

ARA-DAC Weekly Analysis Result: 2236 (GFA)

Technical Report

GPS Week: 2236 (GFA)

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

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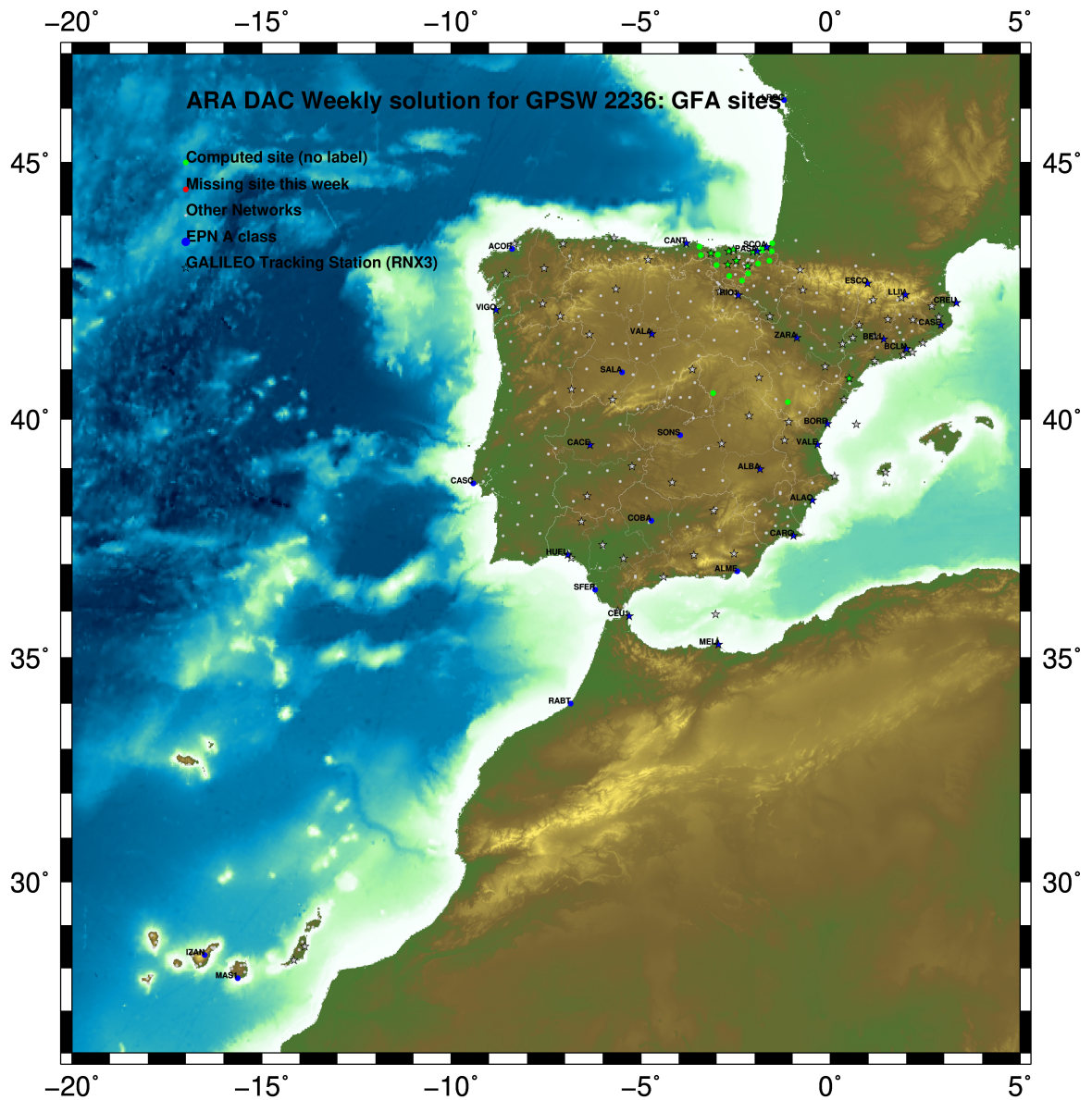
Report generated on 2022/12/11 at 17:43:58



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



2022 Dec 11 17:43:48

Fig.1: Computed Sites for GPS Week2236 (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 also used if available from GPSW 1986 on)
- 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.I14 file and individual calibrations from EPNC_14.ATX. EPN_A class sites (CRD + VEL) IGb14 used to define the reference frame (from GPSW 1934). If individual calibrations, other from these, are available, they are also included in the analysis.
- Troposphere:
 - 3 deg elev. cutoff; elevation dependent weighting
 - VMF1 mapping function. ZPD parameters are estimated using the VMF1 mapping function.
 - CHENHER gradient estimation model.
- Ionosphere: no a priori model, ionospheric effect almost removed by iono free combination.
- Ocean Loading: FES2004 (Scherneck).
- Atmosph. Loading: computed from a global grid using the GRDS1S2 program of Bernese 5.2.

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 EPN A class 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. DE405 planetary ephemeris and JGM3 Earth geopotential model is used.
- Tidal displacements: according to IERS2010 Conventions. Atmospheric loading corrections used.

- Ambiguity: an advanced ambiguity resolution (AR) scheme is included:
 - Code-Based Wideline (WL) AR for baselines shorter than 6000km, a Melbourne-Wuebbena wide-lane and narrow-lane AR is computed.
 - Phase-Based Wideline (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 are the ones used in the Minimal Constraints condition.

5.1 IGB14

The Reference Frame considered in this section is IGB14, release C2130.

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ARA LAC 2236 WEEK FINAL COMBINATION: PRECISE ORBITS                11-DEC-22 14:25
-----
LOCAL GEODETIC DATUM: IGB14                      EPOCH: 2022-11-16 12:00:00
-----
NUM  STATION NAME      X (M)      Y (M)      Z (M)      FLAG
-----
  4  ACRD 13434M001    4594489.52046  -678367.37046  4357066.32140  W
 39  ALDA 19383M001    4687280.12017  -190876.50110  4308106.99398  A
 50  ALSA 19419M001    4677250.79434  -176770.33229  4319079.91604  A
 53  AMUR 19388M001    4661499.41411  -244591.19130  4332269.93467  A
100  BIAZ 10074M002    4634456.00160  -124344.91081  4365785.49780  A
101  BIDA 00000M000    4644177.77939  -145778.25988  4354832.52553  A
113  BRZR 19387M001    4662220.94833  -220769.83616  4333309.48034  A
104  CACE 13447M001    4899866.46995  -544566.97114  4033770.24764  W
116  CANT 13438M001    4625924.27623  -307096.17030  4365771.60047  W
154  CHER 00000M000    4645879.97771  -125721.84693  4353624.12718  A
162  CREU 13432M001    4715420.08695  273178.12542  4271946.88350  W
204  EBRE 13410M001    4833519.95132  41537.45746  4147461.75917  A
180  ELGE 19353S001    4657557.35342  -202241.40473  4338991.92913  A
182  EMAZ 17001M001    4645924.17594  -276949.80507  4347759.62092  A
209  GERN 19389M001    4642811.27728  -217222.86042  4353278.92167  A
257  HOND 15012M002    4640529.27014  -145676.91927  4358761.79540  A
235  IGEL 19352S001    4645951.38152  -165574.43914  4352550.46378  A
240  ISPS 19484M001    4640596.43432  -206963.71220  4356391.95612  A
245  KAST 19499M001    4646949.03612  -240747.20428  4348015.03725  A
252  LARE 19440M001    4632831.91372  -279026.07989  4360314.47240  A
256  LAZK 19354S001    4666098.29328  -178186.12469  4330463.71101  A
261  LEIT 19428M001    4663520.89503  -155858.65394  4334519.92798  A
334  ORDN 19427M001    4659695.73957  -130864.66993  4338948.92697  A
345  PAS2 19351S001    4644909.01513  -156645.00394  4353623.11825  A
493  PASA 19351S001    4644909.01614  -156645.00385  4353623.11939  W
553  RID1 13448M002    4708446.78663  -199490.22049  4284089.77934  W
558  SALA 13469M001    4803054.44964  -462131.00686  4158379.12371  W
566  SCDA 10088M002    4639940.45581  -136224.87772  4359552.45588  W
418  SOPU 19386M001    4643997.86652  -255913.84341  4350063.18609  A
443  TERU 13487M001    4867391.27407  -95523.27892  4108341.72302  A
493  VITO 19385M001    4679397.66193  -218436.44040  4314898.41159  A
752  YEBE 13420M001    4848724.52199  -261631.86263  4123094.36886  A
755  ZARA 13462M001    4773803.12845  -73505.92050  4215454.13797  W

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5.2 ETRF2000 (ETRS89) Coordinates

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

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ETRF2000 FINAL COORD. wk 2236                                11-DEC-22 14:25
-----
LOCAL GEODETIC DATUM: ETRF2000                      EPOCH: 2022-11-16 12:00:00
-----
NUM  STATION NAME      X (M)      Y (M)      Z (M)      FLAG
-----
  4  ACRD 13434M001    4594489.85510  -678367.97498  4357065.85947  W
 39  ALDA 19383M001    4687280.51461  -190877.11531  4308106.53089  A
 50  ALSA 19419M001    4677251.19146  -176770.94529  4319079.45398  A
 53  AMUR 19388M001    4661499.80342  -244591.80267  4332269.47303  A
100  BIAZ 10074M002    4634456.40915  -124345.51868  4365785.04005  A
101  BIDA 00000M000    4644178.18330  -145778.86895  4354832.06667  A
113  BRZR 19387M001    4662221.34082  -220770.44755  4333309.01896  A
104  CACE 13447M001    4899866.79706  -544567.61060  4033769.76177  W
116  CANT 13438M001    4625924.65998  -307096.77771  4365771.14098  W
154  CHER 00000M000    4645880.38414  -125722.45613  4353623.66845  A
162  CREU 13432M001    4715420.53894  273177.50967  4271946.42419  W
204  EBRE 13410M001    4833520.36358  41536.82719  4147461.28683  A
180  ELGE 19353S001    4657557.74876  -202242.01552  4338991.46839  A
182  EMAZ 17001M001    4645924.56223  -276950.41473  4347759.16015  A
209  GERN 19389M001    4642811.67177  -217223.46954  4353278.46197  A
257  HOND 15012M002    4640529.67437  -145676.52791  4358781.33685  A
235  IGEL 19352S001    4645951.78268  -165575.04848  4352550.00451  A
240  ISPS 19484M001    4640596.83039  -206964.32104  4356391.49674  A
245  KAST 19499M001    4646949.42714  -240747.81395  4348014.57688  A
252  LARE 19440M001    4632832.30070  -279026.68802  4360314.01270  A
256  LAZK 19354S001    4666098.69110  -178186.73640  4330463.24987  A
261  LEIT 19428M001    4663521.29607  -155859.26529  4334519.46736  A
334  ORDN 19427M001    4659696.14420  -130865.28075  4338948.46701  A
345  PAS2 19351S001    4644909.41754  -156645.61312  4353622.65919  A
493  PASA 19351S001    4644909.41855  -156645.61303  4353622.66033  W
553  RID1 13448M002    4708447.17809  -199490.83716  4284089.31435  W
558  SALA 13469M001    4803054.79716  -462131.63510  4158378.64716  W
566  SCDA 10088M002    4639940.86133  -136225.48626  4359551.99751  W
418  SOPU 19386M001    4643998.25572  -255914.45278  4350062.72577  A
443  TERU 13487M001    4867391.66547  -95523.91356  4108341.24600  A
493  VITO 19385M001    4679398.05330  -218437.05377  4314897.94879  A
752  YEBE 13420M001    4848724.89291  -261632.49563  4123093.89118  A
755  ZARA 13462M001    4773803.53101  -73506.54432  4215453.66915  W

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5.3 ETRF2014 (ETRS89) Coordinates

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

ETRF2014 FINAL COORD. wk 2236 11-DEC-22 14:25

 LOCAL GEODETIC DATUM: ETRF2014 EPOCH: 2022-11-16 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACDR 13434M001	4594489.81466	-678368.01233	4357065.91124	W
39	ALDA 19383M001	4687280.47175	-190877.15402	4308106.58253	A
50	ALSA 19419M001	4677251.14866	-176770.98409	4319079.50566	A
53	AMUR 19388M001	4661499.76100	-244591.84129	4332269.52472	A
100	BIAZ 10074M002	4634456.36662	-124345.55785	4365785.09189	A
101	BIDA 00000M000	4644178.14074	-145778.90800	4354832.11847	A
113	BRZR 19387M001	4662221.29832	-220770.48626	4333309.07066	A
104	CACE 13447M001	4899866.75287	-544567.64711	4033769.81271	W
116	CANT 13438M001	4625924.61814	-307096.81626	4365771.19275	W
154	CHER 00000M000	4645880.34149	-125722.49525	4353623.72025	A
162	CREU 13432M001	4715420.49406	273177.46945	4271946.47608	W
204	EBRE 13410M001	4833520.31828	41536.78829	4147461.33821	A
180	ELGE 19353S001	4657557.70625	-202242.05432	4338991.52012	A
182	EMAZ 17001M001	4645924.52009	-276950.45331	4347759.21188	A
209	GERN 19389M001	4642811.62946	-217223.50834	4353278.51373	A
257	HOND 15012M002	4640529.63185	-145676.56698	4358781.38866	A
235	IGEL 19352S001	4645951.74017	-165575.08745	4352550.05629	A
240	ISPS 19484M001	4640596.78807	-206964.35989	4356391.54852	A
245	KAST 19499M001	4646949.38487	-240747.85265	4348014.62862	A
252	LARE 19440M001	4632832.25870	-279026.72665	4360314.06447	A
256	LAZK 19354S001	4666098.64841	-178186.77524	4330463.30159	A
261	LEIT 19428M001	4663521.25334	-155859.30422	4334519.51909	A
334	ORON 19427M001	4659696.10142	-130865.31979	4338948.51877	A
345	PAS2 19351S001	4644909.37500	-156645.65213	4353622.71098	A
493	PASA 19351S001	4644909.37601	-156645.65204	4353622.71212	W
553	RI01 13448M002	4708447.13502	-199490.87575	4284089.36593	W
558	SALA 13469M001	4803054.75385	-462131.67233	4158378.69838	W
566	SOA 10088M002	4639940.81878	-136225.52537	4359552.04932	W
418	SOPU 19386M001	4643998.21353	-255914.49144	4350062.77751	A
443	TERU 13487M001	4867391.62028	-95523.95183	4108341.29720	A
493	VITO 19385M001	4679398.01061	-218437.09241	4314898.00045	A
752	YEBE 13420M001	4848724.84848	-261632.53338	4123093.94234	A
755	ZARA 13462M001	4773803.48679	-73506.58306	4215453.72062	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 IGB14 solution and are given with respect to the Local frame (North-East-Up).

ARA LAC 2236 WEEK FINAL COMBINATION: PRECISE ORBITS 11-DEC-22 14:25

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	0.78	1.35	3.87
ALDA 19383M001	7	XXXXXX	1.74	1.62	3.16
ALSA 19419M001	7	XXXXXX	2.08	3.94	3.62
AMUR 19388M001	1	X	0.06	0.51	1.25
BLAZ 10074M002	7	XXXXXX	1.14	1.21	2.62
BIDA 00000M000	7	XXXXXX	0.90	0.65	4.03
BRZR 19387M001	7	XXXXXX	1.32	3.40	5.83
CACE 13447M001	7	XXXXXX	0.88	0.72	2.55
CANT 13438M001	7	XXXXXX	0.84	0.71	2.74
CHER 00000M000	6	XX XXX	2.76	1.45	2.34
CREU 13432M001	7	XXXXXX	0.91	1.02	3.81
EBRE 13410M001	7	XXXXXX	1.54	2.48	7.02
ELGE 19353S001	7	XXXXXX	2.21	1.49	4.29
EMAZ 17001M001	7	XXXXXX	1.76	0.93	4.84
GERN 19389M001	7	XXXXXX	1.09	1.44	5.18
HOND 15012M002	7	XXXXXX	1.02	0.87	4.23
IGEL 19352S001	7	XXXXXX	2.59	0.94	2.39
ISPS 19484M001	7	XXXXXX	1.29	1.48	4.28
KAST 19499M001	7	XXXXXX	1.50	0.70	6.23
LARE 19440M001	7	XXXXXX	1.38	0.70	2.65
LAZK 19354S001	5	XXXX	0.66	1.98	9.11
LEIT 19428M001	7	XXXXXX	1.49	1.07	4.23
ORON 19427M001	7	XXXXXX	1.10	0.79	5.13
PAS2 19351S001	7	XXXXXX	0.78	0.56	5.13
PASA 19351S001	7	XXXXXX	0.57	0.53	4.30
RI01 13448M002	7	XXXXXX	1.21	0.28	3.58
SALA 13469M001	7	XXXXXX	0.54	0.64	1.77
SCDA 10088M002	7	XXXXXX	2.17	1.27	5.26
SOPU 19386M001	7	XXXXXX	1.22	1.60	4.30
TERU 13487M001	7	XXXXXX	1.03	1.87	3.46
VITO 19385M001	7	XXXXXX	1.30	2.12	4.11
YEBE 13420M001	7	XXXXXX	0.75	0.70	2.40
ZARA 13462M001	7	XXXXXX	1.34	0.77	2.34

Comparison of individual solutions:

ACOR 13434M001	N	0.78	-0.20	-0.55	0.45	-0.17	0.70	-1.60	-0.22
ACOR 13434M001	E	1.35	-2.90	-0.46	0.44	-0.75	-0.35	-1.01	0.69
ACOR 13434M001	U	3.87	4.68	0.83	-3.31	-5.66	0.12	4.56	2.13
ALDA 19383M001	N	1.74	-2.29	0.77	0.49	3.04	-1.40	-0.88	0.31
ALDA 19383M001	E	1.62	0.45	-0.79	-1.16	1.37	2.54	-2.22	0.52
ALDA 19383M001	U	3.16	-2.89	0.70	0.70	0.46	6.90	1.30	-1.03
ALSA 19419M001	N	2.08	-4.01	0.28	-1.07	-0.07	0.18	1.80	2.35
ALSA 19419M001	E	3.94	4.59	1.70	1.34	-6.51	-4.00	1.70	2.47
ALSA 19419M001	U	3.62	5.04	4.04	-2.02	-4.66	2.77	-0.71	-1.69
AMUR 19388M001	N	0.06	-0.06						
AMUR 19388M001	E	0.51	-0.51						
AMUR 19388M001	U	1.25	-1.25						
BLAZ 10074M002	N	1.14	-2.11	0.37	-1.10	-0.07	-0.30	0.95	1.00
BLAZ 10074M002	E	1.21	-0.63	-1.57	0.39	-1.34	0.07	1.46	1.36
BLAZ 10074M002	U	2.62	5.35	0.43	0.62	-0.43	0.06	1.19	-3.23
BIDA 00000M000	N	0.90	-1.24	1.11	-0.95	0.53	-0.50	-0.66	0.51
BIDA 00000M000	E	0.65	0.83	-0.04	-0.93	0.37	-0.51	0.51	-0.59
BIDA 00000M000	U	4.03	4.31	2.69	-1.00	-5.50	-4.41	3.66	2.78
BRZR 19387M001	N	1.32	-1.44	1.14	-1.37	-1.57	0.72	1.49	-0.04
BRZR 19387M001	E	3.40	-0.07	1.63	-2.71	-6.55	1.44	0.76	3.74
BRZR 19387M001	U	5.83	-0.05	1.10	-6.21	-8.18	-1.85	3.75	8.94
CACE 13447M001	N	0.88	-0.02	-1.06	-0.19	-1.75	0.32	-0.41	0.45
CACE 13447M001	E	0.72	-0.29	-1.21	-0.15	-0.38	-0.47	-0.91	-0.59
CACE 13447M001	U	2.55	-1.41	-1.01	4.43	-1.83	1.86	-2.90	1.05
CANT 13438M001	N	0.84	0.18	-0.33	-0.60	1.07	-0.82	-1.01	0.94
CANT 13438M001	E	0.71	-1.05	-0.74	-0.10	-0.14	-0.00	-0.17	1.14
CANT 13438M001	U	2.74	-1.48	-0.85	-1.75	-2.63	5.58	-0.53	0.91
CHER 00000M000	N	2.76	5.56	0.40		0.99	-0.10	-2.37	-0.75
CHER 00000M000	E	1.45	1.79	0.55		0.72	-1.80	-0.25	1.77
CHER 00000M000	U	2.34	4.80	-0.10		-1.38	-0.09	1.36	0.70
CREU 13432M001	N	0.91	0.12	0.55	-1.32	1.43	0.82	0.28	0.32
CREU 13432M001	E	1.02	-0.61	-0.41	-0.01	0.77	1.48	0.98	1.39
CREU 13432M001	U	3.81	3.10	-4.42	-4.27	-4.66	-1.60	3.49	1.79
EBRE 13410M001	N	1.54	-0.33	0.94	-1.32	2.91	1.72	-0.15	-0.25
EBRE 13410M001	E	2.48	0.26	0.04	1.53	2.96	0.53	3.59	-3.54
EBRE 13410M001	U	7.02	-3.02	-3.31	-2.99	11.57	3.62	5.11	-9.68
ELGE 19353S001	N	2.21	-0.32	0.94	-0.62	3.23	1.22	-1.32	-3.78
ELGE 19353S001	E	1.49	-2.93	-1.21	0.13	-0.20	0.21	0.37	1.75
ELGE 19353S001	U	4.29	1.48	2.68	-8.90	2.58	0.01	-1.43	3.58
EMAZ 17001M001	N	1.76	2.23	0.35	-0.07	1.97	-0.38	-1.23	-2.82
EMAZ 17001M001	E	0.93	-0.69	-1.70	0.42	1.00	-0.21	-0.65	0.40
EMAZ 17001M001	U	4.84	-7.14	3.87	0.58	-3.15	-1.95	-1.94	7.54
GERN 19389M001	N	1.09	-0.15	1.19	-0.86	1.21	0.23	-0.80	-1.68
GERN 19389M001	E	1.44	0.95	0.27	-1.69	-1.27	-2.28	0.82	1.05
GERN 19389M001	U	5.18	-3.75	-0.81	-7.41	-5.25	1.06	5.69	5.50
HOND 15012M002	N	1.02	-1.62	0.65	-0.57	1.39	-0.57	-0.24	-0.80
HOND 15012M002	E	0.87	0.86	-0.49	-0.77	-1.34	0.51	0.42	0.86
HOND 15012M002	U	4.23	2.14	-0.28	-4.53	-5.44	0.12	6.52	3.18
IGEL 19352S001	N	2.59	2.29	-0.40	2.85	2.20	-2.48	-3.52	-1.85
IGEL 19352S001	E	0.94	0.34	-0.04	-1.32	-0.86	-0.27	-0.07	1.62
IGEL 19352S001	U	2.39	3.35	1.37	0.13	-3.53	-2.38	1.09	1.37
ISPS 19484M001	N	1.29	-0.27	1.59	1.97	-0.15	-1.36	-1.08	-0.68
ISPS 19484M001	E	1.48	-1.35	-1.85	-2.24	1.44	-0.18	0.93	-0.02
ISPS 19484M001	U	4.28	1.18	2.44	-9.45	-2.09	0.76	-2.13	1.92
KAST 19499M001	N	1.50	-2.04	2.02	-0.19	-2.09	0.03	0.73	0.58
KAST 19499M001	E	0.70	-0.81	0.31	-0.44	-0.39	-1.03	-0.48	0.73
KAST 19499M001	U	6.23	-6.01	5.07	-7.30	-8.12	0.60	3.52	6.25
LARE 19440M001	N	1.38	1.69	-1.39	-0.50	2.09	-0.09	-1.42	-0.01

LARE 19440M001	E	0.70	-0.34	0.25	0.74	-0.18	-0.79	-1.21	0.32
LARE 19440M001	U	2.65	2.34	1.84	-2.80	-2.57	-2.62	2.88	-1.90
LAZK 19354S001	N	0.66		0.30	0.51	0.65	-0.51	-0.85	
LAZK 19354S001	E	1.98		-2.87	1.47	2.15	-0.83	-0.04	
LAZK 19354S001	U	9.11		11.12	2.79	4.09	-5.34	-12.45	
LEIT 19428M001	N	1.49	-2.31	-1.04	2.45	-0.76	-0.38	-0.14	0.26
LEIT 19428M001	E	1.07	1.41	0.10	1.63	-1.15	-0.29	-0.66	0.63
LEIT 19428M001	U	4.23	6.41	-2.03	-0.80	-2.58	6.61	-3.27	-0.59
ORDN 19427M001	N	1.10	1.12	-1.27	1.60	0.06	0.49	-0.65	1.10
ORDN 19427M001	E	0.79	-1.10	0.20	0.15	1.39	0.53	-0.41	-0.37
ORDN 19427M001	U	5.13	7.74	3.04	6.66	-4.21	-1.70	-0.19	-4.90
PAS2 19351S001	N	0.78	-0.97	0.50	0.54	-0.57	0.61	-0.38	-1.17
PAS2 19351S001	E	0.56	0.12	0.13	-0.81	-0.43	-0.54	0.66	0.55
PAS2 19351S001	U	5.13	-4.05	0.25	-7.99	-3.20	5.18	5.78	2.71
PASA 19351S001	N	0.57	-1.22	0.31	0.29	-0.34	0.08	-0.19	-0.36
PASA 19351S001	E	0.53	-0.33	0.08	-0.86	-0.06	-0.41	0.72	0.38
PASA 19351S001	U	4.30	1.52	1.23	-7.67	-3.63	4.01	4.33	0.65
RIDI 13448M002	N	1.21	-0.77	-1.09	-0.82	-0.17	1.32	-0.47	2.08
RIDI 13448M002	E	0.28	0.44	0.40	0.06	0.17	0.27	0.15	0.01
RIDI 13448M002	U	3.58	-1.13	5.03	-4.76	-1.96	-2.44	3.94	1.48
SALA 13469M001	N	0.54	0.23	-0.70	-0.43	-0.79	-0.57	-0.03	-0.33
SALA 13469M001	E	0.64	-0.08	0.05	-0.01	-1.28	-0.49	-0.54	0.50
SALA 13469M001	U	1.77	-2.33	-2.57	0.68	2.19	0.97	0.53	-0.57
SCDA 10088M002	N	2.17	3.05	-1.69	-0.15	-0.41	-1.75	-0.70	-3.53
SCDA 10088M002	E	1.27	-0.64	1.62	-1.67	0.59	1.69	0.75	-0.35
SCDA 10088M002	U	5.26	6.86	-7.76	0.65	-4.98	-1.98	5.07	-1.97
SOPU 19386M001	N	1.22	-0.21	0.49	-1.38	2.11	0.25	-1.02	-1.10
SOPU 19386M001	E	1.60	0.81	0.18	-0.59	2.20	-2.59	-1.65	-0.41
SOPU 19386M001	U	4.30	1.33	-3.66	-4.06	-3.63	-1.22	-1.84	7.82
TERU 13487M001	N	1.03	0.01	0.43	1.94	0.86	-0.98	0.52	-0.63
TERU 13487M001	E	1.87	0.71	0.22	2.64	0.62	2.07	0.34	-2.94
TERU 13487M001	U	3.46	-1.86	3.15	-2.95	3.90	-4.55	0.56	3.68
VITO 19385M001	N	1.30	1.20	1.03	-2.49	-0.33	-1.04	0.47	-0.22
VITO 19385M001	E	2.12	0.89	-1.75	-3.37	-1.00	1.18	1.22	2.81
VITO 19385M001	U	4.11	2.70	1.54	-3.24	-6.04	-4.02	0.52	5.30
YEBE 13420M001	N	0.75	-0.62	-0.90	-0.73	-0.34	-0.69	0.49	0.90
YEBE 13420M001	E	0.70	-0.21	0.93	0.22	-0.81	-1.00	0.37	0.45
YEBE 13420M001	U	2.40	0.35	-0.97	2.37	1.22	0.24	-0.77	-5.09
ZARA 13462M001	N	1.34	-0.12	-0.45	-1.06	-0.24	2.06	-1.28	1.89
ZARA 13462M001	E	0.77	-0.17	0.48	0.15	1.00	0.90	-0.16	-1.20
ZARA 13462M001	U	2.34	0.87	1.47	-3.94	-0.41	1.86	1.62	-2.84

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.

LOCAL GEODETIC DATUM: Igb14
RESIDUALS IN LOCAL SYSTEM (NORTH, EAST, UP)

NUM	NAME	FLG	RESIDUALS IN MILLIMETERS		
4	ACOR 13434M001	I W	-2.22	1.62	1.64
12	ALAC 13433M001	I W	0.74	-0.88	-0.47
15	ALBA 13452M001	I W	1.00	-1.09	-6.81
21	ALME 13437M001	I W	-2.65	-0.10	2.89
47	BCLN 13412M001	I W	0.54	-3.01	1.00
52	BELL 13431M001	I W	0.83	-0.72	1.68
71	BORR 13480M001	I W	-1.40	-1.57	-3.37
76	BRST 10004M004	I W	-1.65	0.55	3.05
104	CACE 13447M001	I W	1.37	0.99	2.61
116	CANT 13438M001	I W	-2.48	1.28	-6.12
117	CARG 19412M001	I W	2.55	-1.20	-2.43
122	CASE 13494M001	I W	-1.88	1.84	-4.07
128	CEU1 13449M002	I W	-0.50	0.61	4.84
143	COBA 13453M001	I W	1.05	0.43	-5.41
162	CREU 13432M001	I W	-0.53	0.56	-1.83
222	ESCO 13435M001	I W	-2.03	-0.38	-4.54
299	HUEL 13451M001	I W	8.29	-10.38	13.72
316	IZAN 31309M002	I W	-1.44	1.17	3.22
385	LLIV 13436M001	I W	-0.03	0.10	-2.42
392	LRDC 10023M001	I W	-0.41	3.29	-0.01
421	MAS1 31303M002	I W	-0.05	-0.78	2.73
432	MELI 19379M001	I W	2.57	2.29	3.51
493	PASA 19351S001	I W	-1.76	-0.03	-2.87
501	PDEL 31906M004	I W	0.47	-1.78	8.95
536	RABT 35001M002	I W	0.73	0.89	-8.30
553	RID1 13448M002	I W	-2.86	1.43	-1.92
558	SALA 13469M001	I W	0.27	2.81	-7.09
566	SCOA 10088M002	I W	-1.77	0.17	-4.52
574	SFER 13402M004	I W	2.90	-3.89	1.17
599	SONS 13446M001	I W	-1.92	1.81	7.17
700	VALA 13463M002	I W	-0.20	1.91	0.14
704	VALE 13439M001	I W	-1.21	6.46	-1.73
715	VIGO 13450M001	I W	0.66	0.78	5.41
755	ZARA 13462M001	I W	-0.06	1.88	-2.01
764	ZIMM 14001M004	I W	-2.05	-0.56	-0.27
121	CASC 13909S001	A W	5.13	-6.51	2.43
RMS / COMPONENT			2.27	2.81	4.71
MEAN			0.00	0.00	0.00
MIN			-2.86	-10.38	-8.30
MAX			8.29	6.46	13.72

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 108
RMS OF TRANSFORMATION : 3.43 MM

BARYCENTER COORDINATES:

LATITUDE : 40 3 2.85
LONGITUDE : - 4 5 3.36
HEIGHT : -38.538 KM

PARAMETERS:

TRANSLATION IN N : 0.00 +- 0.57 MM
TRANSLATION IN E : 0.00 +- 0.57 MM
TRANSLATION IN U : 0.00 +- 0.57 MM

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          20270335
NUMBER OF UNKNOWN               266739
NUMBER OF DEGREES OF FREEDOM    20003596
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  2.114972816353943

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
 1  0.00211    -0.0095  0.0053  0.0067   -0.0000 -0.0004  0.0002  0.00061
 2  0.00218    -0.0090 -0.0173  0.0083   0.0003 -0.0004 -0.0005  0.00015
 3  0.00297     0.0280  0.0235 -0.0247  -0.0003  0.0012  0.0007  -0.00083
 4  0.00281     0.0088  0.0091 -0.0101  -0.0000  0.0004  0.0004  -0.00012
 5  0.00250     0.0097 -0.0266 -0.0066   0.0006  0.0004 -0.0007  -0.00079
 6  0.00237    -0.0026 -0.0147  0.0020   0.0003 -0.0001 -0.0004  0.00008
 7  0.00266    -0.0150  0.0014  0.0167  -0.0000 -0.0007  0.0000  0.00019
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Ch1**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
 1  0.00134      2817093      1.81          2852811      3          996      34725      0
 2  0.00136      2760016      1.86          2795878      3          996      34869      0
 3  0.00153      2812779      2.33          2851465      3          990      37699      0
 4  0.00149      2841412      2.23          2882804      3          981      40414      0
 5  0.00158      2864930      2.51          2907066      3          1002     41137      0
 6  0.00143      2922945      2.04          2964209      3          1002     40265      0
 7  0.00139      2978514      1.94          3016102      3          987      36604      0
```

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 22:317:00000 22:323:86370 LEICA GR50      -----
ALDA  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
ALSA  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
AMUR  A  1 P 22:317:00000 22:317:86370 LEICA GR10      -----
BIAZ  A  1 P 22:317:00000 22:323:82770 SPECTRA SP90M   -----
BIDA  A  1 P 22:317:00000 22:323:86370 LEICA GR10      -----
BRZR  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
CACE  A  1 P 22:317:00000 22:323:86370 TRIMBLE NETR9   -----
CANT  A  1 P 22:317:00000 22:323:86370 LEICA GR10      -----
CHER  A  1 P 22:317:00000 22:323:49050 LEICA GR30      -----
CREU  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
EBRE  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
ELGE  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
EMAZ  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
GERN  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
HOND  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
IGEL  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
ISPS  A  1 P 22:317:00000 22:323:86370 TRIMBLE NETR9   -----
KAST  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
LARE  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
LAZK  A  1 P 22:318:00000 22:322:86370 LEICA GR30      -----
LEIT  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
ORON  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
PAS2  A  1 P 22:317:03600 22:323:86370 STONEX SC2200   -----
PASA  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
RIO1  A  1 P 22:317:00000 22:323:86370 LEICA GR25      -----
SALA  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
SCOA  A  1 P 22:317:00000 22:323:71970 LEICA GR50      -----
SOPU  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
TERU  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
VITO  A  1 P 22:317:00000 22:323:86370 LEICA GR30      -----
YEBE  A  1 P 22:317:00000 22:323:86370 LEICA GR50      -----
ZARA  A  1 P 22:317:00000 22:323:86370 TRIMBLE NETR9   -----
```

7.2 Antennas

Serial number ONLY provided in case individual calibrations are available.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_____ S/N__
ACOR  A  1 P 22:317:00000 22:323:86370 LEIAT504      LEIS  -----
ALDA  A  1 P 22:317:00000 22:323:86370 LEIAS10      NONE  -----
ALSA  A  1 P 22:317:00000 22:323:86370 LEIAR10      NONE  -----
```

AMUR	A	1	P	22:317:00000	22:317:86370	LEIAS10	NONE	----
BLAZ	A	1	P	22:317:00000	22:323:82770	LEIAR25	LEIT	----
BIDA	A	1	P	22:317:00000	22:323:86370	LEIAS10	NONE	----
BRZR	A	1	P	22:317:00000	22:323:86370	LEIAS10	NONE	----
CACE	A	1	P	22:317:00000	22:323:86370	TRM29659.00	NONE	----
CANT	A	1	P	22:317:00000	22:323:86370	LEIAR25.R4	LEIT	25066
CHER	A	1	P	22:317:00000	22:323:49050	LEIAR10	NONE	----
CREU	A	1	P	22:317:00000	22:323:86370	LEIAR25.R4	NONE	26357
EBRE	A	1	P	22:317:00000	22:323:86370	LEIAR25.R4	NONE	26359
ELGE	A	1	P	22:317:00000	22:323:86370	LEIAR25.R4	LEIT	----
EMAZ	A	1	P	22:317:00000	22:323:86370	LEIAS10	NONE	----
GERN	A	1	P	22:317:00000	22:323:86370	LEIAS10	NONE	----
HOND	A	1	P	22:317:00000	22:323:86370	LEIAR20	LEIM	41012
IGEL	A	1	P	22:317:00000	22:323:86370	LEIAR20	LEIM	43011
ISPS	A	1	P	22:317:00000	22:323:86370	TRM59900.00	SCIS	----
KAST	A	1	P	22:317:00000	22:323:86370	LEIAS10	NONE	----
LARE	A	1	P	22:317:00000	22:323:86370	LEIAR20	LEIM	----
LAZK	A	1	P	22:318:00000	22:322:86370	LEIAR25.R4	LEIT	----
LEIT	A	1	P	22:317:00000	22:323:86370	LEIAR10	NONE	----
ORDN	A	1	P	22:317:00000	22:323:86370	LEIAR10	NONE	----
PAS2	A	1	P	22:317:03600	22:323:86370	LEIAR20	LEIM	73034
PASA	A	1	P	22:317:00000	22:323:86370	LEIAR20	LEIM	73034
RIO1	A	1	P	22:317:00000	22:323:86370	LEIAR25.R4	LEIT	25138
SALA	A	1	P	22:317:00000	22:323:86370	LEIAR25	NONE	----
SCDA	A	1	P	22:317:00000	22:323:71970	TRM59971.00	NONE	----
SOPU	A	1	P	22:317:00000	22:323:86370	LEIAS10	NONE	----
TERU	A	1	P	22:317:00000	22:323:86370	LEIAR20	LEIM	49044
VITO	A	1	P	22:317:00000	22:323:86370	LEIAS10	NONE	----
YEBE	A	1	P	22:317:00000	22:323:86370	LEIAR20	LEIM	49016
ZARA	A	1	P	22:317:00000	22:323:86370	TRM29659.00	NONE	----

7.3 Eccentricities

* SITE	PT	SOLN	T	DATA_START_	DATA_END_	AXE	UP_	NORTH_	EAST_
							ARP->	BENCHMARK(M)	
ACOR	A	1	P	22:317:00000	22:323:86370	UNE	3.0460	0.0000	0.0000
ALDA	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
ALSA	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
AMUR	A	1	P	22:317:00000	22:317:86370	UNE	0.0000	0.0000	0.0000
BLAZ	A	1	P	22:317:00000	22:323:82770	UNE	0.0000	0.0000	0.0000
BIDA	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
BRZR	A	1	P	22:317:00000	22:323:86370	UNE	0.0771	0.0000	0.0000
CACE	A	1	P	22:317:00000	22:323:86370	UNE	0.0600	0.0000	0.0000
CANT	A	1	P	22:317:00000	22:323:86370	UNE	3.0490	0.0000	0.0000
CHER	A	1	P	22:317:00000	22:323:49050	UNE	0.0000	0.0000	0.0000
CREU	A	1	P	22:317:00000	22:323:86370	UNE	0.0770	0.0000	0.0000
EBRE	A	1	P	22:317:00000	22:323:86370	UNE	0.0770	0.0000	0.0000
ELGE	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
EMAZ	A	1	P	22:317:00000	22:323:86370	UNE	0.0350	0.0000	0.0000
GERN	A	1	P	22:317:00000	22:323:86370	UNE	0.0771	0.0000	0.0000
HOND	A	1	P	22:317:00000	22:323:86370	UNE	0.0771	0.0000	0.0000
IGEL	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
ISPS	A	1	P	22:317:00000	22:323:86370	UNE	0.0350	0.0000	0.0000
KAST	A	1	P	22:317:00000	22:323:86370	UNE	0.0350	0.0000	0.0000
LARE	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
LAZK	A	1	P	22:318:00000	22:322:86370	UNE	0.0000	0.0000	0.0000
LEIT	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
ORDN	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
PAS2	A	1	P	22:317:03600	22:323:86370	UNE	0.0000	0.0000	0.0000
PASA	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
RIO1	A	1	P	22:317:00000	22:323:86370	UNE	0.0606	0.0000	0.0000
SALA	A	1	P	22:317:00000	22:323:86370	UNE	0.0600	0.0000	0.0000
SCDA	A	1	P	22:317:00000	22:323:71970	UNE	0.0000	0.0000	0.0000
SOPU	A	1	P	22:317:00000	22:323:86370	UNE	0.0771	0.0000	0.0000
TERU	A	1	P	22:317:00000	22:323:86370	UNE	0.0600	0.0000	0.0000
VITO	A	1	P	22:317:00000	22:323:86370	UNE	0.0000	0.0000	0.0000
YEBE	A	1	P	22:317:00000	22:323:86370	UNE	0.0600	0.0000	0.0000
ZARA	A	1	P	22:317:00000	22:323:86370	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:

2022-11-27 21:32 UTC		ALDA3170.220		RECEIVER FIRM. VERS.		4.60/7.811	->	4.60.259
2022-11-27 21:32 UTC		VITO3170.220		RECEIVER FIRM. VERS.		4.60/7.811	->	4.60.259
2022-11-28 23:49 UTC		ALDA3180.220		RECEIVER FIRM. VERS.		4.60/7.811	->	4.60.259
2022-11-28 23:49 UTC		VITO3180.220		RECEIVER FIRM. VERS.		4.60/7.811	->	4.60.259
2022-11-17 19:12 UTC		ALDA3190.220		RECEIVER TYPE		LEICA GR30	->	LEICA GR10
2022-11-17 19:12 UTC		ALDA3190.220		RECEIVER SER. NO.		1708399	->	1700960
2022-11-17 19:12 UTC		ALDA3190.220		RECEIVER FIRM. VERS.		4.60/7.811	->	4.31/6.525
2022-11-17 19:12 UTC		AMUR3190.220		RECEIVER TYPE		LEICA GR30	->	LEICA GR10
2022-11-17 19:12 UTC		AMUR3190.220		RECEIVER SER. NO.		1708401	->	1700998
2022-11-17 19:12 UTC		AMUR3190.220		RECEIVER FIRM. VERS.		4.60/7.811	->	4.31/6.525
2022-11-17 19:13 UTC		LARE3190.220		RECEIVER FIRM. VERS.		4.52/7.711	->	4.31/7.403
2022-11-17 19:13 UTC		VITO3190.220		RECEIVER TYPE		LEICA GR30	->	LEICA GR10
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2022-12-02 00:04 UTC		ALDA3210.220		RECEIVER FIRM. VERS.		4.60/7.811	->	4.60.259
2022-12-02 00:04 UTC		VITO3210.220		RECEIVER FIRM. VERS.		4.60/7.811	->	4.60.259
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9 References

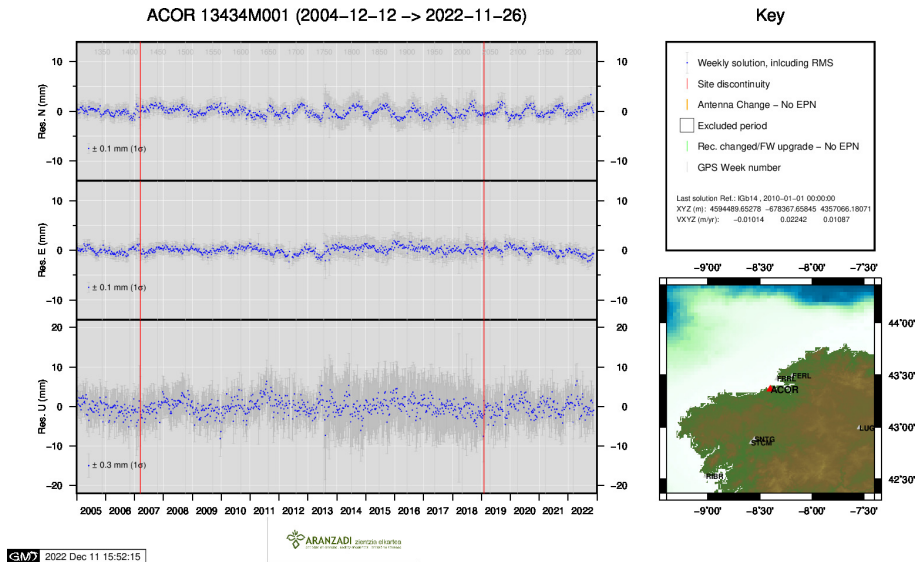
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign*. etrs89.ensg.ign.fr/memo-V8.pdf

EPN Coordination Group and the EPN Central Bureau (2018): *Guidelines for the EPN Analysis Centres*. epncb.oma.be/documentation/guidelines/guidelines_analysis_centres.pdf

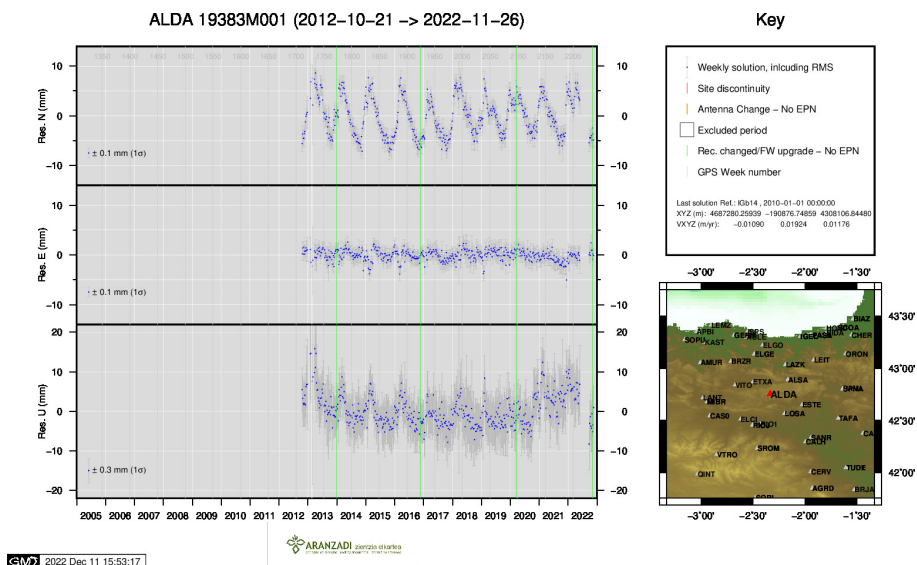
Z. Altamimi (2018): *EUREF Technical Note 1: Relationship and Transformation between the International and the European Terrestrial Reference Systems*. etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf

10 Cumulative Time Series

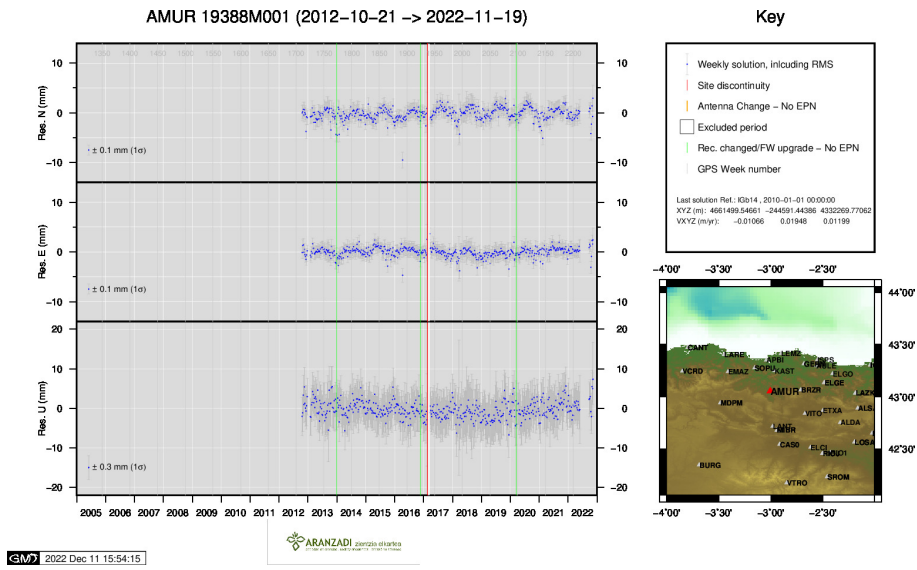
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



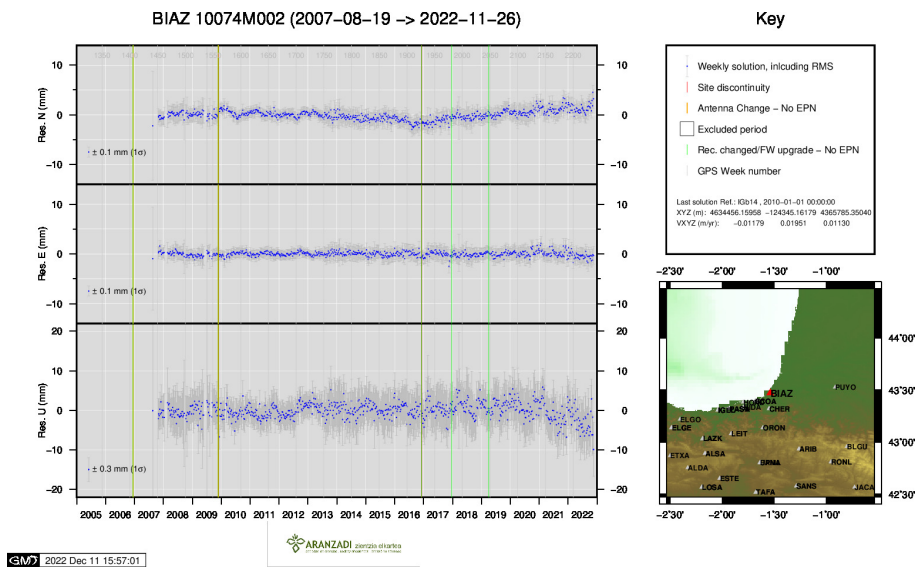
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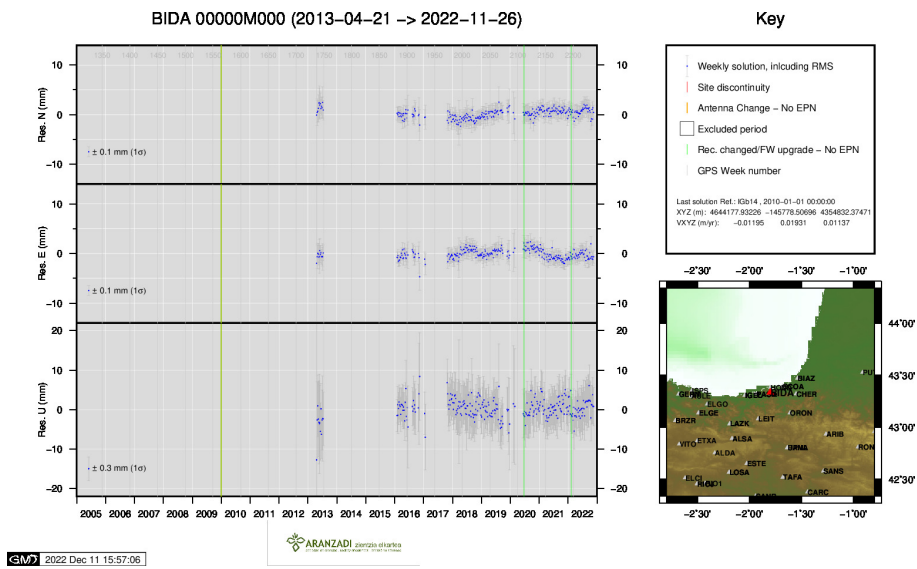
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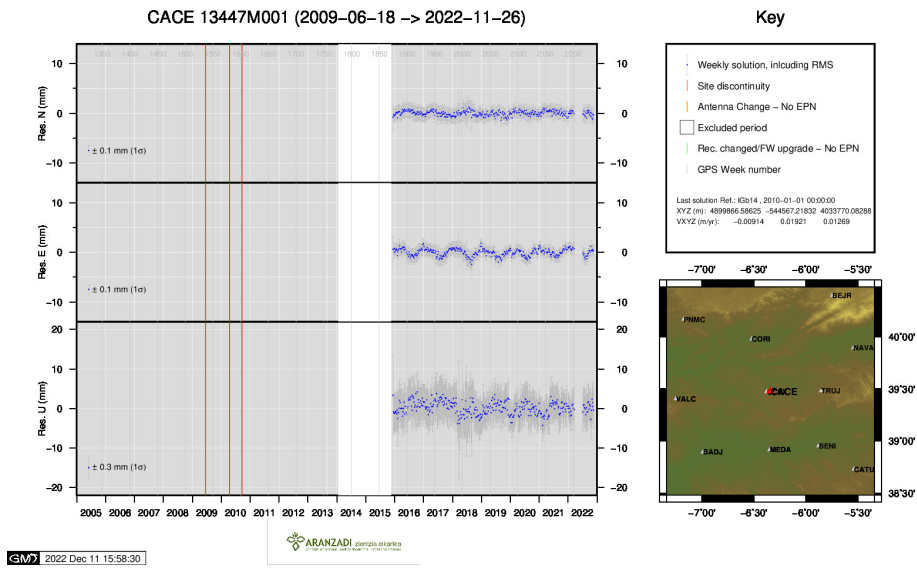
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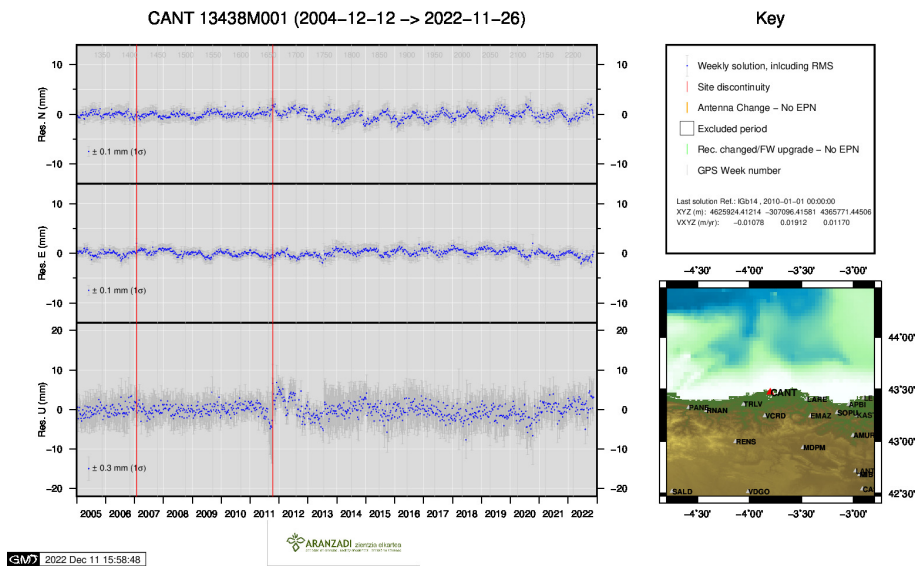
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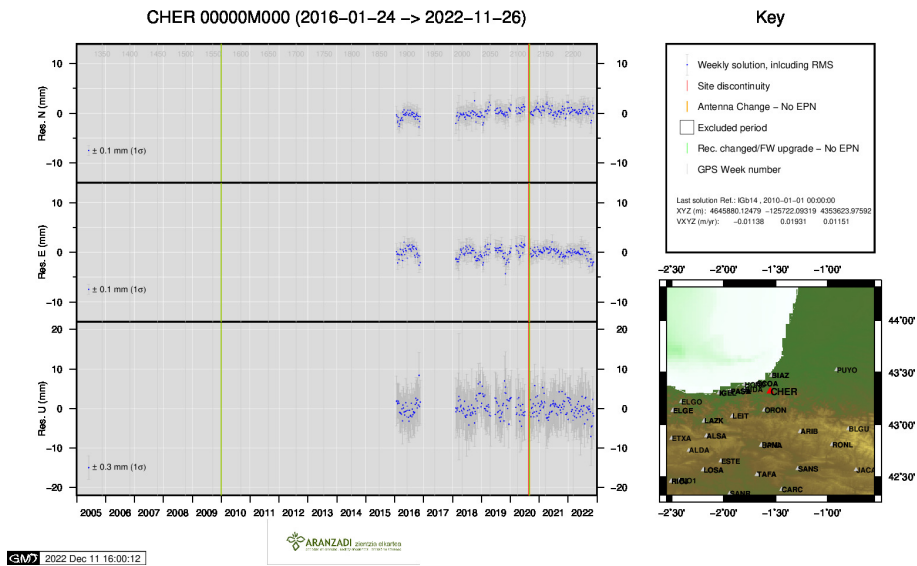
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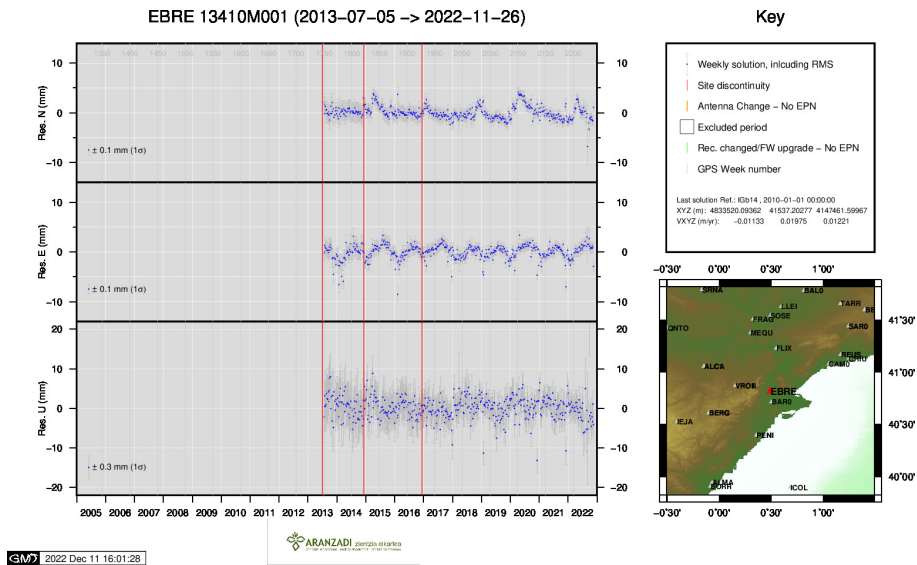
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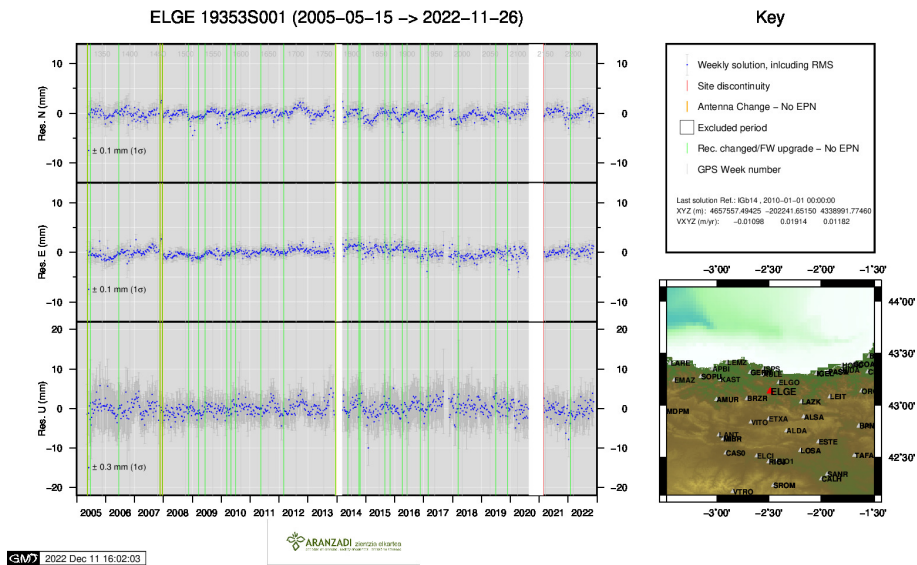
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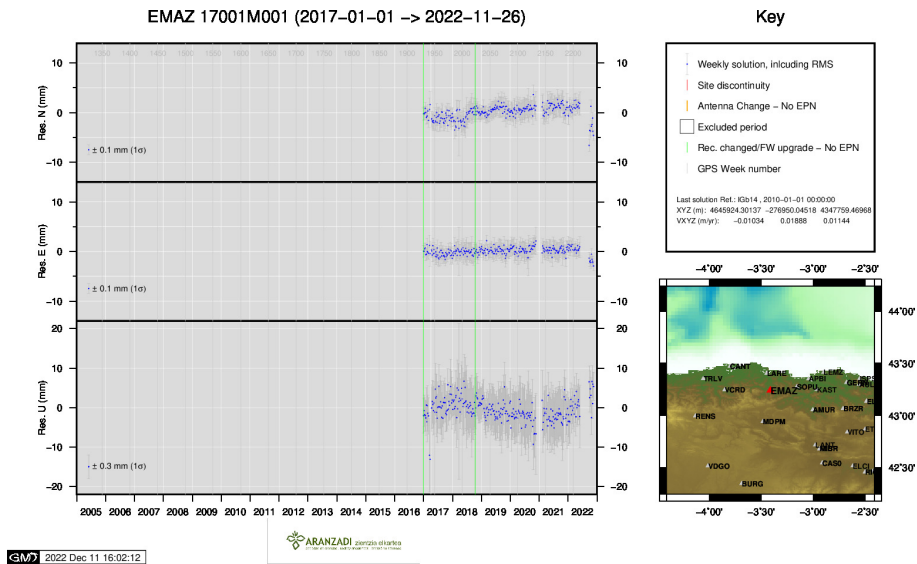
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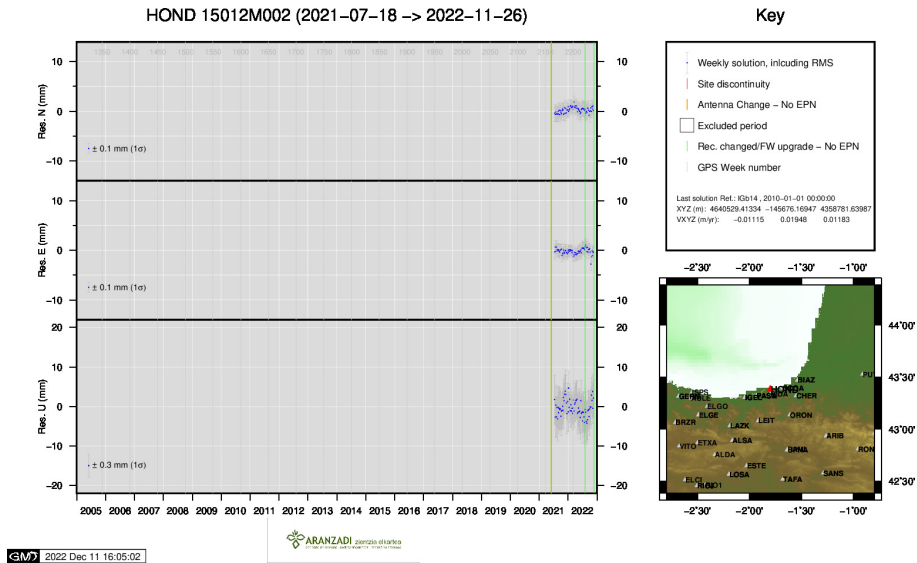
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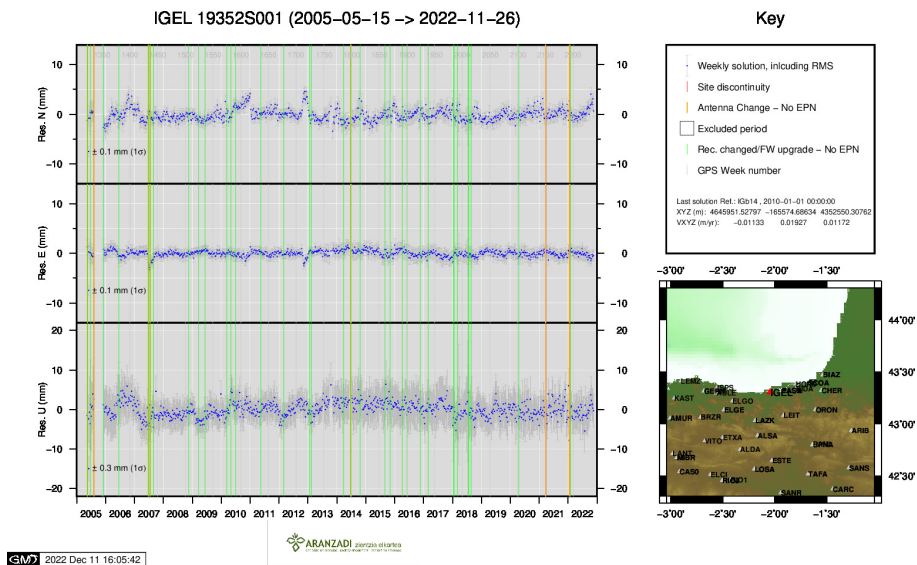
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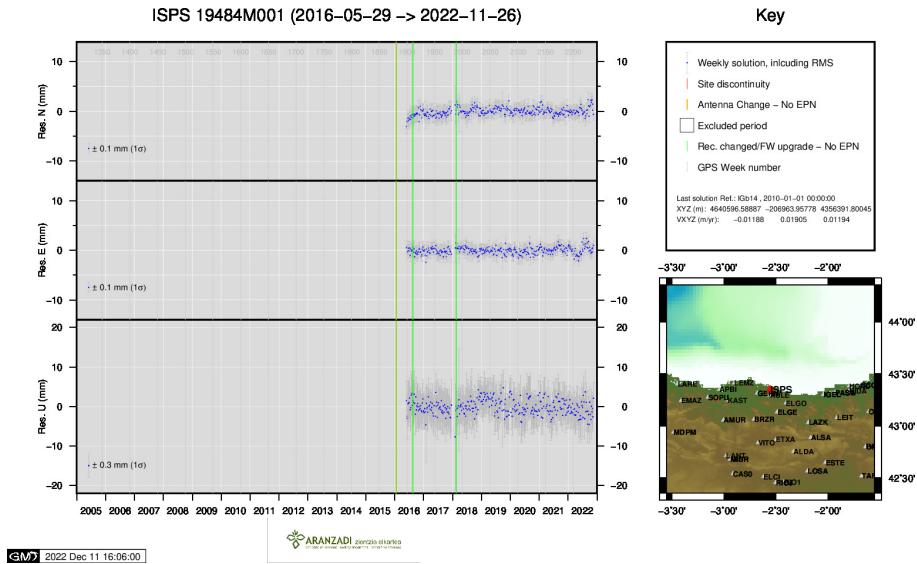
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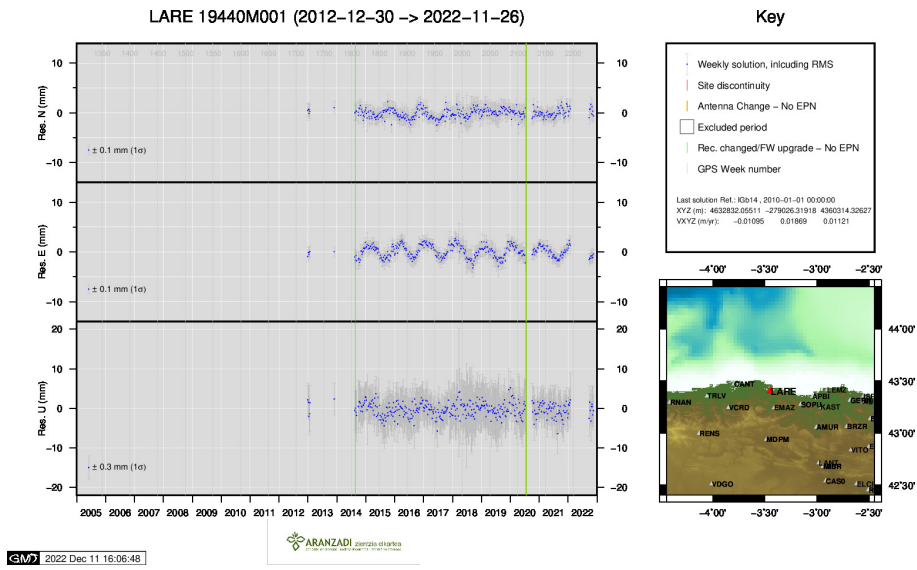
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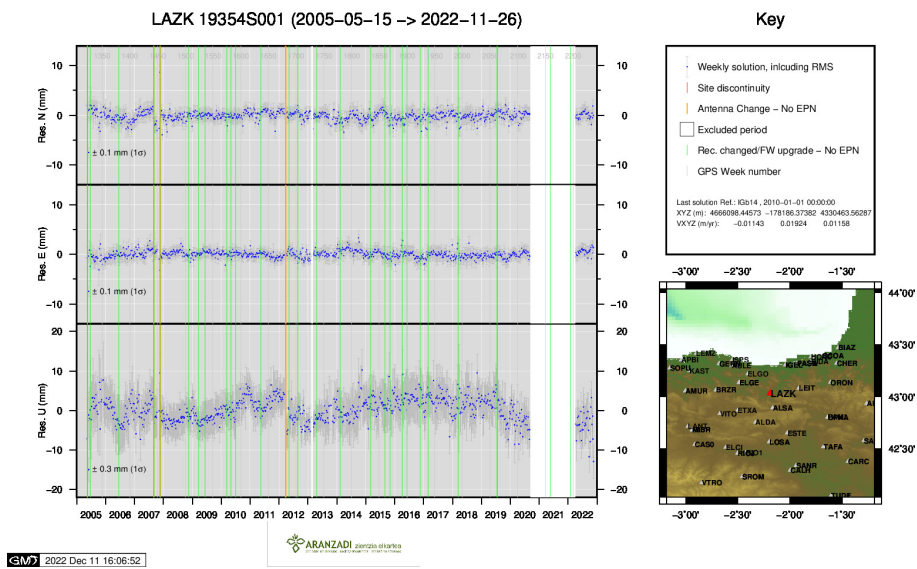
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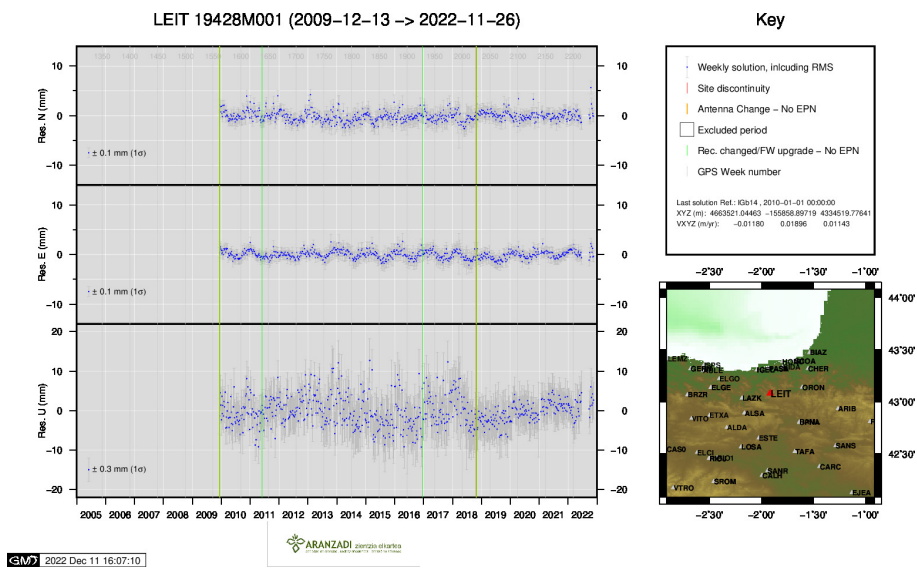
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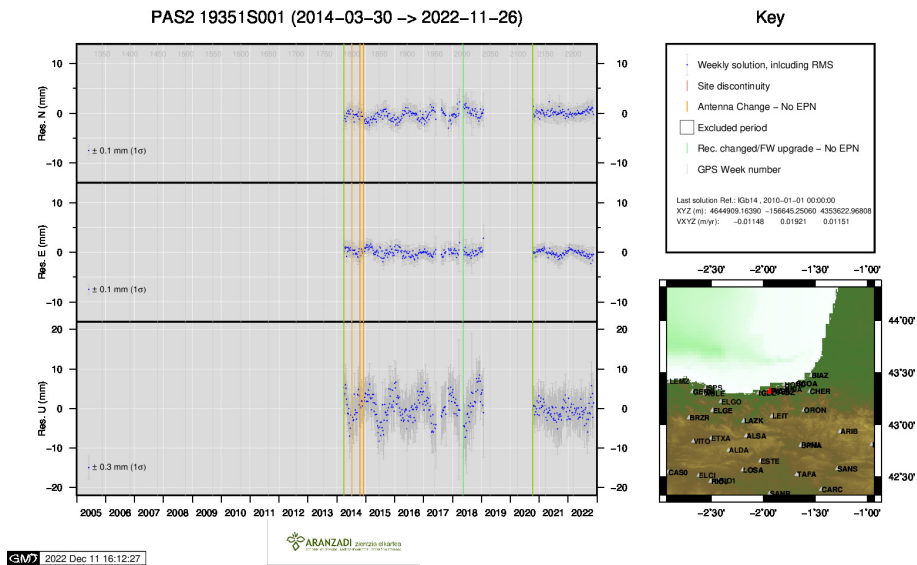
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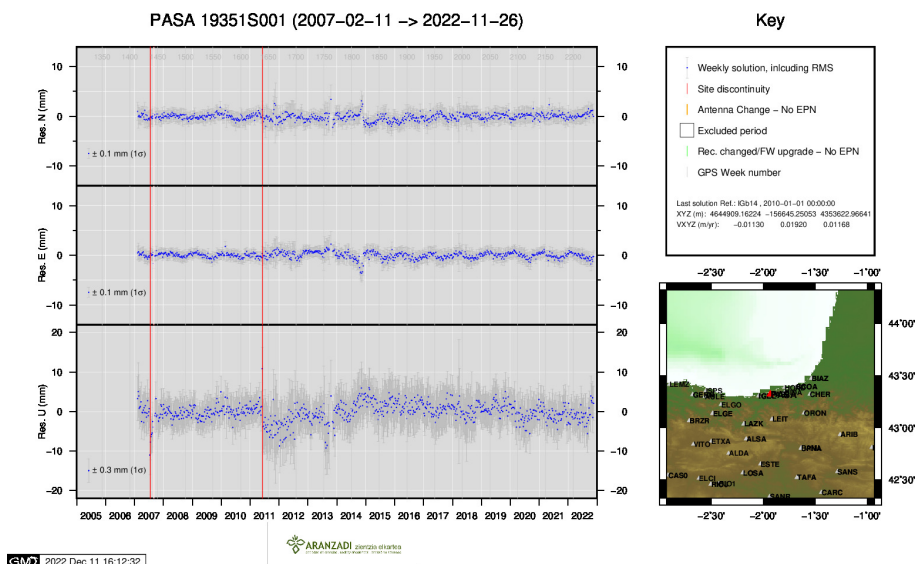
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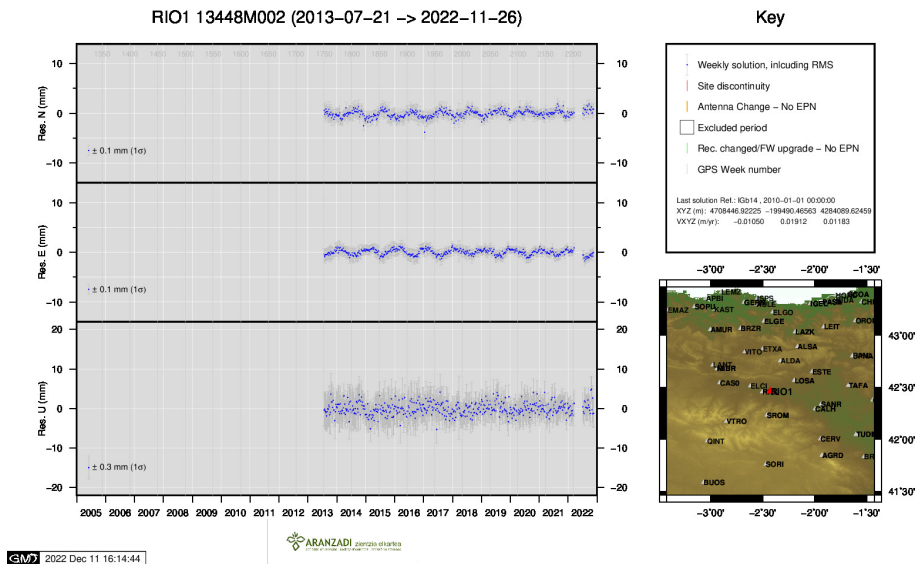
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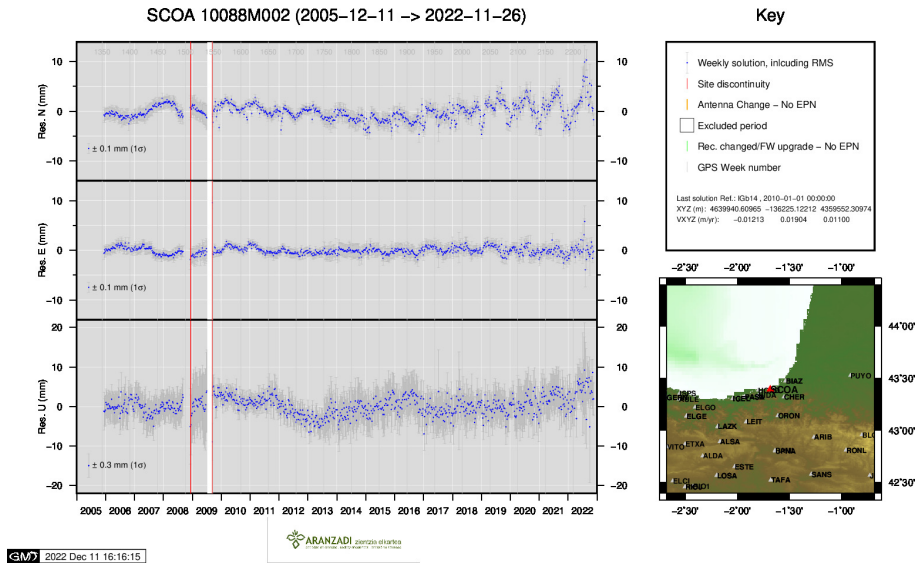
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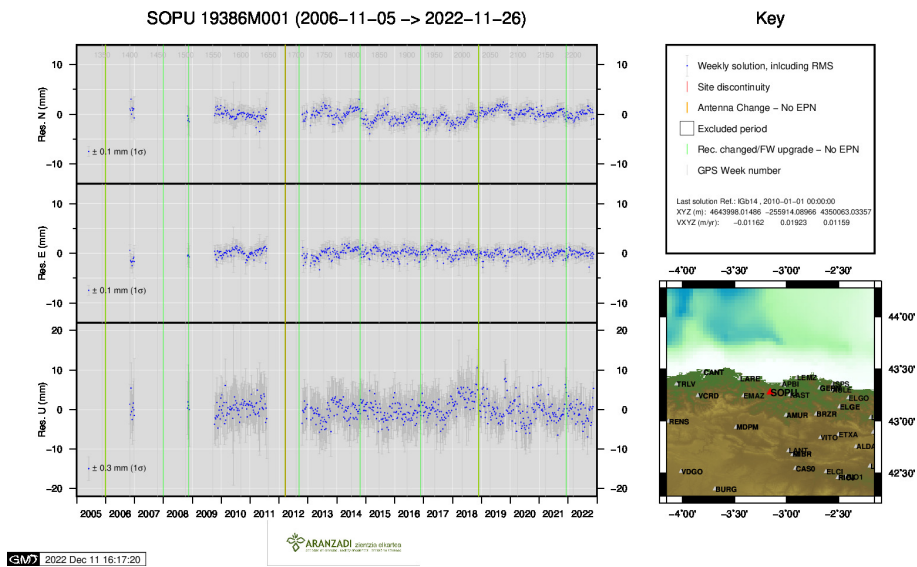
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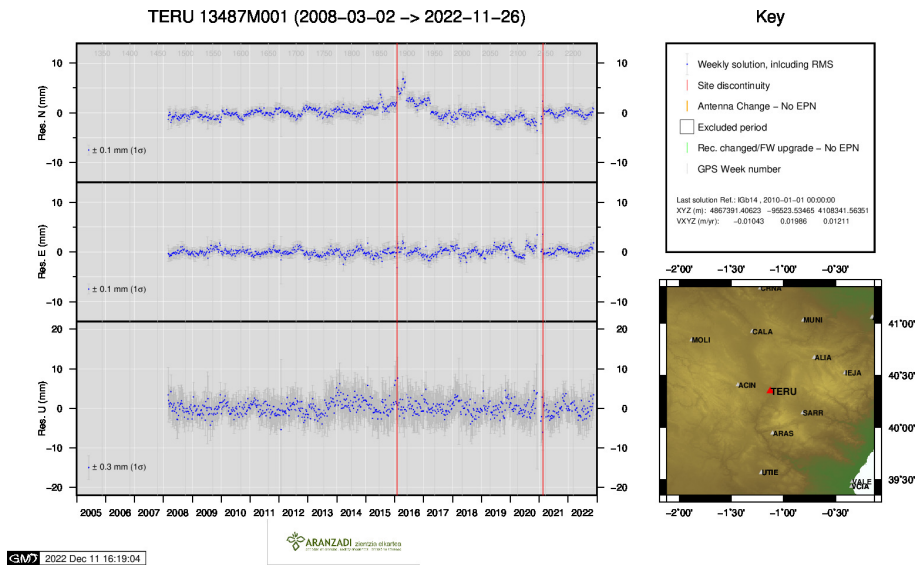
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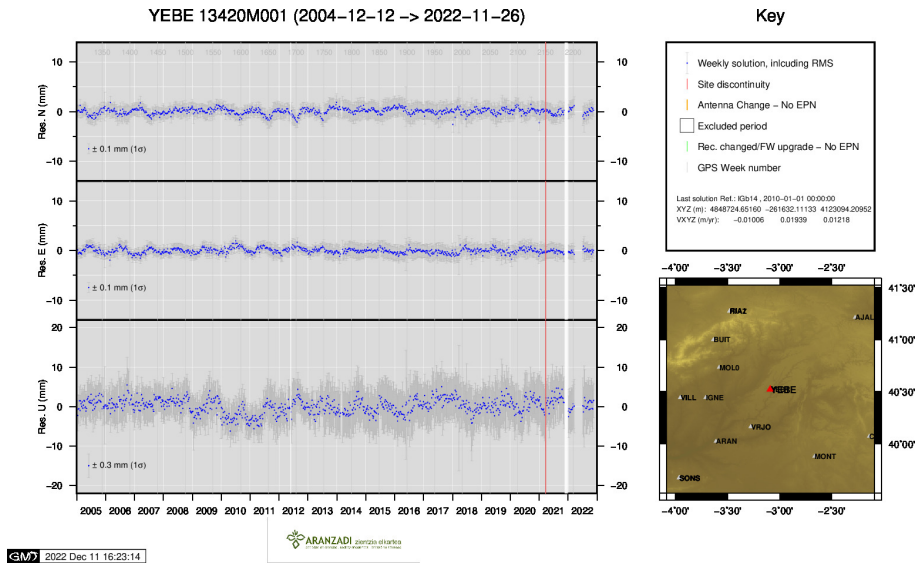
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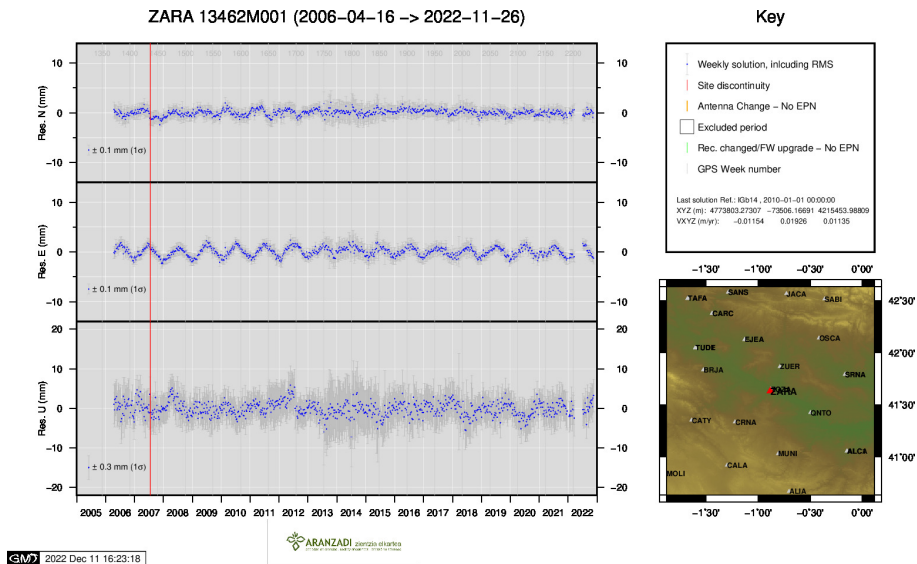
22) SOPU



23) TERU



24) YEBE



25) ZARA