

ARA-DAC Weekly Analysis Result: 2200 (GFA)

Technical Report

GPS Week: 2200 (GFA)

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

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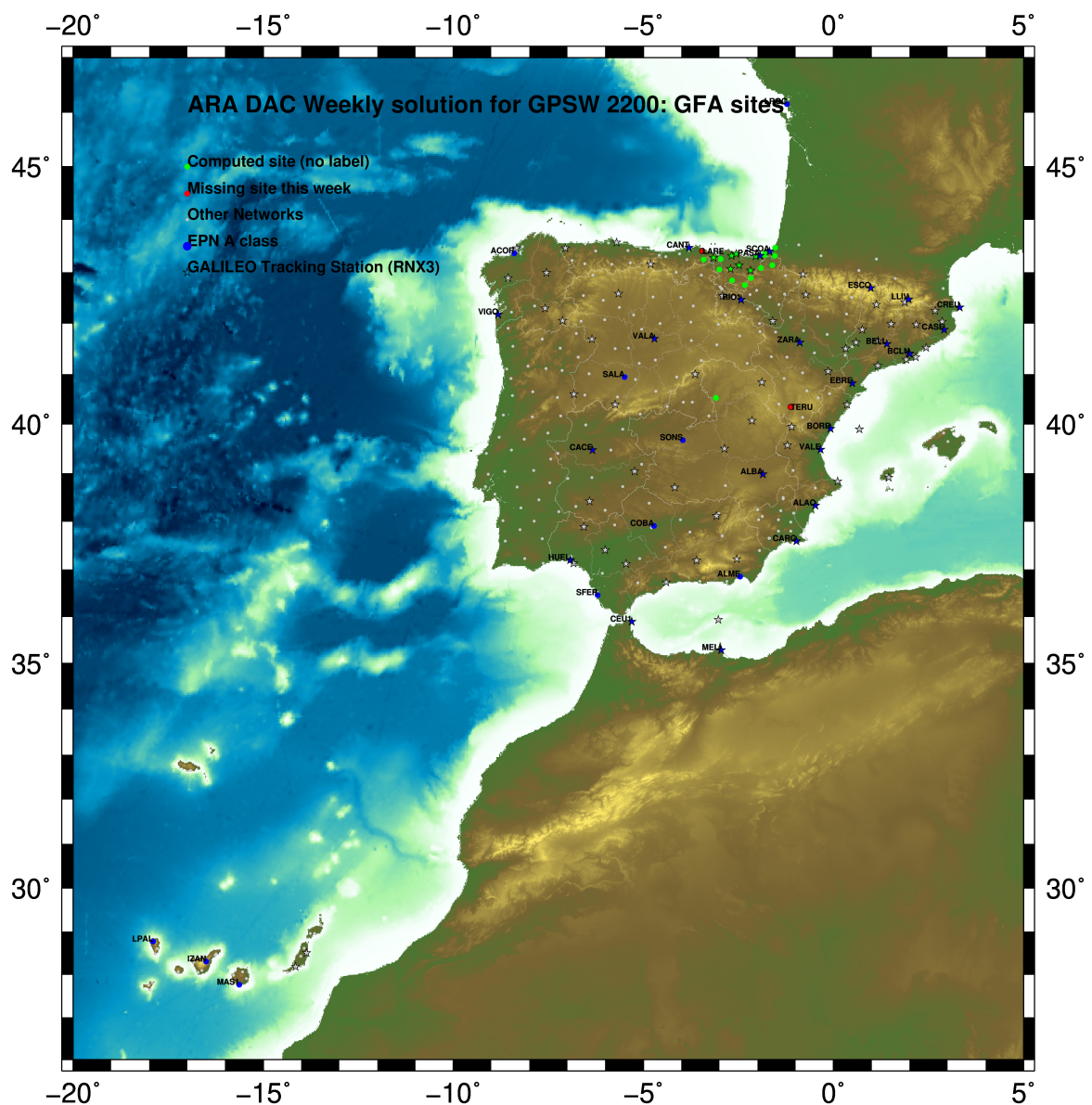
Report generated on 2022/03/27 at 14:18:18



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 2022 Mar 27 14:18:09

Fig.1: Computed Sites for GPS Week2200 (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 2200 WEEK FINAL COMBINATION: PRECISE ORBITS                27-MAR-22 10:45
-----
LOCAL GEODETIC DATUM: IGB14                EPOCH: 2022-03-09 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
  4 ACRD 13434M001        4594489.52725        -678367.38550        4357066.31286        W
 39 ALDA 19383M001        4687280.13058        -190876.51396        4308106.99384        A
 50 ALSA 19419M001        4677250.79821        -176770.34002        4319079.90615        A
 53 AMUR 19388M001        4661499.41907        -244591.20571        4332269.91792        A
100 BIAZ 10074M002        4634456.01554        -124344.92531        4365785.48952        A
101 BIDA 00000M000        4644177.78572        -145778.27205        4354832.51267        A
113 BRZR 19387M001        4662220.95653        -220769.84910        4333309.46924        A
104 CACE 13447M001        4899866.47610        -544566.98332        4033770.23971        W
116 CANT 13438M001        4625924.28382        -307096.18253        4365771.59050        W
154 CHER 00000M000        4645879.98474        -125721.85796        4353624.11539        A
162 CREU 13432M001        4715420.09083        273178.11120        4271946.87410        W
204 EBRE 13410M001        4833519.95747        41537.44271        4147461.74919        W
180 ELGE 19353S001        4657557.36086        -202241.41814        4338991.91776        A
182 EMAZ 17001M001        4645924.17605        -276949.81338        4347759.61314        A
209 GERN 19389M001        4642811.28579        -217222.87054        4353278.90833        A
257 HOND 15012M002        4640529.27748        -145676.93298        4358781.78568        A
235 IGEL 19352S001        4645951.38907        -165574.45158        4352550.45050        A
240 ISPS 19484M001        4640596.44341        -206963.72612        4356391.94678        A
245 KAST 19499M001        4646949.04469        -240747.21936        4348015.02695        A
256 LAZK 19354S001        4666098.30080        -178186.13876        4330463.69790        A
261 LEIT 19428M001        4663520.90179        -155858.66445        4334519.91819        A
334 ORDN 19427M001        4659695.74501        -130864.68355        4338948.91590        A
345 PAS2 19351S001        4644909.02344        -156645.01624        4353623.10874        A
493 PASA 19351S001        4644909.02372        -156645.01623        4353623.10900        W
553 RID1 13448M002        4708446.79375        -199490.23195        4284089.76926        W
558 SALA 13469M001        4803054.45697        -462131.01860        4158379.11486        W
566 SODA 10088M002        4639940.46237        -136224.89894        4359552.44462        W
418 SOPU 19386M001        4643997.87615        -255913.85532        4350063.17702        A
493 VITO 19385M001        4679397.66692        -218436.45257        4314898.39805        A
752 YEBE 13420M001        4848724.52972        -261631.87481        4123094.36080        A
755 ZARA 13462M001        4773803.13352        -73505.93301        4215454.12835        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 2200                27-MAR-22 10:45
-----
LOCAL GEODETIC DATUM: ETRF2000                EPOCH: 2022-03-09 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
  4 ACRD 13434M001        4594489.85613        -678367.97668        4357065.85962        W
 39 ALDA 19383M001        4687280.51804        -190877.11464        4308106.53947        A
 50 ALSA 19419M001        4677251.18830        -176770.93952        4319079.45179        A
 53 AMUR 19388M001        4661499.80150        -244591.80361        4332269.46496        A
100 BIAZ 10074M002        4634456.41584        -124345.51978        4365785.40038        A
101 BIDA 00000M000        4644178.18246        -145778.86769        4354832.06245        A
113 BRZR 19387M001        4662221.34208        -220770.44702        4333309.01654        A
104 CACE 13447M001        4899866.79760        -544567.60874        4033769.76302        W
116 CANT 13438M001        4625924.66080        -307096.77654        4365771.13965        W
154 CHER 00000M000        4645880.38395        -125722.45373        4353623.66529        A
162 CREU 13432M001        4715420.53467        273177.50901        4271946.42343        W
204 EBRE 13410M001        4833520.36239        41536.82629        4147461.28576        W
180 ELGE 19353S001        4657557.74920        -202242.01547        4338991.46569        A
182 EMAZ 17001M001        4645924.55553        -276950.40960        4347759.16104        A
209 GERN 19389M001        4642811.67330        -217223.46623        4353278.45728        A
257 HOND 15012M002        4640529.67453        -145676.52821        4358781.33576        A
235 IGEL 19352S001        4645951.78312        -165575.04748        4352549.99987        A
240 ISPS 19484M001        4640596.83247        -206964.32154        4356391.49605        A
245 KAST 19499M001        4646949.42880        -240747.81559        4348014.57525        A
256 LAZK 19354S001        4666098.69157        -178186.73699        4330463.24544        A
261 LEIT 19428M001        4663521.29571        -155859.26232        4334519.46624        A
334 ORDN 19427M001        4659696.14245        -130865.28091        4338948.46459        A
345 PAS2 19351S001        4644909.41870        -156645.61199        4353622.65831        A
493 PASA 19351S001        4644909.41898        -156645.61198        4353622.65857        W
553 RID1 13448M002        4708447.17829        -199490.83504        4284089.31302        W
558 SALA 13469M001        4803054.79746        -462131.63302        4158378.64731        W
566 SODA 10088M002        4639940.86069        -136225.48497        4359551.99487        W
418 SOPU 19386M001        4643998.25848        -255914.45126        4350062.72536        A
493 VITO 19385M001        4679398.05138        -218437.05243        4314897.94396        A
752 YEBE 13420M001        4848724.89414        -261632.49390        4123093.89214        A
755 ZARA 13462M001        4773803.52893        -73506.54310        4215453.66837        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 2200		27-MAR-22 10:45			
LOCAL GEODETIC DATUM: ETRF2014		EPOCH: 2022-03-09 12:00:00			
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACDR 13434M001	4594489.81545	-678368.01429	4357065.91105	W
39	ALDA 19383M001	4687280.47500	-190877.15358	4308106.59077	A
50	ALSA 19419M001	4677251.14531	-176770.97855	4319079.50313	A
53	AMUR 19388M001	4661499.75890	-244591.84247	4332269.51632	A
100	BIAZ 10074M002	4634456.37313	-124345.55917	4365785.09187	A
101	BIDA 00000M000	4644178.13971	-145778.90697	4354832.11390	A
113	BRZR 19387M001	4662221.29940	-220770.48596	4333309.06790	A
104	CACE 13447M001	4899866.75326	-544567.64552	4033769.81364	W
116	CANT 13438M001	4625924.61876	-307096.81534	4365771.19108	W
154	CHER 00000M000	4645880.34112	-125722.49307	4353623.71675	A
162	CREU 13432M001	4715420.48965	273177.46859	4271946.47497	W
204	EBRE 13410M001	4833520.31695	41536.78717	4147461.33681	W
180	ELGE 19353S001	4657557.70651	-202242.05450	4338991.51708	A
182	EMAZ 17001M001	4645924.51319	-276950.44842	4347759.21243	A
209	GERN 19389M001	4642811.63080	-217223.50527	4353278.50870	A
257	HOND 15012M002	4640529.63182	-145676.56750	4358781.38722	A
235	IGEL 19352S001	4645951.74042	-165575.08669	4352550.05131	A
240	ISPS 19484M001	4640596.78996	-206964.36062	4356391.54748	A
245	KAST 19499M001	4646949.38634	-240747.85453	4348014.62665	A
256	LAZK 19354S001	4666098.64870	-178186.77606	4330463.29682	A
261	LEIT 19428M001	4663521.25280	-155859.30149	4334519.51763	A
334	ORON 19427M001	4659696.09950	-130865.32017	4338948.51601	A
345	PAS2 19351S001	4644909.37598	-156645.65123	4353622.70976	A
493	PASA 19351S001	4644909.37626	-156645.65122	4353622.71002	W
553	RI01 13448M002	4708447.13505	-199490.87386	4284089.36427	W
558	SALA 13469M001	4803054.75399	-462131.67051	4158378.69819	W
566	SOA 10088M002	4639940.81795	-136225.52430	4359552.04634	W
418	SOPU 19386M001	4643998.21609	-255914.49015	4350062.77676	A
493	VITO 19385M001	4679398.00850	-218437.09131	4314897.99528	A
752	YEBE 13420M001	4848724.84956	-261632.53190	4123093.94297	A
755	ZARA 13462M001	4773803.48456	-73506.58208	4215453.71950	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 2200 WEEK FINAL COMBINATION: PRECISE ORBITS 27-MAR-22 10:45

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	1.30	0.58	4.82
ALDA 19383M001	7	XXXXXX	1.08	0.78	2.66
ALSA 19419M001	7	XXXXXX	0.69	0.60	3.09
AMUR 19388M001	7	XXXXXX	2.06	1.26	5.10
BLAZ 10074M002	7	XXXXXX	0.67	0.76	3.76
BIDA 00000M000	7	XXXXXX	1.22	0.70	2.86
BRZR 19387M001	7	XXXXXX	1.47	2.66	4.07
CACE 13447M001	7	XXXXXX	0.48	0.73	2.55
CANT 13438M001	7	XXXXXX	0.97	0.52	2.39
CHER 00000M000	6	XX XXX	0.88	0.88	3.78
CREU 13432M001	7	XXXXXX	0.60	0.70	2.09
EBRE 13410M001	7	XXXXXX	0.51	0.51	2.48
ELGE 19353S001	7	XXXXXX	1.33	1.37	3.22
EMAZ 17001M001	7	XXXXXX	1.13	1.37	4.57
GERN 19389M001	7	XXXXXX	1.05	0.68	2.68
HOND 15012M002	7	XXXXXX	1.18	0.79	1.94
IGEL 19352S001	7	XXXXXX	1.18	0.63	2.96
ISPS 19484M001	7	XXXXXX	1.67	0.89	3.59
KAST 19499M001	7	XXXXXX	1.21	0.72	6.98
LAZK 19354S001	7	XXXXXX	1.56	0.97	6.52
LEIT 19428M001	7	XXXXXX	2.10	0.88	2.25
ORON 19427M001	7	XXXXXX	0.73	0.73	3.48
PAS2 19351S001	7	XXXXXX	0.77	0.55	1.57
PASA 19351S001	7	XXXXXX	0.80	0.58	1.84
RI01 13448M002	7	XXXXXX	0.47	0.41	1.98
SALA 13469M001	7	XXXXXX	0.65	0.60	2.78
SCDA 10088M002	7	XXXXXX	1.13	0.90	3.90
SOPU 19386M001	7	XXXXXX	1.05	1.17	3.21
VITO 19385M001	7	XXXXXX	1.51	0.87	2.77
YEBE 13420M001	7	XXXXXX	0.71	0.36	1.74
ZARA 13462M001	7	XXXXXX	0.44	0.44	1.51

Comparison of individual solutions:

ACOR 13434M001	N	1.30	-0.10	0.36	-0.58	-0.31	-1.61	-2.32	-1.26
ACOR 13434M001	E	0.58	-0.58	0.29	0.65	0.83	-0.11	0.63	0.23
ACOR 13434M001	U	4.82	6.53	0.40	0.95	-0.15	5.06	7.74	3.16
ALDA 19383M001	N	1.08	1.67	0.13	0.87	-1.32	-0.26	-1.21	0.45
ALDA 19383M001	E	0.78	-0.93	1.03	0.60	-0.52	0.27	-0.14	-1.01
ALDA 19383M001	U	2.66	-2.14	-1.03	2.95	-2.12	0.02	0.33	4.84
ALSA 19419M001	N	0.69	0.49	1.09	0.05	-0.92	-0.42	-0.27	0.61
ALSA 19419M001	E	0.60	-0.33	0.14	-0.83	0.33	-0.71	0.82	-0.24
ALSA 19419M001	U	3.09	2.90	4.09	2.33	-3.67	0.36	-3.18	1.74
AMUR 19388M001	N	2.06	0.98	0.51	1.53	2.48	-1.39	-3.04	2.13
AMUR 19388M001	E	1.26	1.32	-0.55	0.15	1.43	-1.10	-1.54	1.34
AMUR 19388M001	U	5.10	-3.00	-1.94	-2.01	3.44	-8.82	-1.59	6.86
BLAZ 10074M002	N	0.67	0.18	0.47	0.24	-0.20	1.02	0.26	1.12
BLAZ 10074M002	E	0.76	0.58	-0.36	-0.01	-0.77	1.09	-0.21	1.09
BLAZ 10074M002	U	3.76	2.90	3.21	0.12	3.64	-5.97	1.78	-3.73
BIDA 00000M000	N	1.22	2.14	0.28	1.27	-1.00	-0.14	-0.27	1.27
BIDA 00000M000	E	0.70	0.07	0.18	0.97	-0.15	0.15	1.36	-0.10
BIDA 00000M000	U	2.86	-1.39	0.45	-0.31	-3.38	-0.33	5.68	-1.76
BRZR 19387M001	N	1.47	2.50	1.23	1.41	-0.35	-1.37	-1.00	0.56
BRZR 19387M001	E	2.66	2.96	1.51	1.82	0.49	-3.80	-3.24	1.67
BRZR 19387M001	U	4.07	0.79	-0.57	1.28	-5.31	-7.35	2.45	-2.92
CACE 13447M001	N	0.48	0.63	0.16	0.15	-0.60	-0.04	0.03	-0.76
CACE 13447M001	E	0.73	0.36	0.36	0.54	-0.99	0.11	0.61	-1.15
CACE 13447M001	U	2.55	4.07	0.93	-2.53	-2.03	-2.86	-1.54	0.70
CANT 13438M001	N	0.97	0.77	0.47	0.71	1.96	0.40	-0.11	-0.51
CANT 13438M001	E	0.52	0.57	-0.21	-0.26	-0.79	-0.16	0.54	-0.49
CANT 13438M001	U	2.39	-2.59	-1.44	-2.14	0.46	-3.20	-3.01	-1.20
CHER 00000M000	N	0.88	0.80	-0.30	0.28		0.95	0.54	1.36
CHER 00000M000	E	0.88	0.79	-0.24	0.37		-0.62	1.30	1.02
CHER 00000M000	U	3.78	1.43	4.35	-0.08		-5.48	-4.40	-0.96
CREU 13432M001	N	0.60	0.46	-0.17	0.55	-0.38	0.16	-0.90	-0.82
CREU 13432M001	E	0.70	0.43	0.21	-1.14	-0.91	0.30	0.31	0.60
CREU 13432M001	U	2.09	-2.41	1.87	-1.07	2.52	-1.34	2.72	-0.45
EBRE 13410M001	N	0.51	0.17	-0.08	-0.03	0.13	-0.50	-1.05	-0.37
EBRE 13410M001	E	0.51	0.18	0.20	-0.06	-0.66	-0.06	0.17	1.01
EBRE 13410M001	U	2.48	-1.62	0.08	-2.60	-1.59	1.80	4.45	1.42
ELGE 19353S001	N	1.33	0.48	2.00	1.31	-0.66	0.14	-1.77	1.01
ELGE 19353S001	E	1.37	0.25	-0.79	-0.38	-1.54	2.09	1.88	-0.29
ELGE 19353S001	U	3.22	-2.66	0.35	-2.32	-4.48	0.51	-5.39	0.36
EMAZ 17001M001	N	1.13	0.71	-1.49	0.54	0.14	0.54	2.03	0.44
EMAZ 17001M001	E	1.37	2.40	-1.52	-0.54	-0.73	-0.58	1.31	-0.60
EMAZ 17001M001	U	4.57	-4.96	-0.15	-1.19	-7.72	-2.75	5.32	-2.04
GERN 19389M001	N	1.05	0.72	0.82	1.18	-0.96	0.76	-1.09	1.17
GERN 19389M001	E	0.68	0.23	-0.97	-0.05	0.55	0.97	0.66	-0.29
GERN 19389M001	U	2.68	-4.15	-3.44	0.82	-2.44	-0.37	-2.64	-0.50
HOND 15012M002	N	1.18	0.63	1.15	0.64	0.41	0.43	-1.88	1.51
HOND 15012M002	E	0.79	1.44	-0.73	-0.21	-0.24	0.03	-0.12	1.00
HOND 15012M002	U	1.94	-3.32	-1.28	1.10	-1.86	-0.18	-1.30	1.90
IGEL 19352S001	N	1.18	-1.25	0.02	0.58	2.32	0.93	0.38	0.29
IGEL 19352S001	E	0.63	0.65	0.14	-0.19	-0.37	0.41	1.10	-0.59
IGEL 19352S001	U	2.96	-2.51	-4.26	2.41	0.12	-2.48	3.96	0.51
ISPS 19484M001	N	1.67	-1.11	0.37	1.10	-0.41	1.78	2.89	-1.60
ISPS 19484M001	E	0.89	1.13	-0.69	-1.24	-0.16	0.94	0.76	0.21
ISPS 19484M001	U	3.59	-2.13	3.06	-2.78	-6.45	-0.40	-3.73	-0.28
KAST 19499M001	N	1.21	1.50	-1.63	1.07	-0.78	1.07	0.88	0.45
KAST 19499M001	E	0.72	0.49	0.35	-0.32	0.32	-0.23	-1.06	1.17
KAST 19499M001	U	6.98	9.05	-2.45	-4.38	-13.46	-1.70	1.04	-0.45
LAZK 19354S001	N	1.56	0.87	-1.27	0.31	-1.01	-1.66	2.80	0.70
LAZK 19354S001	E	0.97	-0.12	-1.28	0.77	0.24	-1.60	0.88	0.25
LAZK 19354S001	U	6.52	-4.73	7.92	-7.53	3.80	9.46	-2.24	-2.03

LEIT 19428M001	N	2.10	0.22	-0.07	-0.90	-1.67	-0.92	4.63	-0.67
LEIT 19428M001	E	0.88	-1.06	-0.24	-0.40	-0.45	-0.30	1.72	-0.21
LEIT 19428M001	U	2.25	-1.02	-0.80	2.91	-0.94	3.70	2.27	-0.77
ORDN 19427M001	N	0.73	0.30	0.03	-0.43	0.57	-0.01	-0.90	1.34
ORDN 19427M001	E	0.73	0.54	-0.68	0.07	0.06	-1.43	-0.06	0.65
ORDN 19427M001	U	3.48	-4.33	-1.44	-0.63	6.10	3.31	1.78	0.45
PAS2 19351S001	N	0.77	0.37	0.90	0.37	0.22	1.37	-0.63	0.46
PAS2 19351S001	E	0.55	0.26	-0.11	-0.13	0.55	1.08	0.08	-0.46
PAS2 19351S001	U	1.57	-2.15	-0.89	0.24	-0.06	-1.45	2.49	-0.97
PASA 19351S001	N	0.80	0.22	0.83	0.50	0.06	1.51	-0.57	0.54
PASA 19351S001	E	0.58	0.27	-0.21	-0.11	0.55	1.15	0.11	-0.49
PASA 19351S001	U	1.84	-2.42	-1.47	0.79	-0.73	-1.33	2.95	-0.81
RID1 13448M002	N	0.47	0.61	0.13	0.40	0.43	0.50	0.40	-0.43
RID1 13448M002	E	0.41	0.37	0.36	-0.59	0.32	-0.18	-0.21	-0.45
RID1 13448M002	U	1.98	1.23	-0.65	0.36	-3.54	-1.30	-2.62	0.60
SALA 13469M001	N	0.65	0.14	-0.12	1.01	0.22	0.37	-0.71	-0.89
SALA 13469M001	E	0.60	0.19	0.43	0.52	-0.15	0.14	-1.13	-0.61
SALA 13469M001	U	2.78	-1.10	3.68	-2.60	-4.05	1.22	2.07	-1.62
SCDA 10088M002	N	1.13	1.70	0.76	0.15	-0.20	1.85	-0.82	0.15
SCDA 10088M002	E	0.90	1.25	-0.51	0.72	-0.72	-0.32	0.66	1.22
SCDA 10088M002	U	3.90	2.82	4.26	0.53	-2.28	-6.07	2.88	-3.80
SOPU 19386M001	N	1.05	-0.18	0.09	1.21	0.00	1.85	0.80	-1.05
SOPU 19386M001	E	1.17	1.65	-0.17	0.65	-0.09	-0.40	1.12	-1.88
SOPU 19386M001	U	3.21	-0.79	-4.51	-2.71	-2.88	-2.74	3.62	-2.13
VITO 19385M001	N	1.51	1.42	0.64	1.46	0.34	-0.53	-2.59	1.43
VITO 19385M001	E	0.87	1.52	-0.70	-0.33	0.75	-0.23	-1.01	0.15
VITO 19385M001	U	2.77	0.78	-4.26	-0.49	-1.64	-3.55	0.27	3.43
YEBE 13420M001	N	0.71	0.24	0.30	0.88	0.30	0.52	-1.05	-0.81
YEBE 13420M001	E	0.36	0.35	-0.42	0.42	-0.09	-0.23	0.06	-0.49
YEBE 13420M001	U	1.74	0.08	-0.70	0.07	-1.65	-3.66	-1.27	0.02
ZARA 13462M001	N	0.44	0.41	0.06	0.28	0.03	0.50	-0.70	-0.39
ZARA 13462M001	E	0.44	0.28	-0.06	-0.76	-0.06	-0.03	-0.45	0.56
ZARA 13462M001	U	1.51	-1.50	1.04	-0.99	0.87	-0.38	-2.72	-1.01

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	-1.43	1.05	2.51
12	ALAC 13433M001	I W	-0.99	-0.04	1.33
15	ALBA 13452M001	I W	-0.02	-1.32	-4.46
21	ALME 13437M001	I W	-1.82	-1.18	2.94
47	BCLN 13412M001	I W	-0.97	-3.17	-1.19
52	BELL 13431M001	I W	-0.19	-0.94	2.49
71	BORR 13480M001	I W	-2.67	-1.47	-2.20
76	BRST 10004M004	I W	-1.75	-0.95	1.10
104	CACE 13447M001	I W	0.49	-0.22	2.05
116	CANT 13438M001	I W	-0.95	0.28	-5.00
117	CARG 19412M001	I W	1.74	-1.66	-2.78
122	CASE 13494M001	I W	-1.52	0.11	-3.81
128	CEU1 13449M002	I W	-0.20	-0.85	-2.31
143	COBA 13453M001	I W	0.43	0.39	-4.44
162	CREU 13432M001	I W	-2.44	1.62	2.42
204	EBRE 13410M001	I W	0.28	1.45	-1.85
222	ESCO 13435M001	I W	-3.37	-1.70	5.35
299	HUEL 13451M001	I W	-0.97	-2.02	1.95
316	IZAN 31309M002	I W	0.15	3.19	-3.32
385	LLIV 13436M001	I W	0.80	0.72	0.51
390	LPAL 81701M001	I W	12.55	-1.32	5.93
392	LROC 10023M001	I W	-1.68	0.65	3.11
421	MAS1 31303M002	I W	1.36	2.76	-2.45
432	MELI 19379M001	I W	1.72	1.11	-1.64
493	PASA 19351S001	I W	-0.12	-0.85	-0.68
553	RID1 13448M002	I W	-1.48	-0.29	-0.53
558	SALA 13469M001	I W	0.09	1.12	-6.31
566	SCOA 10088M002	I W	-0.10	-0.68	-0.79
574	SFER 13402M004	I W	3.14	-3.38	-0.81
599	SONS 13446M001	I W	1.27	3.66	4.01
700	VALA 13463M002	I W	-0.14	1.35	1.47
704	VALE 13439M001	I W	0.10	2.35	-1.70
715	VIGO 13450M001	I W	0.54	-0.36	2.61
755	ZARA 13462M001	I W	-0.58	1.25	1.02
764	ZIMM 14001M004	I W	-1.27	-0.67	5.49
	RMS / COMPONENT		2.57	1.65	3.14
	MEAN		-0.00	-0.00	0.00
	MIN		-3.37	-3.38	-6.31
	MAX		12.55	3.66	5.93

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 105
RMS OF TRANSFORMATION : 2.53 MM

BARYCENTER COORDINATES:

LATITUDE : 39 59 39.06
LONGITUDE : - 3 32 13.48
HEIGHT : -37.255 KM

PARAMETERS:

TRANSLATION IN N : -0.00 +- 0.43 MM
TRANSLATION IN E : 0.00 +- 0.43 MM
TRANSLATION IN U : -0.00 +- 0.43 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 18418482
NUMBER OF UNKNOWN     211496
NUMBER OF DEGREES OF FREEDOM 18206986
PHASE MEASUREMENTS SIGMA 0.00100
SAMPLING INTERVAL (SECONDS) 180
VARIANCE FACTOR 1.672682773862366

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)  Translation (m)  Rotation (")  Scale (ppm)
      X      Y      Z      X      Y      Z
-----
  1  0.00198  -0.0159 -0.0319  0.0144  0.0005 -0.0007 -0.0009  0.00028
  2  0.00168  -0.0086 -0.0212  0.0129  0.0004 -0.0005 -0.0005 -0.00030
  3  0.00143  -0.0004 -0.0086 -0.0008  0.0002  0.0000 -0.0002 -0.00008
  4  0.00172  -0.0131 -0.0120  0.0171  0.0002 -0.0007 -0.0003 -0.00028
#PR_SBS 5 CRD ODEM 13943M001 1 622 1 1 0 0 0 0 2022-03-10 00:00:00 2022-03-10 23:59:30
#PR_SBS 5 CRD ODEM 13943M001 1 623 2 1 0 0 0 0 2022-03-10 00:00:00 2022-03-10 23:59:30
#PR_SBS 5 CRD ODEM 13943M001 1 624 3 1 0 0 0 0 2022-03-10 00:00:00 2022-03-10 23:59:30
  5  0.00175  -0.0261 -0.0048  0.0305 -0.0000 -0.0013 -0.0002 -0.00003
#PR_SBS 6 CRD ODEM 13943M001 1 628 1 1 0 0 0 0 2022-03-11 00:00:00 2022-03-11 23:59:30
#PR_SBS 6 CRD ODEM 13943M001 1 629 2 1 0 0 0 0 2022-03-11 00:00:00 2022-03-11 23:59:30
#PR_SBS 6 CRD ODEM 13943M001 1 630 3 1 0 0 0 0 2022-03-11 00:00:00 2022-03-11 23:59:30
  6  0.00219  -0.0162 -0.0427  0.0190  0.0007 -0.0008 -0.0012 -0.00024
#PR_SBS 7 CRD ODEM 13943M001 1 628 1 1 0 0 0 0 2022-03-12 00:00:00 2022-03-12 23:59:30
#PR_SBS 7 CRD ODEM 13943M001 1 629 2 1 0 0 0 0 2022-03-12 00:00:00 2022-03-12 23:59:30
#PR_SBS 7 CRD ODEM 13943M001 1 630 3 1 0 0 0 0 2022-03-12 00:00:00 2022-03-12 23:59:30
  7  0.00193  -0.0055  0.0139  0.0080 -0.0003 -0.0003  0.0004 -0.00015
    
```

```

Statistics of individual solutions:
-----
File  RMS (m)  DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00122  2645155  1.49  2675198  3  960  29086  0
  2  0.00126  2578318  1.59  2609339  3  954  30070  0
  3  0.00129  2587732  1.67  2618205  3  966  29510  0
  4  0.00129  2584935  1.67  2616155  3  960  30263  3
  5  0.00130  2592826  1.70  2624129  3  957  30349  0
  6  0.00137  2552929  1.88  2584715  3  960  30829  0
  7  0.00130  2659367  1.68  2690741  3  966  30411  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 22:065:00000 22:071:86370 LEICA GR50 -----
ALDA  A  1 P 22:065:00000 22:071:86370 LEICA GR10 -----
ALSA  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
AMUR  A  1 P 22:065:00000 22:071:86370 LEICA GR10 -----
BIAZ  A  1 P 22:065:00000 22:071:86370 SPECTRA SP90M -----
BIDA  A  1 P 22:065:00000 22:071:86370 LEICA GR10 -----
BRZR  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
CACE  A  1 P 22:065:00000 22:071:86370 TRIMBLE NETR9 -----
CANT  A  1 P 22:065:00000 22:071:86370 LEICA GR10 -----
CHER  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
CREU  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
EBRE  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
ELGE  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
EMAZ  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
GERN  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
HOND  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
IGEL  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
ISPS  A  1 P 22:065:00000 22:071:86370 TRIMBLE NETR9 -----
KAST  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
LAZK  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
LEIT  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
OROW  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
PAS2  A  1 P 22:065:00030 22:071:86370 STONEX SC2200 -----
PASA  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
R101  A  1 P 22:065:00000 22:071:86370 LEICA GR25 -----
SALA  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
SCDA  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
SOPU  A  1 P 22:065:00000 22:071:86370 LEICA GR30 -----
VITO  A  1 P 22:065:00000 22:071:86370 LEICA GR10 -----
YEBE  A  1 P 22:065:00000 22:071:86370 LEICA GR50 -----
ZARA  A  1 P 22:065:00000 22:071:86370 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 22:065:00000 22:071:86370 LEIAT504 LEIS -----
ALDA A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
ALSA A 1 P 22:065:00000 22:071:86370 LEIAR10 NONE -----
AMUR A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
BIAZ A 1 P 22:065:00000 22:071:86370 LEIAR25 LEIT -----
BIDA A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
BRZR A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
CACE A 1 P 22:065:00000 22:071:86370 TRM29659.00 NONE -----
CANT A 1 P 22:065:00000 22:071:86370 LEIAR25.R4 LEIT 25066
CHER A 1 P 22:065:00000 22:071:86370 LEIAR10 NONE -----
CREU A 1 P 22:065:00000 22:071:86370 LEIAR25.R4 NONE 26357
EBRE A 1 P 22:065:00000 22:071:86370 LEIAR25.R4 NONE 26359
ELGE A 1 P 22:065:00000 22:071:86370 LEIAR25.R4 LEIT -----
EMAZ A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
GERN A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
HOND A 1 P 22:065:00000 22:071:86370 LEIAR20 LEIM 41012
IGEL A 1 P 22:065:00000 22:071:86370 LEIAR20 LEIM 43011
ISPS A 1 P 22:065:00000 22:071:86370 TRM59900.00 SCIS -----
KAST A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
LAZK A 1 P 22:065:00000 22:071:86370 LEIAR25.R4 LEIT -----
LEIT A 1 P 22:065:00000 22:071:86370 LEIAR10 NONE -----
ORDN A 1 P 22:065:00000 22:071:86370 LEIAR10 NONE -----
PAS2 A 1 P 22:065:00030 22:071:86370 LEIAR20 LEIM 73034
PASA A 1 P 22:065:00000 22:071:86370 LEIAR20 LEIM 73034
RIO1 A 1 P 22:065:00000 22:071:86370 LEIAR25.R4 LEIT 25138
SALA A 1 P 22:065:00000 22:071:86370 LEIAR25 NONE -----
SCDA A 1 P 22:065:00000 22:071:86370 TRM55971.00 NONE -----
SOPU A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
VITO A 1 P 22:065:00000 22:071:86370 LEIAS10 NONE -----
YEBE A 1 P 22:065:00000 22:071:86370 LEIAR20 LEIM 49016
ZARA A 1 P 22:065:00000 22:071:86370 TRM29659.00 NONE -----

```

7.3 Eccentricities

```

*
*SITE PT SOLN T DATA_START__ DATA_END_____ AXE ARP->BENCHMARK(M)_____
ACOR A 1 P 22:065:00000 22:071:86370 UNE 3.0460 0.0000 0.0000
ALDA A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
ALSA A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
AMUR A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
BIAZ A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
BIDA A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
BRZR A 1 P 22:065:00000 22:071:86370 UNE 0.0771 0.0000 0.0000
CACE A 1 P 22:065:00000 22:071:86370 UNE 0.0600 0.0000 0.0000
CANT A 1 P 22:065:00000 22:071:86370 UNE 3.0490 0.0000 0.0000
CHER A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
CREU A 1 P 22:065:00000 22:071:86370 UNE 0.0770 0.0000 0.0000
EBRE A 1 P 22:065:00000 22:071:86370 UNE 0.0770 0.0000 0.0000
ELGE A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
EMAZ A 1 P 22:065:00000 22:071:86370 UNE 0.0350 0.0000 0.0000
GERN A 1 P 22:065:00000 22:071:86370 UNE 0.0771 0.0000 0.0000
HOND A 1 P 22:065:00000 22:071:86370 UNE 0.0771 0.0000 0.0000
IGEL A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
ISPS A 1 P 22:065:00000 22:071:86370 UNE 0.0350 0.0000 0.0000
KAST A 1 P 22:065:00000 22:071:86370 UNE 0.0350 0.0000 0.0000
LAZK A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
LEIT A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
ORDN A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
PAS2 A 1 P 22:065:00030 22:071:86370 UNE 0.0000 0.0000 0.0000
PASA A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
RIO1 A 1 P 22:065:00000 22:071:86370 UNE 0.0606 0.0000 0.0000
SALA A 1 P 22:065:00000 22:071:86370 UNE 0.0600 0.0000 0.0000
SCDA A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
SOPU A 1 P 22:065:00000 22:071:86370 UNE 0.0771 0.0000 0.0000
VITO A 1 P 22:065:00000 22:071:86370 UNE 0.0000 0.0000 0.0000
YEBE A 1 P 22:065:00000 22:071:86370 UNE 0.0600 0.0000 0.0000
ZARA A 1 P 22:065:00000 22:071:86370 UNE 3.2590 0.0000 0.0000

```

8 References

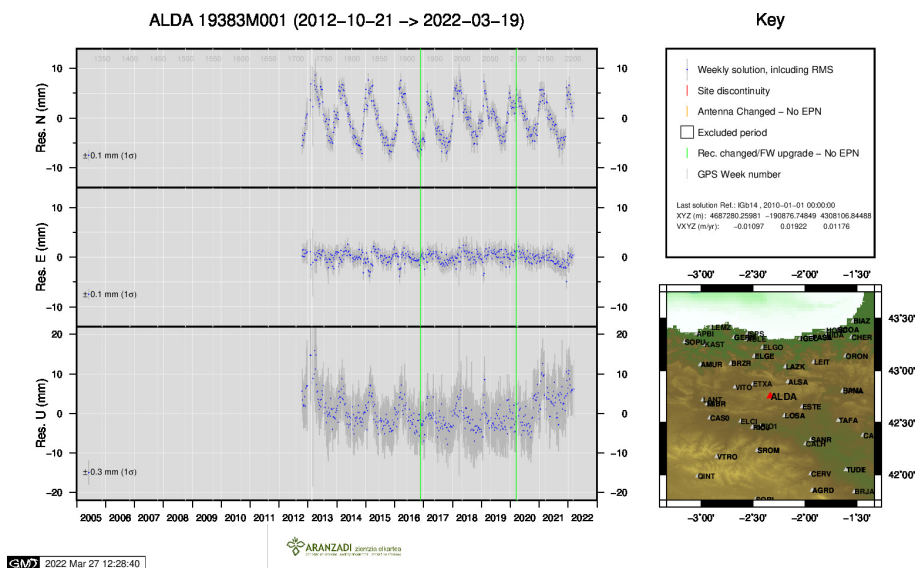
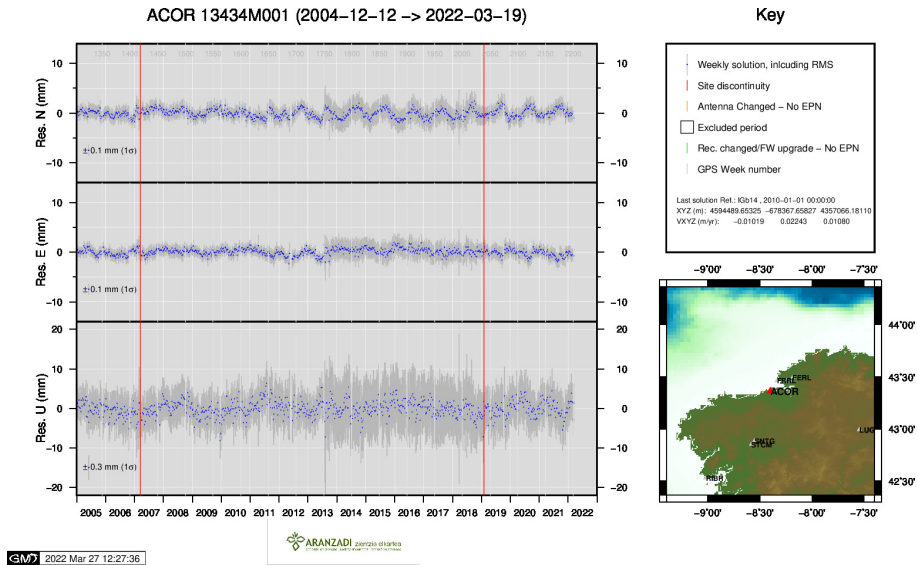
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign*. etrs89.ensg.ign.fr/memo-V8.pdf

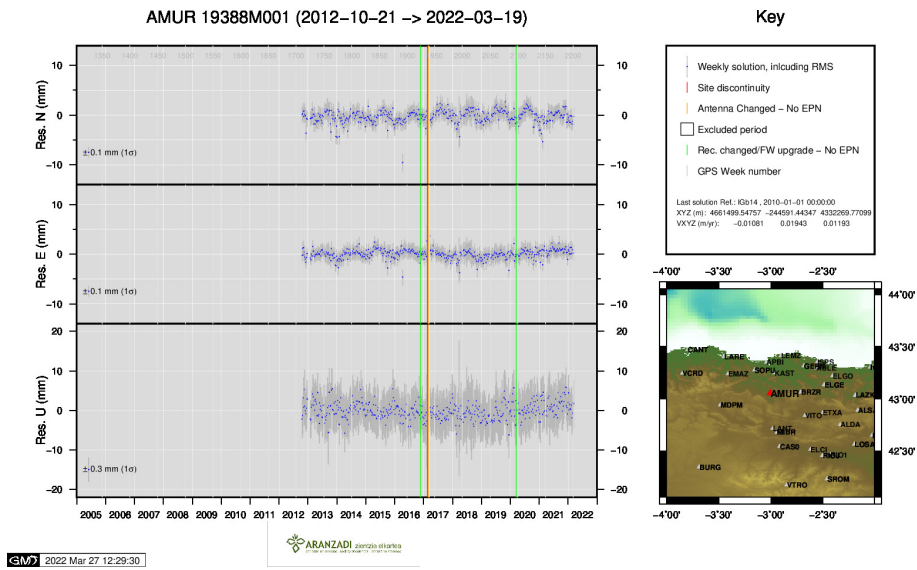
EPN Coordination Group and the EPN Central Bureau (2018): *Guidelines for the EPN Analysis Centres*. epncb.oma.be/documentation/guidelines/guidelines_analysis_centres.pdf

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

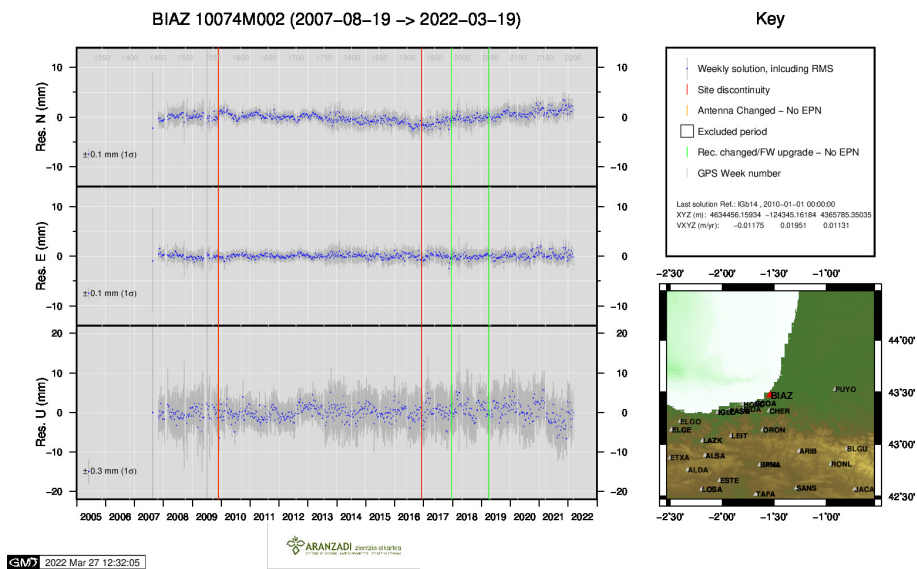
9 Cumulative Time Series

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

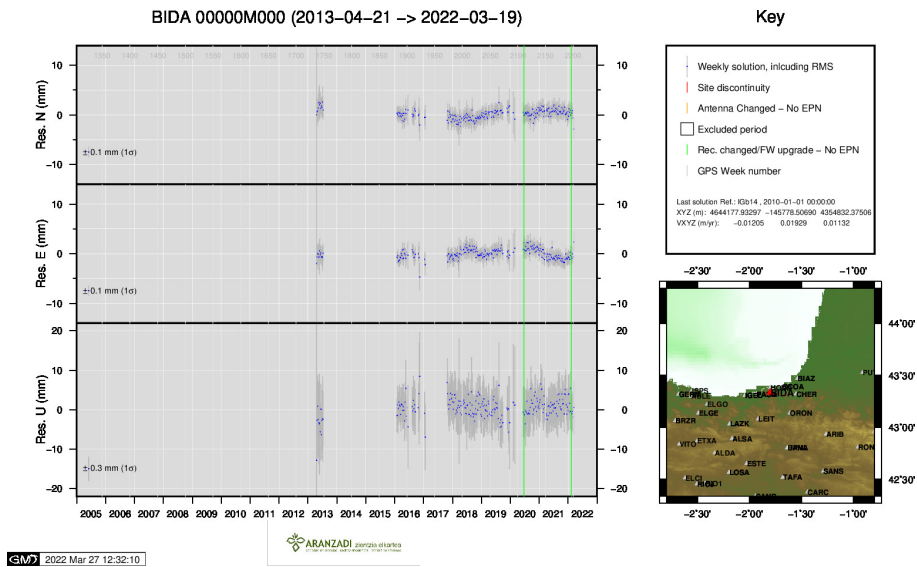




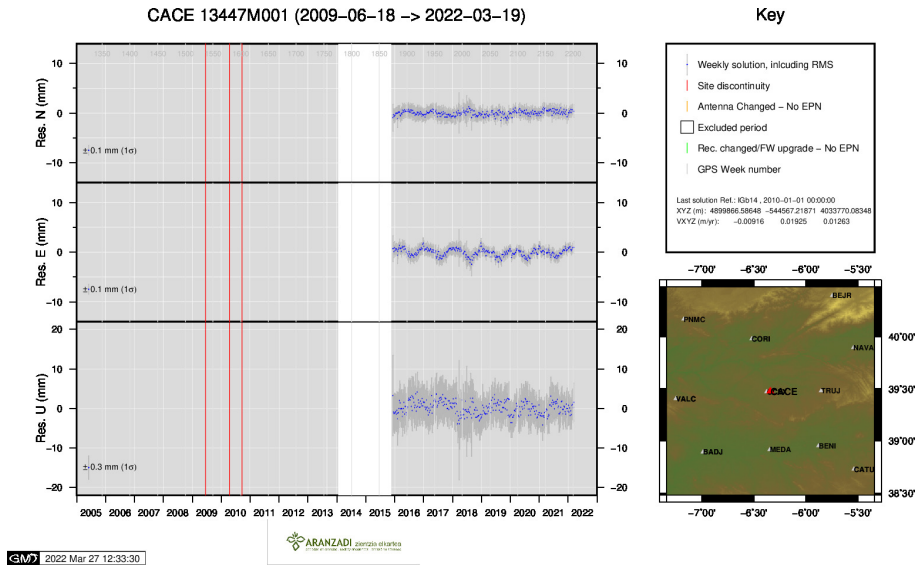
3) AMUR



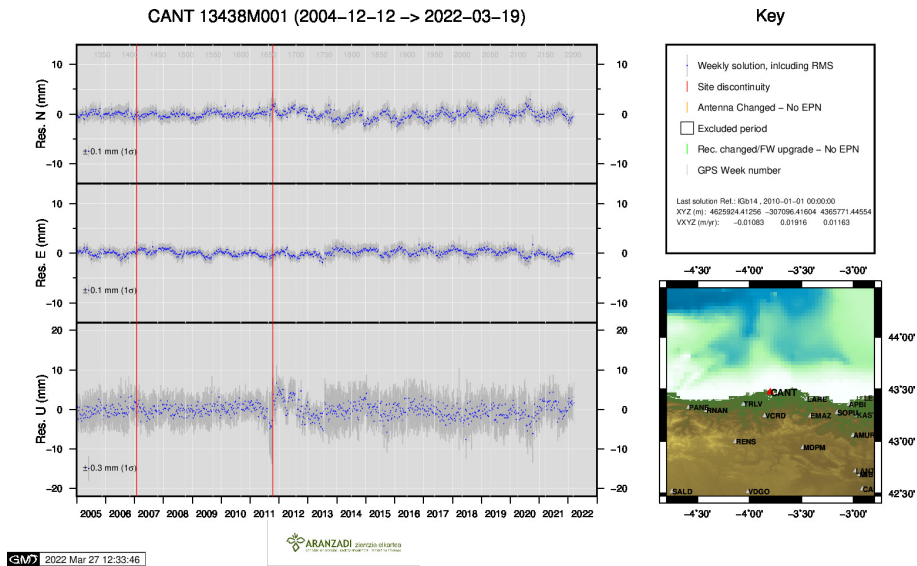
4) BIAZ



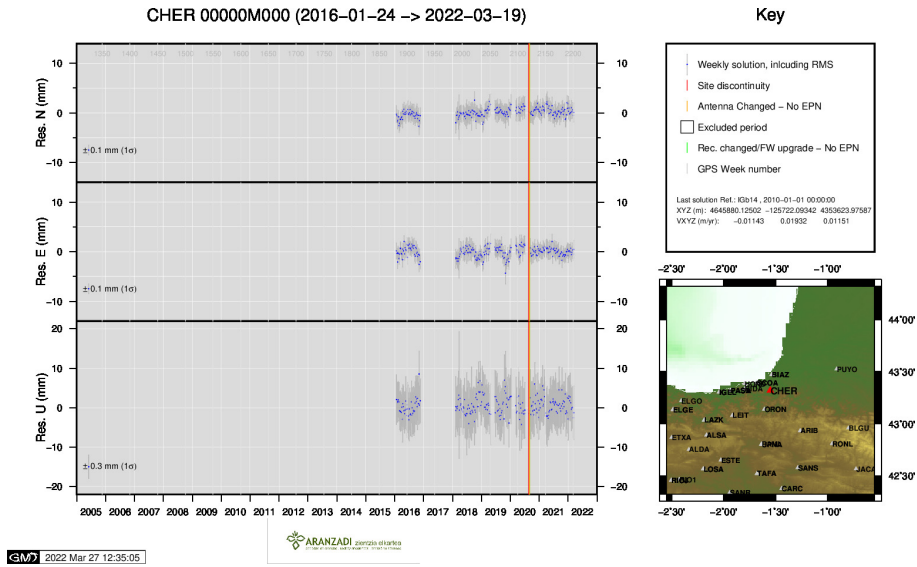
5) BIDA



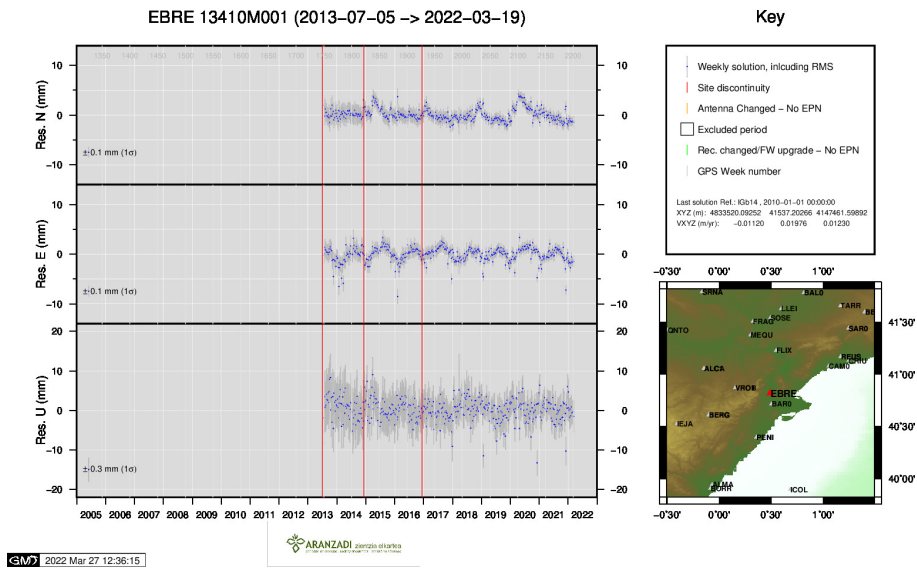
6) CACE



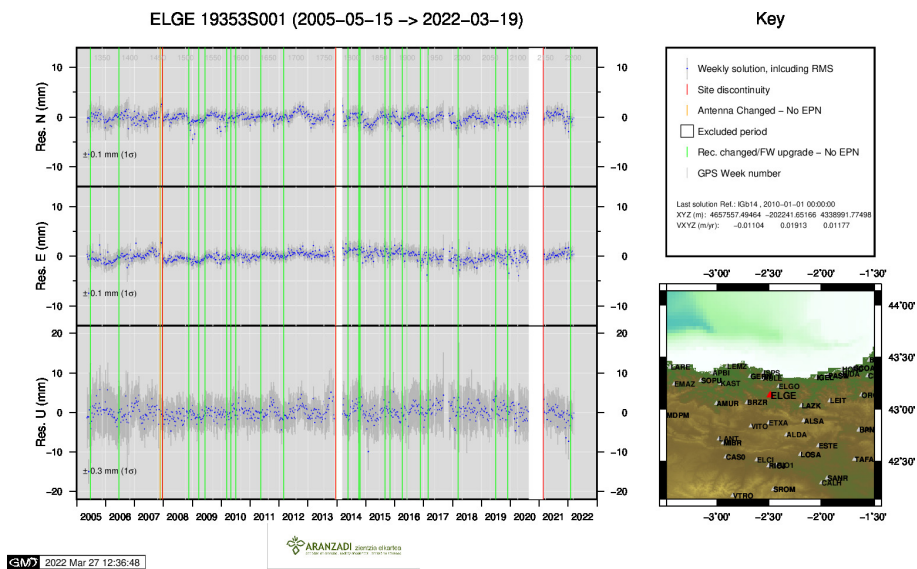
7) CANT



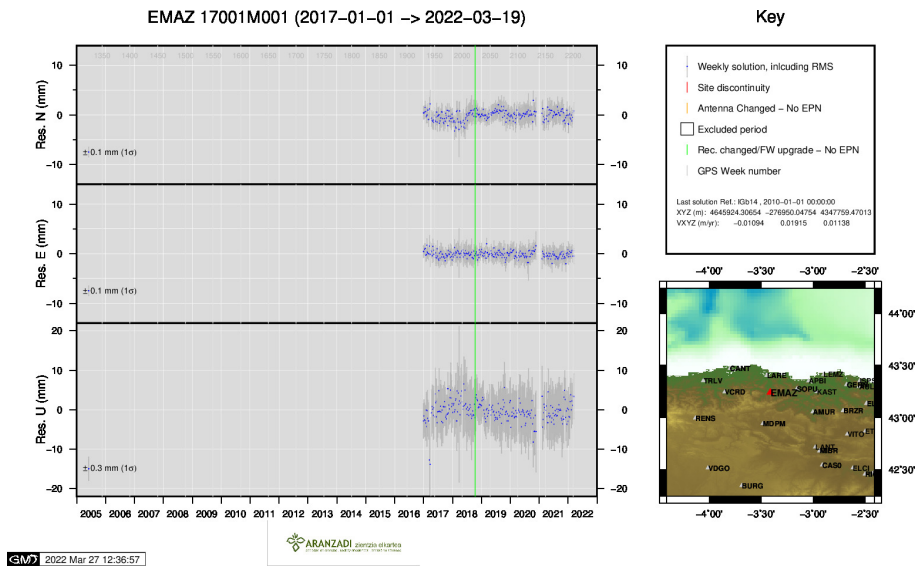
8) CHER



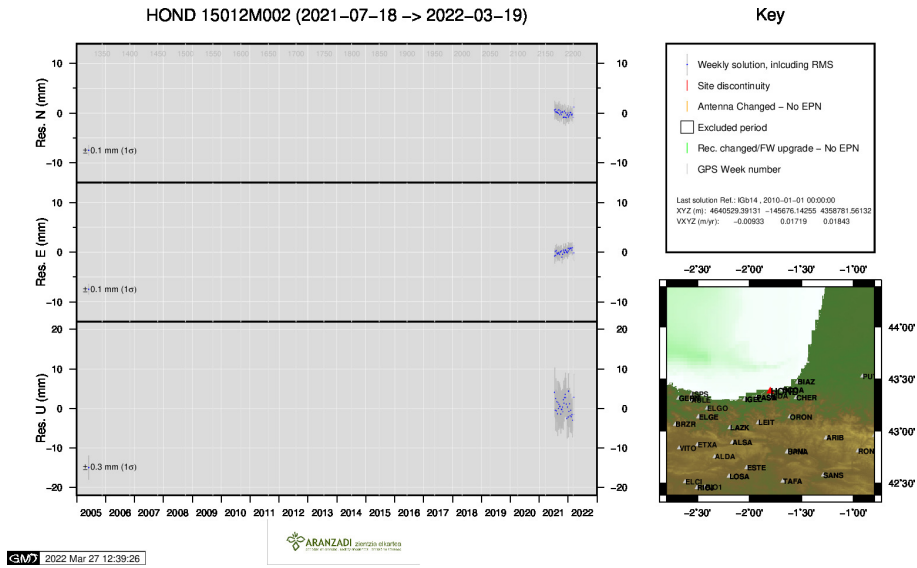
9) EBRE



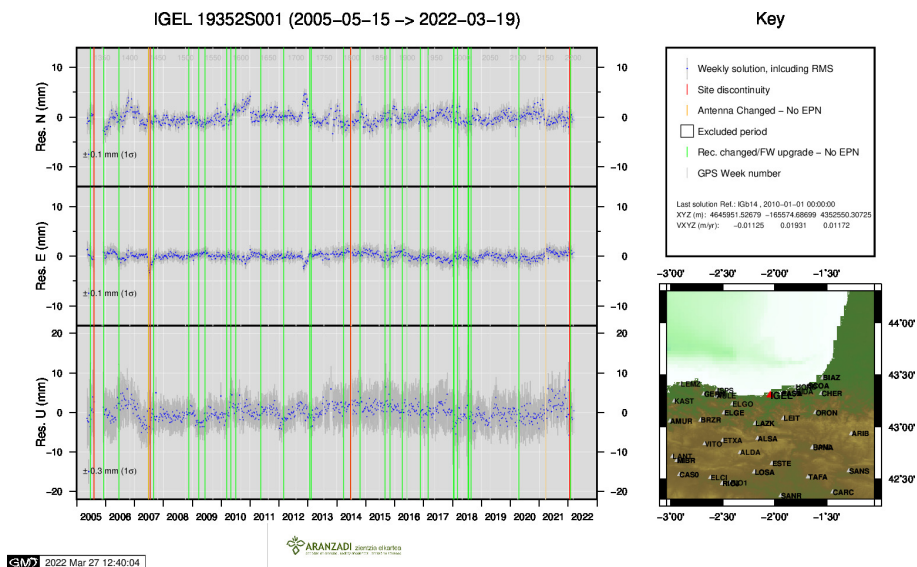
10) ELGE



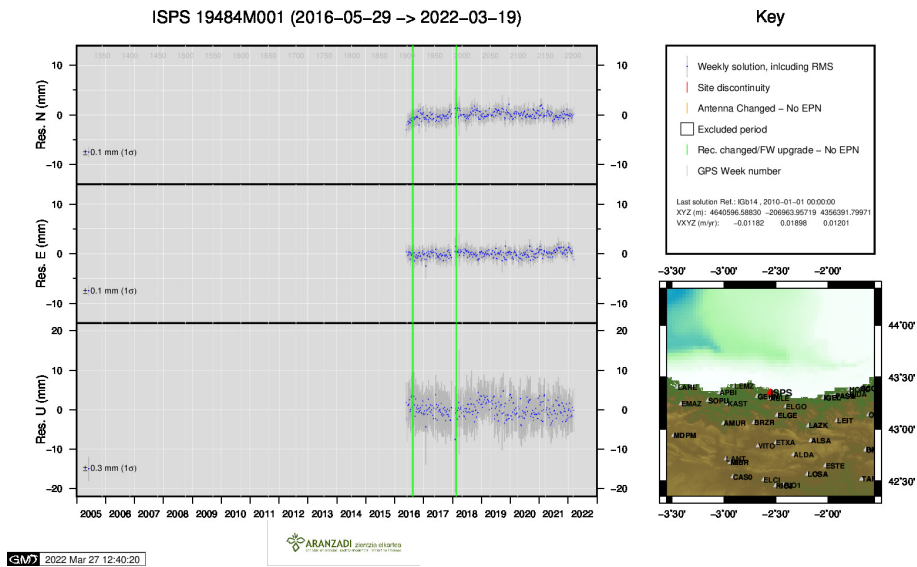
11) EMAZ



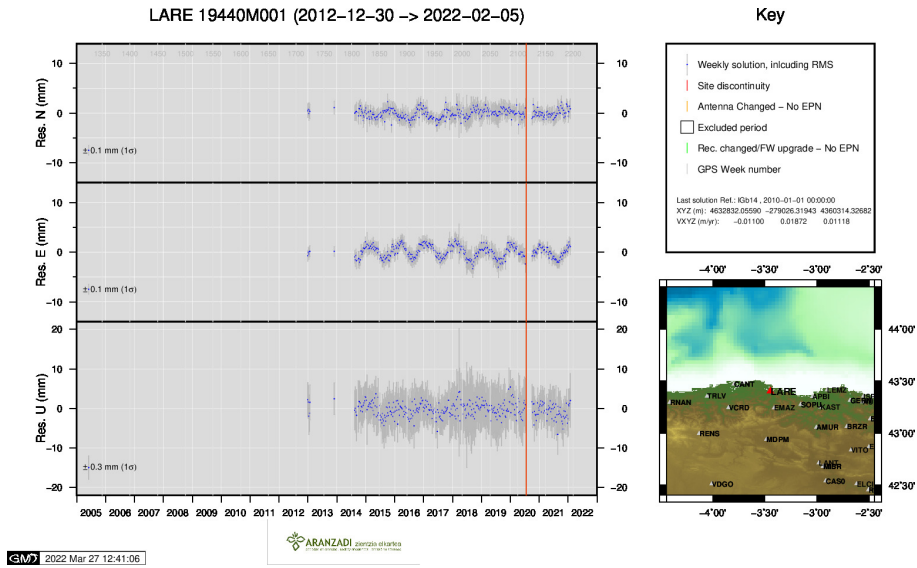
12) HOND



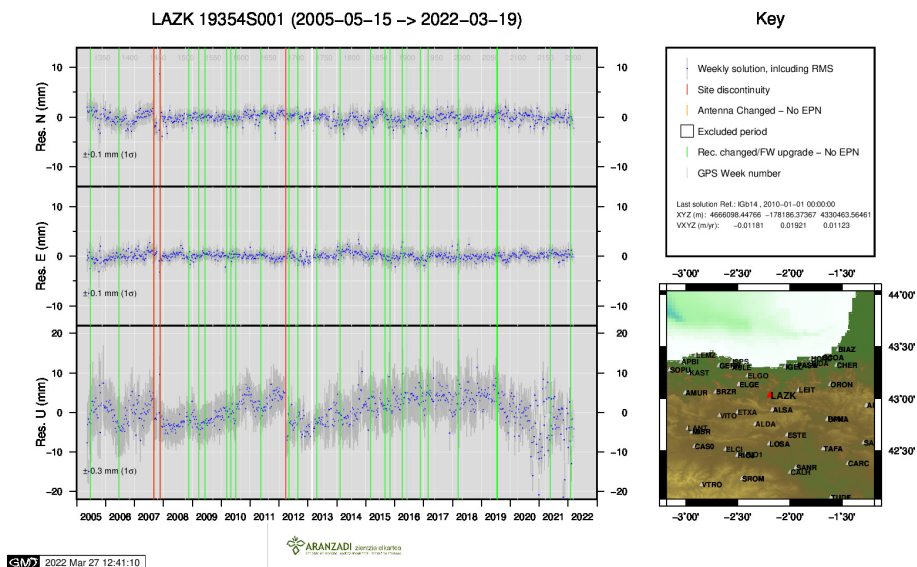
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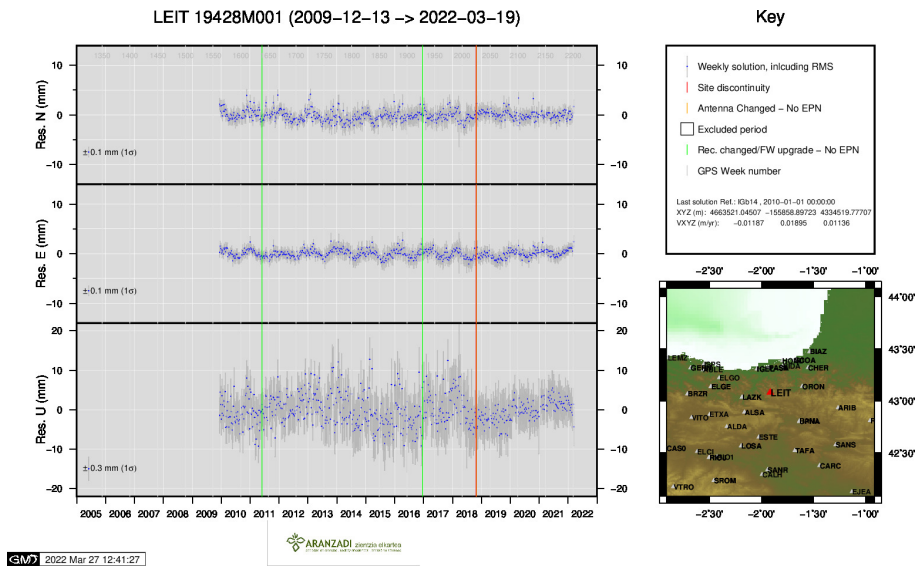
14) ISPS



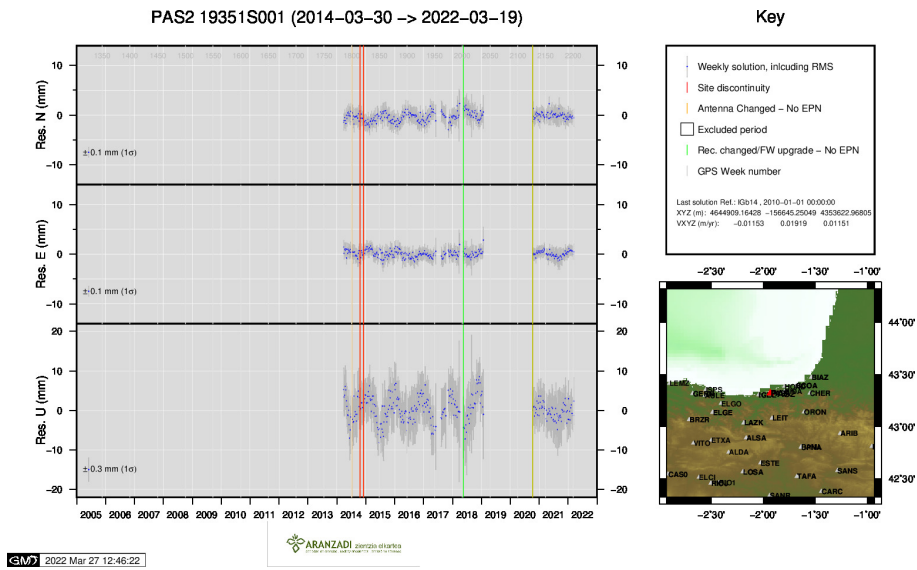
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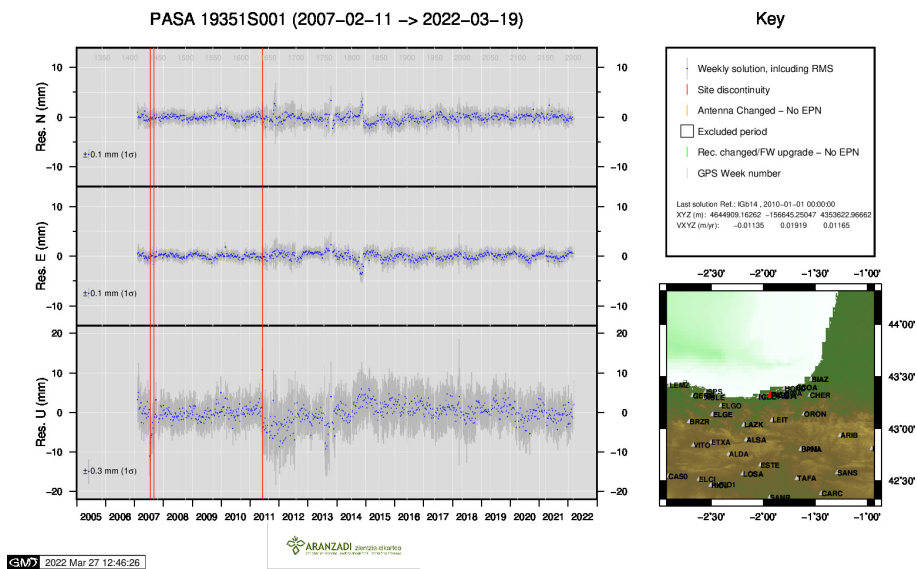
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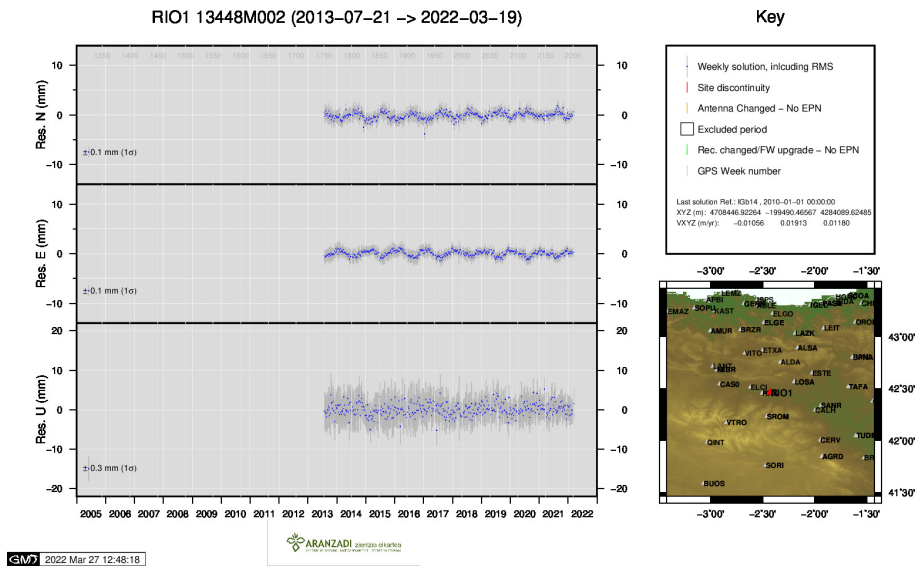
17) LEIT



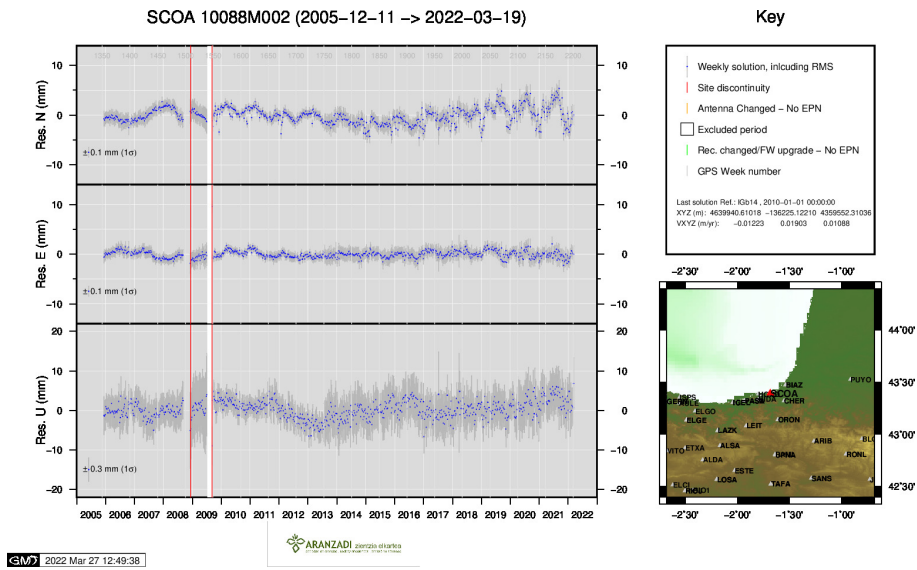
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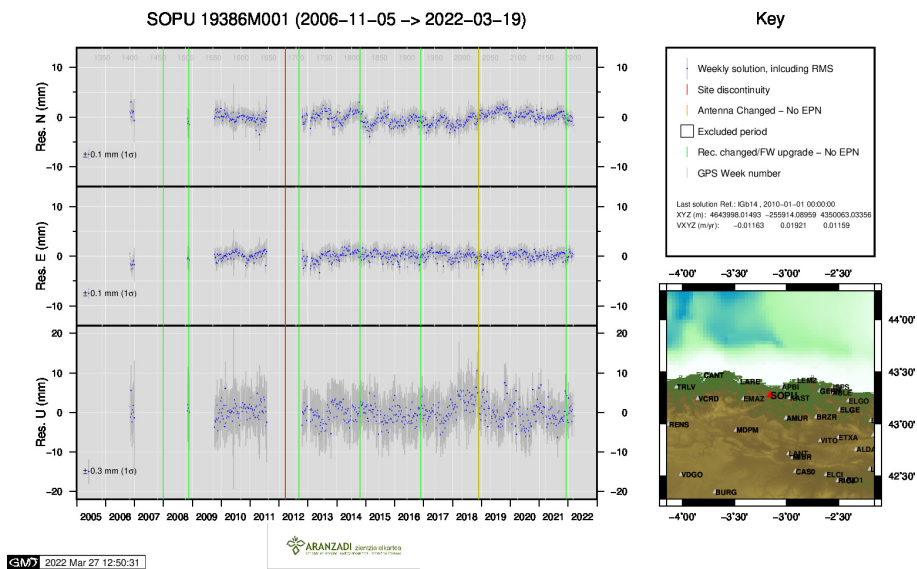
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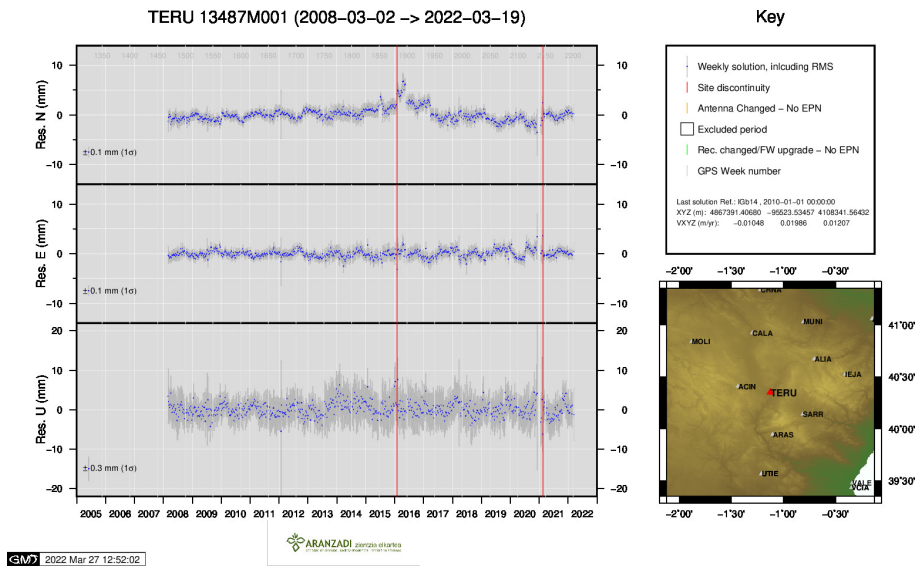
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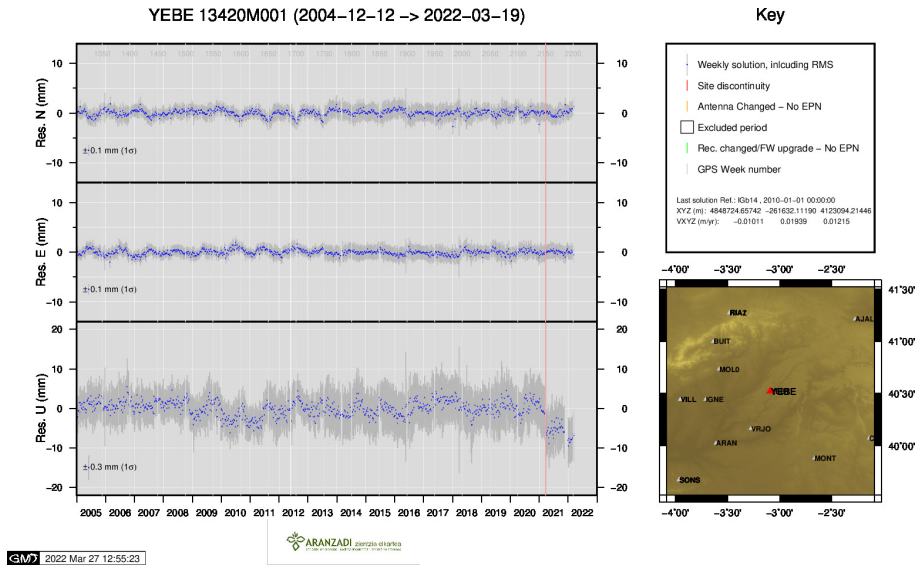
21) SCOA



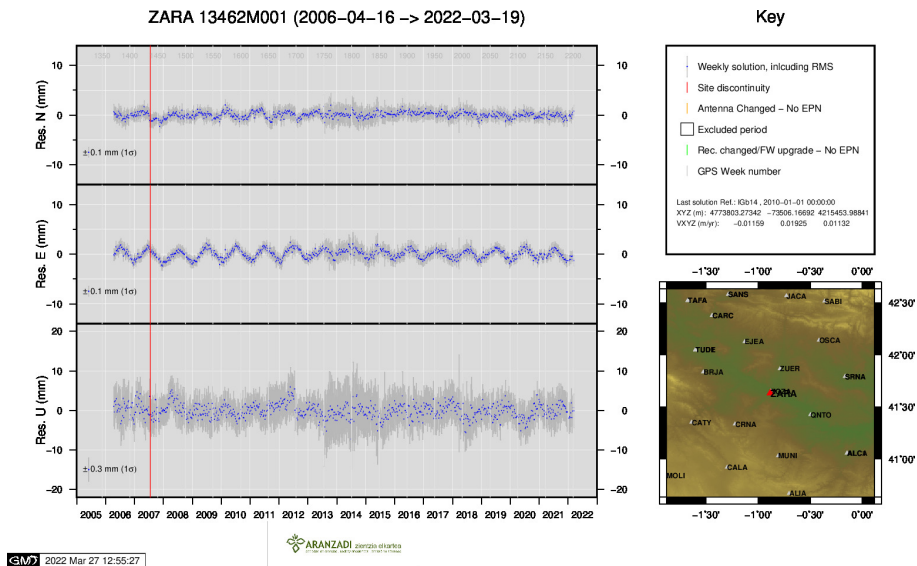
22) SOPU



23) TERU



24) YEBE



25) ZARA