ARA-DAC Weekly Analysis Result: 2331 (GFA)

Technical Report

GPS Week: 2331 (GFA)

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

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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

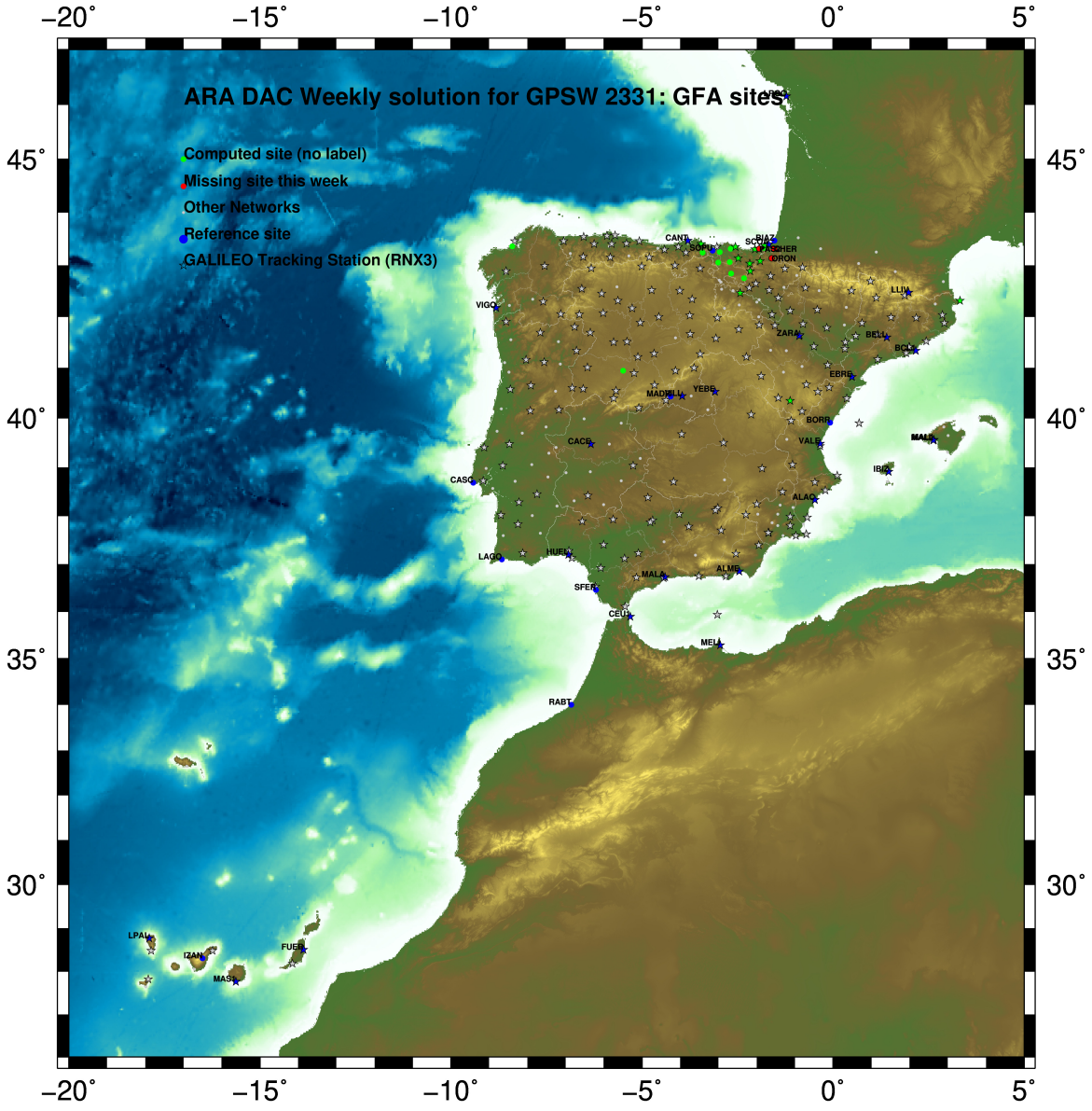

Fig.1: Computed Sites for GPS Week2331 (GFA)

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 observatione 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: 3*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 12-OCT-24 13:09

LOCAL GEODETIC DATUM: IGS20 EPOCH: 2024-09-11 11:59:45

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	SYSTEM
111	ACOR 13434M001	4594489.48526	-678367.28038	4357066.32862	A	G
39	ALDA 19383M001	4687280.10594	-190876.46695	4308107.01681	A	GR
50	ALSA 19419M001	4677250.77761	-176770.29432	4319079.93986	A	GRE
53	AMUR 19388M001	4661499.39474	-244591.15546	4332269.94573	A	GR
384	BIAZ 10074M002	4634455.99139	-124344.87323	4365785.51849	W	GR
101	BIDA 00000M000	4644177.75943	-145778.22265	4354832.54048	A	GR
113	BRZR 19387M001	4662220.93481	-220769.79696	4333309.49948	A	GR
573	CACE 13447M001	4899866.45683	-544566.93495	4033770.26900	W	GRE
592	CANT 13438M001	4625924.26185	-307096.13572	4365771.62301	W	GRE
908	CREU 13432M001	4715420.06634	273178.16239	4271946.90457	A	GRE
135	EBRE 13410M001	4833519.93161	41537.49604	4147461.77886	W	GRE
180	ELGE 19353S001	4657557.33842	-202241.36905	4338991.94963	A	GRE
182	EMAZ 17001M001	4645924.16011	-276949.76817	4347759.63487	A	GR
209	GERN 19389M001	4642811.26598	-217222.82619	4353278.94253	A	GR
257	HOND 15012M002	4640529.26094	-145675.88392	4358781.81882	A	GRE
235	IGEL 19352S001	4645951.37238	-165574.40251	4352550.48548	A	GRE
240	ISPS 19484M001	4640596.42544	-206963.67610	4356391.97914	A	GRE
245	KAST 19499M001	4646949.02429	-240747.16787	4348015.06137	A	GR
252	LARE 19440M001	4632831.90158	-279026.04420	4360314.49031	A	GRE
256	LAZK 19354S001	4666098.28326	-178186.09077	4330463.73306	A	GRE
261	LEIT 19428M001	4663520.88010	-155858.61850	4334519.94994	A	GRE
493	PASA 19351S001	4644909.00448	-156644.96888	4353623.13981	A	GRE
553	RIO1 13448M002	4708446.77277	-199490.18133	4284089.79947	A	GRE
558	SALA 13469M001	4803054.43406	-462130.96741	4158379.14121	A	GR
526	SCOA 10088M002	4639940.44736	-136224.84280	4359552.48430	W	GRE
715	SOPU 19386M001	4643997.85278	-255913.80680	4350063.20461	W	GR
443	TERU 13487M001	4867391.26586	-95523.24076	4108341.74760	A	GRE
493	VITO 19385M001	4679397.64682	-218436.40338	4314898.43339	A	GR
616	YEBE 13420M001	4848724.51617	-261631.82588	4123094.39418	W	GRE
655	ZARA 13462M001	4773803.11362	-73505.88334	4215454.15975	W	GRE

5.2 ETRF2000 (ETRS89) Coordinates

European **T**errestrial **R**eference **S**ystem, **1989** (**ETRS89**) is realized by ETRF2000 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

CONVERT TO ETRF2000 12-OCT-24 13:09

LOCAL GEODETIC DATUM: ETRF2000 EPOCH: 2024-09-11 11:59:45

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	SYSTEM
111	ACOR 13434M001	4594489.83178	-678367.92167	4357065.84525	A	
39	ALDA 19383M001	4687280.51543	-190877.11865	4308106.53224	A	
50	ALSA 19419M001	4677251.18993	-176770.94476	4319079.45638	A	
53	AMUR 19388M001	4661499.79883	-244591.80415	4332269.46268	A	
384	BIAZ 10074M002	4634456.41472	-124345.51828	4365785.03953	W	
101	BIDA 00000M000	4644178.17892	-145778.86895	4354832.06036	A	
113	BRZR 19387M001	4662221.34226	-220770.44568	4333309.01670	A	
573	CACE 13447M001	4899866.79528	-544567.61312	4033769.76054	W	
592	CANT 13438M001	4625924.66010	-307096.78021	4365771.14221	W	
908	CREU 13432M001	4715420.53647	273177.50888	4271946.42400	A	
135	EBRE 13410M001	4833520.35982	41536.82731	4147461.28462	W	
180	ELGE 19353S001	4657557.74887	-202242.01715	4338991.46753	A	
182	EMAZ 17001M001	4645924.56103	-276950.41505	4347759.15273	A	
209	GERN 19389M001	4642811.67554	-217223.47252	4353278.46151	A	
257	HOND 15012M002	4640529.68077	-145676.52978	4358781.33902	A	
235	IGEL 19352S001	4645951.78897	-165575.04909	4352550.00492	A	
240	ISPS 19484M001	4640596.83667	-206964.32214	4356391.49847	A	
245	KAST 19499M001	4646949.43020	-240747.81477	4348014.57966	A	
252	LARE 19440M001	4632832.30324	-279026.68946	4360314.00930	A	
256	LAZK 19354S001	4666098.69632	-178186.73984	4330463.25054	A	
261	LEIT 19428M001	4663521.29655	-155859.26720	4334519.46797	A	
493	PASA 19351S001	4644909.42238	-156645.61530	4353622.65947	A	
553	RIO1 13448M002	4708447.17911	-199490.83563	4284089.31291	A	
558	SALA 13469M001	4803054.79406	-462131.63378	4158378.64253	A	
526	SCOA 10088M002	4639940.86855	-136225.48855	4359552.00468	W	
715	SOPU 19386M001	4643998.25677	-255914.45338	4350062.72294	W	
443	TERU 13487M001	4867391.67208	-95523.91403	4108341.24843	A	
493	VITO 19385M001	4679398.05308	-218437.05419	4314897.94913	A	
616	YEBE 13420M001	4848724.90081	-261632.49735	4123093.89432	W	
655	ZARA 13462M001	4773803.53163	-73506.54522	4215453.66918	W	

5.3 ETRF2014 (ETRS89) Coordinates

European **T**errestrial **R**eference **S**ystem, **1989** (**ETRS89**) is realized by ETRF2014 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

CONVERT TO ETRF2014 12-OCT-24 13:09

LOCAL GEODETIC DATUM: ETRF2014 EPOCH: 2024-09-11 11:59:45

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	SYSTEM
111	ACOR 13434M001	4594489.79194	-678367.95833	4357065.89793	A	
39	ALDA 19383M001	4687280.47304	-190877.15675	4308106.58478	A	
50	ALSA 19419M001	4677251.14760	-176770.98295	4319079.50895	A	
53	AMUR 19388M001	4661499.75692	-244591.84215	4332269.51527	A	
384	BIAZ 10074M002	4634456.37268	-124345.55686	4365785.09227	W	
101	BIDA 00000M000	4644178.13685	-145778.90741	4354832.11305	A	
113	BRZR 19387M001	4662221.30026	-220770.48377	4333309.06930	A	
573	CACE 13447M001	4899866.75150	-544567.64889	4033769.81235	W	
592	CANT 13438M001	4625924.61879	-307096.81814	4365771.19488	W	
908	CREU 13432M001	4715420.49195	273177.46918	4271946.47680	A	
135	EBRE 13410M001	4833520.31486	41536.78902	4147461.33688	W	
180	ELGE 19353S001	4657557.70686	-202242.05533	4338991.52015	A	
182	EMAZ 17001M001	4645924.51940	-276950.45300	4347759.20536	A	
209	GERN 19389M001	4642811.63374	-217223.51071	4353278.51418	A	
257	HOND 15012M002	4640529.63874	-145676.56825	4358781.39173	A	
235	IGEL 19352S001	4645951.74696	-165575.08746	4352550.05760	A	
240	ISPS 19484M001	4640596.79486	-206964.36038	4356391.55114	A	
245	KAST 19499M001	4646949.38843	-240747.85286	4348014.63230	A	
252	LARE 19440M001	4632832.26176	-279026.72747	4360314.06197	A	
256	LAZK 19354S001	4666098.65412	-178186.77808	4330463.30315	A	
261	LEIT 19428M001	4663521.25431	-155859.30553	4334519.52060	A	
493	PASA 19351S001	4644909.38034	-156645.65371	4353622.71216	A	
553	RIO1 13448M002	4708447.13651	-199490.87359	4284089.36538	A	
558	SALA 13469M001	4803054.75121	-462131.67032	4158378.69461	A	
526	SCOA 10088M002	4639940.82649	-136225.52707	4359552.05740	W	
715	SOPU 19386M001	4643998.21509	-255914.49142	4350062.77558	W	
443	TERU 13487M001	4867391.62724	-95523.95166	4108341.30050	A	
493	VITO 19385M001	4679398.01088	-218437.09221	4314898.00168	A	
616	YEBE 13420M001	4848724.85677	-261632.53444	4123093.94635	W	
655	ZARA 13462M001	4773803.48781	-73506.58335	4215453.72153	W	

5.4 ETRF2020 (ETRS89) Coordinates

European **T**errestrial **R**eference **S**ystem, **1989** (**ETRS89**) is realized by ETRF2020 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

CONVERT TO ETRF2020 12-OCT-24 13:09

LOCAL GEODETIC DATUM: ETRF2020 EPOCH: 2024-09-11 11:59:45

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	SYSTEM
111	ACOR 13434M001	4594489.78821	-678367.94398	4357065.90584	A	
39	ALDA 19383M001	4687280.46803	-190877.14191	4308106.59295	A	
50	ALSA 19419M001	4677251.14252	-176770.96814	4319079.51711	A	
53	AMUR 19388M001	4661499.75200	-244591.82742	4332269.52339	A	
384	BIAZ 10074M002	4634456.36733	-124345.54217	4365785.10037	W	
101	BIDA 00000M000	4644178.13159	-145778.89269	4354832.12116	A	
113	BRZR 19387M001	4662221.29526	-220770.46903	4333309.07743	A	
573	CACE 13447M001	4899866.74818	-544567.63353	4033769.82078	W	
592	CANT 13438M001	4625924.61397	-307096.80354	4365771.20293	W	
908	CREU 13432M001	4715420.48565	273177.48430	4271946.48509	A	
135	EBRE 13410M001	4833520.30955	41536.80441	4147461.34532	W	
180	ELGE 19353S001	4657557.70180	-202242.04060	4338991.52827	A	
182	EMAZ 17001M001	4645924.51454	-276950.43833	4347759.21344	A	
209	GERN 19389M001	4642811.62869	-217223.49603	4353278.52227	A	
257	HOND 15012M002	4640529.63347	-145676.55354	4358781.39983	A	
235	IGEL 19352S001	4645951.74175	-165575.07275	4352550.06571	A	
240	ISPS 19484M001	4640596.78977	-206964.34570	4356391.55923	A	
245	KAST 19499M001	4646949.38346	-240747.83817	4348014.64039	A	
252	LARE 19440M001	4632832.25687	-279026.71284	4360314.07003	A	
256	LAZK 19354S001	4666098.64901	-178186.76330	4330463.31129	A	
261	LEIT 19428M001	4663521.24912	-155859.29076	4334519.52874	A	
493	PASA 19351S001	4644909.37511	-156645.63900	4353622.72027	A	
553	RIO1 13448M002	4708447.13158	-199490.85869	4284089.37358	A	
558	SALA 13469M001	4803054.74735	-462131.65523	4158378.70291	A	
526	SCOA 10088M002	4639940.82119	-136225.51236	4359552.06551	W	
715	SOPU 19386M001	4643998.21016	-255914.47675	4350062.78367	W	
443	TERU 13487M001	4867391.62243	-95523.93622	4108341.30898	A	
493	VITO 19385M001	4679398.00592	-218437.07742	4314898.00983	A	
616	YEBE 13420M001	4848724.85242	-261632.51913	4123093.95477	W	
655	ZARA 13462M001	4773803.48268	-73506.56820	4215453.72987	W	

6 Quality Control

6.1 Mean and Daily Repeatabilities

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

GFA FINAL WEEKLY COMBINATION: FINAL ORBITS 12-OCT-24 13:09

Station	#Days	Weekday 0123456	Repeatability (mm) N	E	U
ACOR 13434M001	7	XXXXXXX	0.76	0.93	3.36
ALDA 19383M001	7	XXXXXXX	2.58	1.48	5.46
ALSA 19419M001	7	XXXXXXX	2.36	1.21	4.18
AMUR 19388M001	7	XXXXXXX	1.09	0.94	4.40
BIAZ 10074M002	5	XX XXX	0.67	1.51	6.97
BIDA 00000M000	7	XXXXXXX	0.91	0.85	4.91
BRZR 19387M001	7	XXXXXXX	1.25	0.93	5.78
CACE 13447M001	7	XXXXXXX	0.67	1.06	3.08
CANT 13438M001	7	XXXXXXX	0.60	0.90	5.19
CREU 13432M001	6	XXXXX X	1.35	1.32	4.24
EBRE 13410M001	7	XXXXXXX	1.44	1.63	8.50
ELGE 19353S001	7	XXXXXXX	1.21	1.41	4.81
EMAZ 17001M001	6	XXX XXX	1.48	1.53	2.93
GERN 19389M001	7	XXXXXXX	1.21	2.56	6.06
HOND 15012M002	7	XXXXXXX	0.78	0.72	4.52
IGEL 19352S001	7	XXXXXXX	0.96	0.52	3.55
ISPS 19484M001	7	XXXXXXX	0.80	1.95	6.39
KAST 19499M001	7	XXXXXXX	2.05	0.71	9.46
LARE 19440M001	7	XXXXXXX	1.39	1.27	5.95
LAZK 19354S001	7	XXXXXXX	2.37	0.81	3.42
LEIT 19428M001	7	XXXXXXX	1.23	0.90	4.54
PASA 19351S001	7	XXXXXXX	0.59	0.73	3.33
RIO1 13448M002	7	XXXXXXX	1.01	0.98	3.98
SALA 13469M001	7	XXXXXXX	0.47	0.76	2.63
SCOA 10088M002	7	XXXXXXX	1.81	1.29	4.04
SOPU 19386M001	7	XXXXXXX	0.86	1.30	5.40
TERU 13487M001	7	XXXXXXX	0.77	1.25	2.93
VITO 19385M001	7	XXXXXXX	1.09	0.27	3.04
YEBE 13420M001	7	XXXXXXX	0.67	1.03	2.58
ZARA 13462M001	7	XXXXXXX	0.94	1.27	4.08

Comparison of individual solutions:

ACOR 13434M001	N	0.76	0.22	0.53	0.20	0.87	-0.32	0.34	-1.47
ACOR 13434M001	E	0.93	-2.03	0.21	-0.49	-0.54	0.38	-0.26	0.50
ACOR 13434M001	U	3.36	-4.63	-3.06	-1.52	5.66	-0.74	-1.25	0.71
ALDA 19383M001	N	2.58	-2.65	3.34	2.21	2.58	-1.52	-0.76	-2.70
ALDA 19383M001	E	1.48	1.81	-1.65	-1.50	-1.08	1.24	1.45	0.12
ALDA 19383M001	U	5.46	-0.29	8.17	-1.96	-5.86	-6.49	0.30	5.66
ALSA 19419M001	N	2.36	-0.59	-0.26	3.41	-0.23	-4.03	2.24	0.20
ALSA 19419M001	E	1.21	0.87	-1.55	2.22	-0.56	-0.56	-0.09	0.02
ALSA 19419M001	U	4.18	-2.04	0.66	2.86	-7.68	-3.50	4.31	-1.44
AMUR 19388M001	N	1.09	-0.56	-1.68	1.25	0.29	0.47	1.24	-0.78
AMUR 19388M001	E	0.94	-0.12	0.18	0.84	-1.54	0.90	1.00	-0.64
AMUR 19388M001	U	4.40	-4.96	1.63	-3.67	-5.72	5.20	3.09	-2.44
BIAZ 10074M002	N	0.67	-0.42	-0.67			-0.88	0.51	0.40
BIAZ 10074M002	E	1.51	-0.73	1.83			1.04	-0.62	-1.94
BIAZ 10074M002	U	6.97	-2.21	10.03			3.03	-0.30	-8.93
BIDA 00000M000	N	0.91	-0.53	0.19	1.67	0.51	-0.12	0.05	-1.25
BIDA 00000M000	E	0.85	-0.77	-1.13	0.83	-1.06	-0.10	0.66	0.41
BIDA 00000M000	U	4.91	-1.44	-6.22	1.67	-8.91	4.10	2.15	0.30
BRZR 19387M001	N	1.25	0.74	0.29	0.73	0.90	-2.65	-0.24	0.61
BRZR 19387M001	E	0.93	-0.47	0.85	0.66	-1.58	-1.10	0.25	0.05
BRZR 19387M001	U	5.78	-5.37	-0.37	1.71	-9.94	7.38	1.92	-3.43
CACE 13447M001	N	0.67	-0.63	0.33	-0.15	-0.49	1.11	-0.74	0.31
CACE 13447M001	E	1.06	-0.56	-0.62	-1.98	1.32	0.41	0.20	0.46
CACE 13447M001	U	3.08	4.80	-3.29	3.58	1.56	-2.09	-0.07	-1.90
CANT 13438M001	N	0.60	0.62	-0.15	1.14	0.20	-0.39	-0.28	-0.44
CANT 13438M001	E	0.90	0.20	-0.51	0.76	-1.31	0.15	-0.01	-1.50
CANT 13438M001	U	5.19	-3.62	3.41	2.28	-10.96	2.56	0.80	-1.99
CREU 13432M001	N	1.35	-0.34	-2.01	-0.52	1.46	1.52		-0.43
CREU 13432M001	E	1.32	1.62	0.82	1.57	-0.82	-0.16		-1.52
CREU 13432M001	U	4.24	-3.26	-5.57	0.22	2.12	-5.97		2.88
EBRE 13410M001	N	1.44	0.82	2.94	-0.59	-1.20	-1.10	0.37	-0.03
EBRE 13410M001	E	1.63	-1.63	-1.11	1.81	0.95	2.13	0.32	-1.81
EBRE 13410M001	U	8.50	-11.74	8.39	2.64	-8.36	-6.82	9.95	1.60
ELGE 19353S001	N	1.21	0.34	-1.03	1.37	0.55	-1.74	1.51	-0.37
ELGE 19353S001	E	1.41	-0.94	-1.33	0.12	-0.60	2.49	0.45	-1.60
ELGE 19353S001	U	4.81	-2.16	-6.08	-0.19	-6.81	6.24	2.87	-1.86
EMAZ 17001M001	N	1.48	-0.85	-1.32	0.77		2.01	1.06	1.63
EMAZ 17001M001	E	1.53	-0.37	0.90	-0.22		2.32	-1.58	-1.69
EMAZ 17001M001	U	2.93	0.18	0.80	3.70		4.30	0.84	-3.05
GERN 19389M001	N	1.21	0.68	-0.63	1.63	0.05	-2.19	0.26	0.58
GERN 19389M001	E	2.56	-0.63	-0.49	2.77	-1.89	-0.23	-4.15	3.17
GERN 19389M001	U	6.06	-6.31	-5.48	-1.09	-7.96	7.26	5.73	-0.17
HOND 15012M002	N	0.78	0.70	-0.12	0.99	-0.29	-1.16	0.82	-0.22
HOND 15012M002	E	0.72	0.46	-1.41	0.32	-0.49	0.31	-0.65	0.22
HOND 15012M002	U	4.52	-1.44	-0.57	-0.27	-9.35	2.18	4.45	-2.89
IGEL 19352S001	N	0.96	-0.28	-0.71	1.13	0.56	-1.48	0.60	0.86
IGEL 19352S001	E	0.52	-0.14	-0.09	0.74	-0.55	-0.32	-0.77	-0.13
IGEL 19352S001	U	3.55	-2.07	3.00	1.37	-7.51	-1.81	-0.41	-0.79
ISPS 19484M001	N	0.80	0.32	-1.14	0.53	0.98	-0.78	0.77	-0.09
ISPS 19484M001	E	1.95	-0.55	-0.12	1.63	-1.41	0.96	-3.69	1.80
ISPS 19484M001	U	6.39	-3.51	-2.83	-1.11	-11.50	-2.00	7.03	6.13
KAST 19499M001	N	2.05	-1.84	-1.42	0.36	0.36	4.08	0.71	-1.54
KAST 19499M001	E	0.71	0.59	-0.11	0.81	-0.68	-1.04	-0.46	-0.46
KAST 19499M001	U	9.46	-8.74	0.80	2.14	-12.61	11.87	8.21	-9.38
LARE 19440M001	N	1.39	2.39	-1.40	0.05	-0.19	-1.16	0.26	1.56
LARE 19440M001	E	1.27	0.28	-1.78	-0.40	-2.15	-0.11	1.20	0.40
LARE 19440M001	U	5.95	0.00	3.96	0.12	-13.45	3.13	2.39	-0.61
LAZK 19354S001	N	2.37	-0.46	-1.93	3.82	0.44	-3.43	1.68	0.58
LAZK 19354S001	E	0.81	1.01	-0.70	0.84	-0.48	0.89	-0.58	-0.60
LAZK 19354S001	U	3.42	-1.03	-7.27	2.87	-2.14	-0.67	1.61	-0.41
LEIT 19428M001	N	1.23	-0.58	-0.29	2.23	1.01	-1.53	0.44	-0.37

LEIT	19428M001	E	0.90	1.15	-1.04	-0.06	-1.27	0.52	0.56	-0.47
LEIT	19428M001	U	4.54	-4.09	5.38	0.81	-8.45	-0.61	1.43	-1.87
PASA	19351S001	N	0.59	0.03	-0.36	0.93	0.75	-0.54	0.31	-0.42
PASA	19351S001	E	0.73	-0.27	-0.45	1.34	-0.73	-0.38	-0.12	-0.64
PASA	19351S001	U	3.33	0.71	2.16	-0.15	-7.57	-0.88	-0.31	-1.74
RIO1	13448M002	N	1.01	0.42	-0.78	1.95	0.42	-1.03	0.29	-0.50
RIO1	13448M002	E	0.98	-0.44	-0.31	2.16	-0.50	-0.62	0.25	-0.26
RIO1	13448M002	U	3.98	-3.92	0.62	0.08	-7.45	4.09	1.59	-2.08
SALA	13469M001	N	0.47	0.24	-0.47	-0.53	0.19	0.72	-0.28	-0.36
SALA	13469M001	E	0.76	-0.62	-0.38	-0.98	-0.29	1.33	-0.12	0.33
SALA	13469M001	U	2.63	0.14	1.80	-2.13	5.21	1.02	-1.84	-1.43
SCOA	10088M002	N	1.81	0.03	1.16	3.39	-0.34	-2.12	0.02	-1.45
SCOA	10088M002	E	1.29	0.86	-1.86	1.16	-1.71	1.02	-0.01	-0.72
SCOA	10088M002	U	4.04	-1.35	-0.15	1.50	-9.50	-0.40	-0.30	1.80
SOPU	19386M001	N	0.86	0.55	0.55	0.21	1.29	-0.19	-1.11	-0.91
SOPU	19386M001	E	1.30	-0.81	-1.29	0.88	-1.96	-0.58	1.12	1.28
SOPU	19386M001	U	5.40	-2.85	-1.02	-2.29	-7.43	8.29	2.67	-5.44
TERU	13487M001	N	0.77	0.74	-0.12	-0.08	0.01	0.47	-1.16	1.21
TERU	13487M001	E	1.25	-2.08	-0.51	0.28	-1.51	0.41	-1.40	-0.60
TERU	13487M001	U	2.93	6.00	-1.92	1.14	2.31	-1.12	-1.92	0.62
VITO	19385M001	N	1.09	-0.89	-0.43	1.88	0.33	-1.27	0.84	-0.41
VITO	19385M001	E	0.27	-0.23	0.27	0.33	-0.32	0.23	0.01	0.18
VITO	19385M001	U	3.04	-1.78	-0.55	-1.46	-6.18	2.20	2.35	-1.14
YEBE	13420M001	N	0.67	0.78	-0.40	0.60	0.45	-0.53	-0.46	-0.93
YEBE	13420M001	E	1.03	0.02	-0.65	-0.90	-0.64	2.05	-0.06	-0.71
YEBE	13420M001	U	2.58	0.62	0.41	1.12	3.87	2.28	-2.62	-3.35
ZARA	13462M001	N	0.94	-0.23	0.56	1.06	0.24	-1.76	0.82	-0.18
ZARA	13462M001	E	1.27	0.95	1.00	1.85	-1.18	0.31	-1.51	-0.80
ZARA	13462M001	U	4.08	-7.13	0.02	2.07	-3.48	2.01	4.04	-3.50

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 |       0.96      0.00     -0.35 |   |
|   3 | ALME 13437M001   | I W |      -0.26      0.41      3.87 |   |
|   4 | BCL1 19482M001   | I W |      -0.59     -1.26      2.87 |   |
|   5 | BELL 13431M001   | I W |       0.12     -0.88      4.99 |   |
|   6 | BIAZ 10074M002   | I W |       0.24     -0.62     -4.66 |   |
|   7 | BORR 13480M001   | I W |      -2.03      2.37     -0.07 |   |
|   8 | BRST 10004M004   | I W |      -0.75      0.24      3.30 |   |
|   9 | CACE 13447M001   | I W |       1.78      1.76      3.27 |   |
|  10 | CANT 13438M001   | I W |      -0.12      0.96     -2.73 |   |
|  11 | CASC 13909S001   | I W |       0.77     -1.24     -1.56 |   |
|  12 | CEU1 13449M002   | I W |       0.22     -0.19     -6.77 |   |
|  14 | EBRE 13410M001   | I W |      -0.35     -0.07      1.86 |   |
|  16 | FLRS 31907M001   | I W |      -1.02     -1.66     -6.50 |   |
|  17 | FUER 31330M001   | I W |       0.67     -1.05      1.71 |   |
|  19 | HUEL 13451M001   | I W |       2.24      3.52     -7.87 |   |
|  20 | IBIZ 13454S001   | I W |      -0.06      1.14     -0.86 |   |
|  21 | IZAN 31309M002   | I W |      -0.69     -0.60      2.02 |   |
|  22 | LAGO 13903M001   | I W |       0.86     -0.47      1.18 |   |
|  23 | LLIV 13436M001   | I W |      -1.34      1.74      4.58 |   |
|  24 | LPAL 81701M001   | I W |       2.34      0.22      0.48 |   |
|  25 | LROC 10023M001   | I W |       0.64      0.59      1.09 |   |
|  26 | MADR 13407S012   | I W |      -0.62      1.91     -2.83 |   |
|  27 | MAL1 13444M002   | I W |       3.61     -1.03     -4.35 |   |
|  28 | MALA 13443M001   | I W |       1.58     -2.33      4.08 |   |
|  29 | MALL 13444M001   | I W |      -0.94     -0.19      1.41 |   |
|  30 | MAS1 31303M002   | I W |      -0.04     -2.89      5.78 |   |
|  31 | MELI 19379M001   | I W |       0.54     -1.06      3.80 |   |
|  32 | PDEL 31906M004   | I W |       0.27      1.50      2.55 |   |
|  33 | RABT 35001M002   | I W |       1.48     -2.19     -4.84 |   |
|  34 | SCOA 10088M002   | I W |      -1.87      0.42     -9.88 |   |
|  35 | SFER 13402M004   | I W |      -1.53     -4.72      5.49 |   |
|  36 | SOPU 19386M001   | I W |      -1.44      1.11     -2.02 |   |
|  37 | VALE 13439M001   | I W |      -0.34      1.87     -3.68 |   |
|  38 | VIGO 13450M001   | I W |       0.87      1.99      1.39 |   |
|  39 | VILL 13406M001   | I W |      -0.65     -0.61      1.64 |   |
|  40 | YEBE 13420M001   | I W |      -0.88     -0.00      2.08 |   |
|  41 | ZARA 13462M001   | I W |      -0.61      0.24     -3.64 |   |
|  42 | ZIMM 14001M004   | I W |      -2.10     -0.29      2.85 |   |
|     |                  |     |                                |   |
-----------------------------------------------------------------------
|     | RMS / COMPONENT  |     |       1.27      1.59      3.98 |   |
|     | IQR              |     |       1.53      2.14      5.69 |   |
|     | MEAN             |     |       0.02     -0.04     -0.01 |   |
|     | MEDIAN           |     |      -0.09     -0.04      1.28 |   |
|     | MIN              |     |      -2.10     -4.72     -9.88 |   |
|     | MAX              |     |       3.61      3.52      5.78 |   |
-----------------------------------------------------------------------
        OVERALL RMS/IQR/MAX(3D)        2.58      2.61     10.07       SCOA 10088M002      #SUM
-----------------------------------------------------------------------
| ALL | RMS / COMPONENT  |     |       1.27      1.59      3.98 |   |
| ALL | IQR              |     |       1.53      2.14      5.69 |   |
| ALL | MEAN             |     |       0.02     -0.04     -0.01 |   |
| ALL | MEDIAN           |     |      -0.09     -0.04      1.28 |   |
| ALL | MIN              |     |      -2.10     -4.72     -9.88 |   |
| ALL | MAX              |     |       3.61      3.52      5.78 |   |
-----------------------------------------------------------------------
  ALL   OVERALL RMS/IQR/MAX(3D)        2.58      2.61     10.07       SCOA 10088M002      #SUM_ALL


NUMBER OF PARAMETERS  :     3
NUMBER OF STATIONS    :    38
NUMBER OF COORDINATES :   114
RMS OF TRANSFORMATION :    2.58 MM


PARAMETERS:

TRANSLATION IN  X     :          -0.00     +-  0.42    MM
TRANSLATION IN  Y     :           0.00     +-  0.42    MM
TRANSLATION IN  Z     :          -0.00     +-  0.42    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                      19007828
 NUMBER OF UNKNOWNS                            205796
 NUMBER OF DEGREES OF FREEDOM                18802032
 PHASE MEASUREMENTS SIGMA                     0.00100
 SAMPLING INTERVAL (SECONDS)                      180
 VARIANCE FACTOR                 4.661625393018459
```

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 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 ALDA  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 ALSA  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 AMUR  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 BIAZ  A    1 P 24:252:00000 24:258:86370 SPECTRA SP90M        ----- -----------
 BIDA  A    1 P 24:252:00000 24:258:86370 LEICA GR10           ----- -----------
 BRZR  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 CACE  A    1 P 24:252:00000 24:258:86370 TRIMBLE NETR9        ----- -----------
 CANT  A    1 P 24:252:00000 24:258:86370 LEICA GR10           ----- -----------
 CREU  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 EBRE  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 ELGE  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 EMAZ  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 GERN  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 HOND  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 IGEL  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 ISPS  A    1 P 24:252:00000 24:258:86370 TRIMBLE NETR9        ----- -----------
 KAST  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 LARE  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 LAZK  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 LEIT  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 PASA  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 RIO1  A    1 P 24:252:00000 24:258:86370 LEICA GR25           ----- -----------
 SALA  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 SCOA  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 SOPU  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 TERU  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 VITO  A    1 P 24:252:00000 24:258:86370 LEICA GR30           ----- -----------
 YEBE  A    1 P 24:252:00000 24:258:86370 LEICA GR50           ----- -----------
 ZARA  A    1 P 24:252:00000 24:258:86370 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 24:252:00000 24:258:86370 LEIAT504         LEIS -----
 ALDA  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 ALSA  A    1 P 24:252:00000 24:258:86370 LEIAR10          NONE -----
 AMUR  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 BIAZ  A    1 P 24:252:00000 24:258:86370 LEIAR25          LEIT -----
 BIDA  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 BRZR  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 CACE  A    1 P 24:252:00000 24:258:86370 TRM29659.00      NONE -----
 CANT  A    1 P 24:252:00000 24:258:86370 LEIAR25.R4       LEIT -----
 CREU  A    1 P 24:252:00000 24:258:86370 LEIAR25.R4       NONE -----
 EBRE  A    1 P 24:252:00000 24:258:86370 LEIAR25.R4       NONE -----
 ELGE  A    1 P 24:252:00000 24:258:86370 LEIAR25.R4       LEIT -----
 EMAZ  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 GERN  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 HOND  A    1 P 24:252:00000 24:258:86370 LEIAR20          LEIM -----
 IGEL  A    1 P 24:252:00000 24:258:86370 LEIAR20          LEIM -----
 ISPS  A    1 P 24:252:00000 24:258:86370 TRM59900.00      SCIS -----
 KAST  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 LARE  A    1 P 24:252:00000 24:258:86370 LEIAR20          LEIM -----
 LAZK  A    1 P 24:252:00000 24:258:86370 LEIAR25.R4       LEIT -----
 LEIT  A    1 P 24:252:00000 24:258:86370 LEIAR10          NONE -----
 PASA  A    1 P 24:252:00000 24:258:86370 LEIAR20          LEIM -----
 RIO1  A    1 P 24:252:00000 24:258:86370 LEIAR25.R4       LEIT -----
 SALA  A    1 P 24:252:00000 24:258:86370 LEIAR25          NONE -----
 SCOA  A    1 P 24:252:00000 24:258:86370 TRM55971.00      NONE -----
 SOPU  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 TERU  A    1 P 24:252:00000 24:258:86370 LEIAR20          LEIM -----
 VITO  A    1 P 24:252:00000 24:258:86370 LEIAS10          NONE -----
 YEBE  A    1 P 24:252:00000 24:258:86370 LEIAR20          LEIM -----
 ZARA  A    1 P 24:252:00000 24:258:86370 TRM29659.00      NONE -----
```

7.3 Eccentricities

```
*                                        UP_____ NORTH___ EAST____
*SITE PT SOLN T DATA_START__ DATA_END____ AXE ARP->BENCHMARK(M)_________
 ACOR  A    1 P 24:252:00000 24:258:86370 UNE   3.0460   0.0000   0.0000
 ALDA  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 ALSA  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 AMUR  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 BIAZ  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 BIDA  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 BRZR  A    1 P 24:252:00000 24:258:86370 UNE   0.0771   0.0000   0.0000
 CACE  A    1 P 24:252:00000 24:258:86370 UNE   0.0600   0.0000   0.0000
 CANT  A    1 P 24:252:00000 24:258:86370 UNE   3.0490   0.0000   0.0000
 CREU  A    1 P 24:252:00000 24:258:86370 UNE   0.0770   0.0000   0.0000
 EBRE  A    1 P 24:252:00000 24:258:86370 UNE   0.0770   0.0000   0.0000
 ELGE  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 EMAZ  A    1 P 24:252:00000 24:258:86370 UNE   0.0350   0.0000   0.0000
 GERN  A    1 P 24:252:00000 24:258:86370 UNE   0.0771   0.0000   0.0000
 HOND  A    1 P 24:252:00000 24:258:86370 UNE   0.0771   0.0000   0.0000
 IGEL  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 ISPS  A    1 P 24:252:00000 24:258:86370 UNE   0.0350   0.0000   0.0000
 KAST  A    1 P 24:252:00000 24:258:86370 UNE   0.0350   0.0000   0.0000
 LARE  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 LAZK  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 LEIT  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 PASA  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 RIO1  A    1 P 24:252:00000 24:258:86370 UNE   0.0606   0.0000   0.0000
 SALA  A    1 P 24:252:00000 24:258:86370 UNE   0.0600   0.0000   0.0000
 SCOA  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 SOPU  A    1 P 24:252:00000 24:258:86370 UNE   0.0771   0.0000   0.0000
 TERU  A    1 P 24:252:00000 24:258:86370 UNE   0.0600   0.0000   0.0000
 VITO  A    1 P 24:252:00000 24:258:86370 UNE   0.0000   0.0000   0.0000
 YEBE  A    1 P 24:252:00000 24:258:86370 UNE   0.0600   0.0000   0.0000
 ZARA  A    1 P 24:252:00000 24:258:86370 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:

```
2024-09-29 12:39 UTC | ALDA2550.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: alda00esp_20230308.log
2024-09-29 15:40 UTC | ALDA2560.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: alda00esp_20230308.log
2024-09-29 18:49 UTC | ALDA2570.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: alda00esp_20230308.log
2024-09-29 22:20 UTC | ALDA2580.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: alda00esp_20230308.log
2024-09-29 12:39 UTC | AMUR2550.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: amur00esp_20230308.log
2024-09-29 15:40 UTC | AMUR2560.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: amur00esp_20230308.log
2024-09-29 18:49 UTC | AMUR2570.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: amur00esp_20230308.log
2024-09-29 22:20 UTC | AMUR2580.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: amur00esp_20230308.log
2024-09-29 12:39 UTC | EMAZ2550.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.31/7.403 (source: emaz00esp_20221108.log
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2024-09-29 18:49 UTC | EMAZ2570.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.31/7.403 (source: emaz00esp_20221108.log
2024-09-29 22:20 UTC | EMAZ2580.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.31/7.403 (source: emaz00esp_20221108.log
2024-09-29 12:39 UTC | KAST2550.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.31/7.403 (source: kast00esp_20221108.log
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2024-09-29 18:49 UTC | KAST2570.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.31/7.403 (source: kast00esp_20221108.log
2024-09-29 22:20 UTC | KAST2580.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.31/7.403 (source: kast00esp_20221108.log
2024-09-29 22:20 UTC | PAS22580.24O | RECEIVER TYPE        |  0 -> STONEX SC2200 (source: pas200esp_20231031.log
2024-09-29 12:39 UTC | VITO2550.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: vito00esp_20230308.log
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2024-09-29 18:49 UTC | VITO2570.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: vito00esp_20230308.log
2024-09-29 22:20 UTC | VITO2580.24O | RECEIVER FIRM. VERS. |  4.80/7.900 -> 4.60/7.811 (source: vito00esp_20230308.log
```

9 References

C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign.* etrs89.ensg.ign.fr/memo-V8.pdf

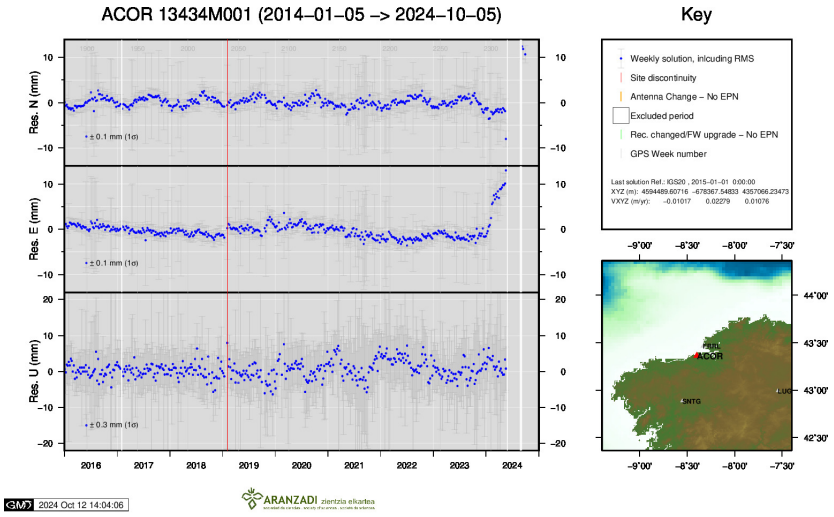
EPN Coordination Group and the EPN Central Bureau (2018): *Guidelines for the EPN Analysis Centres.* epncb.oma.be/$_d$*ocumentation/guidelines/guidelines*$_a$*nalysis*$_c$*entres.pdf*

Johnston, G., Riddell, A., Hausler, G. (2017). The International GNSS Service. Teunissen, Peter J.G., Montenbruck, O. (Eds.), Springer Handbook of Global Navigation Satellite Systems (1st ed., pp. 967-982). Cham, Switzerland: Springer International Publishing. DOI: 10.1007/978-3-319-42928-1

Z. Altamimi (2018): *EUREF Technical Note 1: Relationship and Transformation between the International and the European Terrestrial Reference Systems.* etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf

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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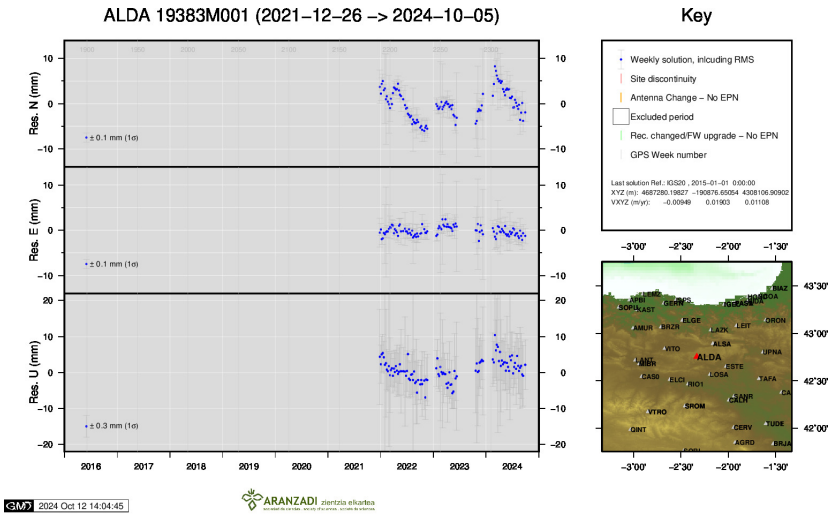

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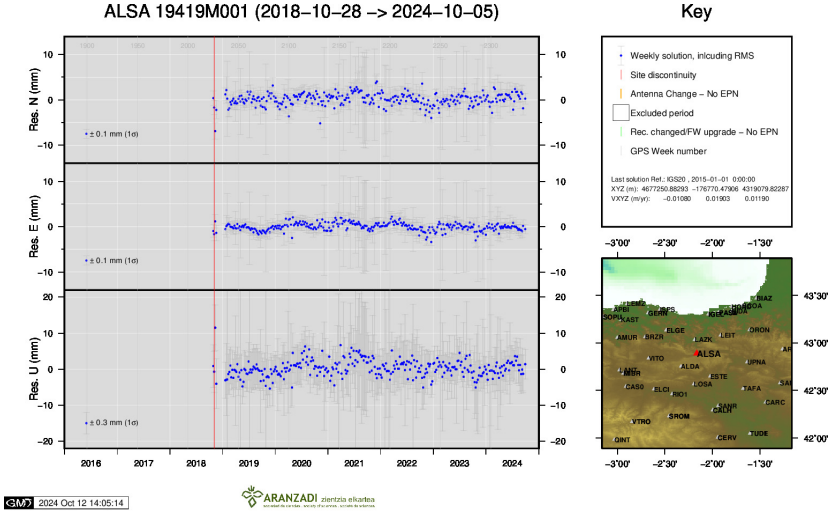

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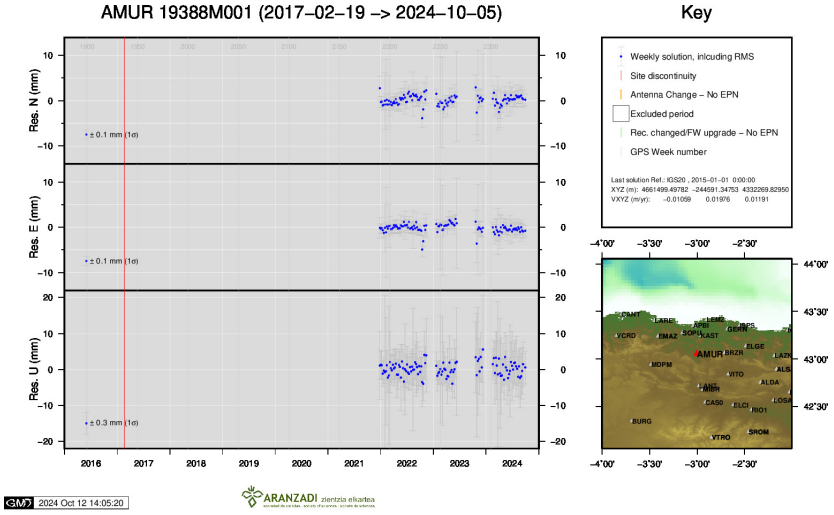

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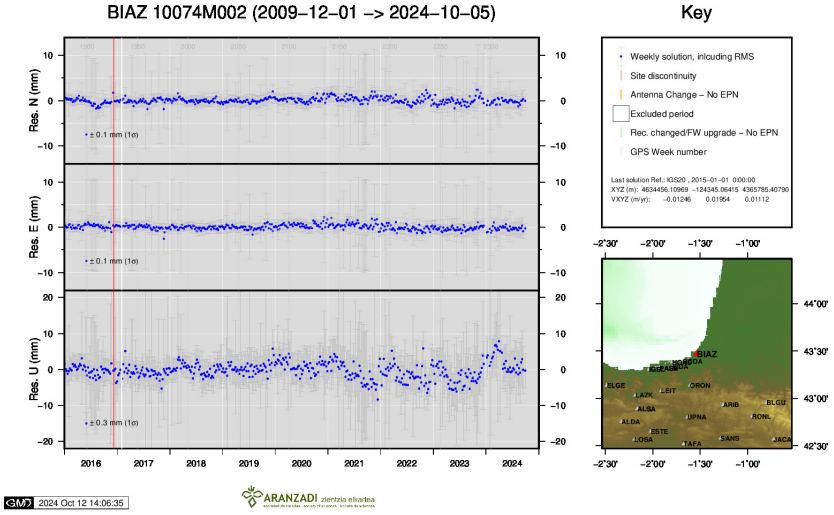

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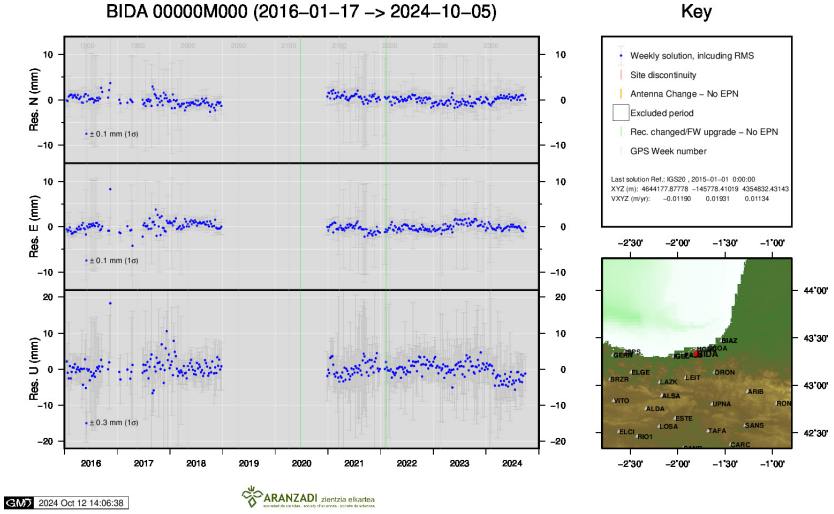

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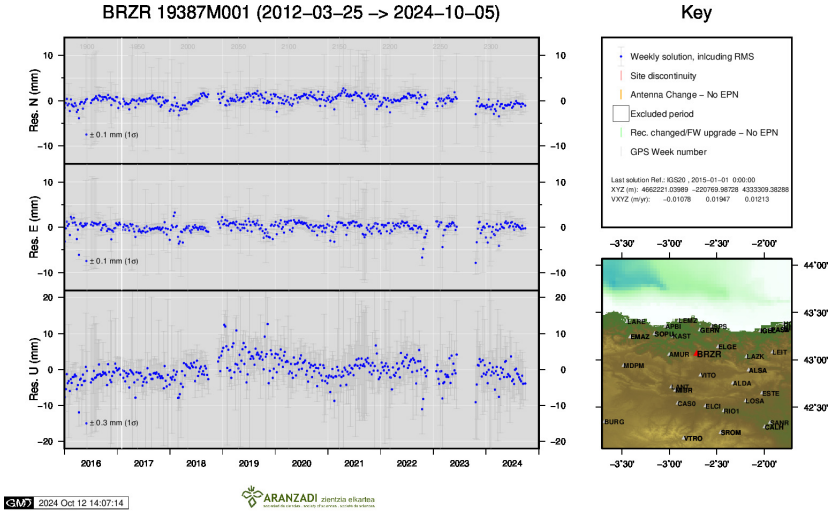

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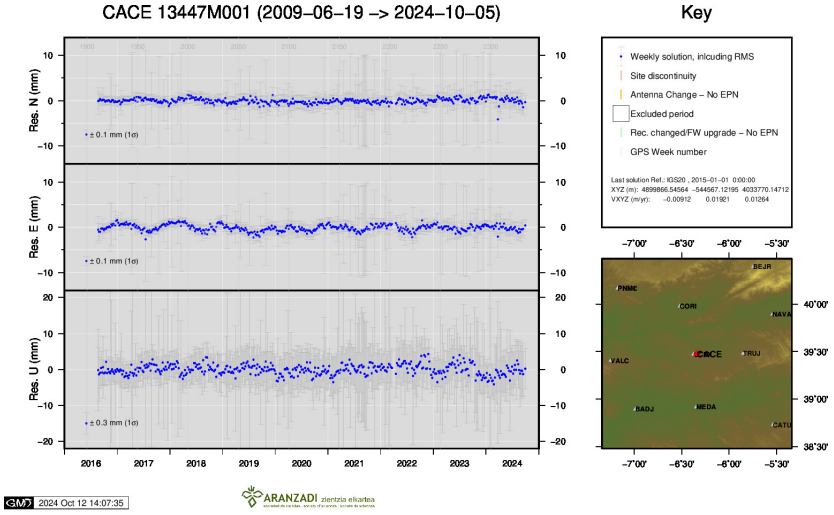

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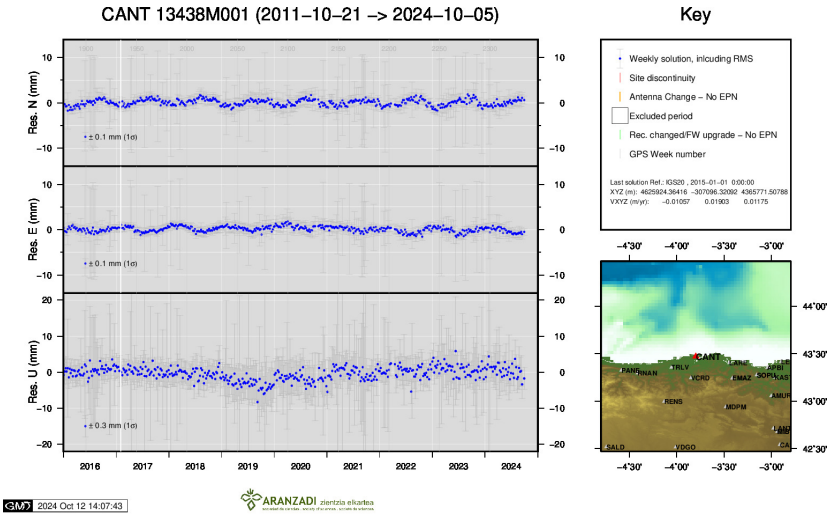

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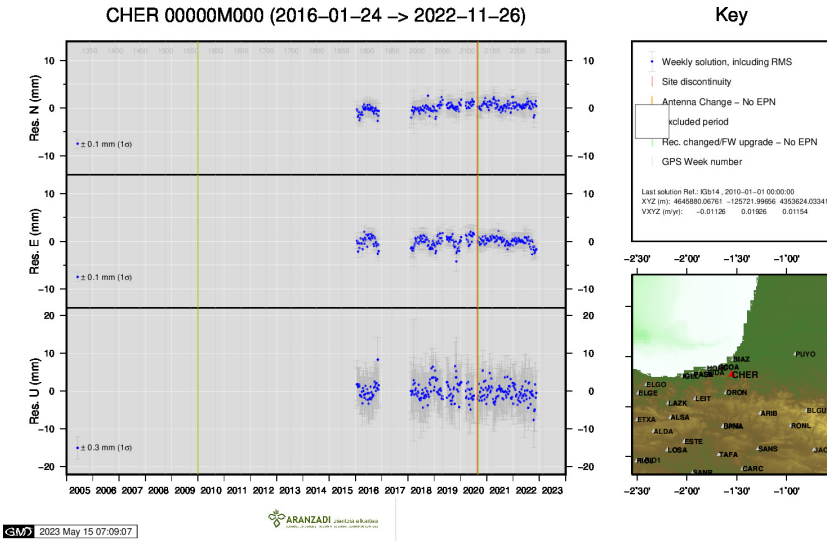

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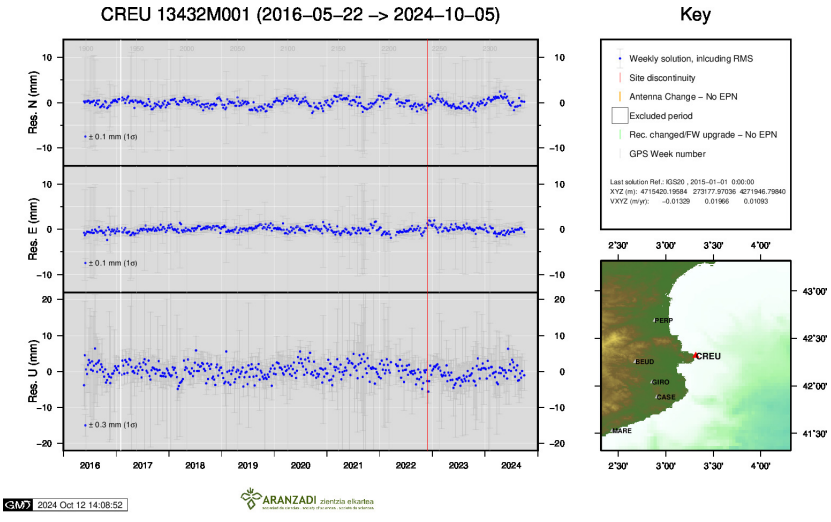

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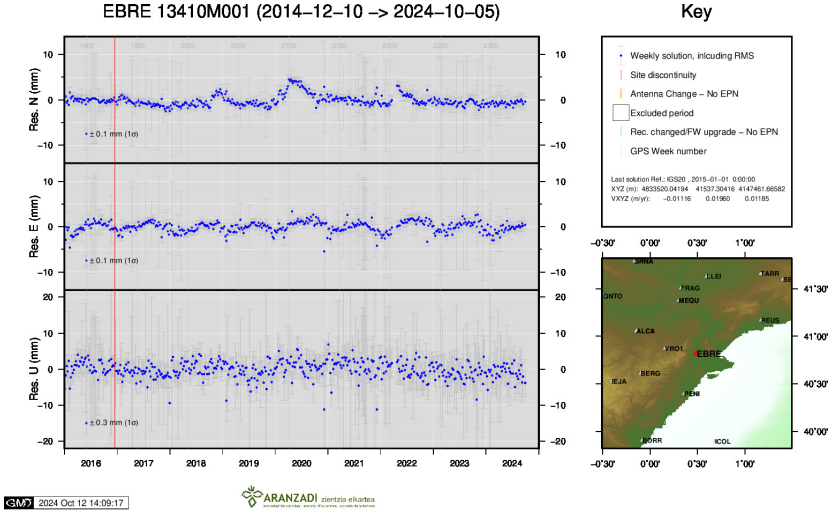

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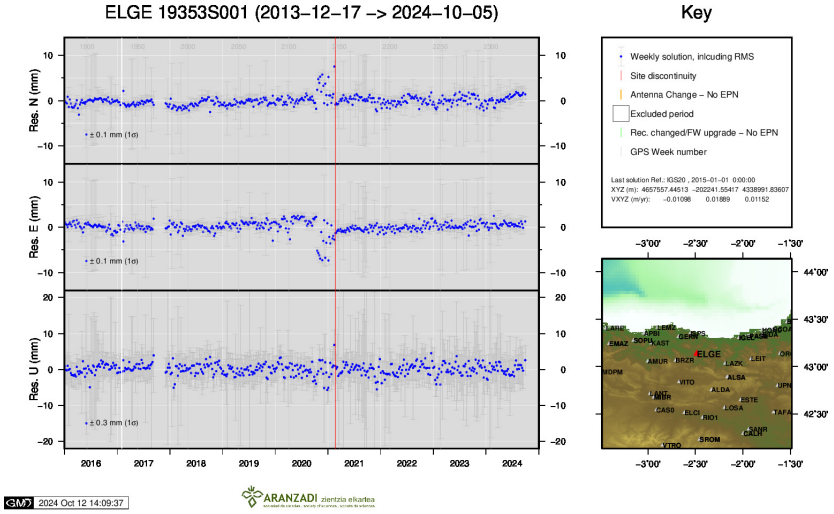

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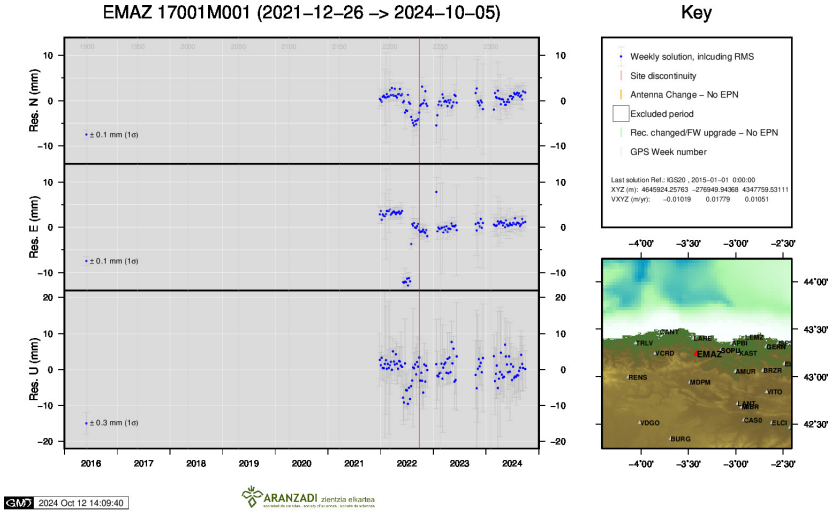

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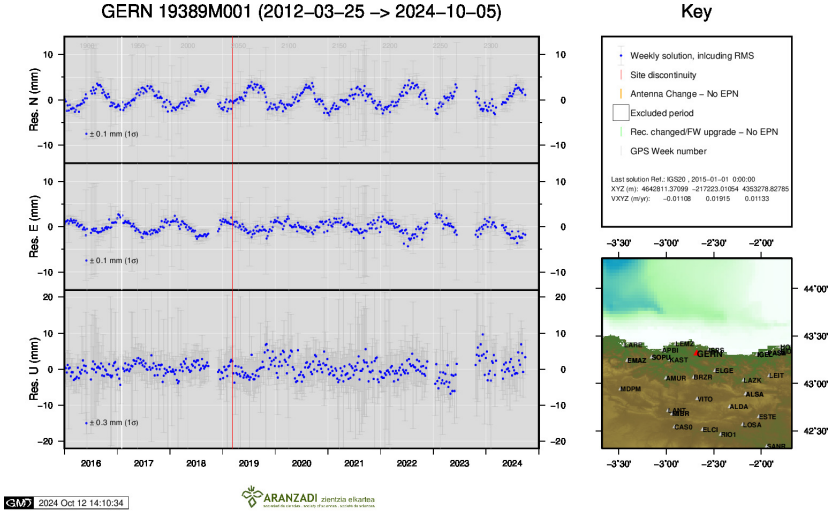

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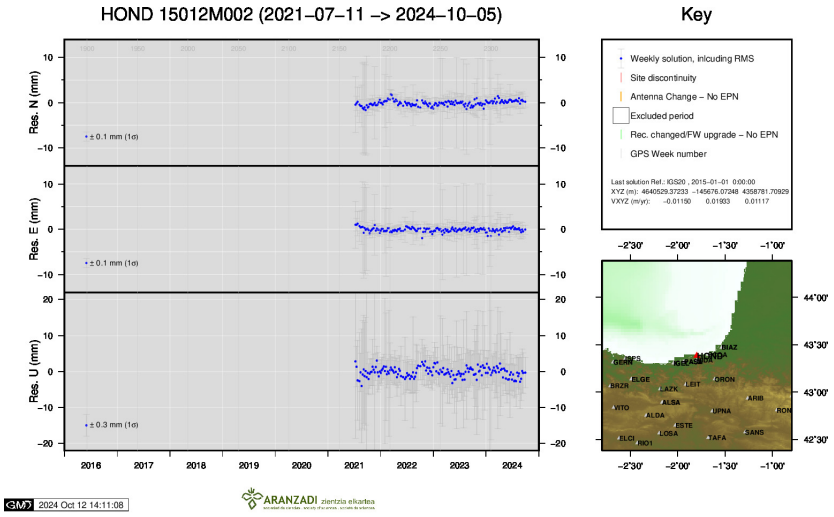

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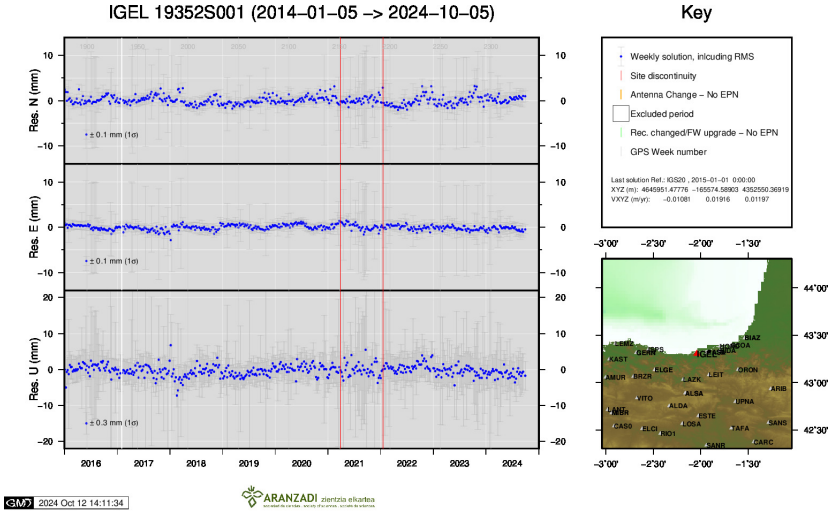

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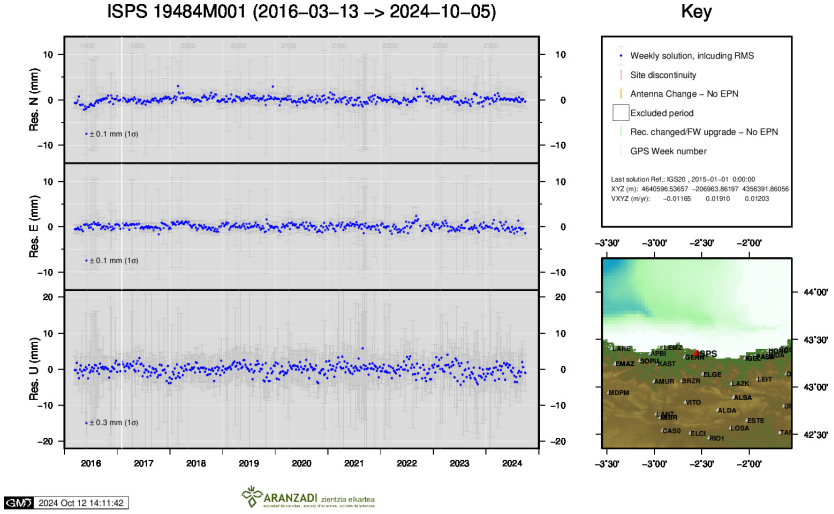

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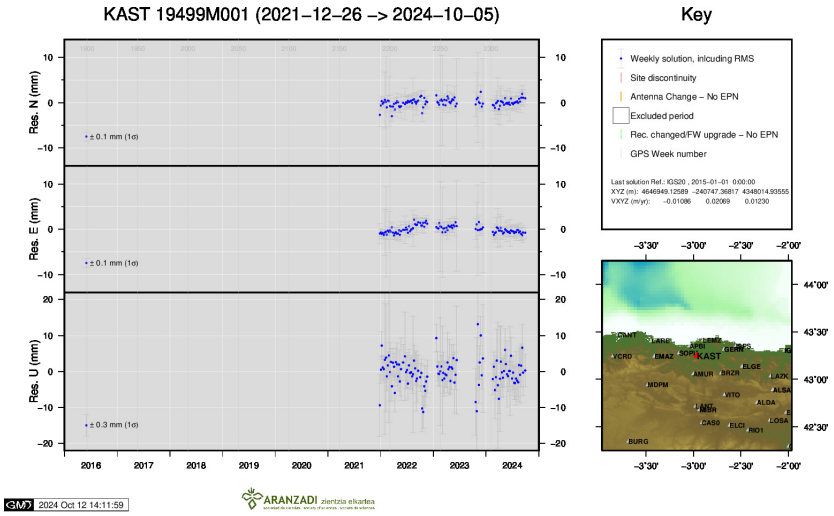

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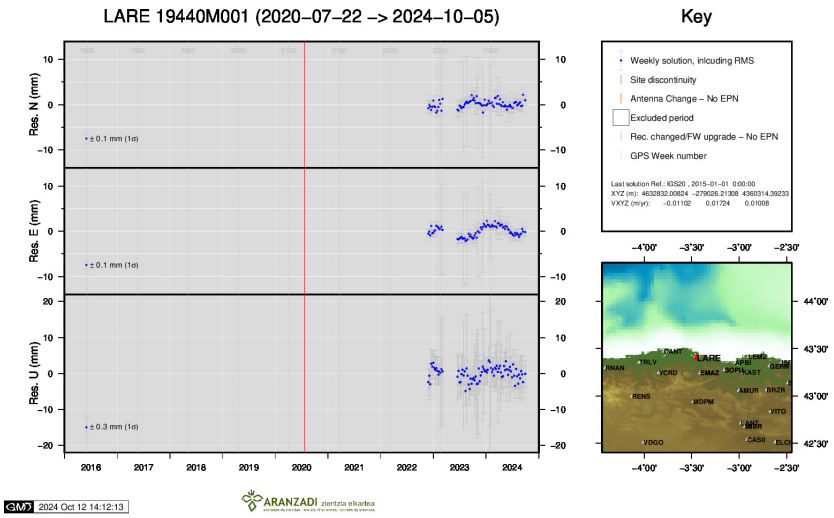

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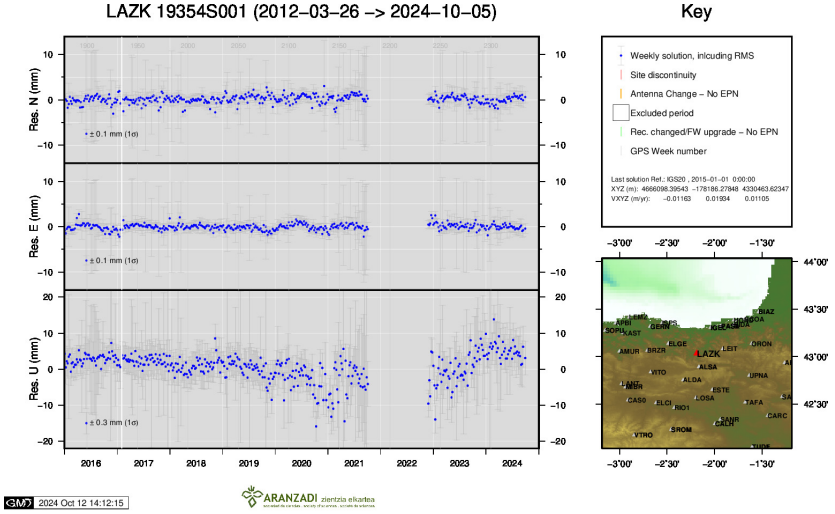

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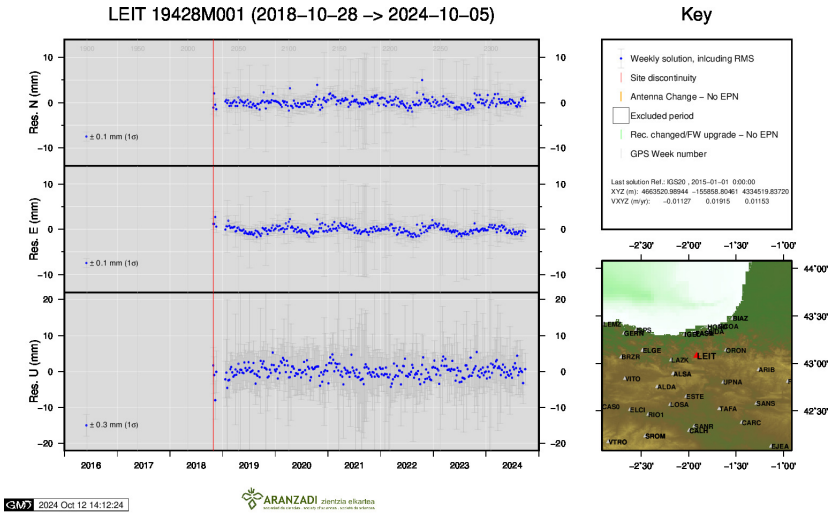

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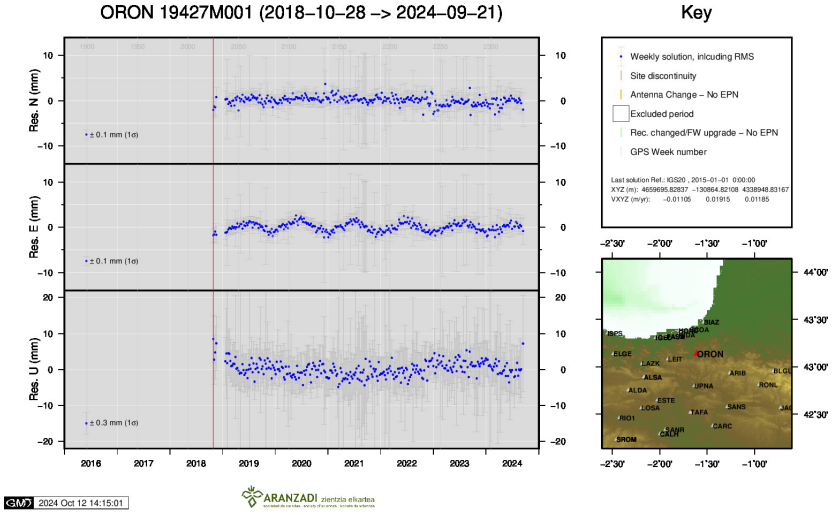

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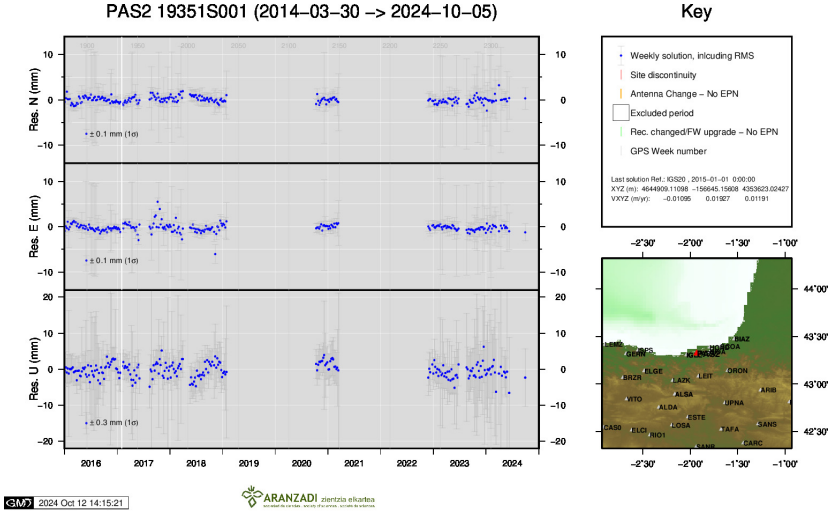

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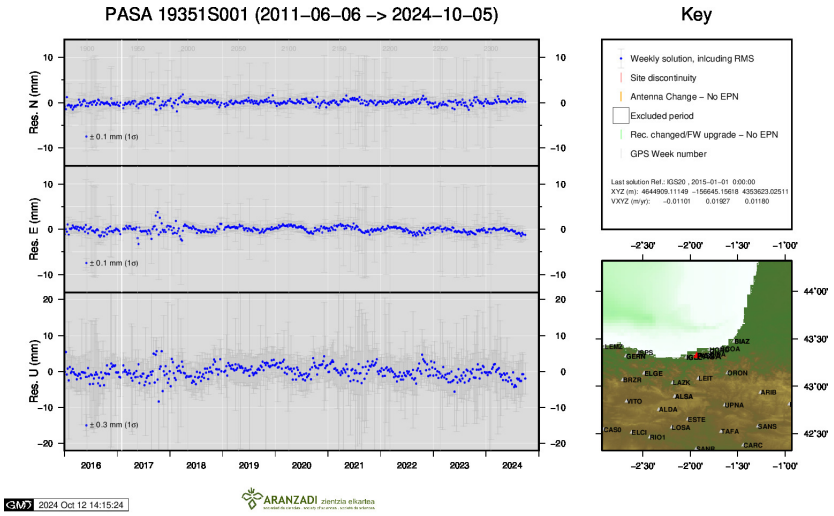

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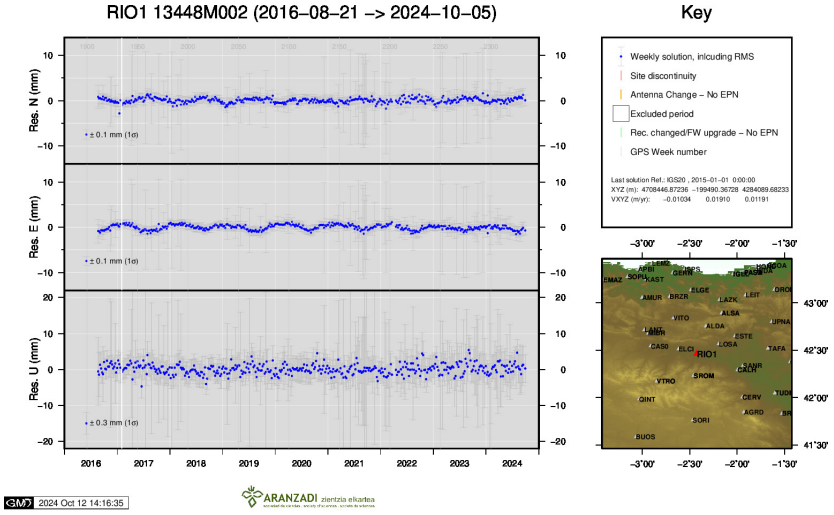

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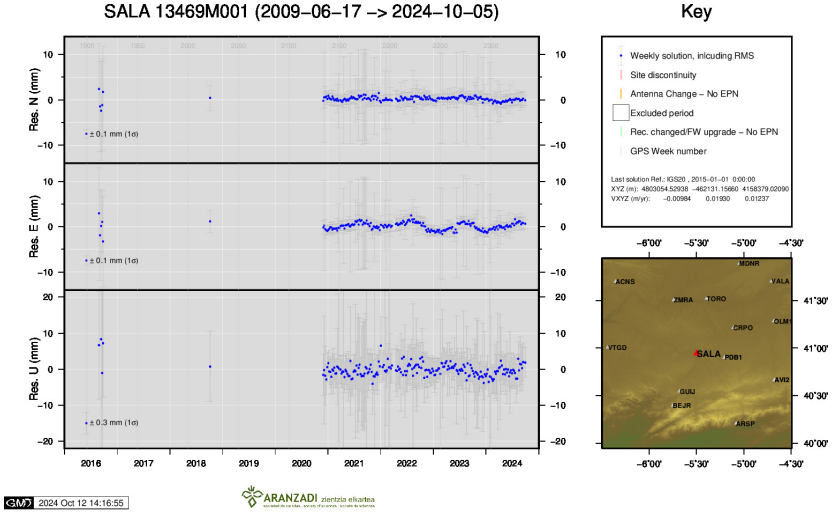

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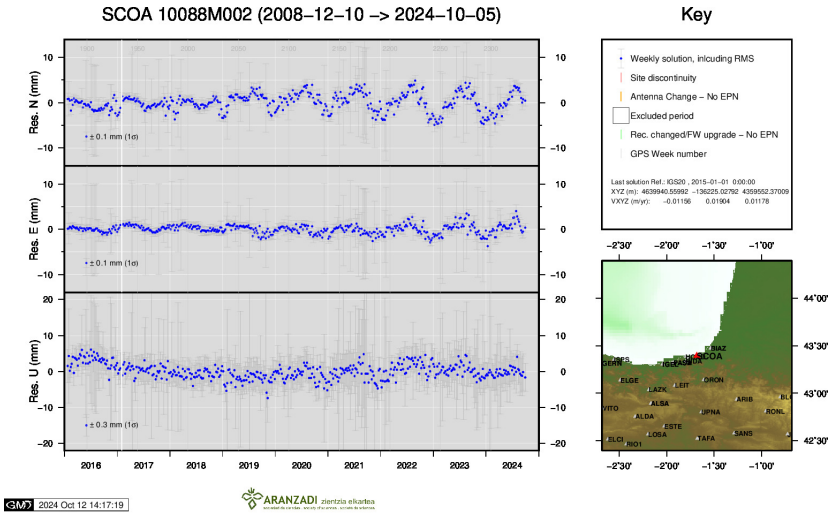

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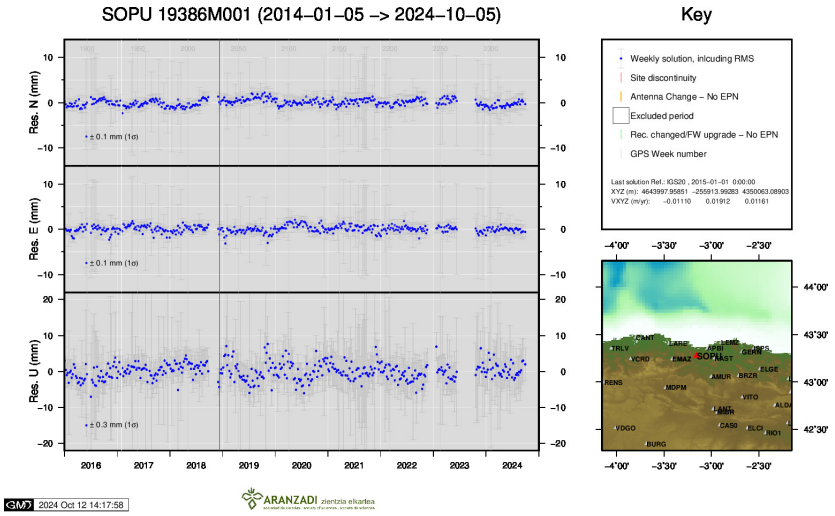

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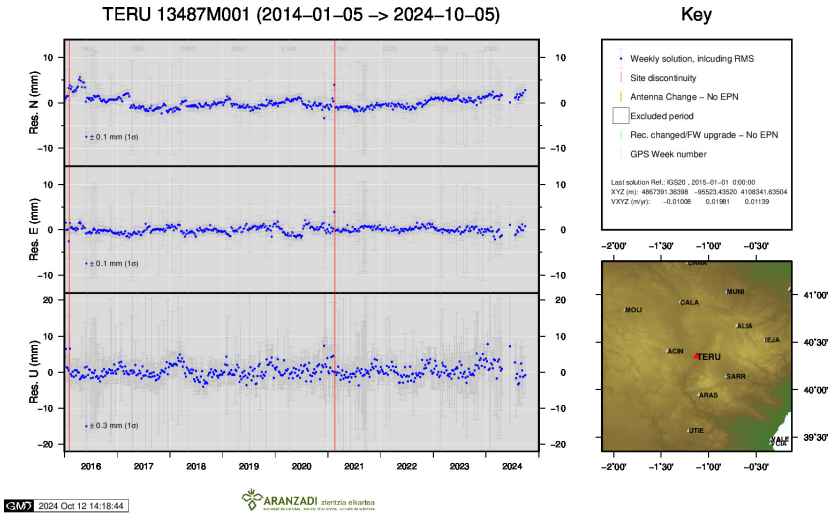

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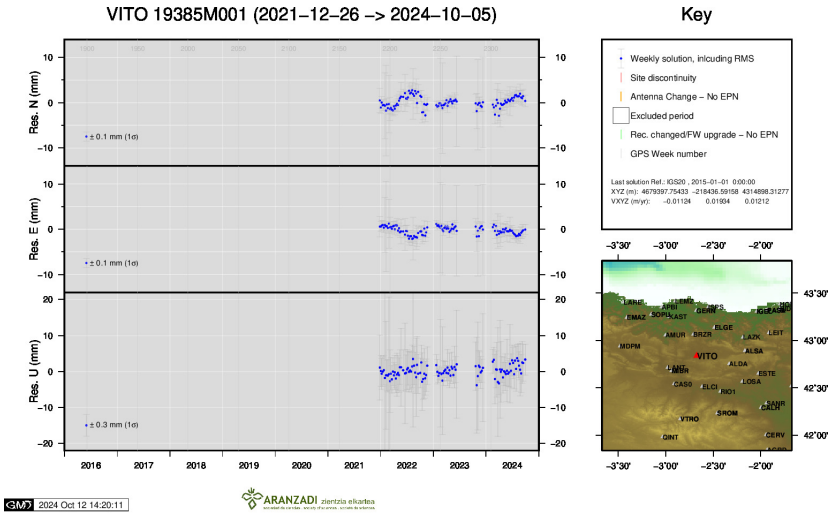

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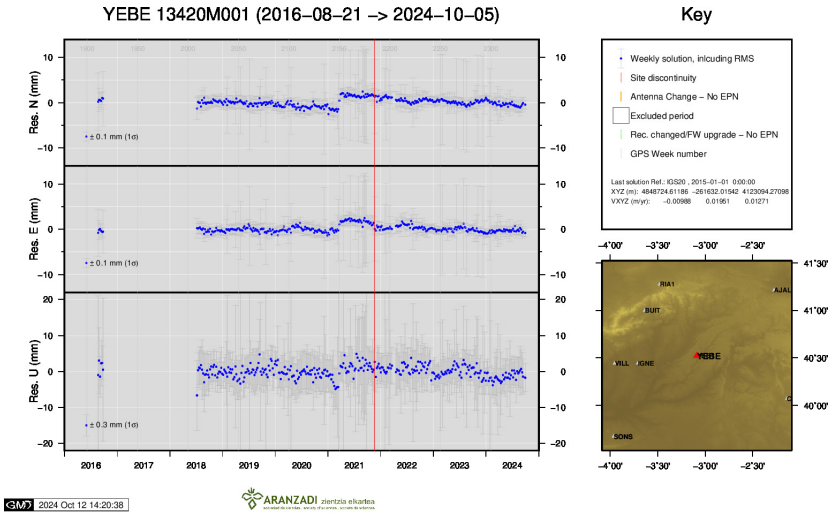

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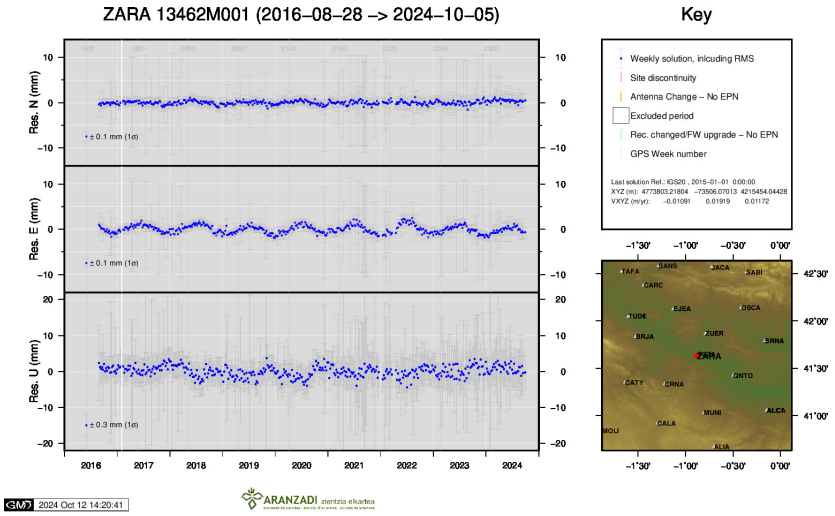
ZARA 13462M001 (2016–08–28 –> 2024–10–05)
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Res. N (mm)
Res. E (mm)
Res. U (mm)
± 0.1 mm (1σ)
± 0.1 mm (1σ)
± 0.3 mm (1σ)
2016
2017
2018
2019
2020
2021
2022
2023
2024
Weekly solution, inlcuding RMS
Site discontinuity
Antenna Change – No EPN
Excluded period
Rec. changed/FW upgrade – No EPN
GPS Week number
Last solution Ref.: IGS20 , 2015–01–01 0:00:00
XYZ (m): 4773803.21804 -73506.07013 4215454.04428
VXYZ (m/yr): -0.01091 0.01919 0.01172
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–1°00'
–0°30'
0°00'
42°30'
42°00'
41°30'
41°00'
JAFA
SANS
JACA
SABI
CARC
EJEA
OSCA
TUDE
BRJA
ZUER
SRNA
ZARA
GNTO
CATY
CRNA
MUNI
ALCA
CALA
MOLI
ALIA
2024 Oct 12 14:20:41
ARANZADI zientzia elkartea

33) ZARA