

ARA-DAC Weekly Analysis Result: 2190 (GFA)

Technical Report

GPS Week: 2190 (GFA)

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

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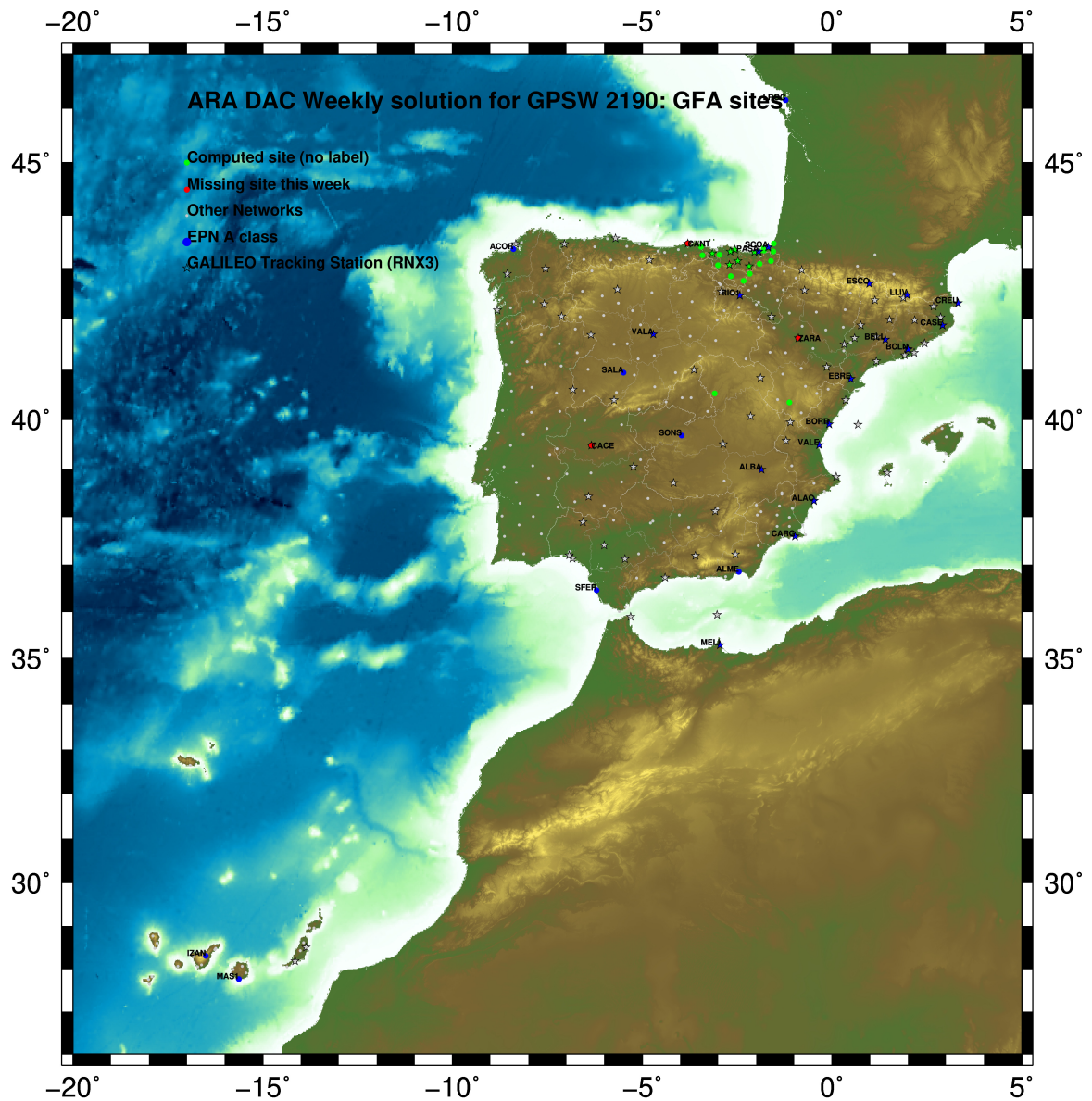
Report generated on 2022/01/16 at 02:58:48



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 Jan 16 02:58:40

Fig.1: Computed Sites for GPS Week2190 (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 2190 WEEK FINAL COMBINATION: PRECISE ORBITS          15-JAN-22 23:44
-----
LOCAL GEODETIC DATUM: IGB14          EPOCH: 2021-12-29 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
 4 ACDR 13434M001        4594489.53288      -678367.38959      4357066.31307      W
39 ALDA 19383M001        4687280.12946      -190876.51849      4308106.99348      A
50 ALSA 19419M001        4677250.80005      -176770.34576      4319079.90387      A
53 AMUR 19388M001        4661499.41912      -244591.21151      4332269.91337      A
100 BIAZ 10074M002        4634456.02049      -124344.92811      4366785.48891      A
101 BIDA 00000M000        4644177.79016      -145778.27661      4354832.51125      A
113 BRZR 19387M001        4662220.95675      -220769.85138      4333309.46692      A
154 CHER 00000M000        4645879.98968      -125721.86125      4353624.11682      A
162 CREU 13432M001        4715420.09337        273178.10761      4271946.87105      W
204 EBRE 13410M001        4833519.96279        41537.43997      4147461.74857      W
180 ELGE 19353S001        4657557.36334      -202241.42200      4338991.91732      A
182 EMAZ 17001M001        4645924.17689      -276949.81759      4347759.60799      A
209 GERN 19389M001        4642811.28528      -217222.87581      4353278.90544      A
257 HOND 15012M002        4640529.28051      -145676.93652      4358781.78308      A
235 IGEL 19352S001        4645951.39921      -165574.45514      4352550.45048      A
240 ISPS 19484M001        4640596.44641      -206963.72925      4356391.94374      A
245 KAST 19499M001        4646949.04359      -240747.22339      4348015.02029      A
252 LARE 19440M001        4632831.92167      -279026.09449      4360314.46050      A
256 LAZK 19354S001        4666098.30721      -178186.14343      4330463.69926      A
261 LEIT 19428M001        4663520.90626      -155858.66948      4334519.91577      A
334 ORDN 19427M001        4659695.74613      -130864.68705      4338948.91199      A
345 PAS2 19351S001        4644909.02706      -156645.01991      4353623.10615      A
493 PASA 19351S001        4644909.02713      -156645.01987      4353623.10609      W
553 RID1 13448M002        4708446.79721      -199490.23512      4284089.76804      W
558 SALA 13469M001        4803054.45693      -462131.02234      4158379.11093      W
566 SCD4 10088M002        4639940.46650      -136224.89424      4359552.44422      W
418 SOPU 19386M001        4643997.87556      -255913.85977      4350063.17180      A
443 TERU 13487M001        4867391.28007      -95523.29576      4108341.70922      A
493 VITO 19385M001        4679397.67121      -218436.45625      4314898.39831      A
752 YEBE 13420M001        4848724.57621      -261631.88065      4123094.39501      A
    
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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 2190          15-JAN-22 23:44
-----
LOCAL GEODETIC DATUM: ETRF2000        EPOCH: 2021-12-29 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
 4 ACDR 13434M001        4594489.86016      -678367.97707      4357065.86224      W
39 ALDA 19383M001        4687280.51498      -190877.11541      4308106.54153      A
50 ALSA 19419M001        4677251.18818      -176770.94150      4319079.45293      A
53 AMUR 19388M001        4661499.79964      -244591.80566      4332269.46283      A
100 BIAZ 10074M002        4634456.41878      -124345.51886      4366785.04216      A
101 BIDA 00000M000        4644178.18491      -145778.86852      4354832.06342      A
113 BRZR 19387M001        4662221.34037      -220770.44556      4333309.01663      A
154 CHER 00000M000        4645880.38688      -125722.45329      4353623.66912      A
162 CREU 13432M001        4715420.53495        273177.50919      4271946.42278      W
204 EBRE 13410M001        4833520.36567        41536.82740      4147461.28762      W
180 ELGE 19353S001        4657557.74974      -202242.01559      4338991.46766      A
182 EMAZ 17001M001        4645924.55447      -276950.41008      4347759.15830      A
209 GERN 19389M001        4642811.67085      -217223.46777      4353278.45679      A
257 HOND 15012M002        4640529.67557      -145676.52802      4358781.33555      A
235 IGEL 19352S001        4645951.79128      -165575.04731      4352550.00225      A
240 ISPS 19484M001        4640596.83352      -206964.32094      4356391.49541      A
245 KAST 19499M001        4646949.42578      -240747.81589      4348014.57099      A
252 LARE 19440M001        4632832.29933      -279026.68549      4360314.01185      A
256 LAZK 19354S001        4666098.69602      -178186.73791      4330463.24921      A
261 LEIT 19428M001        4663521.29821      -155859.26361      4334519.46623      A
334 ORDN 19427M001        4659696.14158      -130865.28067      4338948.46309      A
345 PAS2 19351S001        4644909.42034      -156645.61194      4353622.65812      A
493 PASA 19351S001        4644909.42041      -156645.61190      4353622.65806      W
553 RID1 13448M002        4708447.17983      -199490.83444      4284089.31424      W
558 SALA 13469M001        4803054.79675      -462131.63292      4158378.64588      W
566 SCD4 10088M002        4639940.86281      -136225.48564      4359551.99687      W
418 SOPU 19386M001        4643998.25598      -255914.45197      4350062.72254      A
443 TERU 13487M001        4867391.66263      -95523.91258      4108341.24370      A
493 VITO 19385M001        4679398.05374      -218437.05236      4314897.94664      A
752 YEBE 13420M001        4848724.93882      -261632.49587      4123093.92885      A
    
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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 2190		15-JAN-22 23:44			
LOCAL GEODETIC DATUM: ETRF2014		EPOCH: 2021-12-29 12:00:00			
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACDR 13434M001	4594489.81942	-678368.01475	4357065.91358	W
39	ALDA 19383M001	4687280.47189	-190877.15442	4308106.59274	A
50	ALSA 19419M001	4677251.14515	-176770.98060	4319079.50417	A
53	AMUR 19388M001	4661499.75698	-244591.84459	4332269.51409	A
100	BIAZ 10074M002	4634456.37601	-124345.55831	4365785.09356	A
101	BIDA 00000M000	4644178.14211	-145778.90786	4354832.11478	A
113	BRZR 19387M001	4662221.29764	-220770.48456	4333309.06790	A
154	CHER 00000M000	4645880.34400	-125722.49269	4353623.72048	A
162	CREU 13432M001	4715420.48988	273177.46871	4271946.47423	W
204	EBRE 13410M001	4833520.32020	41536.78822	4147461.33857	W
180	ELGE 19353S001	4657557.70699	-202242.05468	4338991.51895	A
182	EMAZ 17001M001	4645924.51208	-276950.44896	4347759.20959	A
209	GERN 19389M001	4642811.62830	-217223.50687	4353278.50812	A
257	HOND 15012M002	4640529.63281	-145676.56738	4358781.38693	A
235	IGEL 19352S001	4645951.74853	-165575.08658	4352550.05359	A
240	ISPS 19484M001	4640596.79096	-206964.36008	4356391.54675	A
245	KAST 19499M001	4646949.38326	-240747.85489	4348014.62230	A
252	LARE 19440M001	4632832.25767	-279026.72442	4360314.06319	A
256	LAZK 19354S001	4666098.65310	-178186.77705	4330463.30049	A
261	LEIT 19428M001	4663521.25524	-155859.30284	4334519.51752	A
334	ORON 19427M001	4659696.09857	-130865.32000	4338948.51441	A
345	PAS2 19351S001	4644909.37757	-156645.65124	4353622.70947	A
493	PASA 19351S001	4644909.37764	-156645.65120	4353622.70941	W
553	RI01 13448M002	4708447.13654	-199490.87333	4284089.36538	W
558	SALA 13469M001	4803054.75323	-462131.67049	4158378.69667	W
566	SOA 10088M002	4639940.82003	-136225.52503	4359552.04824	W
418	SOPU 19386M001	4643998.21354	-255914.49093	4350062.77385	A
443	TERU 13487M001	4867391.61727	-95523.95115	4108341.29448	A
493	VITD 19385M001	4679398.01082	-218437.09130	4314897.99786	A
752	YEBE 13420M001	4848724.89421	-261632.53395	4123093.97959	A

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 2190 WEEK FINAL COMBINATION: PRECISE ORBITS 15-JAN-22 23:44

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	0.81	0.87	2.86
ALDA 19383M001	7	XXXXXX	0.80	1.41	4.61
ALSA 19419M001	7	XXXXXX	1.82	2.06	7.12
AMUR 19388M001	7	XXXXXX	1.95	2.84	3.64
BLAZ 10074M002	7	XXXXXX	0.95	0.69	3.28
BIDA 00000M000	7	XXXXXX	0.91	0.72	3.05
BRZR 19387M001	7	XXXXXX	3.10	2.55	6.00
CHER 00000M000	7	XXXXXX	0.83	1.29	3.89
CREU 13432M001	7	XXXXXX	1.59	0.74	2.89
EBRE 13410M001	6	X XXXX	1.40	3.07	3.43
ELGE 19353S001	7	XXXXXX	0.91	0.56	4.11
EMAZ 17001M001	7	XXXXXX	0.78	0.58	3.92
GERN 19389M001	7	XXXXXX	1.14	2.28	2.57
HOND 15012M002	7	XXXXXX	0.68	0.47	3.42
IGEL 19352S001	7	XXXXXX	1.77	0.61	2.66
ISPS 19484M001	7	XXXXXX	0.63	1.50	3.00
KAST 19499M001	7	XXXXXX	1.19	0.71	4.85
LARE 19440M001	7	XXXXXX	1.34	0.82	3.59
LAZK 19354S001	7	XXXXXX	1.48	1.09	6.32
LEIT 19428M001	7	XXXXXX	1.43	1.29	1.85
ORDN 19427M001	7	XXXXXX	1.30	0.94	2.40
PAS2 19351S001	7	XXXXXX	0.62	0.70	2.26
PASA 19351S001	7	XXXXXX	0.65	0.72	2.30
RI01 13448M002	7	XXXXXX	0.65	0.54	3.60
SALA 13469M001	7	XXXXXX	0.21	0.97	1.80
SCOA 10088M002	7	XXXXXX	0.58	0.66	2.61
SOPU 19386M001	7	XXXXXX	0.58	1.25	2.68
TERU 13487M001	3	X X X	0.95	1.86	2.72
VITO 19385M001	7	XXXXXX	1.28	2.30	6.70
YEBE 13420M001	7	XXXXXX	0.50	0.66	2.11

Comparison of individual solutions:

ACOR 13434M001	N	0.81	1.73	0.09	-0.01	-0.39	-0.73	-0.20	-0.48
ACOR 13434M001	E	0.87	0.77	0.40	-0.54	-0.87	-0.87	-1.31	0.52
ACOR 13434M001	U	2.86	-3.82	0.60	-2.21	1.82	5.07	0.02	0.40
ALDA 19383M001	N	0.80	-0.35	1.18	1.17	0.08	-0.89	-0.12	-0.38
ALDA 19383M001	E	1.41	0.19	3.11	-1.09	-0.27	-0.48	0.35	0.82
ALDA 19383M001	U	4.61	-1.09	5.35	-8.02	1.96	-2.10	4.36	2.42
ALSA 19419M001	N	1.82	-0.10	3.93	0.15	-0.30	-0.91	-1.62	-0.90
ALSA 19419M001	E	2.06	-0.46	-4.00	-0.82	2.23	1.44	0.95	0.84
ALSA 19419M001	U	7.12	-5.02	-12.09	11.14	-0.02	1.95	2.01	1.05
AMUR 19388M001	N	1.95	1.75	-2.33	1.71	0.17	-0.77	-1.87	2.72
AMUR 19388M001	E	2.84	3.43	-5.44	-0.48	1.11	1.62	0.05	1.70
AMUR 19388M001	U	3.64	0.88	-2.81	2.57	-5.06	-1.34	3.94	4.62
BLAZ 10074M002	N	0.95	-0.17	1.71	-0.13	-1.39	-0.48	0.46	0.11
BLAZ 10074M002	E	0.69	-0.36	-0.33	-0.14	-1.16	-0.68	-0.84	-0.32
BLAZ 10074M002	U	3.28	1.37	-4.51	1.52	5.20	-1.22	-0.08	3.37
BIDA 00000M000	N	0.91	1.27	1.39	0.27	-0.01	-1.06	0.03	0.42
BIDA 00000M000	E	0.72	0.39	0.29	-1.50	0.19	-0.58	0.11	0.46
BIDA 00000M000	U	3.05	-3.54	-5.44	-0.05	-0.26	-0.45	-1.40	3.37
BRZR 19387M001	N	3.10	0.06	-5.80	4.25	1.49	0.99	-1.15	1.14
BRZR 19387M001	E	2.55	-0.57	-5.84	1.35	1.12	0.53	0.29	1.08
BRZR 19387M001	U	6.00	1.83	-12.55	0.21	4.41	3.23	2.35	4.41
CHER 00000M000	N	0.83	-0.04	-1.18	1.00	-0.96	-0.12	0.61	0.64
CHER 00000M000	E	1.29	0.51	-2.80	0.12	0.42	-1.07	-0.29	-0.74
CHER 00000M000	U	3.89	-4.45	-5.17	-1.86	3.64	2.01	-1.52	4.58
CREU 13432M001	N	1.59	-1.65	-0.42	0.37	3.16	-0.05	-0.84	-1.21
CREU 13432M001	E	0.74	-0.55	0.86	0.81	-0.78	-0.31	-0.74	-0.58
CREU 13432M001	U	2.89	-1.19	2.48	-0.20	2.53	-1.54	0.32	-5.79
EBRE 13410M001	N	1.40	-1.08		-2.50	1.05	1.09	0.12	0.30
EBRE 13410M001	E	3.07	-0.60		6.14	-0.90	-1.82	-1.68	-1.48
EBRE 13410M001	U	3.43	1.19		5.47	-0.78	-4.32	-1.01	-2.67
ELGE 19353S001	N	0.91	1.11	-1.11	0.44	-0.92	-0.13	0.52	1.10
ELGE 19353S001	E	0.56	-0.21	-0.33	-1.11	-0.68	0.09	0.15	0.11
ELGE 19353S001	U	4.11	-0.90	2.09	-1.31	1.09	-6.56	4.89	5.11
EMAZ 17001M001	N	0.78	0.98	0.44	0.64	-0.15	-1.30	-0.56	-0.15
EMAZ 17001M001	E	0.58	-0.81	-0.53	-0.97	0.16	-0.31	-0.09	-0.06
EMAZ 17001M001	U	3.92	-7.00	-1.65	-0.08	4.80	3.67	-1.13	1.63
GERN 19389M001	N	1.14	-0.38	-1.63	-0.58	0.57	1.57	1.35	-0.20
GERN 19389M001	E	2.28	2.81	-0.70	-4.35	-0.59	1.78	-0.35	-0.55
GERN 19389M001	U	2.57	1.48	-3.93	-0.29	0.09	1.86	3.80	2.00
HOND 15012M002	N	0.68	0.70	0.50	1.24	0.07	-0.56	-0.09	0.41
HOND 15012M002	E	0.47	0.77	-0.30	-0.70	0.14	-0.25	-0.04	-0.28
HOND 15012M002	U	3.42	-3.62	-6.08	-1.45	-1.12	3.09	-0.40	2.67
IGEL 19352S001	N	1.77	0.63	3.53	-0.55	-1.27	-1.68	0.86	0.72
IGEL 19352S001	E	0.61	0.82	-0.13	-0.38	0.69	-0.38	-0.51	-0.74
IGEL 19352S001	U	2.66	-3.84	-4.71	0.23	0.85	-1.42	1.60	0.33
ISPS 19484M001	N	0.63	0.67	0.57	-0.45	0.89	-0.77	0.15	-0.11
ISPS 19484M001	E	1.50	1.27	1.86	-1.32	-0.47	-1.24	-2.18	-0.24
ISPS 19484M001	U	3.00	-0.71	-0.22	-0.19	5.63	3.23	-0.21	-3.37
KAST 19499M001	N	1.19	1.16	-0.90	1.11	1.60	0.00	-0.66	-1.42
KAST 19499M001	E	0.71	-0.24	-0.98	0.27	0.77	-0.98	-0.25	-0.55
KAST 19499M001	U	4.85	0.76	-4.23	1.13	7.63	6.14	-2.64	-4.32
LARE 19440M001	N	1.34	-1.53	-0.96	0.32	1.14	1.39	0.43	-2.00
LARE 19440M001	E	0.82	0.40	-1.69	0.49	-0.81	-0.11	-0.19	0.32
LARE 19440M001	U	3.59	-3.07	-3.94	-1.91	5.52	2.29	0.65	3.57
LAZK 19354S001	N	1.48	1.40	1.51	-0.53	0.75	0.32	-2.69	-0.78
LAZK 19354S001	E	1.09	1.04	-1.70	1.14	1.16	-0.40	-0.46	-0.33
LAZK 19354S001	U	6.32	-7.58	0.60	9.21	-0.31	-4.24	-5.07	7.29
LEIT 19428M001	N	1.43	0.88	2.20	1.22	0.50	-1.74	-1.12	-0.76
LEIT 19428M001	E	1.29	0.10	2.61	-1.03	-0.79	-0.43	-1.09	0.26
LEIT 19428M001	U	1.85	-3.48	-0.51	0.23	-1.08	-2.28	0.16	1.33
ORDN 19427M001	N	1.30	0.66	2.36	-0.83	0.15	-0.38	-0.13	-1.81

ORDN 19427M001	E	0.94	-0.21	-0.38	2.08	0.16	-0.58	-0.60	-0.18
ORDN 19427M001	U	2.40	-4.47	0.19	2.97	-1.70	0.29	0.39	1.55
PAS2 19351S001	N	0.62	0.72	1.25	0.16	0.17	0.27	-0.33	-0.11
PAS2 19351S001	E	0.70	-0.07	1.28	0.26	-0.47	-0.71	-0.65	-0.27
PAS2 19351S001	U	2.26	-3.80	-3.73	1.16	-0.54	-0.16	-0.52	0.63
PASA 19351S001	N	0.65	0.84	1.27	0.20	0.02	0.27	-0.23	-0.19
PASA 19351S001	E	0.72	0.04	1.30	0.18	-0.51	-0.75	-0.69	-0.25
PASA 19351S001	U	2.30	-4.12	-3.40	0.59	-0.71	-0.15	-0.53	1.38
RID1 13448M002	N	0.65	0.34	0.67	0.91	-0.22	0.06	-0.75	-0.74
RID1 13448M002	E	0.54	-0.29	-0.28	0.05	0.09	-0.67	-0.76	-0.73
RID1 13448M002	U	3.60	-2.39	1.06	5.10	-3.42	-5.21	-2.17	-1.11
SALA 13469M001	N	0.21	-0.01	0.14	0.06	0.45	0.10	-0.14	0.01
SALA 13469M001	E	0.97	-1.61	-0.74	1.27	0.32	-0.32	0.06	-0.81
SALA 13469M001	U	1.80	-0.75	-0.06	3.07	-0.70	-1.74	2.40	0.14
SCDA 10088M002	N	0.58	0.01	0.66	0.14	0.35	1.05	-0.34	0.48
SCDA 10088M002	E	0.66	1.08	-0.18	0.13	-0.50	0.04	-0.13	-1.08
SCDA 10088M002	U	2.61	-0.03	-5.84	-1.53	0.30	0.37	-1.96	0.58
SOPU 19386M001	N	0.58	0.51	0.19	0.29	0.48	0.42	-1.12	0.03
SOPU 19386M001	E	1.25	0.18	1.56	-0.87	1.04	-0.88	-1.19	-1.70
SOPU 19386M001	U	2.68	-2.19	2.19	-3.01	4.24	1.95	1.39	0.83
TERU 13487M001	N	0.95		1.21		-0.33		-0.49	
TERU 13487M001	E	1.86		2.59		-0.42		-0.09	
TERU 13487M001	U	2.72		-3.69		0.93		0.58	
VITO 19385M001	N	1.28	0.96	-2.65	0.82	1.01	0.13	0.45	0.03
VITO 19385M001	E	2.30	1.50	-1.86	-4.85	0.40	0.98	1.02	0.67
VITO 19385M001	U	6.70	-1.88	-13.90	-6.33	-0.35	-0.33	4.11	3.90
YEBE 13420M001	N	0.50	0.40	1.08	-0.00	0.31	-0.08	-0.31	-0.06
YEBE 13420M001	E	0.66	0.14	0.39	-1.06	-0.50	0.24	-0.70	-0.72
YEBE 13420M001	U	2.11	3.27	2.71	-0.33	0.36	-1.18	-2.12	-1.63

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	-0.78	0.60	-1.77
12	ALAC 13433M001	I W	-0.37	0.35	2.17
15	ALBA 13452M001	I W	-0.34	-0.89	-3.42
21	ALME 13437M001	I W	-1.57	-1.54	3.31
47	BCLN 13412M001	I W	-0.26	-1.42	1.05
52	BELL 13431M001	I W	1.53	-1.64	2.66
71	BORR 13480M001	I W	-2.02	-1.50	0.27
76	BRST 10004M004	I W	-0.55	0.06	2.36
117	CARG 19412M001	I W	1.67	-1.66	-3.79
122	CASE 13494M001	I W	-1.26	1.67	0.56
162	CREU 13432M001	I W	-1.76	1.40	2.78
204	EBRE 13410M001	I W	1.05	0.29	-5.32
222	ESCO 13435M001	I W	-1.73	-0.21	3.69
316	IZAN 31309M002	I W	-0.15	0.18	-5.43
385	LLIV 13436M001	I W	0.38	2.33	3.16
392	LROC 10023M001	I W	-0.96	1.49	0.07
421	MAS1 31303M002	I W	0.37	-0.50	-1.64
432	MELI 19379M001	I W	1.57	0.45	1.65
493	PASA 19351S001	I W	1.22	-0.93	-1.07
553	RID1 13448M002	I W	-1.33	-0.85	-2.32
558	SALA 13469M001	I W	0.70	1.24	-4.55
566	SCDA 10088M002	I W	-0.18	0.00	-3.33
574	SFER 13402M004	I W	2.05	-3.19	2.75
599	SONS 13446M001	I W	0.96	3.59	6.51
700	VALA 13463M002	I W	0.55	1.03	0.31
704	VALE 13439M001	I W	0.90	0.82	-2.05
764	ZIMM 14001M004	I W	0.33	-1.16	1.38
	RMS / COMPONENT		1.17	1.46	3.09
	MEAN		-0.00	0.00	-0.00
	MIN		-2.02	-3.19	-5.43
	MAX		2.05	3.59	6.51

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 81
RMS OF TRANSFORMATION : 2.09 MM

BARYCENTER COORDINATES:

LATITUDE : 40 26 19.11
LONGITUDE : - 2 28 15.95
HEIGHT : -35.136 KM

PARAMETERS:

TRANSLATION IN N : 0.00 +- 0.40 MM
TRANSLATION IN E : 0.00 +- 0.40 MM
TRANSLATION IN U : -0.00 +- 0.40 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          16881509
NUMBER OF UNKNOWN               204809
NUMBER OF DEGREES OF FREEDOM    16676700
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  1.629094450059086

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")
      X          Y          Z          X          Y          Z      Scale (ppm)
-----
  1  0.00239      0.0360 0.0236 -0.0268 -0.0004 0.0014 0.0007 -0.00152
  2  0.00274      0.0112 0.0096 -0.0116 -0.0002 0.0005 0.0002 -0.00030
  3  0.00243      0.0078 0.0027 -0.0025 -0.0000 0.0002 0.0001 -0.00060
  4  0.00190     -0.0093 -0.0193 0.0083 0.0003 -0.0004 -0.0005 0.00008
  5  0.00175     -0.0122 -0.0392 0.0159 0.0006 -0.0006 -0.0011 -0.00040
  6  0.00155     -0.0111 -0.0140 0.0135 0.0002 -0.0006 -0.0004 -0.00009
  7  0.00160     -0.0055 0.0004 -0.0010 -0.0001 -0.0001 -0.0000 0.00066
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00133      2332748      1.76                2362558      3      891      28922      0
  2  0.00144      2332913      2.08                2364382      3      888      30584      0
  3  0.00135      2358459      1.82                2390763      3      894      31413      0
  4  0.00123      2406193      1.50                2437184      3      915      30079      0
  5  0.00118      2410638      1.39                2439350      3      900      27815      0
  6  0.00118      2423959      1.38                2452319      3      900      27463      0
  7  0.00119      2406435      1.42                2434953      3      912      27609      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 21:360:00000 22:001:86370 LEICA GR50      -----
ALDA  A   1 P 21:360:00000 22:001:86370 LEICA GR10      -----
ALSA  A   1 P 21:360:00000 22:001:86370 LEICA GR50      -----
AMUR  A   1 P 21:360:00000 22:001:86370 LEICA GR10      -----
BIAZ  A   1 P 21:360:00000 22:001:86370 SPECTRA SP90M   -----
BIDA  A   1 P 21:360:00000 22:001:86370 LEICA GR10      -----
BRZR  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
CHER  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
CREU  A   1 P 21:360:00000 22:001:86370 LEICA GR50      -----
EBRE  A   1 P 21:360:00000 22:001:86370 LEICA GR50      -----
ELGE  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
EMAZ  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
GERN  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
HOND  A   1 P 21:360:00000 22:001:86370 LEICA GR50      -----
IGEL  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
ISPS  A   1 P 21:360:00000 22:001:86370 TRIMBLE NETR9   -----
KAST  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
LARE  A   1 P 21:360:00000 22:001:86370 LEICA GR50      -----
LAZK  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
LEIT  A   1 P 21:360:00000 22:001:86370 LEICA GR50      -----
ORON  A   1 P 21:360:00000 22:001:86370 LEICA GR50      -----
PAS2  A   1 P 21:360:00030 22:001:86370 STONEX SC2200   -----
PASA  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
RIO1  A   1 P 21:360:00000 22:001:86370 LEICA GR25      -----
SALA  A   1 P 21:360:00000 22:001:86370 TRIMBLE NETR9   -----
SCOA  A   1 P 21:360:00000 22:001:86370 LEICA GR25      -----
SOPU  A   1 P 21:360:00000 22:001:86370 LEICA GR30      -----
TERU  A   1 P 21:361:00000 21:365:86370 LEICA GR50      -----
VITO  A   1 P 21:360:00000 22:001:86370 LEICA GR10      -----
YEBE  A   1 P 21:360:00000 22:001:86370 LEICA GR50      -----
```

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 21:360:00000 22:001:86370 LEIAT504      LEIS -----
ALDA  A   1 P 21:360:00000 22:001:86370 LEIAS10      NONE -----
ALSA  A   1 P 21:360:00000 22:001:86370 LEIAR10      NONE -----
AMUR  A   1 P 21:360:00000 22:001:86370 LEIAS10      NONE -----
BIAZ  A   1 P 21:360:00000 22:001:86370 LEIAR25      LEIT -----
BIDA  A   1 P 21:360:00000 22:001:86370 LEIAS10      NONE -----
```

BRZR	A	1	P	21:360.00000	22:001:86370	LEIAS10	NONE	----
CHER	A	1	P	21:360.00000	22:001:86370	LEIAR10	NONE	----
CREU	A	1	P	21:360.00000	22:001:86370	LEIAR25_R4	NONE	26357
EBRE	A	1	P	21:360.00000	22:001:86370	LEIAR25_R4	NONE	26359
ELGE	A	1	P	21:360.00000	22:001:86370	LEIAR25_R4	LEIT	----
EMAZ	A	1	P	21:360.00000	22:001:86370	LEIAS10	NONE	----
GERN	A	1	P	21:360.00000	22:001:86370	LEIAS10	NONE	----
HOND	A	1	P	21:360.00000	22:001:86370	LEIAR20	LEIM	41012
IGEL	A	1	P	21:360.00000	22:001:86370	LEIAS10	NONE	----
ISPS	A	1	P	21:360.00000	22:001:86370	TRM59900.00	SCIS	----
KAST	A	1	P	21:360.00000	22:001:86370	LEIAS10	NONE	----
LARE	A	1	P	21:360.00000	22:001:86370	LEIAR20	LEIM	----
LAZK	A	1	P	21:360.00000	22:001:86370	LEIAR25_R4	LEIT	----
LEIT	A	1	P	21:360.00000	22:001:86370	LEIAR10	NONE	----
ORDN	A	1	P	21:360.00000	22:001:86370	LEIAR10	NONE	----
PAS2	A	1	P	21:360.00030	22:001:86370	LEIAR20	LEIM	73034
PASA	A	1	P	21:360.00000	22:001:86370	LEIAR20	LEIM	73034
RIO1	A	1	P	21:360.00000	22:001:86370	LEIAR25_R4	LEIT	25138
SALA	A	1	P	21:360.00000	22:001:86370	LEIAR25	NONE	----
SCDA	A	1	P	21:360.00000	22:001:86370	TRM55971.00	NONE	----
SOPU	A	1	P	21:360.00000	22:001:86370	LEIAS10	NONE	----
TERU	A	1	P	21:361.00000	21:365:86370	LEIAR20	LEIM	49044
VITO	A	1	P	21:360.00000	22:001:86370	LEIAS10	NONE	----
YEBE	A	1	P	21:360.00000	22:001:86370	LEIAR20	LEIM	49016

7.3 Eccentricities

*SITE	PT	SOLN	T	DATA_START_	DATA_END_	AXE	ARP->BENCHMARK(M)	UP_	NORTH_	EAST_
ACOR	A	1	P	21:360.00000	22:001:86370	UNE	3.0460	0.0000	0.0000	0.0000
ALDA	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
ALSA	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
AMUR	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
BIAZ	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
BIDA	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
BRZR	A	1	P	21:360.00000	22:001:86370	UNE	0.0771	0.0000	0.0000	0.0000
CHER	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
CREU	A	1	P	21:360.00000	22:001:86370	UNE	0.0770	0.0000	0.0000	0.0000
EBRE	A	1	P	21:360.00000	22:001:86370	UNE	0.0770	0.0000	0.0000	0.0000
ELGE	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
EMAZ	A	1	P	21:360.00000	22:001:86370	UNE	0.0350	0.0000	0.0000	0.0000
GERN	A	1	P	21:360.00000	22:001:86370	UNE	0.0771	0.0000	0.0000	0.0000
HOND	A	1	P	21:360.00000	22:001:86370	UNE	0.0771	0.0000	0.0000	0.0000
IGEL	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
ISPS	A	1	P	21:360.00000	22:001:86370	UNE	0.0350	0.0000	0.0000	0.0000
KAST	A	1	P	21:360.00000	22:001:86370	UNE	0.0350	0.0000	0.0000	0.0000
LARE	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
LAZK	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
LEIT	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
ORDN	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
PAS2	A	1	P	21:360.00030	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
PASA	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
RIO1	A	1	P	21:360.00000	22:001:86370	UNE	0.0606	0.0000	0.0000	0.0000
SALA	A	1	P	21:360.00000	22:001:86370	UNE	0.0600	0.0000	0.0000	0.0000
SCDA	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
SOPU	A	1	P	21:360.00000	22:001:86370	UNE	0.0771	0.0000	0.0000	0.0000
TERU	A	1	P	21:361.00000	21:365:86370	UNE	0.0600	0.0000	0.0000	0.0000
VITO	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	0.0000	0.0000
YEBE	A	1	P	21:360.00000	22:001:86370	UNE	0.0000	0.0000	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:

2022-01-09 23:05 UTC		BRZR3600.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-09 23:05 UTC		GERN3600.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-09 23:06 UTC		MUL13600.210		ANTENNA TYPE		LEIATS04GG LEIS -> LEIAR25	LEIT
2022-01-09 23:06 UTC		SOPU3600.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-10 23:13 UTC		GERN3610.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-10 23:13 UTC		MUL13610.210		ANTENNA TYPE		LEIATS04GG LEIS -> LEIAR25	LEIT
2022-01-10 23:13 UTC		SOPU3610.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-11 23:07 UTC		GERN3620.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-11 23:07 UTC		MUL13620.210		ANTENNA TYPE		LEIATS04GG LEIS -> LEIAR25	LEIT
2022-01-11 23:07 UTC		SOPU3620.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-12 23:10 UTC		GERN3630.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-12 23:10 UTC		MUL13630.210		ANTENNA TYPE		LEIATS04GG LEIS -> LEIAR25	LEIT
2022-01-12 23:10 UTC		SOPU3630.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-13 23:10 UTC		GERN3640.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-13 23:10 UTC		MUL13640.210		ANTENNA TYPE		LEIATS04GG LEIS -> LEIAR25	LEIT
2022-01-13 23:10 UTC		SOPU3640.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-14 23:13 UTC		GERN3650.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-14 23:13 UTC		SOPU3650.210		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-15 23:09 UTC		GERN0010.220		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	
2022-01-15 23:09 UTC		SOPU0010.220		RECEIVER FIRM. VERS.		4.51/7.710 -> 4.31/7.403	

9 References

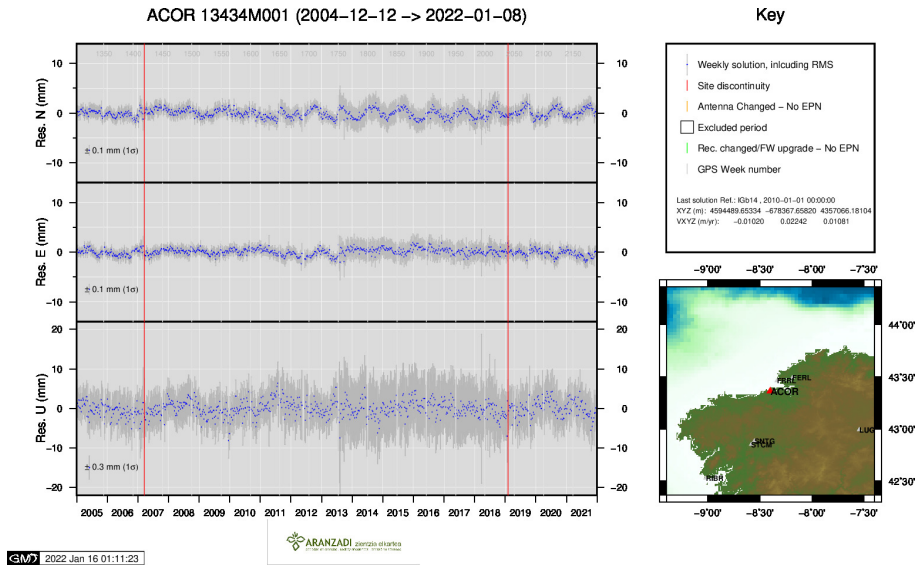
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign*. etrs89.ensg.ign.fr/memo-V8.pdf

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

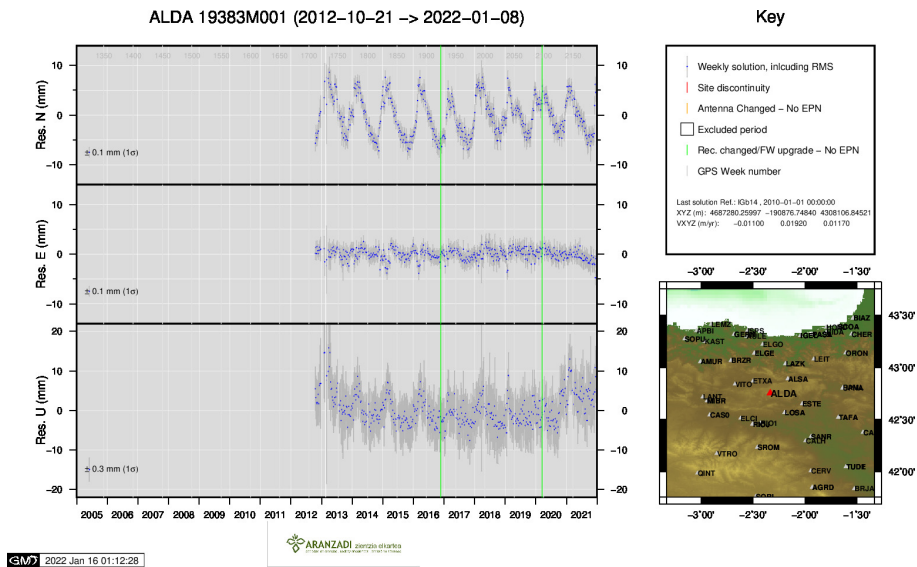
Z. Altamimi (2018): *EUREF Technical Note 1: Relationship and Transformation between the International and the European Terrestrial Reference Systems*. etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf

10 Cumulative Time Series

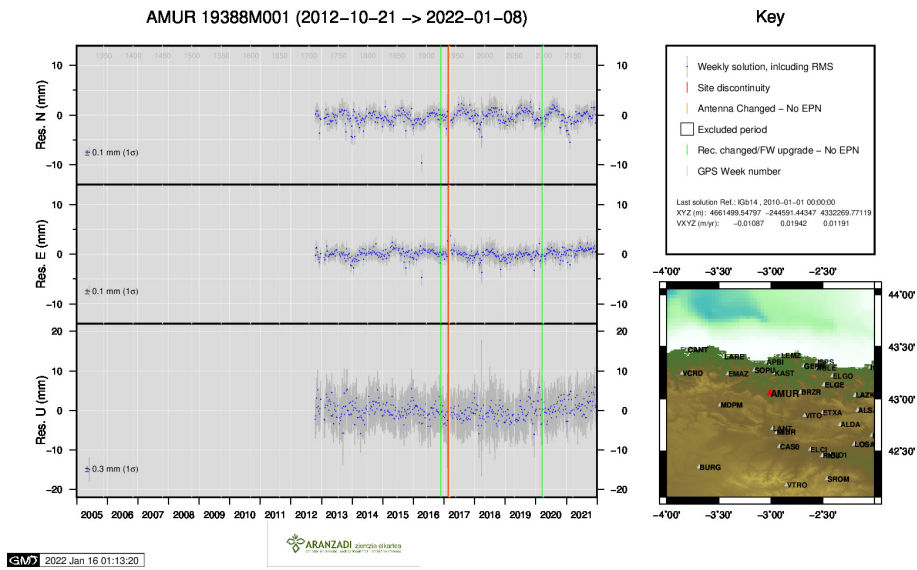
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



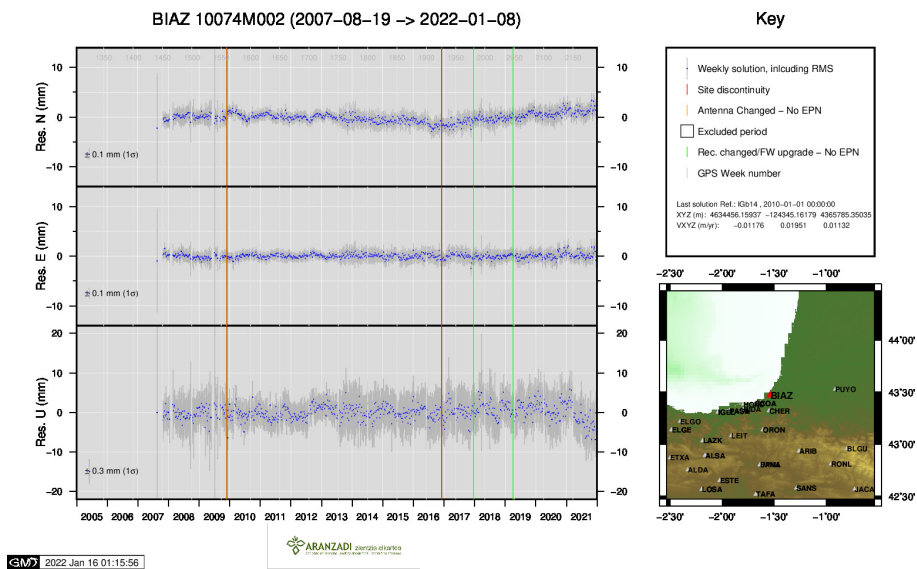
1) ACOR



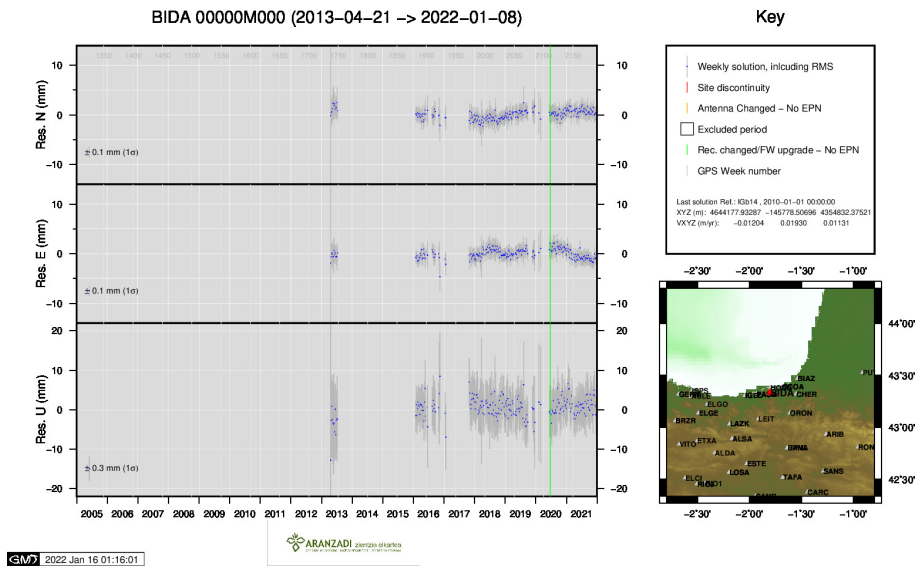
2) ALDA



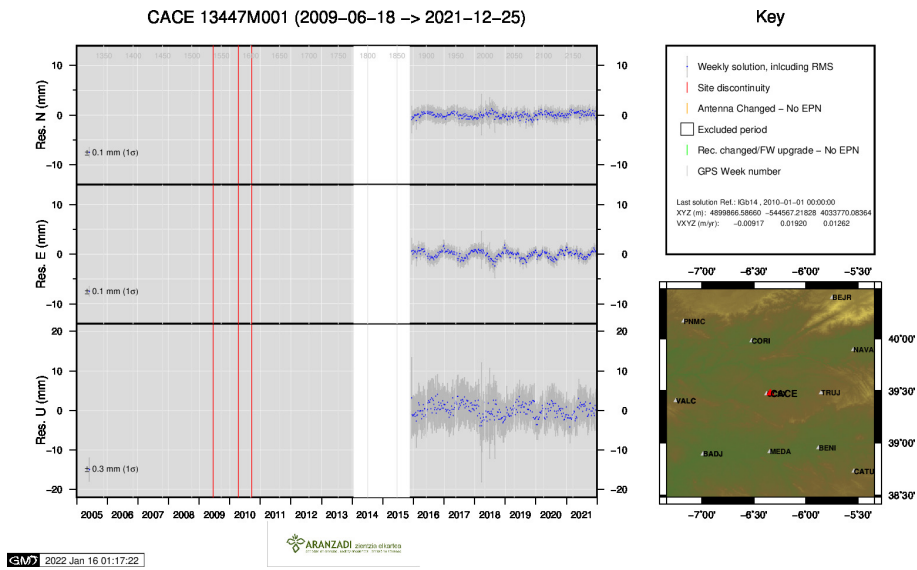
3) AMUR



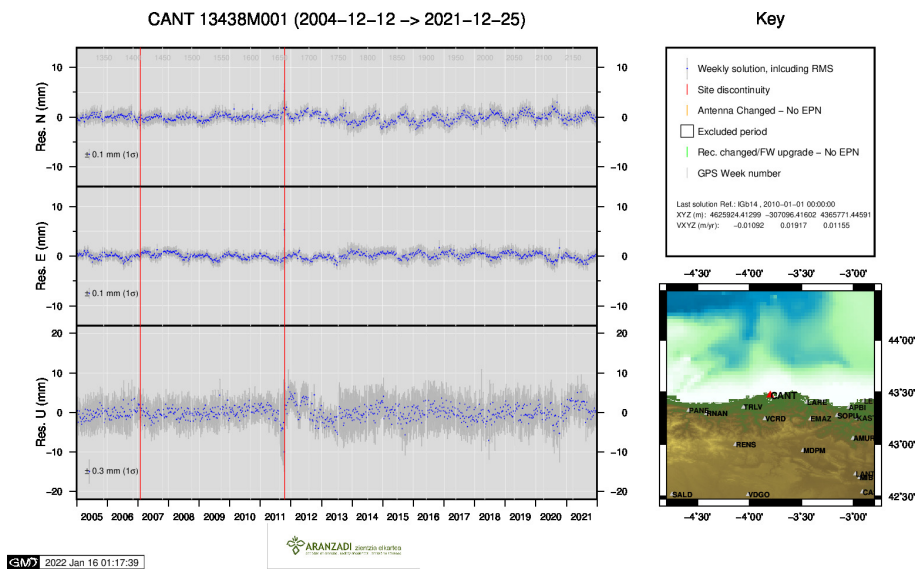
4) BIAZ



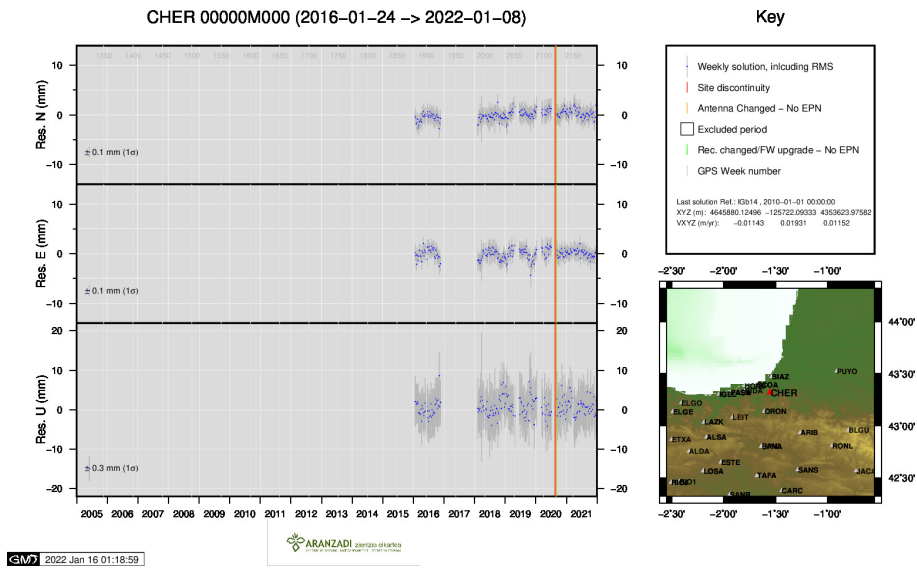
5) BIDA



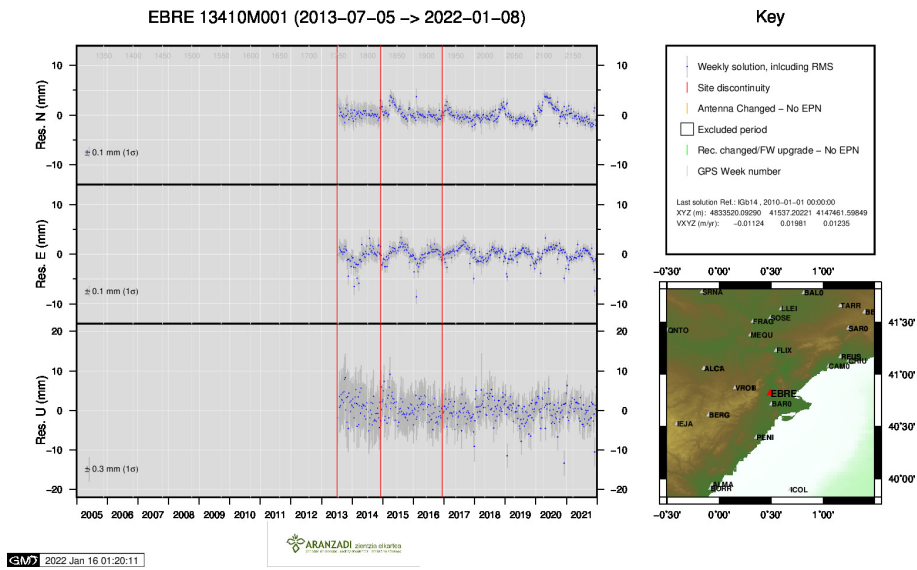
6) CACE



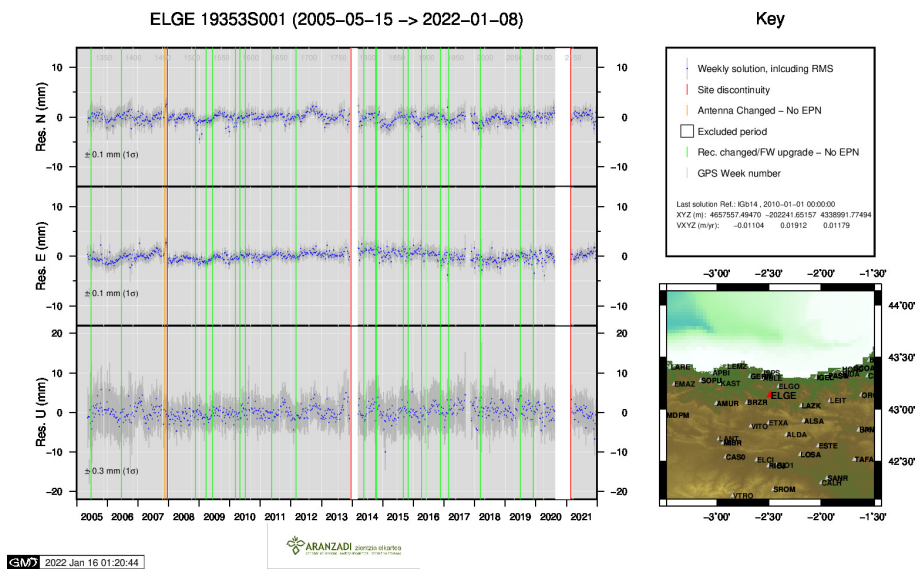
7) CANT



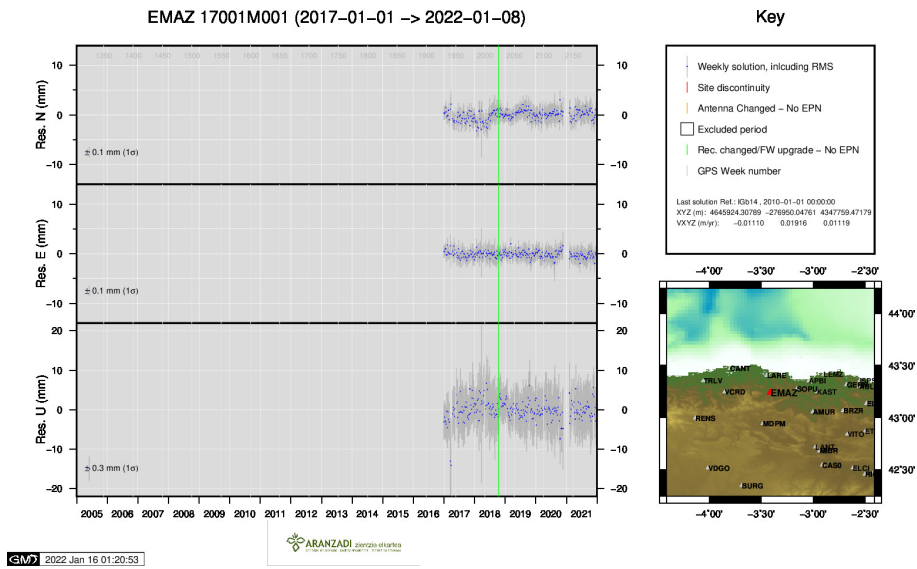
8) CHER



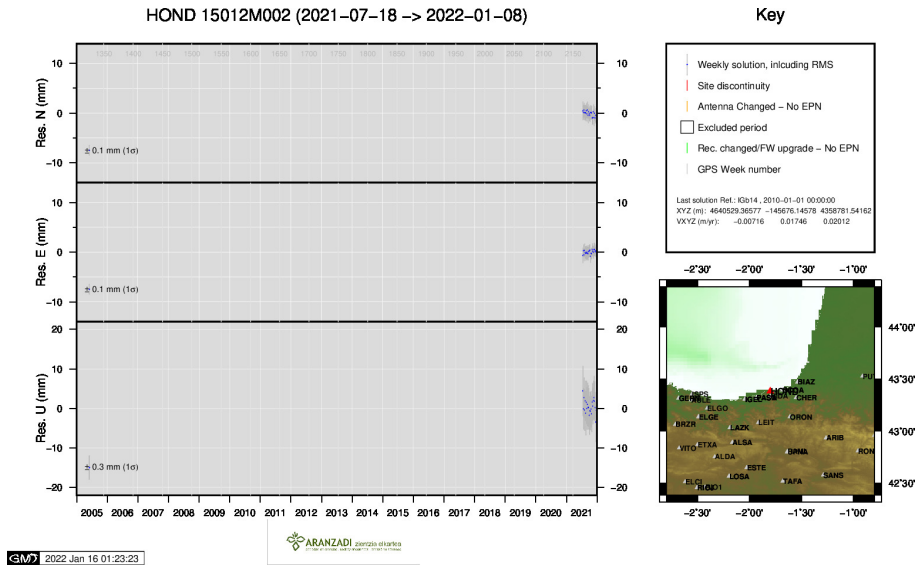
9) EBRE



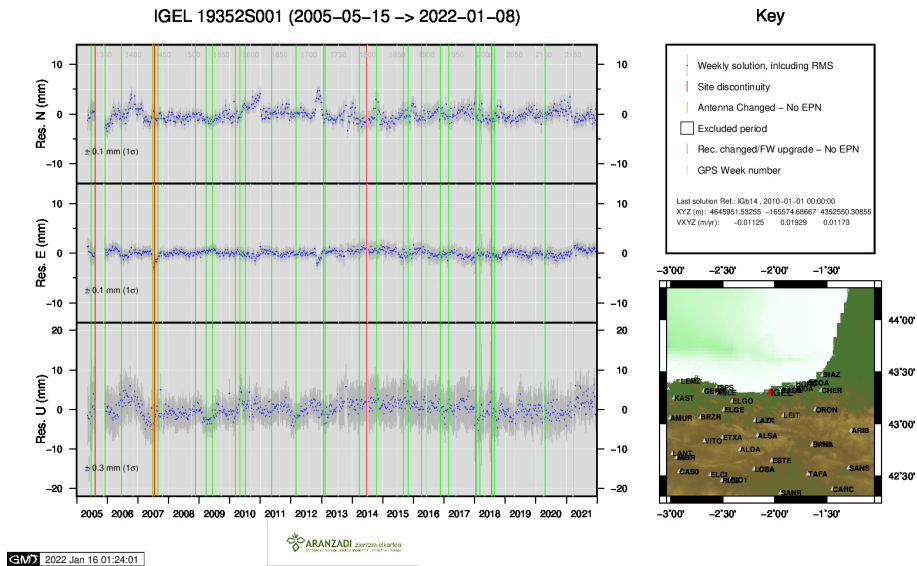
10) ELGE



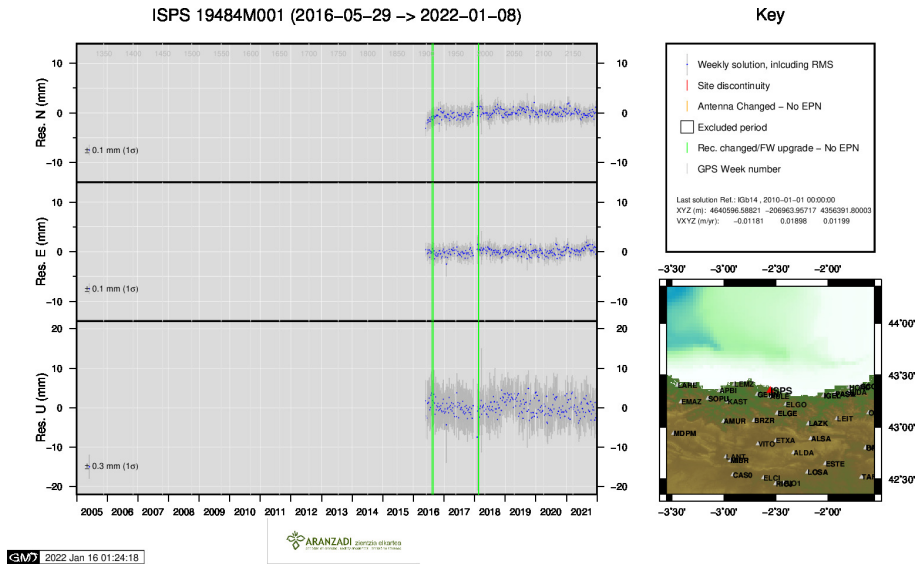
11) EMAZ



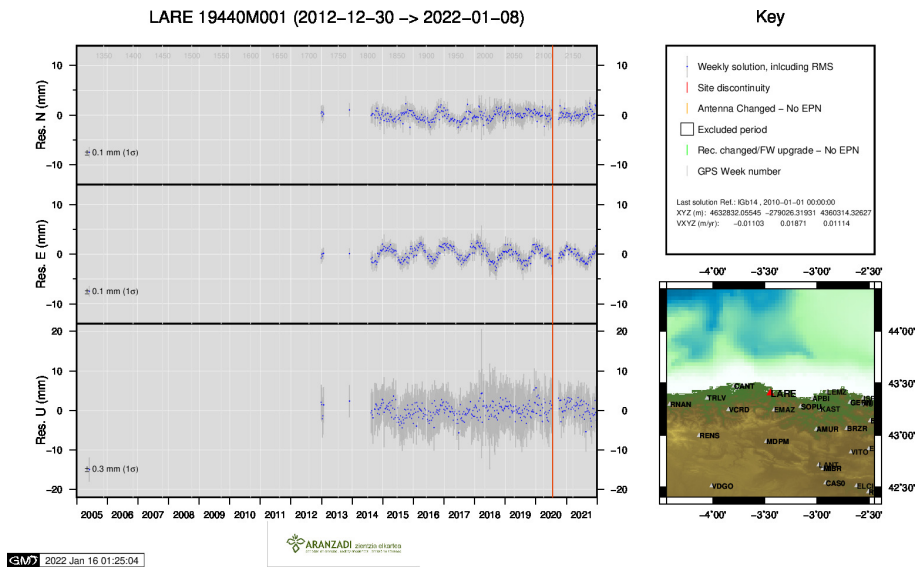
12) HOND



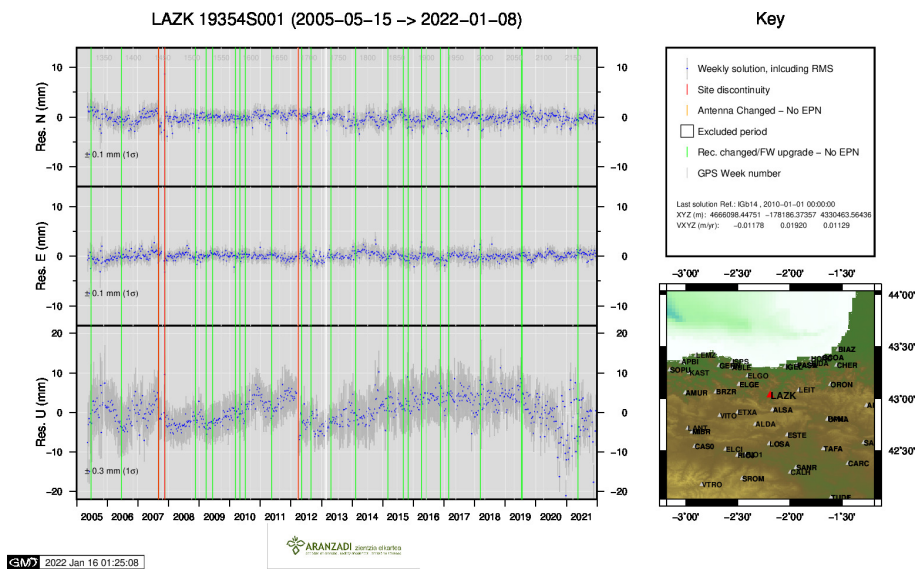
13) IGEL



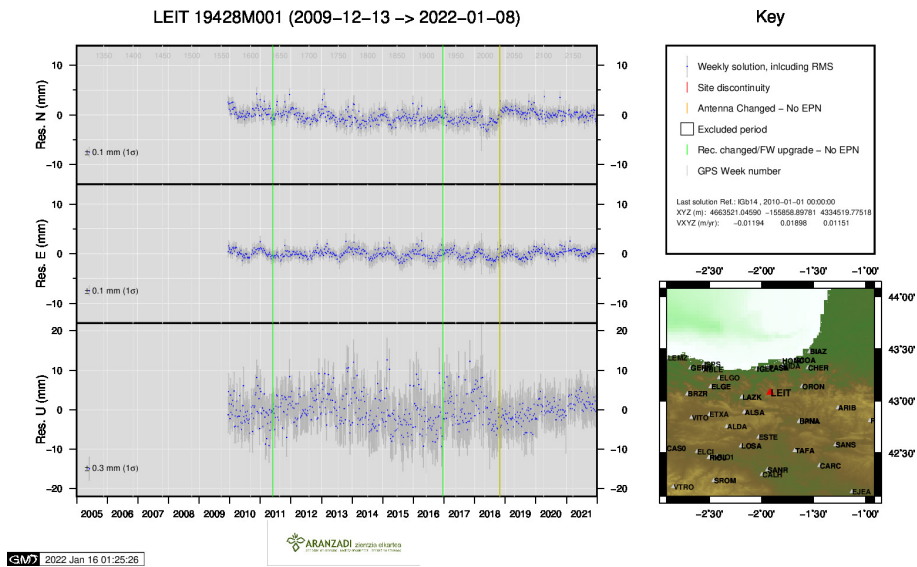
14) ISPS



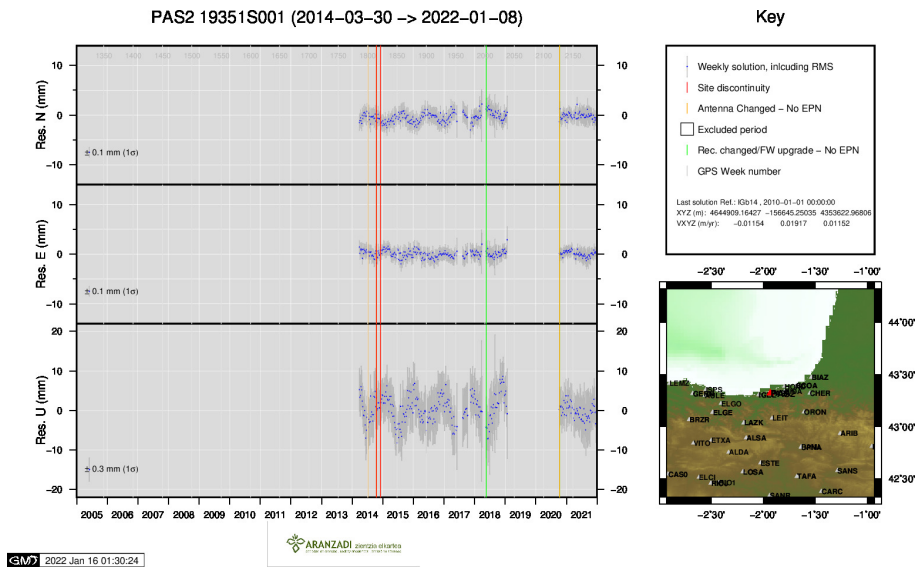
15) LARE



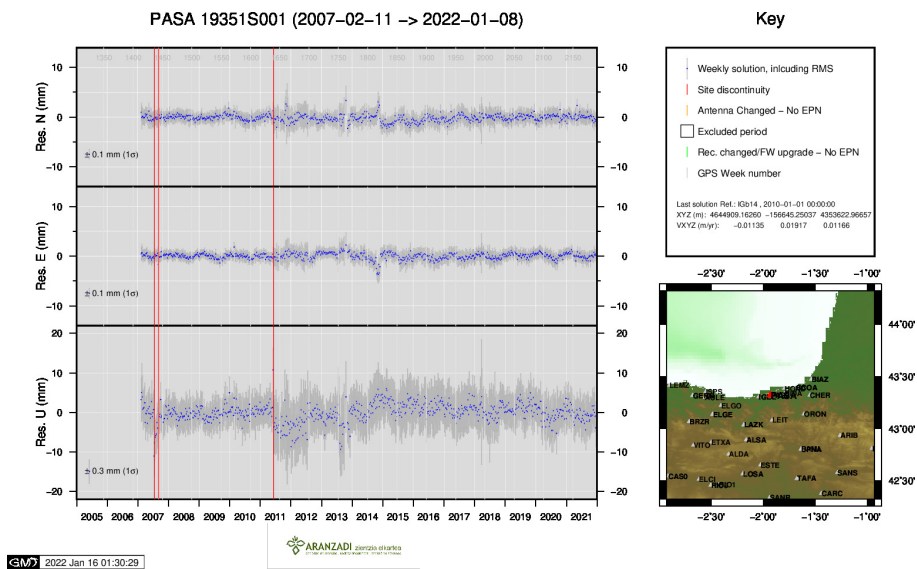
16) LAZK



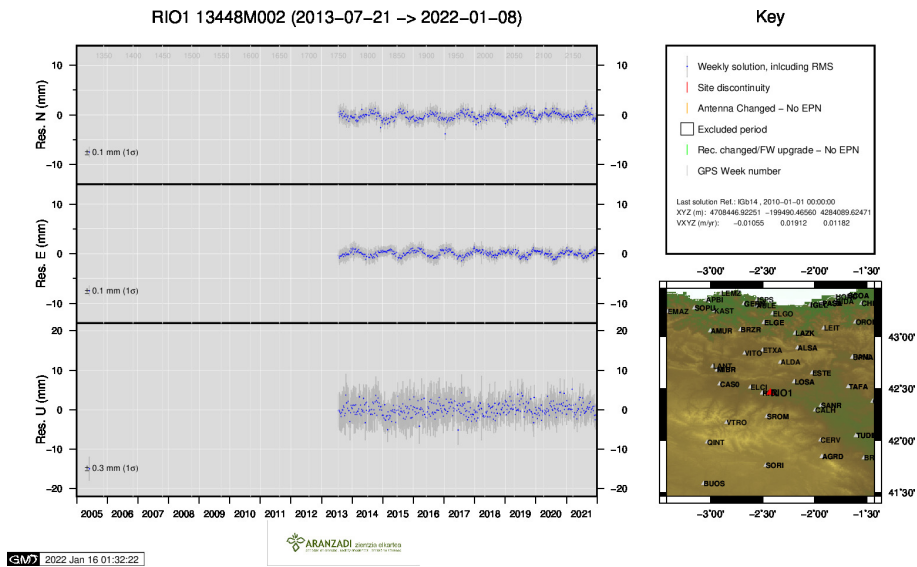
17) LEIT



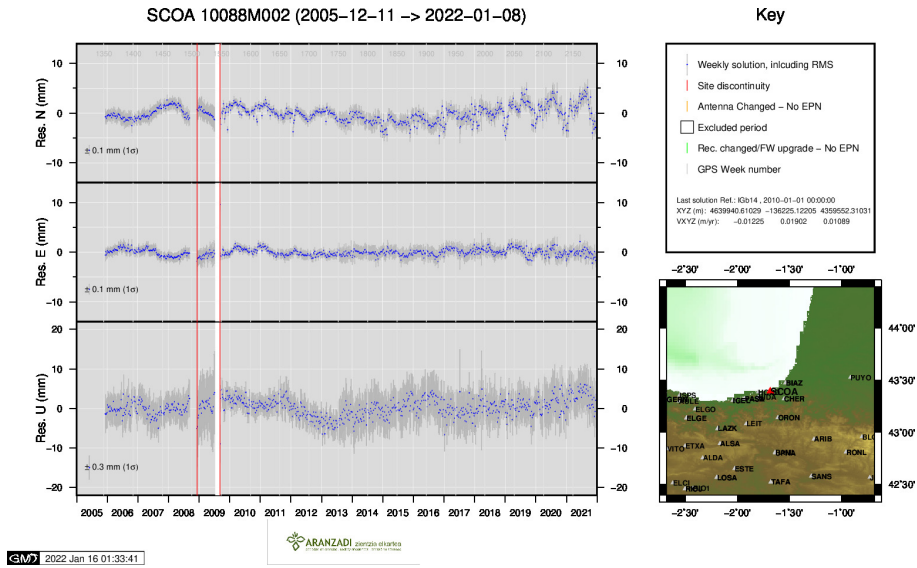
18) PAS2



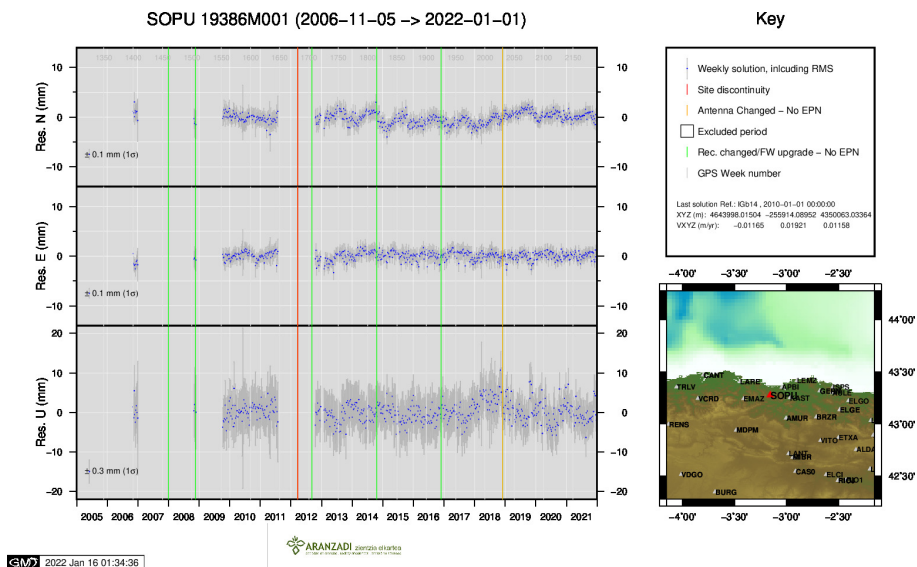
19) PASA



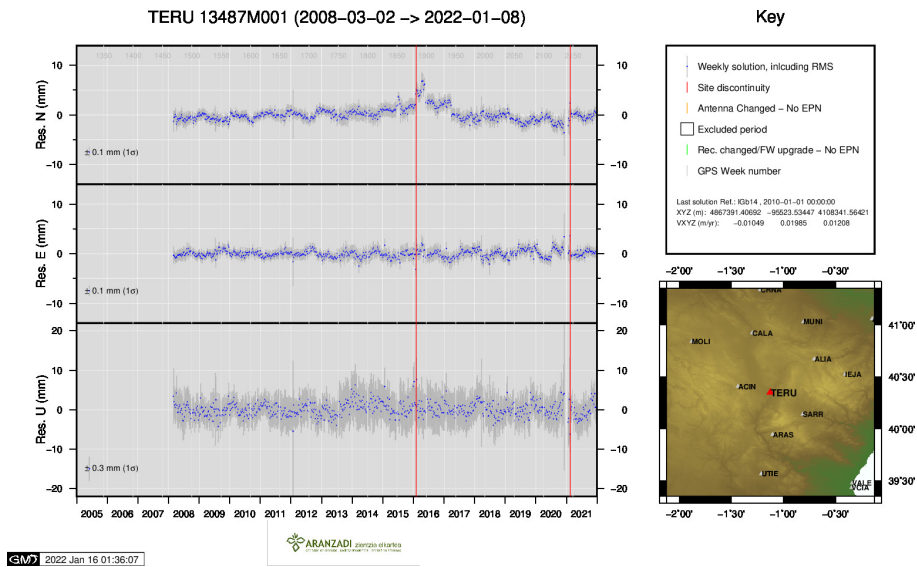
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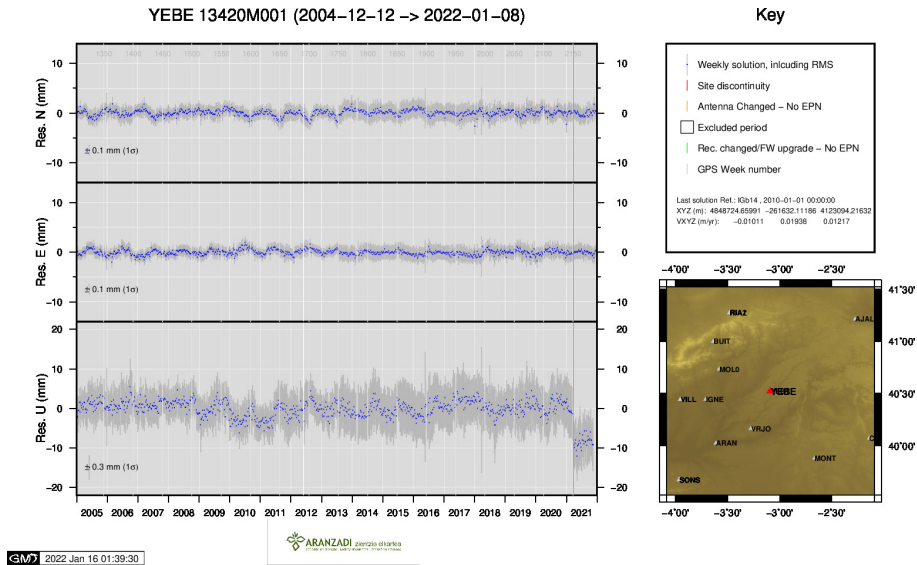
21) SCOA



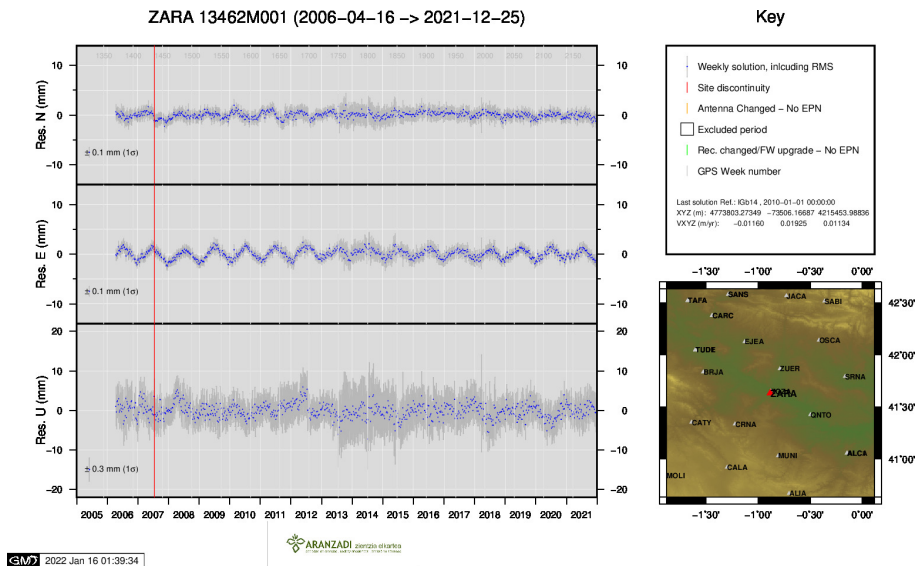
22) SOPU



23) TERU



24) YEBE



25) ZARA