07	0.22	-0.34	0.99	-0.77	-0.46	0.45
CACE 13447M001	U	3.68	-2.75	-1.37	0.73	-2.94	6.58	-4.11	-1.63
CANT 13438M001	N	0.60	0.96	0.40	0.22	0.37	0.89	0.27	-0.15
CANT 13438M001	E	0.85	0.59	0.33	0.50	-1.31	0.15	0.92	-1.01
CANT 13438M001	U	4.52	-0.88	1.10	0.54	7.91	-5.09	-2.61	5.01
CREU 13432M001	N	1.01	0.53	-1.14	1.66	0.77	0.55	-0.13	0.95
CREU 13432M001	E	1.70	-0.24	-1.09	-2.05	0.81	3.05	-0.01	-1.39
CREU 13432M001	U	6.79	3.01	1.00	-3.30	5.78	-11.87	5.30	7.29
EBRE 13410M001	N	1.36	-1.21	0.46	0.47	0.17		-0.10	2.71
EBRE 13410M001	E	1.06	-0.04	-0.83	-0.47	0.56		0.48	-2.03
EBRE 13410M001	U	7.85	14.69	-2.62	-4.98	2.76		6.15	3.86
ELGE 19353S001	N	1.36	0.61	0.13	2.87	-1.10	0.78	-0.07	0.83
ELGE 19353S001	E	1.09	0.94	-0.20	-0.24	-1.67	0.82	-0.51	1.58
ELGE 19353S001	U	5.09	0.27	2.55	4.77	-1.35	-8.08	3.17	6.98
GERN 19389M001	N	0.96	0.39	0.71	1.20	-0.38	1.51	0.27	
GERN 19389M001	E	0.95	-0.67	-0.22	1.87	-0.05	0.61	-0.40	
GERN 19389M001	U	5.64	-0.34	6.21	-0.26	-5.77	-6.44	6.75	
HOND 15012M002	N	0.83	0.49	0.35	0.28	1.72	0.64	0.15	0.53
HOND 15012M002	E	0.67	-0.51	-0.08	0.38	-0.40	1.00	0.88	-0.56
HOND 15012M002	U	5.44	0.41	2.15	-0.00	6.90	-6.40	-2.64	8.80
IGEL 19352S001	N	1.03	-0.05	0.25	2.19	0.43	1.14	0.07	0.03
IGEL 19352S001	E	0.53	0.12	-0.54	-0.24	0.44	-0.26	0.41	0.94
IGEL 19352S001	U	6.34	-0.32	3.12	-3.38	3.14	-6.97	0.29	12.69
ISPS 19484M001	N	1.29	-0.13	0.74	-0.09	3.04	0.35	0.10	0.05
ISPS 19484M001	E	1.19	0.93	0.72	-0.58	-2.33	0.80	0.65	0.59
ISPS 19484M001	U	5.69	0.37	5.96	-4.93	-0.32	-6.59	5.67	7.66
LARE 19440M001	N	1.80	0.09	2.37	-2.38	2.33	-0.76	-1.14	-0.87
LARE 19440M001	E	0.80	-0.38	-1.40	0.30	1.19	0.43	-0.13	-0.07
LARE 19440M001	U	3.96	-3.39	5.30	5.03	-3.51	-2.26	0.13	3.44
LAZK 19354S001	N	1.90	0.82	0.39	-2.24	-2.12	1.57	1.95	2.26
LAZK 19354S001	E	1.01	1.02	1.01	-0.88	-0.57	1.05	0.45	-1.29
LAZK 19354S001	U	8.16	-1.61	-1.64	9.58	12.63	-11.34	-0.90	3.66
LEIT 19428M001	N	1.49	0.69	-0.26	-0.81	3.26	0.52	-0.02	1.06
LEIT 19428M001	E	1.51	-1.33	-0.20	1.25	2.76	0.47	-0.57	-1.50
LEIT 19428M001	U	4.90	0.54	1.22	-6.38	4.30	-2.63	3.62	7.96
PAS2 19351S001	N	1.56	0.48	-0.55	-0.10	3.54	0.88	0.74	-0.52
PAS2 19351S001	E	0.92	0.50	-0.96	0.15	1.61	0.58	0.29	-0.95
PAS2 19351S001	U	4.52	-0.21	1.23	-2.38	5.94	-4.54	1.00	7.66
PASA 19351S001	N	1.52	0.64	-0.73	0.19	3.34	1.04	0.42	-0.71
PASA 19351S001	E	0.80	0.27	-0.96	0.21	1.22	0.55	0.39	-0.94
PASA 19351S001	U	4.82	-0.36	1.63	-2.39	6.90	-5.13	0.66	7.51
RI01 13448M002	N	0.78	0.18	-0.14	-0.12	0.53	1.29	0.45	1.22
RI01 13448M002	E	0.79	0.54	-1.04	0.25	0.07	1.39	0.27	-0.53
RI01 13448M002	U	6.39	-1.05	-0.45	-0.16	3.72	-8.91	4.44	11.42
SALA 13469M001	N	0.28	-0.17	-0.06	0.00	-0.27	0.05	0.55	-0.26
SALA 13469M001	E	0.62	-0.34	0.68	0.00	0.53	-0.64	-0.91	-0.46
SALA 13469M001	U	3.61	-3.57	1.38	4.20	-2.98	4.34	2.53	-3.42
SCDA 10088M002	N	1.95	-0.58	-0.94	3.22	3.25	0.23	-0.68	-0.26
SCDA 10088M002	E	0.72	-0.35	-0.57	0.51	-0.53	0.47	1.39	-0.17

SCDA	10088M002	U	4.55	-0.35	1.76	2.18	4.54	-6.79	0.65	7.00
SOPU	19386M001	N	1.22	1.83	0.02	-0.48	-0.72	1.85	0.40	1.10
SOPU	19386M001	E	1.84	-1.23	-0.71	0.25	3.41	0.25	1.24	-2.22
SOPU	19386M001	U	7.43	-5.27	6.31	4.25	-5.24	-7.77	12.11	3.28
TERU	13487M001	N	0.81	-0.24	-0.89	0.20	1.07	1.05	-0.41	-0.78
TERU	13487M001	E	0.50	0.13	0.66	-0.51	0.19	-0.38	0.05	0.78
TERU	13487M001	U	4.42	-3.61	-1.73	-3.69	1.71	-8.26	3.56	-1.91
YEBE	13420M001	N	0.44	0.17	0.19	-0.20	0.32	0.08	0.39	-0.88
YEBE	13420M001	E	0.66	-0.29	-0.09	-0.33	0.10	0.32	0.47	-1.44
YEBE	13420M001	U	2.24	0.19	0.16	0.95	-2.87	2.75	3.12	-1.88
ZARA	13462M001	N	0.77	1.67	0.19	0.46	-0.28	0.50	-0.27	0.31
ZARA	13462M001	E	0.99	0.91	-0.85	-0.65	0.80	1.78	-0.11	-0.28
ZARA	13462M001	U	5.44	3.86	-0.67	-0.31	7.97	-7.40	1.79	6.36

6.2 Datum verification

In this section, the datum verification is shown. A 3 parameter Helmert 3D (3 translations) is computed to the minimally constrained sites.

TRANSFORMATION IN EQUATORIAL SYSTEM (X, Y, Z):
RESIDUALS IN LOCAL SYSTEM (NORTH, EAST, UP)

LIST OF REMOVED STATIONS:

OUTLIER CRITERIA: 15.00 15.00 20.00

NUM	NAME	FLG	RESIDUALS IN MILLIMETERS		
2	ALAC 13433M001	I W	1.51	-1.29	0.52
3	ALME 13437M001	I W	-0.30	-0.19	4.10
4	BCL1 19482M001	I W	0.10	-1.62	4.07
5	BELL 13431M001	I W	-0.71	-1.07	3.36
6	BIAZ 10074M002	I W	2.11	-0.67	-10.49
7	BORR 13480M001	I W	-5.66	-0.76	1.08
8	BRST 10004M004	I W	-0.39	-0.48	5.24
9	CACE 13447M001	I W	1.83	0.91	-1.72
10	CANT 13438M001	I W	1.12	0.53	-3.00
11	CASC 13909S001	I W	0.95	-0.20	1.36
12	CEU1 13449M002	I W	1.03	0.87	-5.18
14	EBRE 13410M001	I W	-2.07	-0.12	-4.76
16	FLRS 31907M001	I W	0.13	3.73	-1.31
17	FUER 31330M001	I W	-0.04	-0.64	1.57
19	HUEL 13451M001	I W	2.33	2.15	-10.36
20	IBIZ 13454S001	I W	-0.06	1.78	1.17
21	IZAN 31309M002	I W	-1.13	-2.67	-4.47
22	LAGO 13903M001	I W	0.09	-0.39	1.38
23	LLIV 13436M001	I W	-2.56	1.04	5.39
24	LPAL 81701M001	I W	1.32	1.47	-0.61
25	LROC 10023M001	I W	0.58	1.15	0.80
26	MADR 13407S012	I W	-0.98	-0.35	-3.03
27	MAL1 13444M002	I W	4.07	-1.89	-5.42
28	MALA 13443M001	I W	2.74	-0.63	5.07
29	MALL 13444M001	I W	-1.03	0.80	6.21
30	MAS1 31303M002	I W	-1.94	-2.72	1.44
31	MELI 19379M001	I W	0.88	0.42	7.58
32	PDEL 31906M004	I W	-2.67	-1.15	-3.16
33	SCOA 10088M002	I W	-1.62	0.20	-11.83
34	SFER 13402M004	I W	-0.92	-7.10	3.34
35	SOPU 19386M001	I W	0.97	0.28	1.31
36	VALE 13439M001	I W	0.34	2.16	-1.24
37	VIGO 13450M001	I W	1.23	2.34	0.33
38	VILL 13406M001	I W	-0.71	0.06	5.27
39	YEBE 13420M001	I W	-0.34	-0.11	2.71
40	ZARA 13462M001	I W	0.15	1.39	-1.68
41	ZIMM 14001M004	I W	-0.30	0.09	4.62
RMS / COMPONENT			1.75	1.82	4.71
IQR			1.96	1.58	6.36
MEAN			0.00	-0.07	-0.01
MEDIAN			0.09	-0.11	1.08
MIN			-5.66	-7.10	-11.83
MAX			4.07	3.73	7.58
OVERALL RMS/IQR/MAX(3D)			3.08	2.51	11.94
					SCOA 10088M002 #SUM
ALL RMS / COMPONENT			1.75	1.82	4.71
ALL IQR			1.96	1.58	6.36
ALL MEAN			0.00	-0.07	-0.01
ALL MEDIAN			0.09	-0.11	1.08
ALL MIN			-5.66	-7.10	-11.83
ALL MAX			4.07	3.73	7.58
ALL OVERALL RMS/IQR/MAX(3D)			3.08	2.51	11.94
					SCOA 10088M002 #SUM_ALL

NUMBER OF PARAMETERS : 3
NUMBER OF STATIONS : 37
NUMBER OF COORDINATES : 111
RMS OF TRANSFORMATION : 3.08 MM

PARAMETERS:

TRANSLATION IN X : -0.00 +- 0.51 MM
TRANSLATION IN Y : -0.00 +- 0.51 MM
TRANSLATION IN Z : -0.00 +- 0.51 MM

NUMBER OF ITERATIONS : 1

6.3 Adjustment Statistics

In this section, the summary of the global adjustment and not subnetworks are shown. Also, the Helmert parameters of the combined solution with respect to the daily solutions are shown.

```
* STATISTICAL PARAMETER-----VALUE(S)-----
NUMBER OF OBSERVATIONS          19351677
NUMBER OF UNKNOWN               201507
NUMBER OF DEGREES OF FREEDOM    19150170
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)     180
VARIANCE FACTOR                  95.866345450204420
```

7 Equipment

7.1 Receiver List

Serial numbers not shown.

```
*SITE PT SOLN T DATA_START__ DATA_END_____ DESCRIPTION_____ S/N__ FIRMWARE____
ACOR A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
ALSA A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
BIAZ A 1 P 25:306:00000 25:312:86370 SPECTRA SP90M -----
BIDA A 1 P 25:306:00000 25:312:86370 LEICA GR10 -----
BRZR A 1 P 25:306:00000 25:312:86370 LEICA GR30 -----
CACE A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
CANT A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
CREU A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
EBRE A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
ELGE A 1 P 25:306:00000 25:312:86370 LEICA GR30 -----
GERN A 1 P 25:306:00000 25:311:86370 LEICA GR30 -----
HOND A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
IGEL A 1 P 25:306:00000 25:312:86370 LEICA GR30 -----
ISPS A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
LARE A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
LAZK A 1 P 25:306:00000 25:312:86370 LEICA GR30 -----
LEIT A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
PAS2 A 1 P 25:306:00000 25:312:86370 STONEX SC2200 -----
PASA A 1 P 25:306:00000 25:312:86370 LEICA GR30 -----
RI01 A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
SALA A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
SCDA A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
SOPU A 1 P 25:306:00000 25:312:86370 LEICA GR30 -----
TERU A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
YEBE A 1 P 25:306:00000 25:312:86370 LEICA GR50 -----
ZARA A 1 P 25:306:00000 25:312:86370 TRIMBLE NETR9 -----
```

7.2 Antennas

Serial number ONLY provided in case individual calibrations are used.

```
*SITE PT SOLN T DATA_START__ DATA_END_____ DESCRIPTION_____ S/N__ DAZI
ACOR A 1 P 25:306:00000 25:312:86370 LEIAT504 LEIS -----
ALSA A 1 P 25:306:00000 25:312:86370 LEIAR10 NONE -----
BIAZ A 1 P 25:306:00000 25:312:86370 LEIAR25 LEIT -----
BIDA A 1 P 25:306:00000 25:312:86370 LEIAS10 NONE -----
BRZR A 1 P 25:306:00000 25:312:86370 LEIAS10 NONE -----
CACE A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
CANT A 1 P 25:306:00000 25:312:86370 LEIAR25_R4 LEIT -----
CREU A 1 P 25:306:00000 25:312:86370 LEIAR25_R4 NONE -----
EBRE A 1 P 25:306:00000 25:312:86370 LEIAR25_R4 NONE -----
ELGE A 1 P 25:306:00000 25:312:86370 LEIAR25_R4 LEIT -----
GERN A 1 P 25:306:00000 25:311:86370 LEIAS10 NONE -----
HOND A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
IGEL A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
ISPS A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
LARE A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
LAZK A 1 P 25:306:00000 25:312:86370 LEIAR25_R4 LEIT -----
LEIT A 1 P 25:306:00000 25:312:86370 LEIAR10 NONE -----
PAS2 A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
PASA A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
RI01 A 1 P 25:306:00000 25:312:86370 LEIAR25_R4 LEIT -----
SALA A 1 P 25:306:00000 25:312:86370 LEIAR25 NONE -----
SCDA A 1 P 25:306:00000 25:312:86370 TRM55971.00 NONE -----
SOPU A 1 P 25:306:00000 25:312:86370 LEIAS10 NONE -----
TERU A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
YEBE A 1 P 25:306:00000 25:312:86370 LEIAR20 LEIM -----
ZARA A 1 P 25:306:00000 25:312:86370 TRM29659.00 NONE -----
```

7.3 Eccentricities

```
* SITE PT SOLN T DATA_START__ DATA_END_____ AXE ARP->BENCHMARK(M)-----
ACOR A 1 P 25:306:00000 25:312:86370 UNE 3.0460 0.0000 0.0000
ALSA A 1 P 25:306:00000 25:312:86370 UNE 0.0000 0.0000 0.0000
BIAZ A 1 P 25:306:00000 25:312:86370 UNE 0.0000 0.0000 0.0000
```

BIDA	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
BRZR	A	1	P	25:306:00000	25:312:86370	UNE	0.0771	0.0000	0.0000
CACE	A	1	P	25:306:00000	25:312:86370	UNE	0.0600	0.0000	0.0000
CANT	A	1	P	25:306:00000	25:312:86370	UNE	3.0490	0.0000	0.0000
CREU	A	1	P	25:306:00000	25:312:86370	UNE	0.0770	0.0000	0.0000
EBRE	A	1	P	25:306:00000	25:312:86370	UNE	0.0770	0.0000	0.0000
ELGE	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
GERN	A	1	P	25:306:00000	25:311:86370	UNE	0.0771	0.0000	0.0000
HOND	A	1	P	25:306:00000	25:312:86370	UNE	0.0771	0.0000	0.0000
IGEL	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
ISPS	A	1	P	25:306:00000	25:312:86370	UNE	0.0350	0.0000	0.0000
LARE	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
LAZK	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
LEIT	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
PAS2	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
PASA	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
RID1	A	1	P	25:306:00000	25:312:86370	UNE	0.0606	0.0000	0.0000
SALA	A	1	P	25:306:00000	25:312:86370	UNE	0.0600	0.0000	0.0000
SCDA	A	1	P	25:306:00000	25:312:86370	UNE	0.0000	0.0000	0.0000
SOPU	A	1	P	25:306:00000	25:312:86370	UNE	0.0771	0.0000	0.0000
TERU	A	1	P	25:306:00000	25:312:86370	UNE	0.0600	0.0000	0.0000
YEBE	A	1	P	25:306:00000	25:312:86370	UNE	0.0600	0.0000	0.0000
ZARA	A	1	P	25:306:00000	25:312:86370	UNE	3.2590	0.0000	0.0000

8 Inconsistencies (logsheet-RINEX metadata)

The following inconsistencies were found comparing the data available in the logsheets and the RINEX headers:

2025-11-23	03:11	UTC	BIDA3060.250	RECEIVER	TYPE		LEICA GR30	->	LEICA GR10	(source: bida_20200626.log
2025-11-23	03:11	UTC	BIDA3060.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.52/6.525	(source: bida_20200626.log
2025-11-23	09:05	UTC	BIDA3070.250	RECEIVER	TYPE		LEICA GR30	->	LEICA GR10	(source: bida_20200626.log
2025-11-23	09:05	UTC	BIDA3070.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.52/6.525	(source: bida_20200626.log
2025-11-23	14:53	UTC	BIDA3080.250	RECEIVER	TYPE		LEICA GR30	->	LEICA GR10	(source: bida_20200626.log
2025-11-23	14:53	UTC	BIDA3080.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.52/6.525	(source: bida_20200626.log
2025-11-23	20:42	UTC	BIDA3090.250	RECEIVER	TYPE		LEICA GR30	->	LEICA GR10	(source: bida_20200626.log
2025-11-23	20:42	UTC	BIDA3090.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.52/6.525	(source: bida_20200626.log
2025-11-24	07:24	UTC	BIDA3100.250	RECEIVER	TYPE		LEICA GR30	->	LEICA GR10	(source: bida_20200626.log
2025-11-24	07:24	UTC	BIDA3100.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.52/6.525	(source: bida_20200626.log
2025-11-24	12:47	UTC	BIDA3110.250	RECEIVER	TYPE		LEICA GR30	->	LEICA GR10	(source: bida_20200626.log
2025-11-24	12:47	UTC	BIDA3110.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.52/6.525	(source: bida_20200626.log
2025-11-24	18:15	UTC	BIDA3120.250	RECEIVER	TYPE		LEICA GR30	->	LEICA GR10	(source: bida_20200626.log
2025-11-24	18:15	UTC	BIDA3120.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.52/6.525	(source: bida_20200626.log
2025-11-23	03:11	UTC	BRZR3060.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.80/7.900	(source: brzr00esp_20240315.log
2025-11-23	09:05	UTC	BRZR3070.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.80/7.900	(source: brzr00esp_20240315.log
2025-11-23	14:53	UTC	BRZR3080.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.80/7.900	(source: brzr00esp_20240315.log
2025-11-23	20:42	UTC	BRZR3090.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.80/7.900	(source: brzr00esp_20240315.log
2025-11-24	07:24	UTC	BRZR3100.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.80/7.900	(source: brzr00esp_20240315.log
2025-11-24	12:47	UTC	BRZR3110.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.80/7.900	(source: brzr00esp_20240315.log
2025-11-24	18:15	UTC	BRZR3120.250	RECEIVER	FIRM. VERS.		4.83/7.900	->	4.80/7.900	(source: brzr00esp_20240315.log
2025-11-23	03:11	UTC	CANT3060.250	RECEIVER	TYPE		LEICA GR10	->	LEICA GR50	(source: cant00esp_20250509.log
2025-11-23	03:11	UTC	CANT3060.250	RECEIVER	FIRM. VERS.		4.00/6.713	->	4.80/7.900	(source: cant00esp_20250509.log
2025-11-23	09:05	UTC	CANT3070.250	RECEIVER	TYPE		LEICA GR10	->	LEICA GR50	(source: cant00esp_20250509.log
2025-11-23	09:05	UTC	CANT3070.250	RECEIVER	FIRM. VERS.		4.00/6.713	->	4.80/7.900	(source: cant00esp_20250509.log
2025-11-23	14:53	UTC	CANT3080.250	RECEIVER	TYPE		LEICA GR10	->	LEICA GR50	(source: cant00esp_20250509.log
2025-11-23	14:53	UTC	CANT3080.250	RECEIVER	FIRM. VERS.		4.00/6.713	->	4.80/7.900	(source: cant00esp_20250509.log
2025-11-23	20:42	UTC	CANT3090.250	RECEIVER	TYPE		LEICA GR10	->	LEICA GR50	(source: cant00esp_20250509.log
2025-11-23	20:42	UTC	CANT3090.250	RECEIVER	FIRM. VERS.		4.00/6.713	->	4.80/7.900	(source: cant00esp_20250509.log
2025-11-24	07:24	UTC	CANT3100.250	RECEIVER	TYPE		LEICA GR10	->	LEICA GR50	(source: cant00esp_20250509.log
2025-11-24	07:24	UTC	CANT3100.250	RECEIVER	FIRM. VERS.		4.00/6.713	->	4.80/7.900	(source: cant00esp_20250509.log
2025-11-24	12:47	UTC	CANT3110.250	RECEIVER	TYPE		LEICA GR10	->	LEICA GR50	(source: cant00esp_20250509.log
2025-11-24	12:47	UTC	CANT3110.250	RECEIVER	FIRM. VERS.		4.00/6.713	->	4.80/7.900	(source: cant00esp_20250509.log
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9 References

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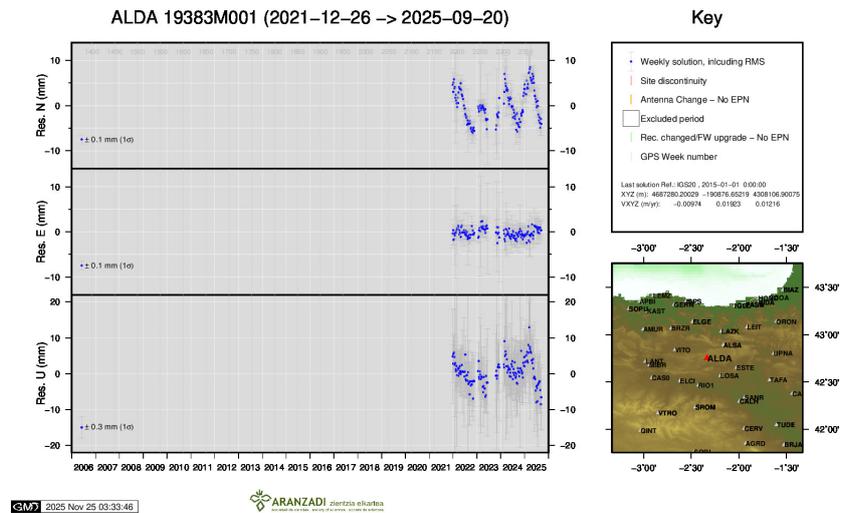
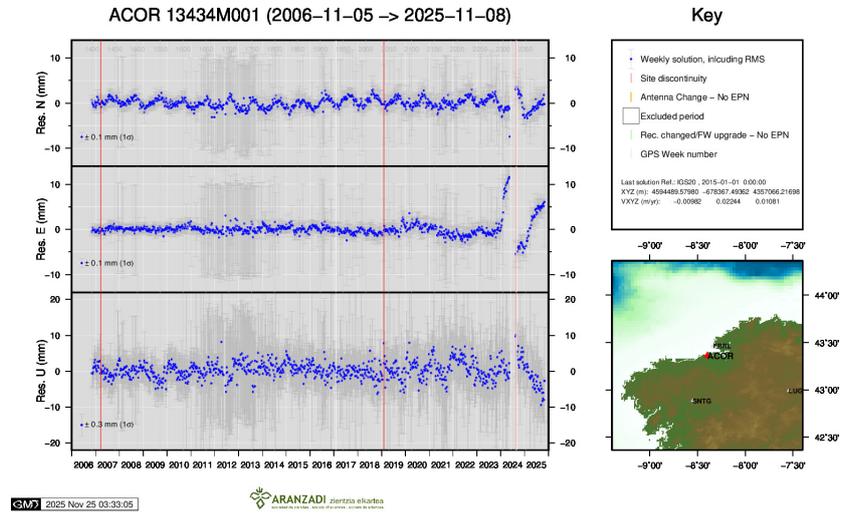
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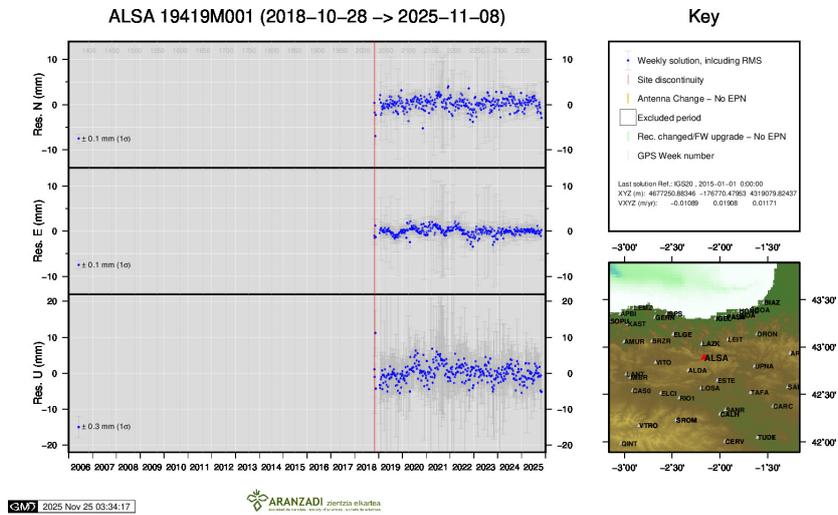
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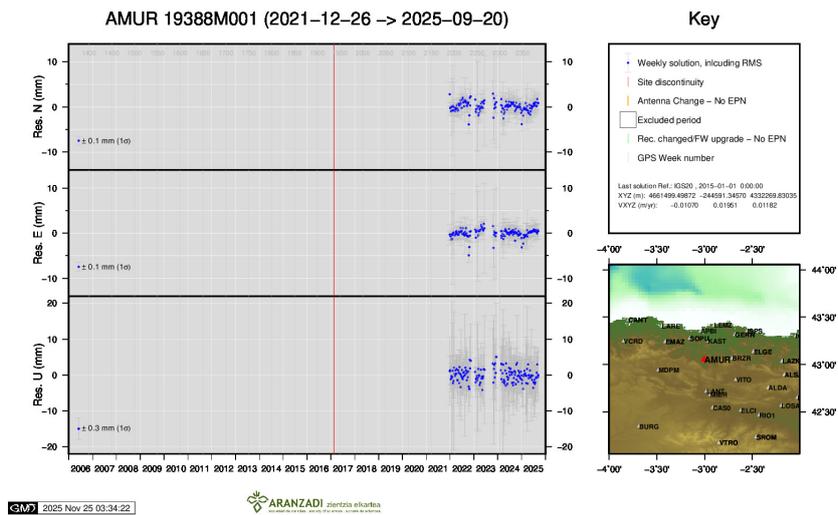
10 Cumulative Time Series

Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.

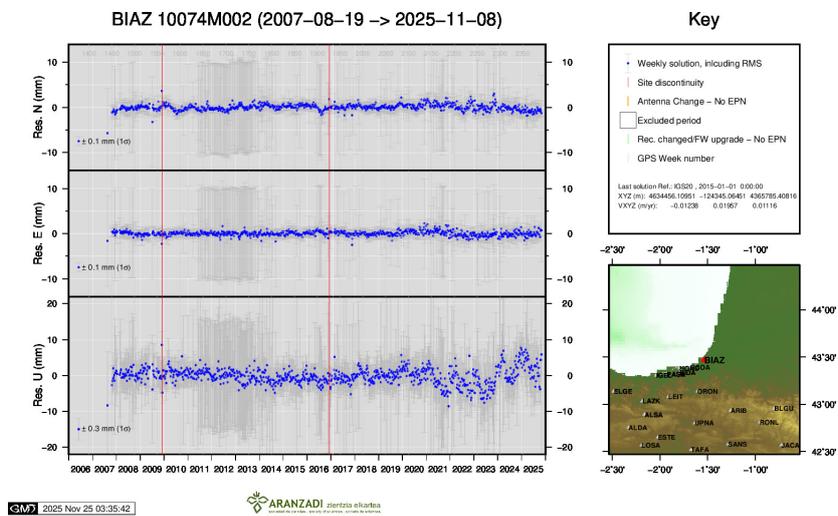




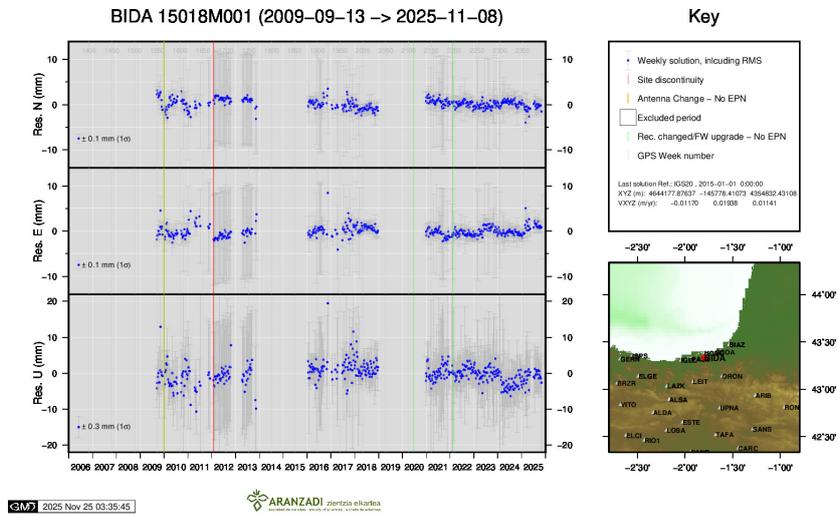
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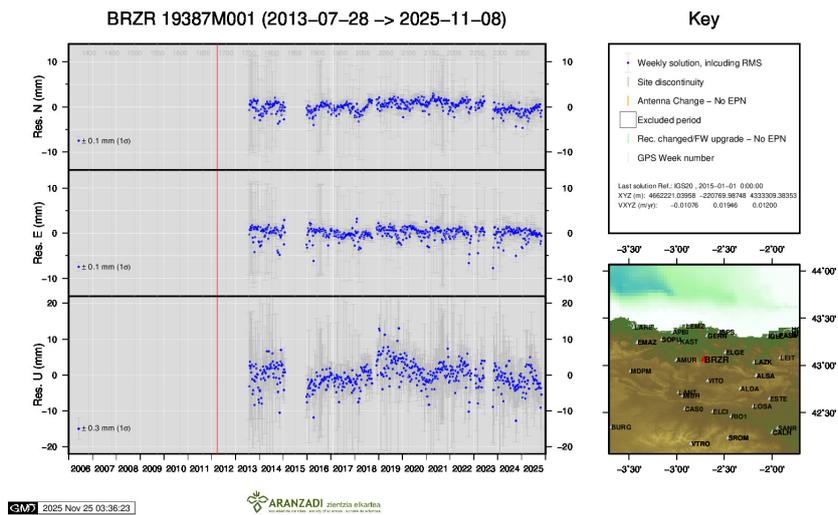
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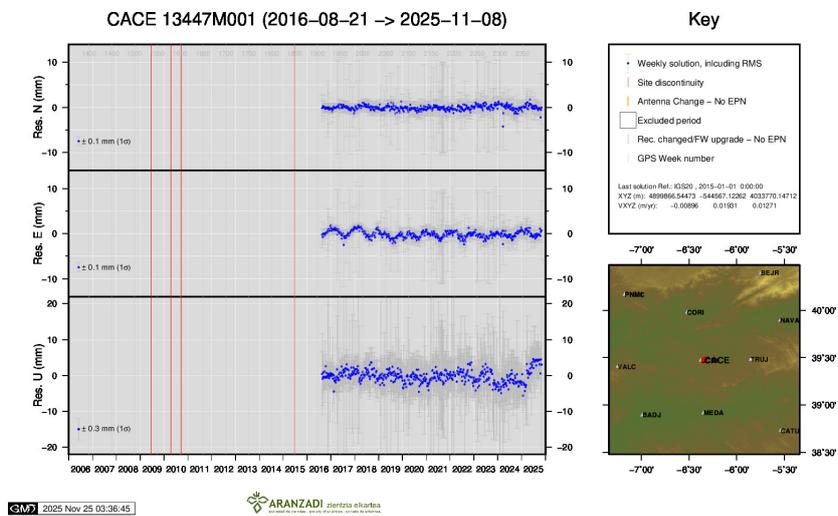
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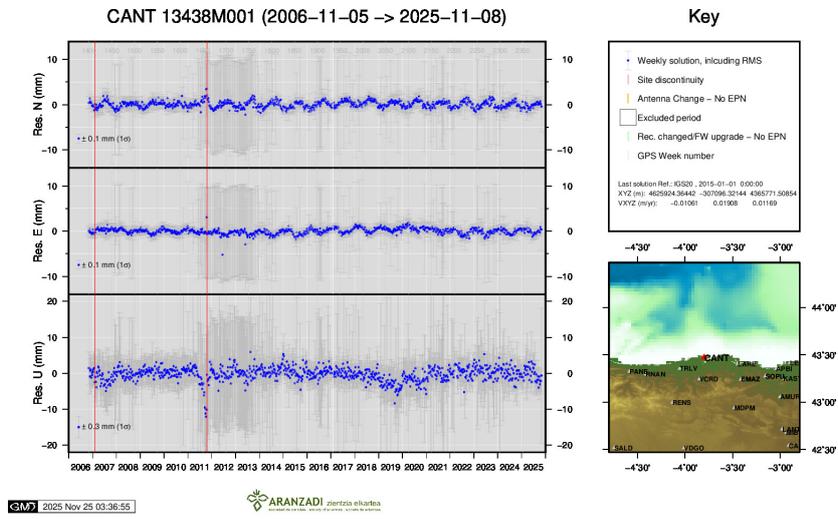
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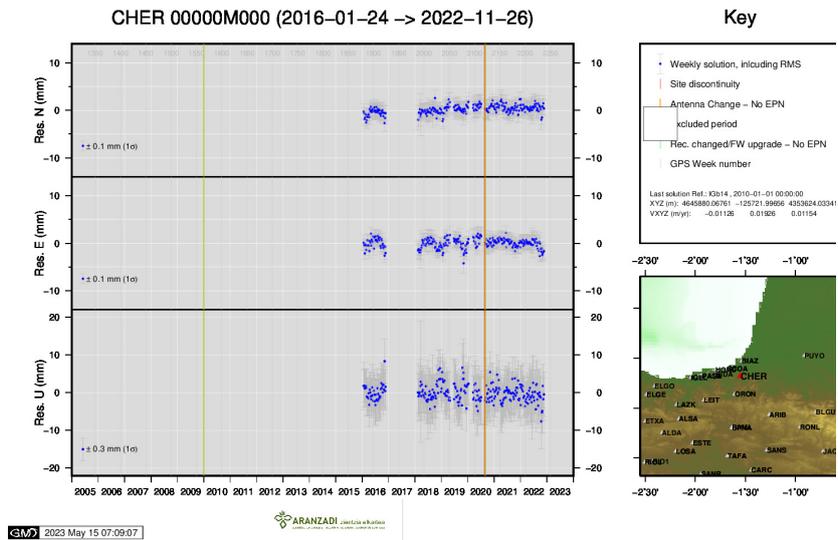
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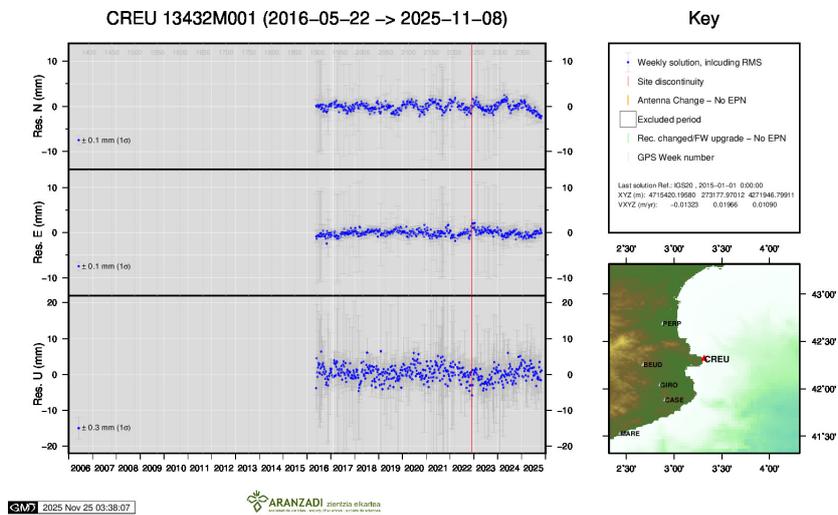
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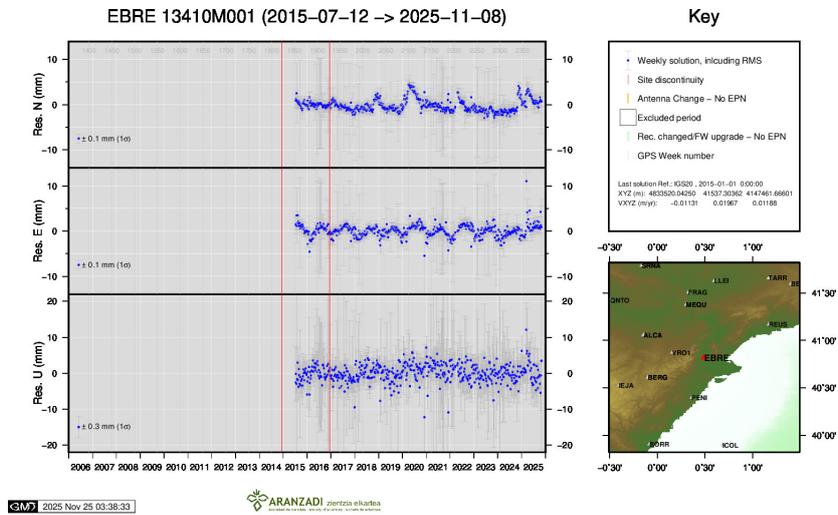
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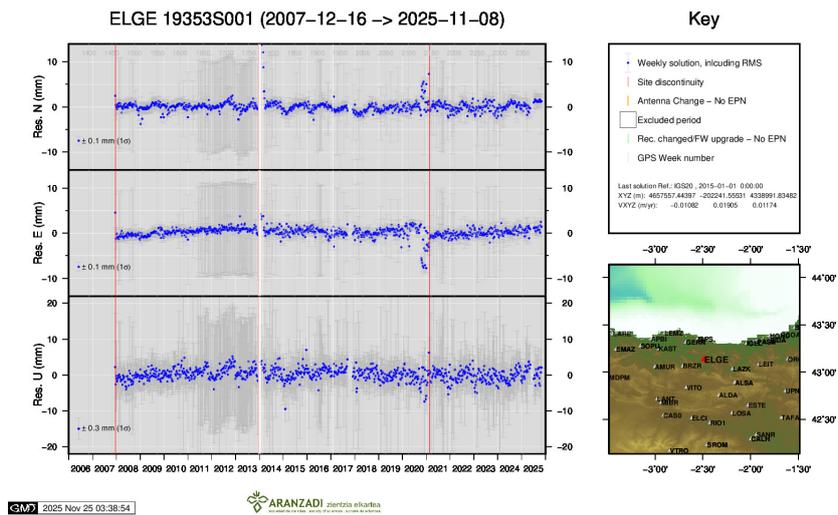
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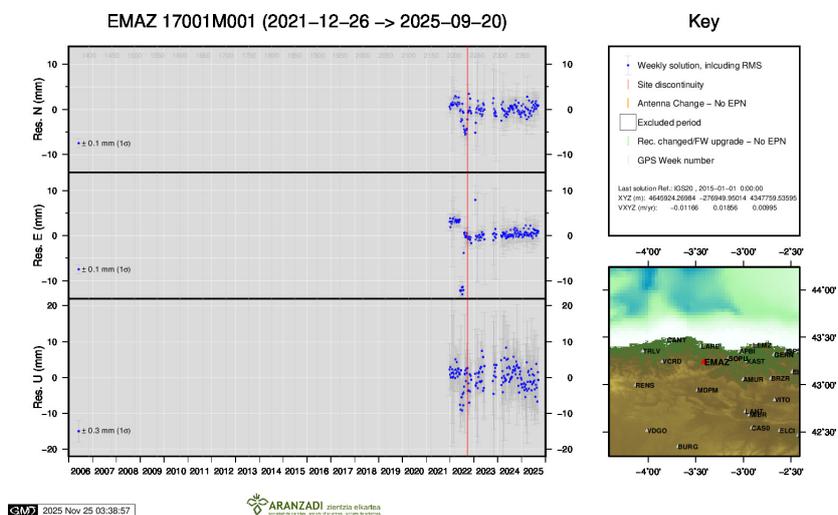
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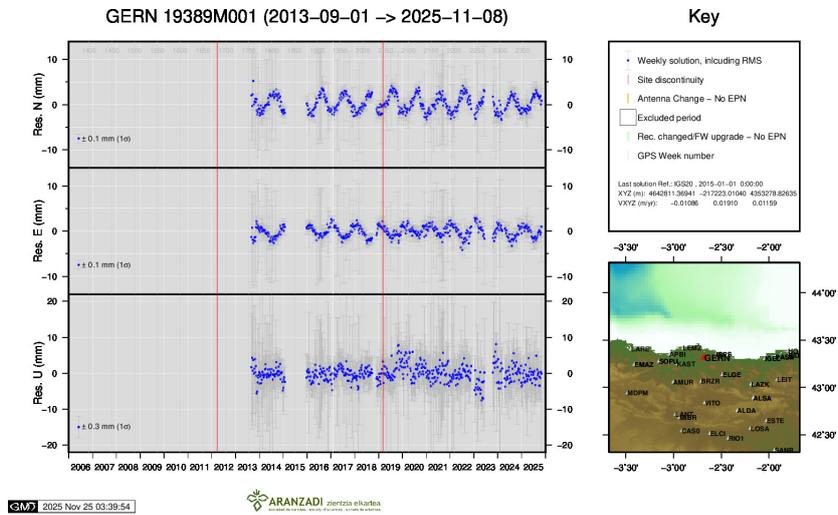
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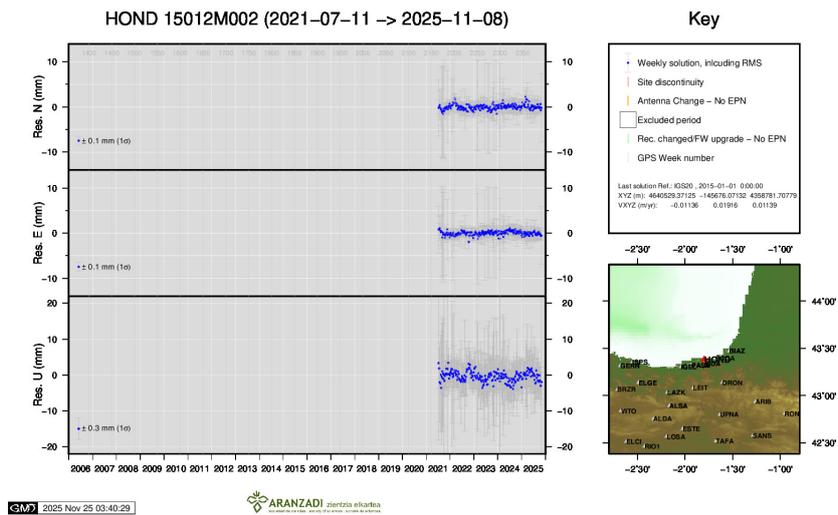
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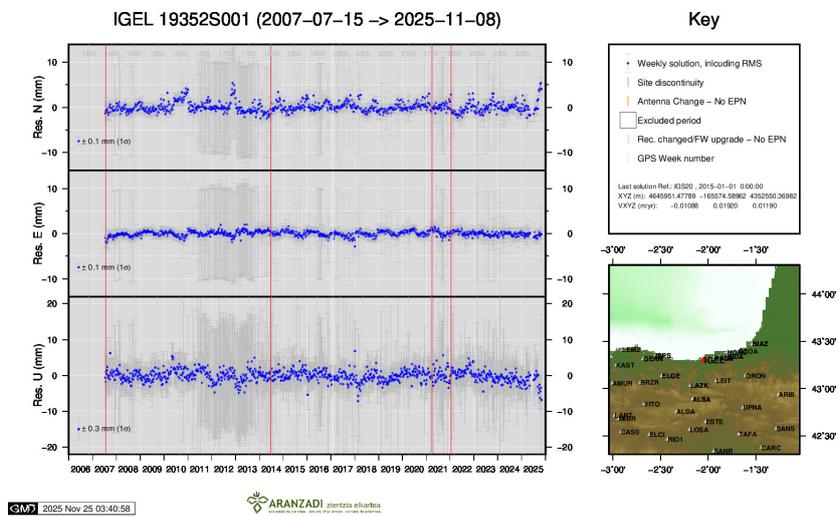
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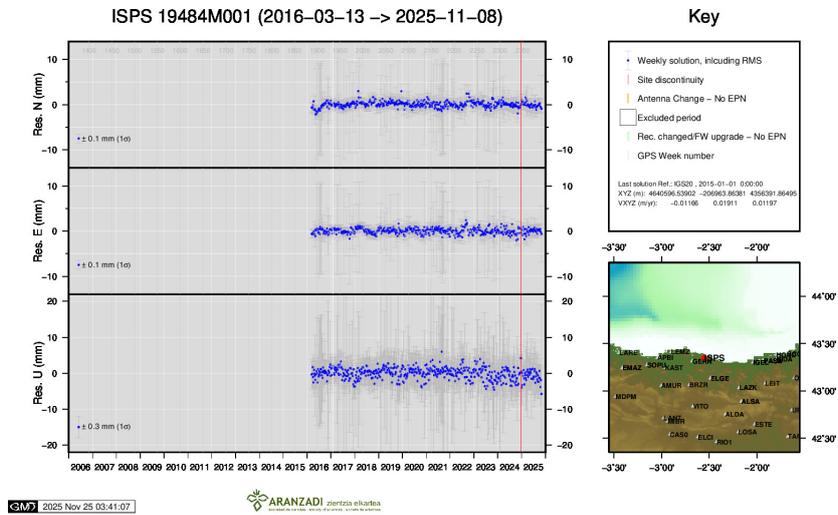
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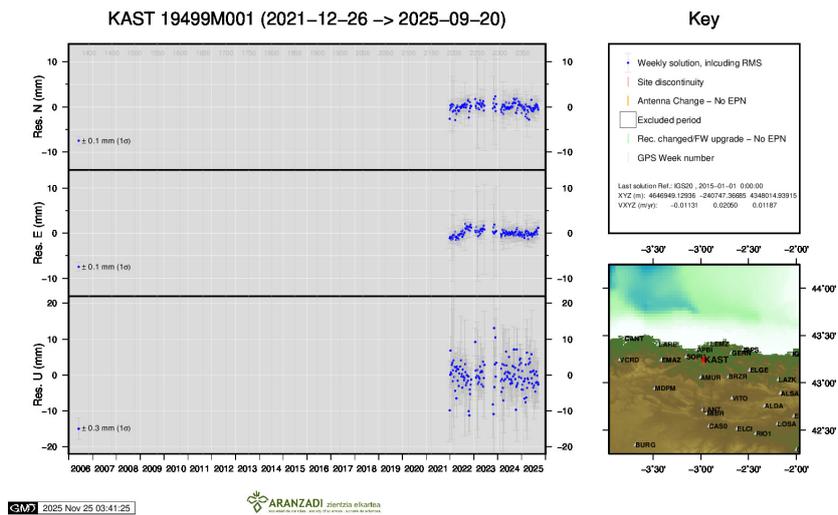
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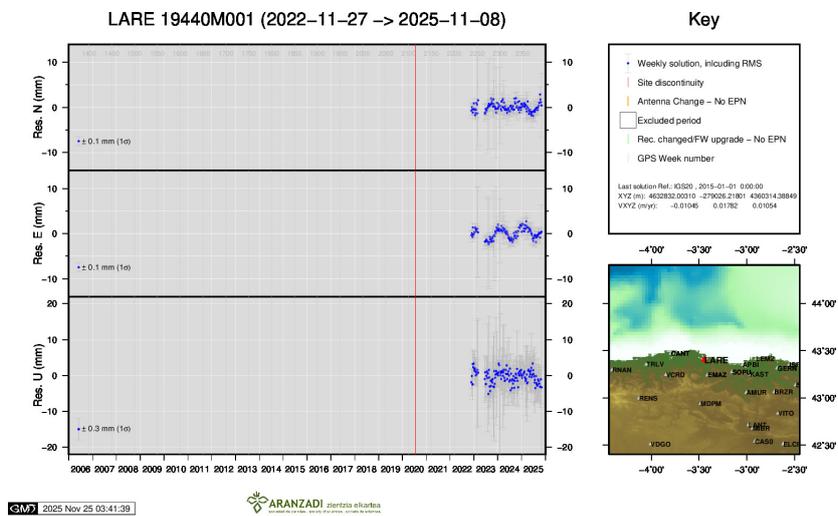
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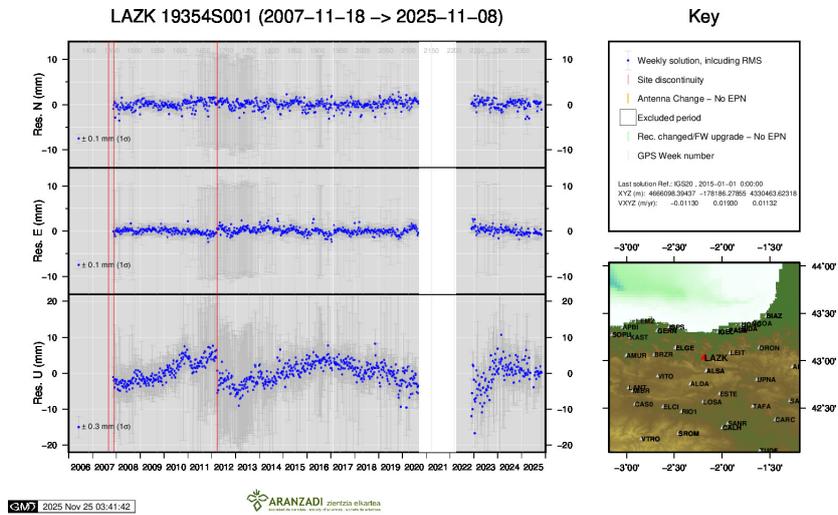
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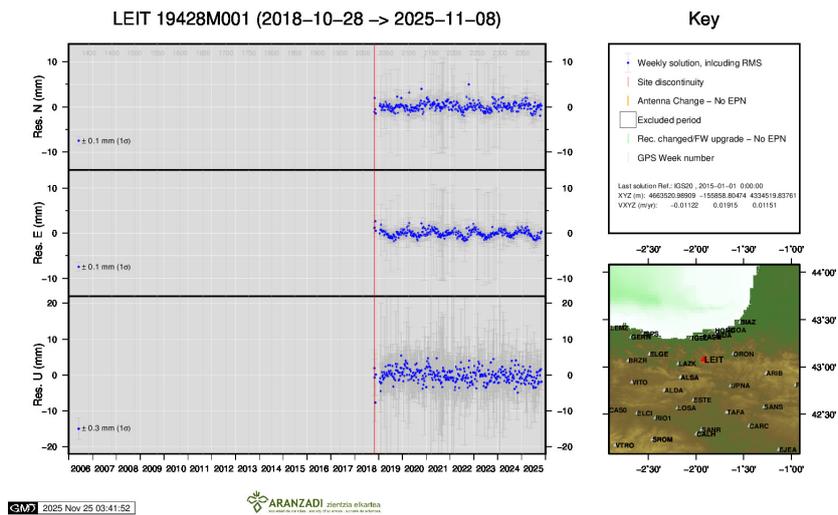
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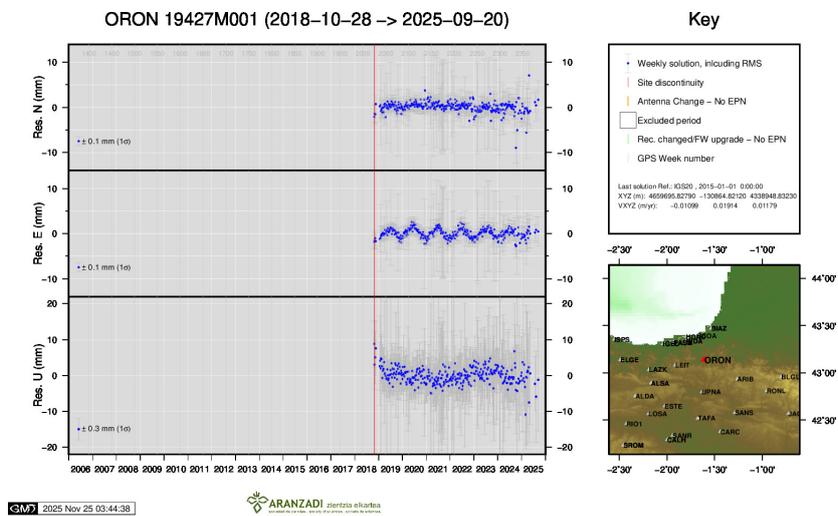
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21) LAZK



22) LEIT



23) ORON

