

ARA-DAC Weekly Analysis Result: 2137 (GFA)

Technical Report

GPS Week: 2137 (GFA)

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

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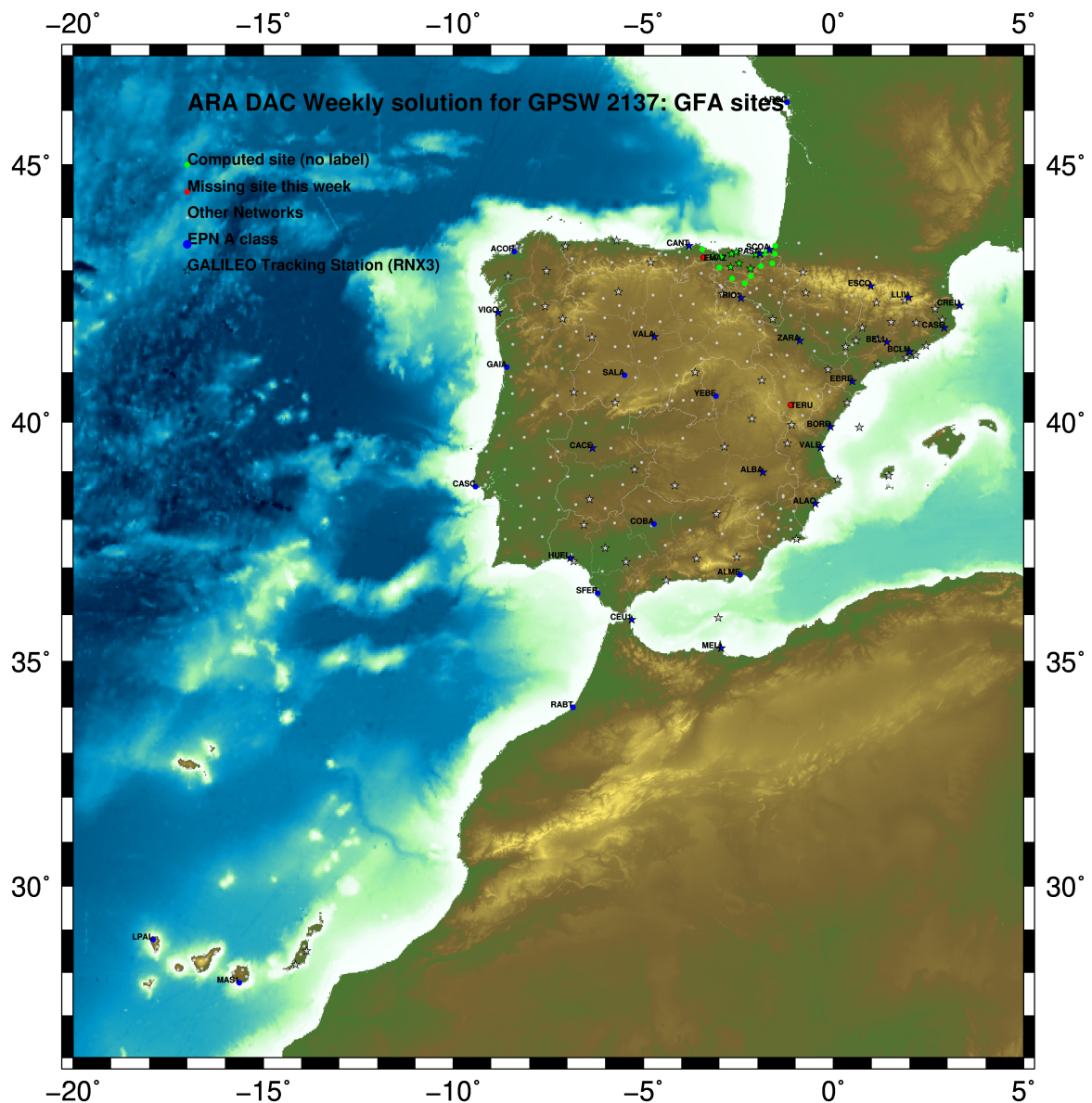
Report generated on 2021/01/10 at 02:26:10



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 2021 Jan 10 02:26:01

Fig.1: Computed Sites for GPS Week2137 (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 C2115.

ARA LAC 2137 WEEK FINAL COMBINATION: PRECISE ORBITS						09-JAN-21 23:13
LOCAL GEODETIC DATUM: IGB14						EPOCH: 2020-12-23 12:00:00
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	
4	ACDR 13434M001	4594489.54254	-678367.41160	4357066.30003	W	
39	ALDA 19383M001	4687280.14222	-190876.53686	4308106.97872	A	
50	ALSA 19419M001	4677250.81141	-176770.36463	4319079.89157	A	
53	AMUR 19388M001	4661499.42991	-244591.22948	4332269.90225	A	
100	BLAZ 10074M002	4634456.03123	-124344.94667	4366785.47758	A	
101	BIDA 00000M000	4644177.80030	-145778.29410	4354832.50089	A	
113	BRZR 19387M001	4662220.96979	-220769.87097	4333309.45671	A	
100	CACE 13447M001	4899866.48479	-544567.00599	4033770.22206	W	
111	CANT 13438M001	4625924.29326	-307096.20521	4365771.57243	W	
154	CHER 00000M000	4645880.00042	-125721.88053	4353624.10394	A	
156	CREU 13432M001	4715420.10898	273178.08835	4271946.85966	W	
194	EBRE 13410M001	4833519.97107	41537.42013	4147461.73481	W	
180	ELGE 19353S001	4657557.38207	-202241.45016	4338991.88878	A	
209	GERN 19389M001	4642811.30177	-217222.89476	4353278.89722	A	
235	IGEL 19352S001	4645951.40808	-165574.47496	4352550.43758	A	
240	ISPS 19484M001	4640596.46118	-206963.74844	4356391.93318	A	
245	KAST 19499M001	4646949.05919	-240747.24524	4348015.01195	A	
252	LARE 19440M001	4632831.93456	-279026.11291	4360314.44832	A	
256	LAZK 19354S001	4666098.31103	-178186.16282	4330463.68075	A	
261	LEIT 19428M001	4663520.91480	-155858.68830	4334519.90108	A	
334	ORND 19427M001	4659695.75650	-130864.70662	4338948.90032	A	
345	PAS2 19351S001	4644909.03974	-156645.03930	4353623.09500	A	
464	PASA 19351S001	4644909.03952	-156645.03927	4353623.09482	W	
522	RID1 13448M002	4708446.80760	-199490.25510	4284089.75492	W	
527	SALA 13469M001	4803054.46321	-462131.04154	4158379.09552	W	
535	SCDA 10088M002	4639940.47662	-136224.91336	4359552.43066	W	
418	SOPU 19386M001	4643997.88929	-255913.87876	4350063.16193	A	
493	VITO 19385M001	4679397.68390	-218436.47506	4314898.38679	A	
708	YEBE 13420M001	4848724.54890	-261631.90169	4123094.34807	W	
711	ZARA 13462M001	4773803.14546	-73505.95663	4215454.11172	W	

5.2 ETRF2000 (ETRS89) Coordinates

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

ETRF2000 FINAL COORD. wk 2137						09-JAN-21 23:13
LOCAL GEODETIC DATUM: ETRF2000						EPOCH: 2020-12-23 12:00:00
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG	
4	ACDR 13434M001	4594489.86134	-678367.97944	4357065.86200	W	
39	ALDA 19383M001	4687280.51747	-190877.11386	4308106.53960	A	
50	ALSA 19419M001	4677251.18919	-176770.94049	4319079.45343	A	
53	AMUR 19388M001	4661499.80031	-244591.80380	4332269.46450	A	
100	BLAZ 10074M002	4634456.41885	-124345.51769	4366785.04351	A	
101	BIDA 00000M000	4644178.18449	-145778.86625	4354832.06577	A	
113	BRZR 19387M001	4662221.34320	-220770.44531	4333309.01921	A	
100	CACE 13447M001	4899866.79647	-544567.60683	4033769.76144	W	
111	CANT 13438M001	4625924.65841	-307096.77579	4365771.13671	W	
154	CHER 00000M000	4645880.38699	-125722.45280	4353623.66894	A	
156	CREU 13432M001	4715420.53855	273177.50989	4271946.42411	W	
194	EBRE 13410M001	4833520.36314	41536.82796	4147461.28697	W	
180	ELGE 19353S001	4657557.75817	-202242.02394	4338991.45188	A	
209	GERN 19389M001	4642811.67706	-217223.46696	4353278.46130	A	
235	IGEL 19352S001	4645951.78967	-165575.04736	4352550.00207	A	
240	ISPS 19484M001	4640596.83796	-206964.32037	4356391.49757	A	
245	KAST 19499M001	4646949.43121	-240747.81796	4348014.57540	A	
252	LARE 19440M001	4632832.30277	-279026.68417	4360314.01241	A	
256	LAZK 19354S001	4666098.68946	-178186.73716	4330463.24348	A	
261	LEIT 19428M001	4663521.29627	-155859.26260	4334519.46430	A	
334	ORND 19427M001	4659696.14137	-130865.28042	4338948.46416	A	
345	PAS2 19351S001	4644909.42251	-156645.61156	4353622.65968	A	
464	PASA 19351S001	4644909.42229	-156645.61153	4353622.65950	W	
522	RID1 13448M002	4708447.18003	-199490.83443	4284089.31401	W	
527	SALA 13469M001	4803054.79416	-462131.63178	4158378.64370	W	
535	SCDA 10088M002	4639940.86233	-136225.48501	4359551.99600	W	
418	SOPU 19386M001	4643998.25859	-255914.45119	4350062.72543	A	
493	VITO 19385M001	4679398.05625	-218437.05127	4314897.94795	A	
708	YEBE 13420M001	4848724.90194	-261632.49643	4123093.89519	W	
711	ZARA 13462M001	4773803.52837	-73506.54270	4215453.66720	W	

5.3 ETRF2014 (ETRS89) Coordinates

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

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ETRF2014 FINAL COORD. wk 2137                                09-JAN-21 23:13
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LOCAL GEODETIC DATUM: ETRF2014          EPOCH: 2020-12-23 12:00:00
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
4  ACRD 13434M001        4594489.82026  -678368.01752  4357065.91284  W
39 ALDA 19383M001        4687280.47411  -190877.15321  4308106.59032  A
50 ALSA 19419M001        4677251.14588  -176770.97993  4319079.50418  A
53 AMUR 19388M001        4661499.75737  -244591.84307  4332269.51526  A
100 BIAZ 10074M002        4634456.37581  -124345.55747  4365785.09440  A
101 BIDA 00000M000        4644178.14142  -145778.90592  4354832.11663  A
113 BRZR 19387M001        4662221.30018  -220770.48466  4333309.06998  A
100 CACE 13447M001        4899866.75187  -544567.64410  4033769.81149  W
111 CANT 13438M001        4625924.61602  -307096.81499  4365771.18755  W
154 CHER 00000M000        4645880.34383  -125722.49254  4353623.71980  A
156 CREU 13432M001        4715420.49329  273177.46912  4271946.47506  W
194 EBRE 13410M001        4833520.31748  41536.78844  4147461.33743  W
180 ELGE 19353S001        4657557.71514  -202242.06337  4338991.50267  A
209 GERN 19389M001        4642811.63423  -217223.50640  4353278.51213  A
235 IGEL 19352S001        4645951.74664  -165575.08696  4352550.05291  A
240 ISPS 19484M001        4640596.79512  -206964.35985  4356391.54841  A
245 KAST 19499M001        4646949.38841  -240747.85730  4348014.62621  A
252 LARE 19440M001        4632832.26022  -279026.72345  4360314.06324  A
256 LAZK 19354S001        4666098.64627  -178186.77663  4330463.29426  A
261 LEIT 19428M001        4663521.25304  -155859.30216  4334519.51509  A
334 ORON 19427M001        4659696.09809  -130865.32008  4338948.51498  A
345 PAS2 19351S001        4644909.37946  -156645.65119  4353622.71054  A
464 PASA 19351S001        4644909.37924  -156645.65116  4353622.71036  W
522 RIO1 13448M002        4708447.13648  -199490.87366  4284089.36466  W
527 SALA 13469M001        4803054.75039  -462131.66974  4158378.69401  W
535 SOA 10088M002        4639940.81926  -136225.52473  4359552.04687  W
418 SOPU 19386M001        4643998.21586  -255914.49049  4350062.77623  A
493 VITO 19385M001        4679398.01305  -218437.09056  4314897.99867  A
708 YEBE 13420M001        4848724.85711  -261632.53487  4123093.94544  W
711 ZARA 13462M001        4773803.48373  -73506.58209  4215453.71774  W

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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 2137 WEEK FINAL COMBINATION: PRECISE ORBITS 09-JAN-21 23:13

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	1.21	1.05	3.10
ALDA 19383M001	7	XXXXXX	0.67	1.02	2.73
ALSA 19419M001	7	XXXXXX	1.29	1.34	2.68
AMUR 19388M001	7	XXXXXX	2.45	1.86	3.72
BLAZ 10074M002	7	XXXXXX	1.21	1.16	4.12
BIDA 00000M000	7	XXXXXX	1.24	0.43	3.78
BRZR 19387M001	7	XXXXXX	3.16	3.41	5.30
CACE 13447M001	7	XXXXXX	0.36	0.34	1.24
CANT 13438M001	7	XXXXXX	0.76	0.62	2.24
CHER 00000M000	7	XXXXXX	1.13	2.72	3.67
CREU 13432M001	7	XXXXXX	0.76	0.26	2.14
EBRE 13410M001	7	XXXXXX	0.76	0.54	3.67
ELGE 19353S001	7	XXXXXX	3.66	5.13	6.04
GERN 19389M001	7	XXXXXX	1.83	1.55	3.66
IGEL 19352S001	7	XXXXXX	1.86	0.86	1.35
ISPS 19484M001	7	XXXXXX	0.65	0.99	4.01
KAST 19499M001	7	XXXXXX	1.81	1.93	8.34
LARE 19440M001	7	XXXXXX	1.49	0.85	1.59
LAZK 19354S001	7	XXXXXX	1.84	2.01	11.20
LEIT 19428M001	7	XXXXXX	1.14	0.78	1.81
ORON 19427M001	7	XXXXXX	1.50	0.62	3.81
PAS2 19351S001	7	XXXXXX	1.09	0.48	2.21
PASA 19351S001	7	XXXXXX	1.09	0.54	2.05
RI01 13448M002	7	XXXXXX	0.61	0.70	2.02
SALA 13469M001	7	XXXXXX	0.44	0.31	2.35
SCOA 10088M002	7	XXXXXX	1.13	1.37	3.12
SOPU 19386M001	7	XXXXXX	2.48	1.74	4.03
VITO 19385M001	7	XXXXXX	0.85	0.74	3.29
YEBE 13420M001	7	XXXXXX	0.37	0.54	1.86
ZARA 13462M001	7	XXXXXX	0.49	0.55	2.99

Comparison of individual solutions:

ACOR 13434M001	N	1.21	-0.06	1.37	2.46	0.19	-0.78	-0.51	-0.05
ACOR 13434M001	E	1.05	0.51	-1.49	-0.69	-0.07	1.72	0.72	0.44
ACOR 13434M001	U	3.10	-0.70	0.48	6.11	0.56	-3.34	-1.50	-2.43
ALDA 19383M001	N	0.67	-0.25	-0.79	-0.49	-0.12	-0.70	1.06	-0.31
ALDA 19383M001	E	1.02	0.08	-0.24	-1.44	-0.19	-0.75	-1.42	-1.23
ALDA 19383M001	U	2.73	3.28	3.30	-2.34	-0.84	-0.87	-3.84	-1.18
ALSA 19419M001	N	1.29	-0.51	-0.69	-0.46	-1.29	0.30	2.61	-0.70
ALSA 19419M001	E	1.34	0.21	1.45	-0.31	-2.76	0.61	-0.30	0.72
ALSA 19419M001	U	2.68	-1.14	1.75	4.24	0.68	0.57	-4.23	-1.40
AMUR 19388M001	N	2.45	-2.19	-0.41	1.94	-4.57	0.16	2.43	-0.65
AMUR 19388M001	E	1.86	-1.00	-0.38	2.76	-2.32	-0.22	2.46	0.74
AMUR 19388M001	U	3.72	-1.00	-1.66	5.36	-6.45	-0.87	-2.68	0.92
BLAZ 10074M002	N	1.21	-0.67	-1.79	-1.87	-1.11	-0.04	0.46	0.35
BLAZ 10074M002	E	1.16	-0.39	-0.05	-1.02	-1.90	1.70	0.05	0.56
BLAZ 10074M002	U	4.12	-0.72	0.87	-0.46	8.94	2.43	-1.35	-3.57
BIDA 00000M000	N	1.24	-1.22	-1.32	-1.70	1.50	-0.09	-0.42	-0.88
BIDA 00000M000	E	0.43	-0.36	0.35	0.56	0.55	-0.46	0.08	-0.05
BIDA 00000M000	U	3.78	-1.92	-0.17	3.51	2.50	5.34	3.85	-4.46
BRZR 19387M001	N	3.16	2.64	2.15	-2.85	-5.43	1.87	2.63	0.53
BRZR 19387M001	E	3.41	0.71	0.82	-0.25	-6.95	2.76	3.29	1.38
BRZR 19387M001	U	5.30	1.62	3.14	-10.02	-5.63	1.00	1.21	4.67
CACE 13447M001	N	0.36	0.19	0.14	-0.14	-0.06	0.01	-0.80	-0.20
CACE 13447M001	E	0.34	-0.11	-0.41	0.46	0.03	-0.29	-0.42	-0.16
CACE 13447M001	U	1.24	0.49	-2.35	-0.97	0.52	0.85	1.20	0.29
CANT 13438M001	N	0.76	-0.41	-1.43	0.11	-0.51	-0.82	-0.06	-0.57
CANT 13438M001	E	0.62	0.59	-0.54	0.13	0.61	0.40	0.92	0.54
CANT 13438M001	U	2.24	3.92	-1.12	1.56	-0.76	-0.43	-0.94	-3.07
CHER 00000M000	N	1.13	-0.37	-0.31	-1.92	0.92	-1.23	-1.18	-0.02
CHER 00000M000	E	2.72	0.00	1.58	0.41	-6.30	-1.28	-0.32	0.37
CHER 00000M000	U	3.67	-1.99	2.69	5.86	-4.23	-1.24	0.40	-3.92
CREU 13432M001	N	0.76	-1.34	-0.45	-0.34	0.35	0.08	1.08	0.14
CREU 13432M001	E	0.26	0.38	0.15	-0.13	-0.01	-0.47	-0.03	-0.01
CREU 13432M001	U	2.14	-1.43	0.30	-2.19	-2.40	2.38	-0.56	-2.97
EBRE 13410M001	N	0.76	-0.84	0.75	0.94	0.53	-0.17	-0.99	0.19
EBRE 13410M001	E	0.54	-0.85	0.05	0.31	-0.61	-0.59	0.41	-0.02
EBRE 13410M001	U	3.67	1.91	-0.40	-1.44	1.56	2.66	-8.03	-1.03
ELGE 19353S001	N	3.66	4.11	3.62	4.40	-0.78	-3.46	-2.33	-3.57
ELGE 19353S001	E	5.13	-3.16	-5.36	-6.60	3.08	4.44	5.08	4.55
ELGE 19353S001	U	6.04	0.87	1.44	10.98	-2.75	-3.56	-8.09	-3.07
GERN 19389M001	N	1.83	1.09	0.32	3.49	-2.48	-0.01	-0.31	-0.63
GERN 19389M001	E	1.55	2.31	-0.40	0.85	-1.72	-1.43	1.42	1.06
GERN 19389M001	U	3.66	1.36	-5.43	-5.92	0.45	2.15	2.53	1.60
IGEL 19352S001	N	1.86	0.28	-0.51	2.62	2.86	-0.57	-0.89	-2.04
IGEL 19352S001	E	0.86	0.48	0.15	-1.18	1.47	0.46	0.48	0.41
IGEL 19352S001	U	1.35	-1.32	1.53	-0.29	-0.68	-2.32	0.21	-0.92
ISPS 19484M001	N	0.65	0.87	0.65	-0.67	-0.45	0.16	0.62	0.53
ISPS 19484M001	E	0.99	0.39	0.31	-1.54	0.42	0.12	1.56	0.80
ISPS 19484M001	U	4.01	0.16	2.79	-1.29	-0.71	-8.76	0.87	3.02
KAST 19499M001	N	1.81	0.66	1.24	-2.51	-2.49	0.81	1.65	1.37
KAST 19499M001	E	1.93	-0.03	1.27	0.40	-2.47	1.29	2.32	2.71
KAST 19499M001	U	8.34	-1.97	6.07	-9.16	-6.76	1.72	6.61	14.16
LARE 19440M001	N	1.49	0.34	1.26	-0.47	-3.05	-0.85	0.23	-1.13
LARE 19440M001	E	0.85	-0.48	0.94	1.34	-0.04	-0.44	0.15	1.09
LARE 19440M001	U	1.59	-0.87	0.40	0.89	-2.76	-0.95	0.21	2.20
LAZK 19354S001	N	1.84	-0.47	-0.14	-3.81	1.62	0.22	1.70	0.12
LAZK 19354S001	E	2.01	-0.48	-0.98	-1.59	4.16	-1.09	-1.38	0.28
LAZK 19354S001	U	11.20	-0.86	6.18	9.42	11.59	-2.17	-21.83	-3.01
LEIT 19428M001	N	1.14	0.16	0.64	-2.14	-1.11	0.45	1.16	-0.21
LEIT 19428M001	E	0.78	-0.42	-1.35	-0.64	1.07	0.13	0.03	0.30
LEIT 19428M001	U	1.81	-0.40	-0.92	1.33	3.41	-1.91	-0.98	-0.78
ORON 19427M001	N	1.50	-1.03	-1.38	-0.26	2.75	-1.29	0.83	-0.76

ORDN 19427M001	E	0.62	-0.00	0.13	-1.25	-0.70	0.33	0.29	0.25
ORDN 19427M001	U	3.81	-3.85	0.18	2.50	3.99	4.78	-3.61	-3.80
PAS2 19351S001	N	1.09	0.78	1.09	0.39	-1.86	1.33	-0.19	-0.02
PAS2 19351S001	E	0.48	0.70	0.02	0.24	0.08	0.72	0.54	-0.08
PAS2 19351S001	U	2.21	-2.40	1.57	-2.44	2.99	-1.42	-2.00	-0.36
PASA 19351S001	N	1.09	0.74	1.02	0.30	-1.94	1.27	-0.07	0.16
PASA 19351S001	E	0.54	0.73	-0.02	0.26	-0.03	0.71	0.79	-0.03
PASA 19351S001	U	2.05	-2.01	0.25	-2.32	3.31	-0.88	-1.91	-0.64
RID1 13448M002	N	0.61	-0.97	-0.77	0.43	0.51	-0.18	0.41	0.15
RID1 13448M002	E	0.70	-0.05	-0.35	0.29	0.50	0.16	-1.56	-0.00
RID1 13448M002	U	2.02	0.10	-1.31	0.47	-1.06	0.23	1.84	-4.24
SALA 13469M001	N	0.44	-0.16	0.71	0.29	0.46	-0.47	-0.03	-0.35
SALA 13469M001	E	0.31	0.47	-0.27	-0.25	0.34	-0.05	0.11	0.29
SALA 13469M001	U	2.35	-0.61	-2.18	0.61	-1.74	-0.16	4.03	2.86
SCDA 10088M002	N	1.13	-0.29	-0.11	-1.49	0.04	0.18	0.00	-2.30
SCDA 10088M002	E	1.37	0.90	0.38	-1.06	-2.03	0.95	2.04	-0.12
SCDA 10088M002	U	3.12	-1.84	2.83	5.17	3.70	0.81	-1.79	-1.64
SOPU 19386M001	N	2.48	-0.76	0.25	-0.93	5.62	1.04	-1.27	-1.08
SOPU 19386M001	E	1.74	2.81	0.78	-1.13	-1.04	-1.81	1.26	1.57
SOPU 19386M001	U	4.03	4.15	-2.40	3.88	-3.62	-5.74	2.17	2.97
VITO 19385M001	N	0.85	-0.40	0.27	0.23	-1.36	0.83	-0.48	-1.13
VITO 19385M001	E	0.74	0.25	0.41	-0.14	-1.59	-0.40	0.20	0.59
VITO 19385M001	U	3.29	-0.03	-0.85	2.92	0.45	-6.30	1.33	-3.75
YEBE 13420M001	N	0.37	0.42	-0.50	0.40	0.18	0.24	-0.36	-0.16
YEBE 13420M001	E	0.54	0.32	-1.05	-0.24	0.37	0.43	0.36	0.10
YEBE 13420M001	U	1.86	0.64	-0.45	1.81	-1.03	3.55	0.40	-1.70
ZARA 13462M001	N	0.49	-0.71	-0.69	-0.43	-0.25	-0.22	-0.43	-0.05
ZARA 13462M001	E	0.55	0.29	0.22	0.09	-0.47	-1.04	-0.36	-0.53
ZARA 13462M001	U	2.99	-1.44	1.48	1.14	-2.05	5.95	-0.33	-2.89

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	0.52	-0.33	0.05
11	ALAC 13433M001	I W	0.51	0.65	0.10
14	ALBA 13452M001	I W	-0.21	-0.62	0.13
20	ALME 13437M001	I W	-1.51	-0.58	1.20
43	BCLN 13412M001	I W	0.51	0.02	0.96
48	BELL 13431M001	I W	0.02	-1.72	2.33
67	BORR 13480M001	I W	-1.04	-0.97	-1.03
72	BRST 10004M004	I W	0.40	-0.98	0.76
100	CACE 13447M001	I W	1.25	-0.90	4.17
111	CANT 13438M001	I W	0.66	-0.01	0.93
116	CASC 13909S001	I W	-0.86	-0.25	0.00
117	CASE 13494M001	I W	-1.81	0.41	0.78
123	CEU1 13449M002	I W	0.02	-0.99	-2.11
137	COBA 13453M001	I W	0.17	0.09	-2.66
156	CREU 13432M001	I W	-0.13	0.71	-0.04
194	EBRE 13410M001	I W	-0.29	0.17	-1.33
212	ESCO 13435M001	I W	0.29	-0.02	-0.61
229	GAI1 13902M001	I W	0.70	-0.57	1.18
291	HUEL 13451M001	I W	-2.42	4.58	-4.07
365	LLIV 13436M001	I W	1.14	0.18	3.11
370	LPAL 81701M001	I W	-3.23	-0.06	-0.30
372	LROC 10023M001	I W	0.77	0.37	-0.62
395	MAS1 31303M002	I W	-0.47	-1.61	0.31
406	MELI 19379M001	I W	1.35	0.15	-3.89
464	PASA 19351S001	I W	0.66	0.00	-2.13
505	RABT 35001M002	I W	-0.09	-0.17	-7.64
522	RID1 13448M002	I W	0.13	-0.35	-2.30
527	SALA 13469M001	I W	0.40	0.70	0.30
535	SCOA 10088M002	I W	-1.25	-0.02	-0.08
543	SFER 13402M004	I W	0.31	-1.59	3.74
664	VALA 13463M002	I W	0.94	1.01	1.04
668	VALE 13439M001	I W	0.90	1.25	0.30
679	VIGO 13450M001	I W	-0.31	-0.44	0.48
708	YEBE 13420M001	I W	-0.02	0.81	3.35
711	ZARA 13462M001	I W	1.05	1.60	2.97
720	ZIMM 14001M004	I W	0.92	-0.52	0.63
	RMS / COMPONENT		1.03	1.10	2.33
	MEAN		-0.00	-0.00	-0.00
	MIN		-3.23	-1.72	-7.64
	MAX		1.35	4.58	4.17

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 108
RMS OF TRANSFORMATION : 1.60 MM

BARYCENTER COORDINATES:

LATITUDE : 40 13 15.72
LONGITUDE : - 3 34 48.79
HEIGHT : -31.445 KM

PARAMETERS:

TRANSLATION IN N : -0.00 +- 0.27 MM
TRANSLATION IN E : 0.00 +- 0.27 MM
TRANSLATION IN U : -0.00 +- 0.27 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          17743129
NUMBER OF UNKNOWN               203784
NUMBER OF DEGREES OF FREEDOM    17539345
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  1.595801414850600

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")
      X          Y          Z          X          Y          Z      Scale (ppm)
-----
  1  0.00191     0.0262  0.0284 -0.0226  -0.0005  0.0011  0.0008  -0.00066
  2  0.00445     0.0101  0.0206 -0.0106  -0.0003  0.0005  0.0006  -0.00009
  3  0.00180     0.0112  0.0149 -0.0112  -0.0003  0.0005  0.0004  -0.00003
  4  0.00178     0.0040 -0.0117 -0.0038  0.0003  0.0002 -0.0002  -0.00015
  5  0.00185     0.0074 -0.0048 -0.0060  0.0001  0.0003 -0.0001  -0.00033
  6  0.00208    -0.0131 -0.0208  0.0085  0.0004 -0.0005 -0.0006  0.00052
  7  0.00211     0.0062 -0.0062 -0.0124  0.0001  0.0004 -0.0002  0.00024
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00123     2373500  1.52          2400988      3          873  26618  0
  2  0.00126     2371914  1.58          2401197      3          879  28407  0
  3  0.00125     2573799  1.55          2605599      3          951  30852  0
  4  0.00129     2535317  1.67          2566654      3          960  30380  0
  5  0.00124     2547281  1.55          2576398      3          945  28175  0
  6  0.00130     2566343  1.69          2596833      3          951  29542  0
  7  0.00125     2565668  1.56          2595460      3          951  28844  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 20:355:00000 20:361:86370 LEICA GR50 -----
ALDA  A  1 P 20:355:00000 20:361:86370 LEICA GR10 -----
ALSA  A  1 P 20:355:00000 20:361:86370 LEICA GR50 -----
AMUR  A  1 P 20:355:00000 20:361:86370 LEICA GR10 -----
BIAZ  A  1 P 20:355:00390 20:361:79170 SPECTRA SP90M -----
BIDA  A  1 P 20:355:00000 20:361:86370 LEICA GR10 -----
BRZR  A  1 P 20:355:00000 20:361:86370 LEICA GR30 -----
CACE  A  1 P 20:355:00000 20:361:86370 TRIMBLE NETR9 -----
CANT  A  1 P 20:355:00000 20:361:86370 LEICA GR10 -----
CHER  A  1 P 20:355:00000 20:361:86370 LEICA GR30 -----
CREU  A  1 P 20:355:00000 20:361:86370 LEICA GR50 -----
EBRE  A  1 P 20:355:00000 20:361:86370 LEICA GR50 -----
ELGE  A  1 P 20:355:00000 20:361:86370 LEICA GR30 -----
GERN  A  1 P 20:355:00000 20:361:86370 LEICA GR30 -----
IGEL  A  1 P 20:355:00000 20:361:86370 LEICA GR30 -----
ISPS  A  1 P 20:355:00000 20:361:86370 TRIMBLE NETR9 -----
KAST  A  1 P 20:355:00000 20:361:86370 LEICA GR30 -----
LARE  A  1 P 20:355:00000 20:361:86370 LEICA GR50 -----
LAZK  A  1 P 20:355:00000 20:361:86370 LEICA GR30 -----
LEIT  A  1 P 20:355:00000 20:361:86370 LEICA GR50 -----
ORON  A  1 P 20:355:00000 20:361:86370 LEICA GR50 -----
PAS2  A  1 P 20:355:00030 20:361:86370 STONEX SC2200 -----
PASA  A  1 P 20:355:00030 20:361:86370 LEICA GR30 -----
RIO1  A  1 P 20:355:00000 20:361:86370 LEICA GR25 -----
SALA  A  1 P 20:355:00000 20:361:86370 LEICA GRX1200+GNSS -----
SCOA  A  1 P 20:355:00000 20:361:86370 LEICA GR25 -----
SOPU  A  1 P 20:355:00000 20:361:86370 LEICA GR30 -----
VITO  A  1 P 20:355:00000 20:361:86370 LEICA GR10 -----
YEBE  A  1 P 20:355:00000 20:361:86370 TRIMBLE NETR9 -----
ZARA  A  1 P 20:355:00000 20:361:86370 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 20:355:00000 20:361:86370 LEIAT504  LEIS -----
ALDA  A  1 P 20:355:00000 20:361:86370 LEIAS10   NONE -----
ALSA  A  1 P 20:355:00000 20:361:86370 LEIAR10   NONE -----
AMUR  A  1 P 20:355:00000 20:361:86370 LEIAS10   NONE -----
BIAZ  A  1 P 20:355:00390 20:361:79170 LEIAR25   LEIT -----
BIDA  A  1 P 20:355:00000 20:361:86370 LEIAS10   NONE -----
```

BRZR	A	1	P	20:355:00000	20:361:86370	LEIAS10	NONE	----
CACE	A	1	P	20:355:00000	20:361:86370	TRM29659.00	NONE	----
CANT	A	1	P	20:355:00000	20:361:86370	LEIAR25_R4	LEIT	25066
CHER	A	1	P	20:355:00000	20:361:86370	LEIAR10	NONE	----
CREU	A	1	P	20:355:00000	20:361:86370	LEIAR25_R4	NONE	26357
EBRE	A	1	P	20:355:00000	20:361:86370	LEIAR25_R4	NONE	26359
ELGE	A	1	P	20:355:00000	20:361:86370	LEIAR25_R4	LEIT	----
GERN	A	1	P	20:355:00000	20:361:86370	LEIAS10	NONE	----
IGEL	A	1	P	20:355:00000	20:361:86370	LEIAR20	LEIM	----
ISPS	A	1	P	20:355:00000	20:361:86370	TRM59900.00	SCIS	----
KAST	A	1	P	20:355:00000	20:361:86370	LEIAS10	NONE	----
LARE	A	1	P	20:355:00000	20:361:86370	LEIAR20	LEIM	----
LAZK	A	1	P	20:355:00000	20:361:86370	LEIAR25_R4	LEIT	----
LEIT	A	1	P	20:355:00000	20:361:86370	LEIAR10	NONE	----
ORDN	A	1	P	20:355:00000	20:361:86370	LEIAR10	NONE	----
PAS2	A	1	P	20:355:00030	20:361:86370	LEIAR20	LEIM	73034
PASA	A	1	P	20:355:00030	20:361:86370	LEIAR20	LEIM	73034
RIO1	A	1	P	20:355:00000	20:361:86370	LEIAR25_R4	LEIT	25138
SALA	A	1	P	20:355:00000	20:361:86370	LEIAR25	NONE	----
SCDA	A	1	P	20:355:00000	20:361:86370	TRM55971.00	NONE	----
SOPU	A	1	P	20:355:00000	20:361:86370	LEIAS10	NONE	----
VITO	A	1	P	20:355:00000	20:361:86370	LEIAS10	NONE	----
YEBE	A	1	P	20:355:00000	20:361:86370	TRM29659.00	NONE	----
ZARA	A	1	P	20:355:00000	20:361:86370	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	20:355:00000	20:361:86370	UNE	3.0460	0.0000	0.0000
ALDA	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
ALSA	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
AMUR	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
BIAZ	A	1	P	20:355:00390	20:361:79170	UNE	0.0000	0.0000	0.0000
BIDA	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
BRZR	A	1	P	20:355:00000	20:361:86370	UNE	0.0771	0.0000	0.0000
CACE	A	1	P	20:355:00000	20:361:86370	UNE	0.0600	0.0000	0.0000
CANT	A	1	P	20:355:00000	20:361:86370	UNE	3.0490	0.0000	0.0000
CHER	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
CREU	A	1	P	20:355:00000	20:361:86370	UNE	0.0770	0.0000	0.0000
EBRE	A	1	P	20:355:00000	20:361:86370	UNE	0.0770	0.0000	0.0000
ELGE	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
GERN	A	1	P	20:355:00000	20:361:86370	UNE	0.0771	0.0000	0.0000
IGEL	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
ISPS	A	1	P	20:355:00000	20:361:86370	UNE	0.0350	0.0000	0.0000
KAST	A	1	P	20:355:00000	20:361:86370	UNE	0.0350	0.0000	0.0000
LARE	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
LAZK	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
LEIT	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
ORDN	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
PAS2	A	1	P	20:355:00030	20:361:86370	UNE	0.0000	0.0000	0.0000
PASA	A	1	P	20:355:00030	20:361:86370	UNE	0.0000	0.0000	0.0000
RIO1	A	1	P	20:355:00000	20:361:86370	UNE	0.0606	0.0000	0.0000
SALA	A	1	P	20:355:00000	20:361:86370	UNE	0.0600	0.0000	0.0000
SCDA	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
SOPU	A	1	P	20:355:00000	20:361:86370	UNE	0.0771	0.0000	0.0000
VITO	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
YEBE	A	1	P	20:355:00000	20:361:86370	UNE	0.0000	0.0000	0.0000
ZARA	A	1	P	20:355:00000	20:361:86370	UNE	3.2590	0.0000	0.0000

8 References

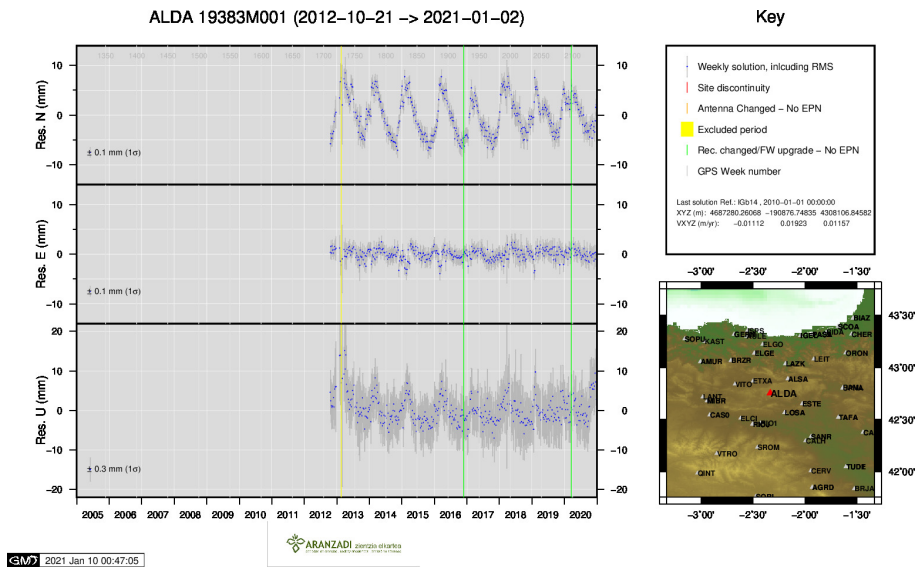
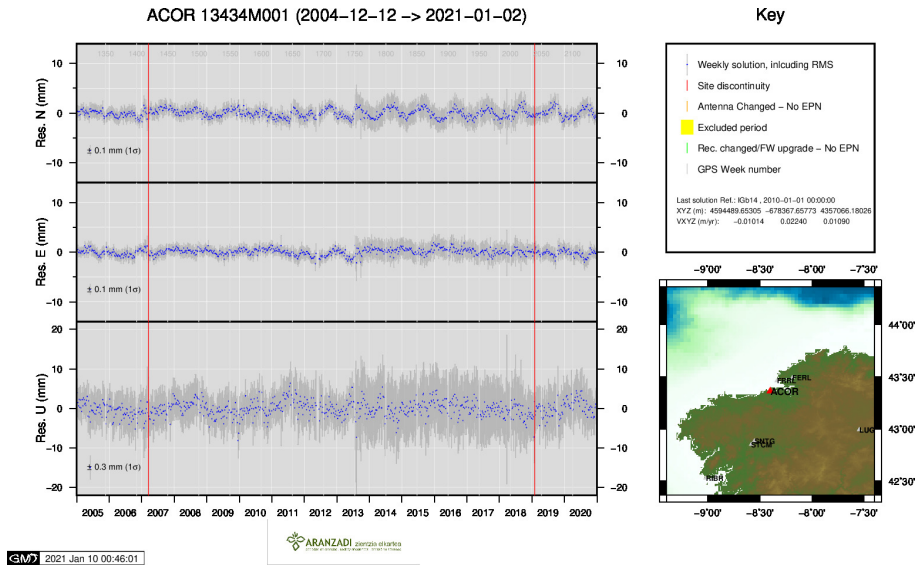
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign*. etrs89.ensg.ign.fr/memo-V8.pdf

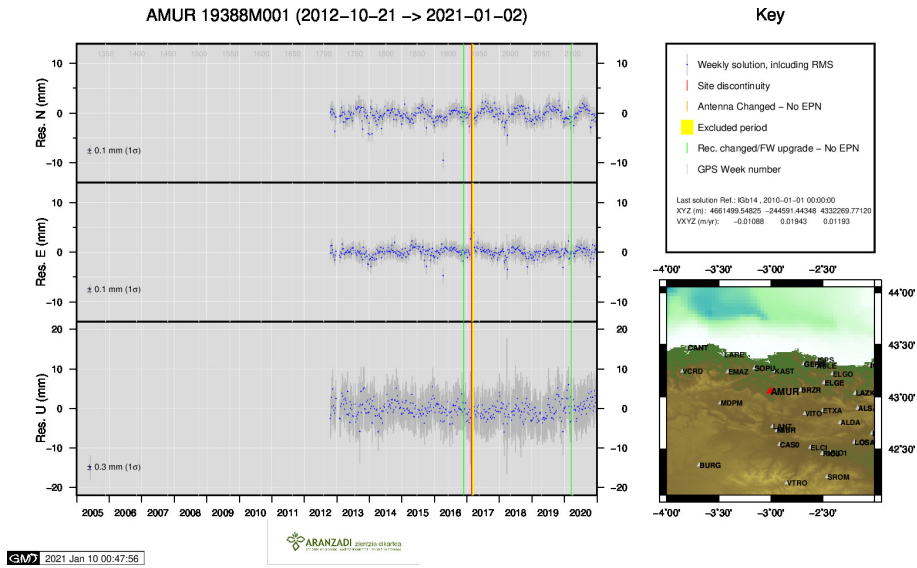
EPN Coordination Group and the EPN Central Bureau (2018): *Guidelines for the EPN Analysis Centres*. epncb.oma.be/documentation/guidelines/guidelines_analysis_centres.pdf

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

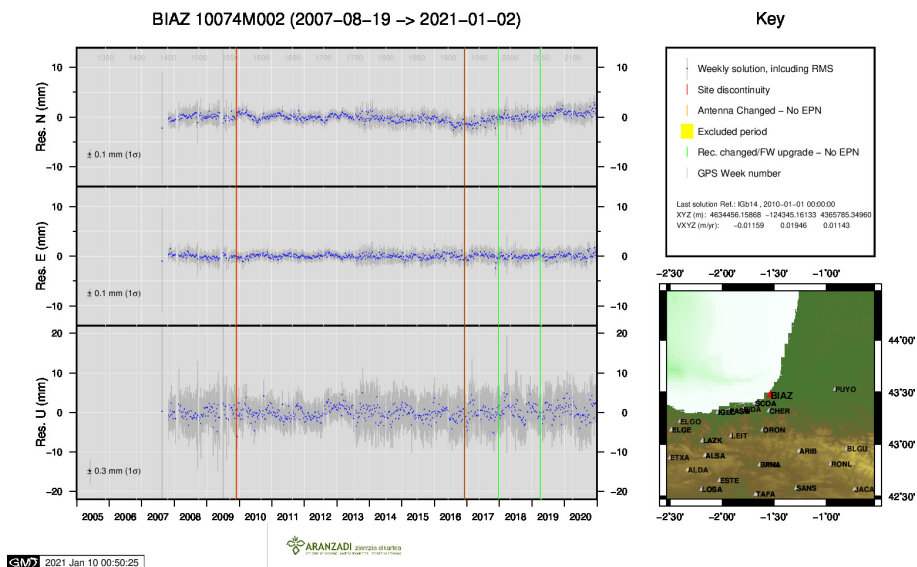
9 Cumulative Time Series

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

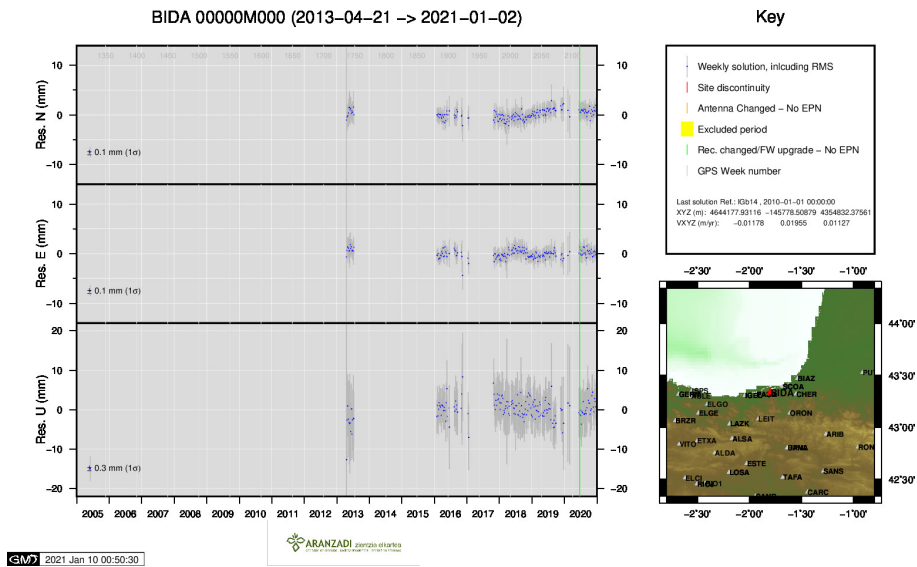




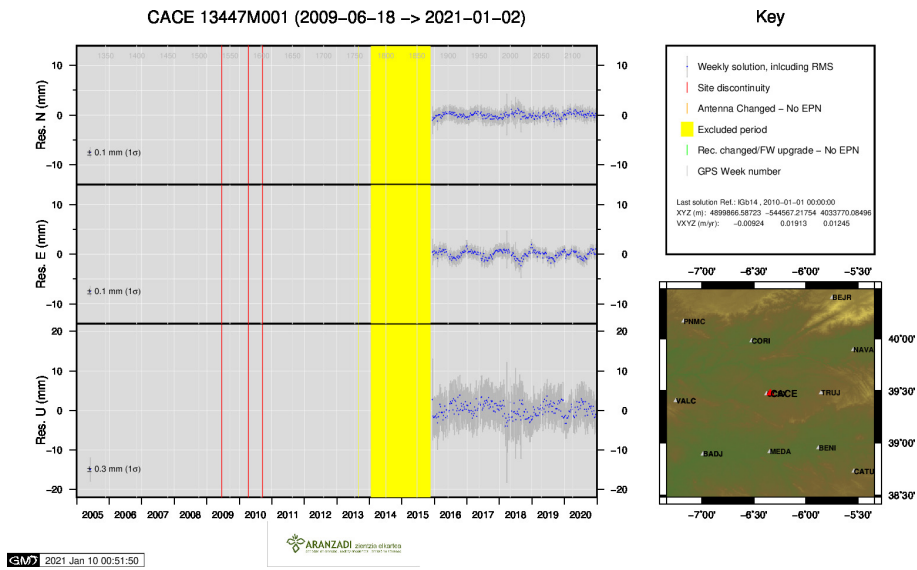
3) AMUR



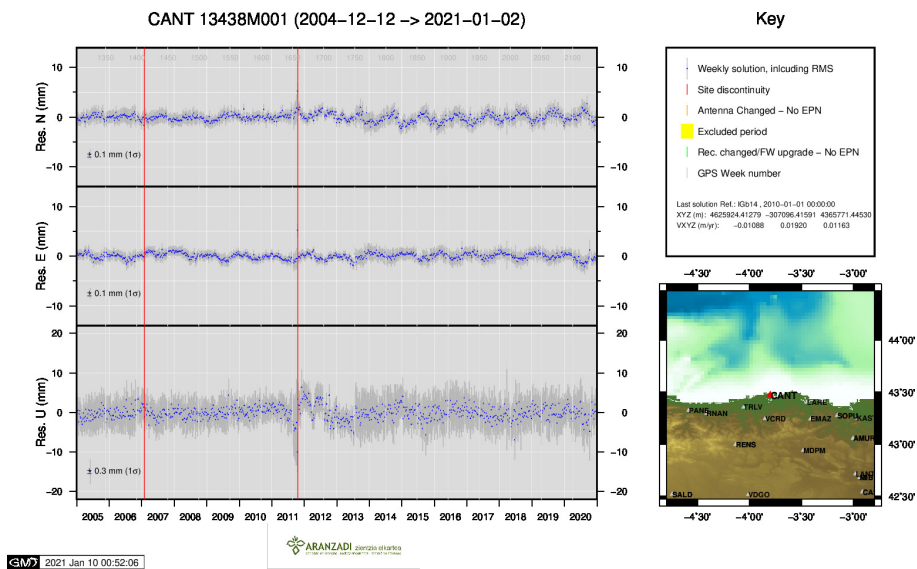
4) BIAZ



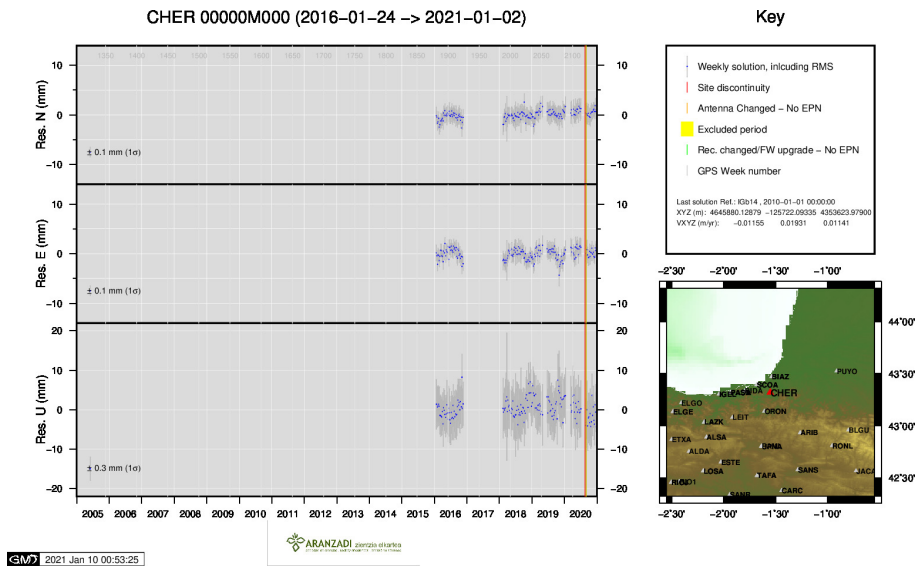
5) BIDA



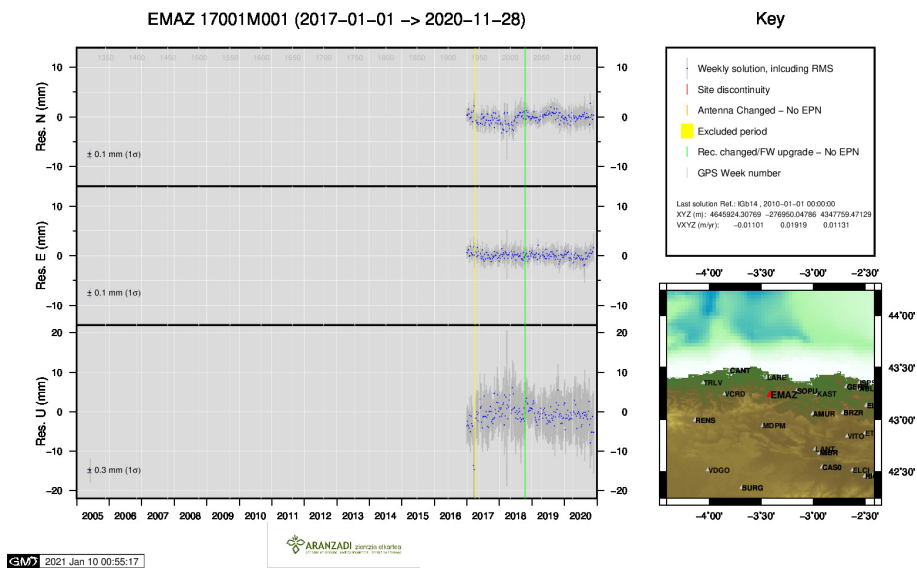
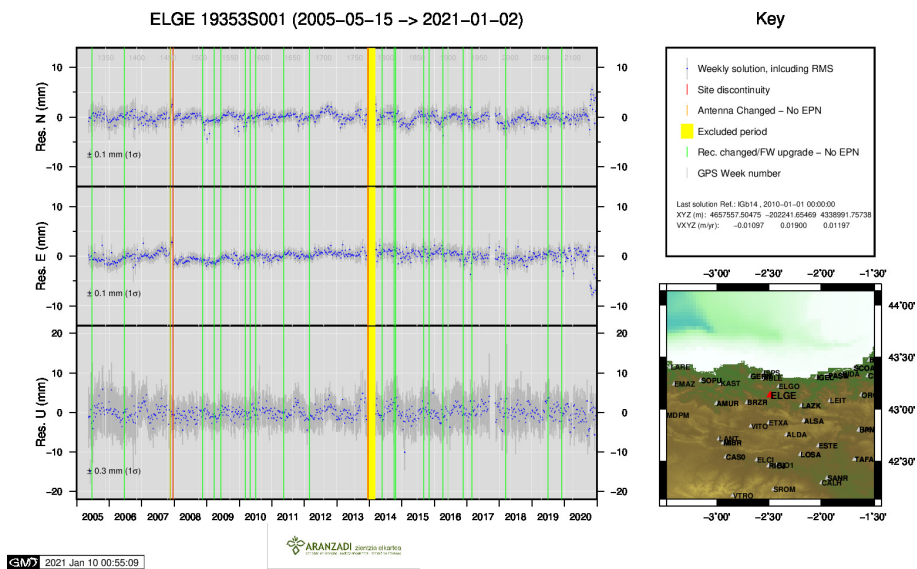
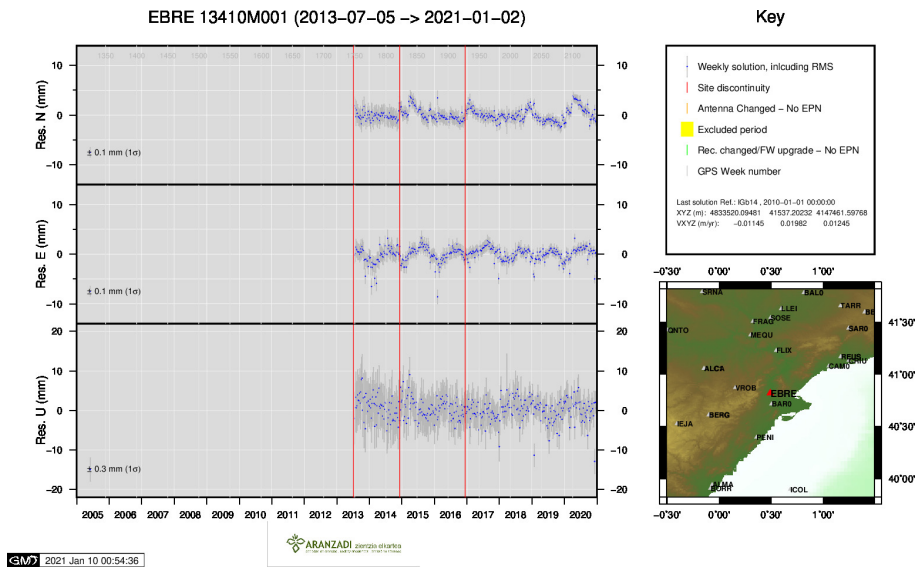
6) CACE

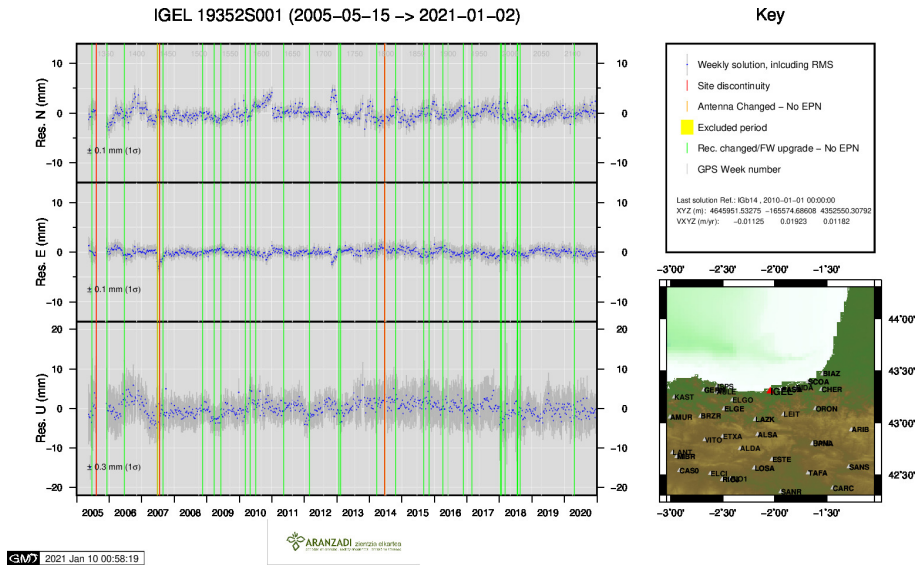


7) CANT

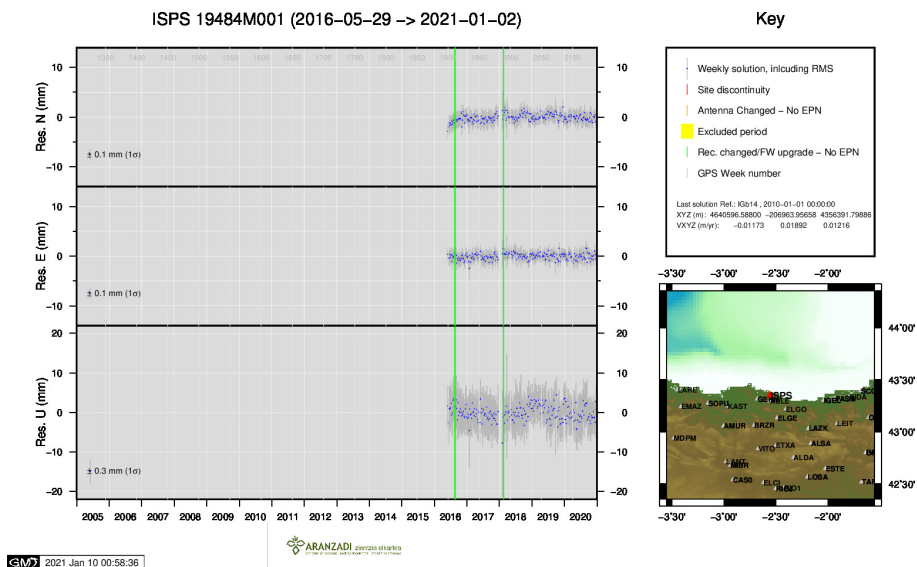


8) CHER

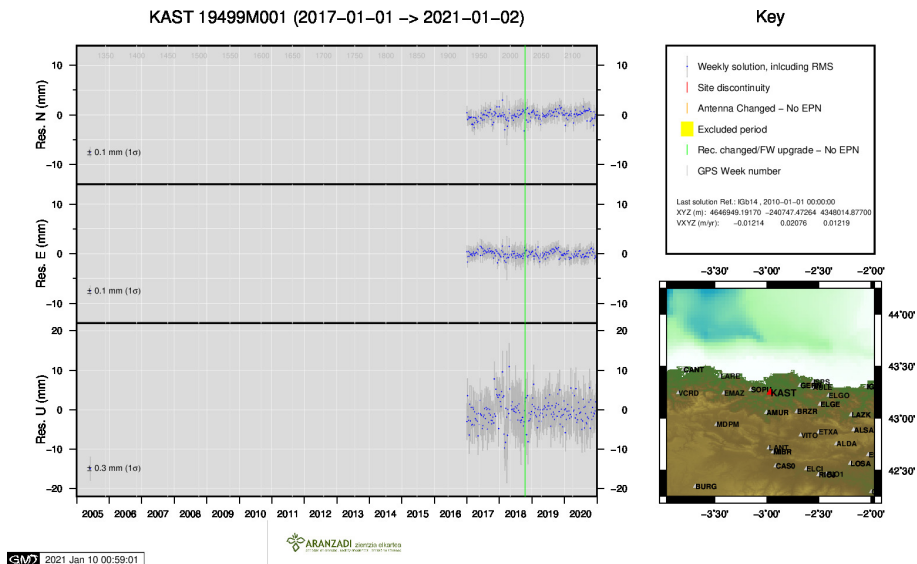




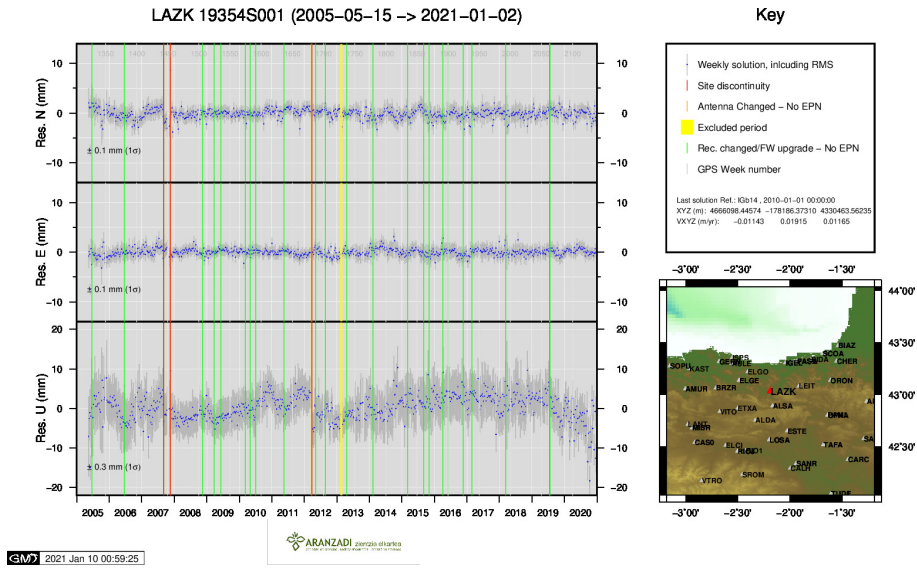
12) IGEL



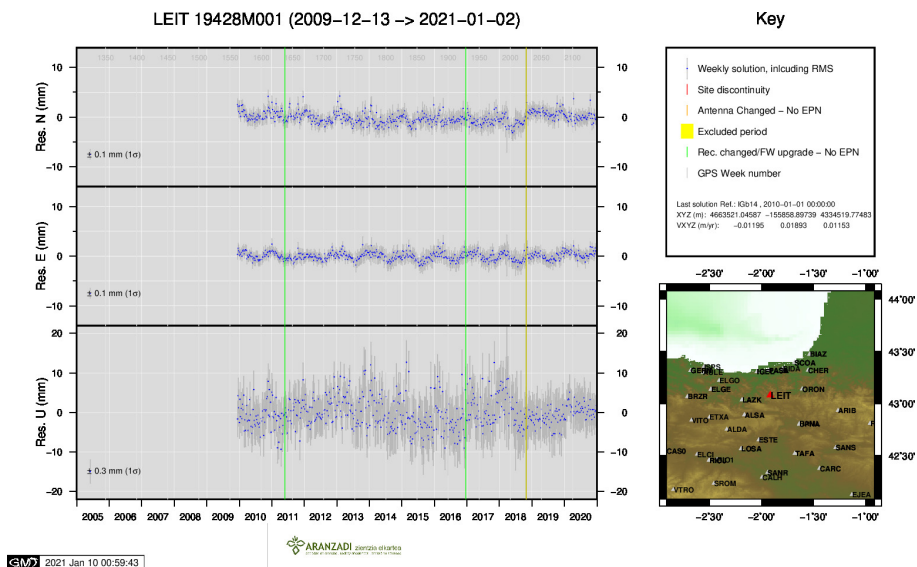
13) ISPS



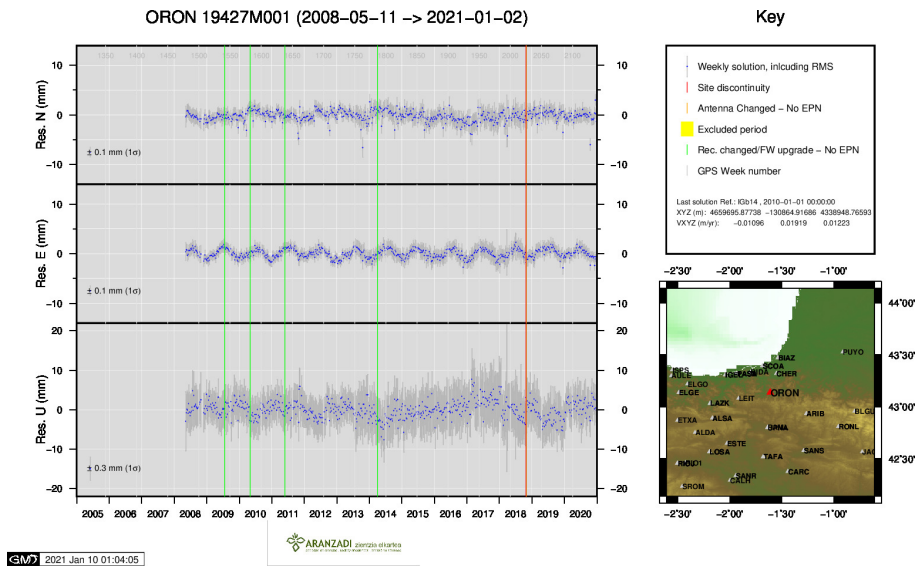
14) KAST



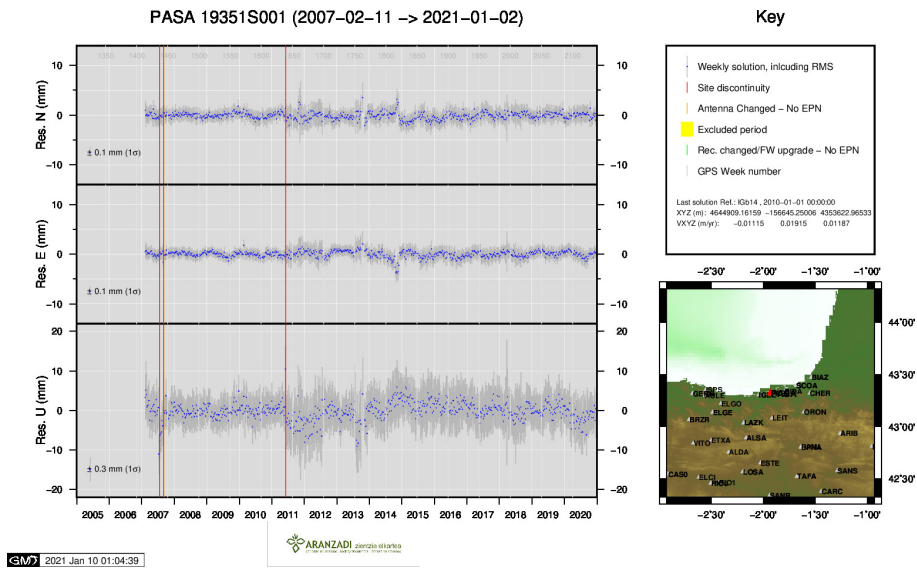
15) LAZK



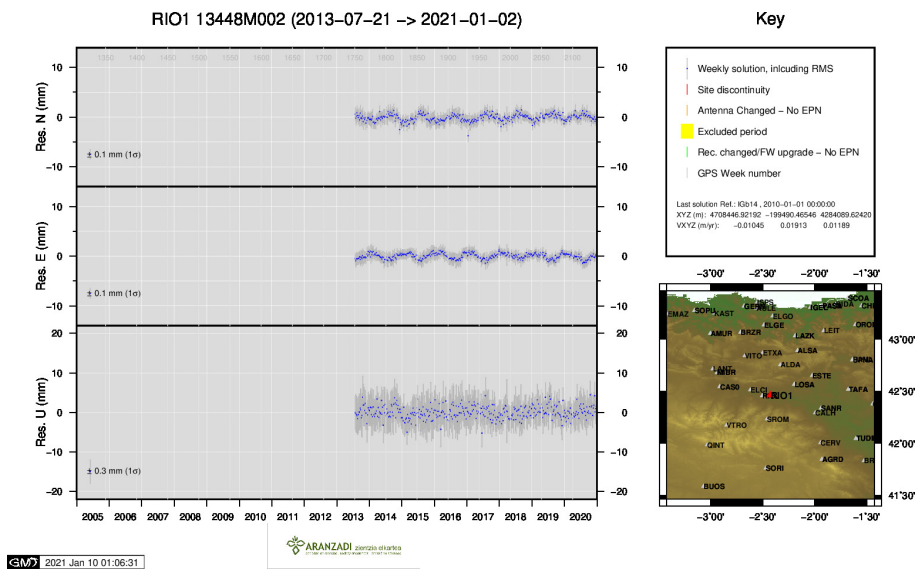
16) LEIT



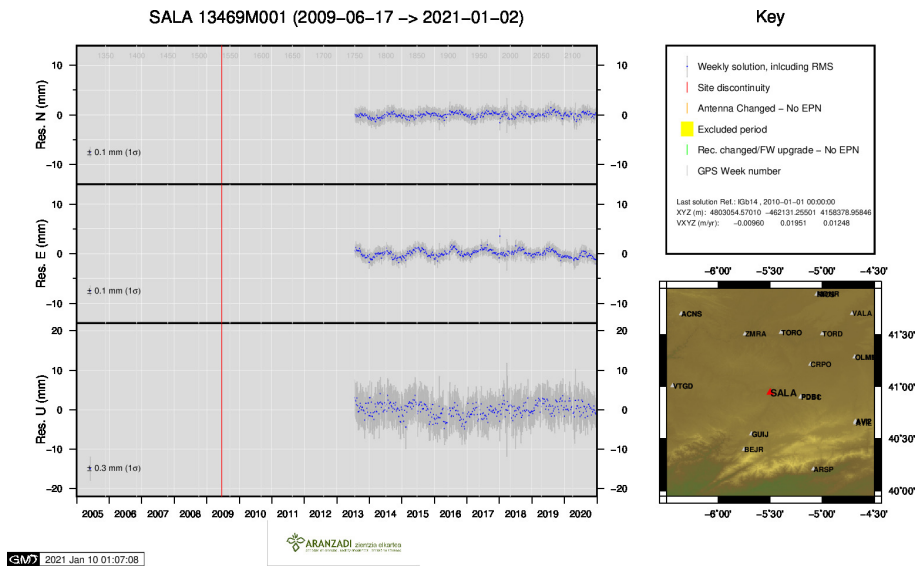
17) ORON



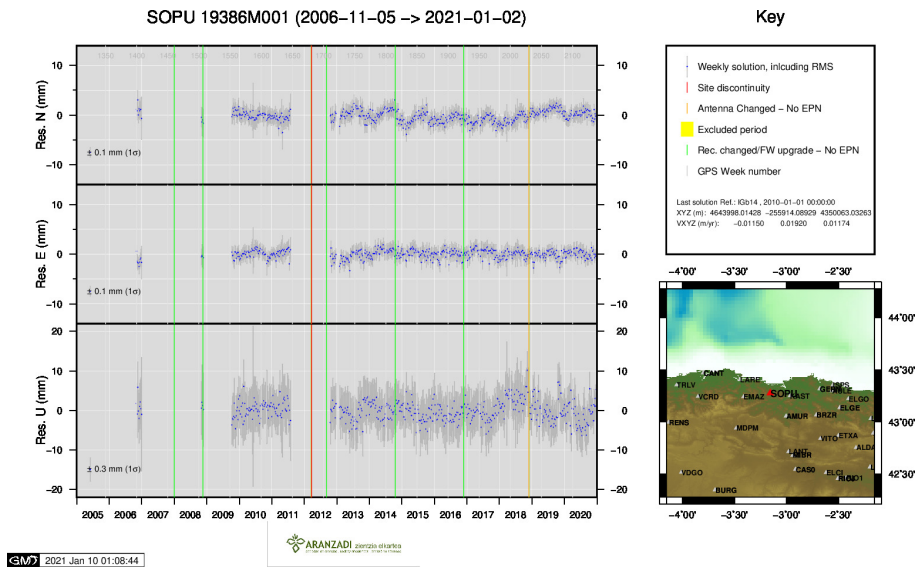
18) PASA



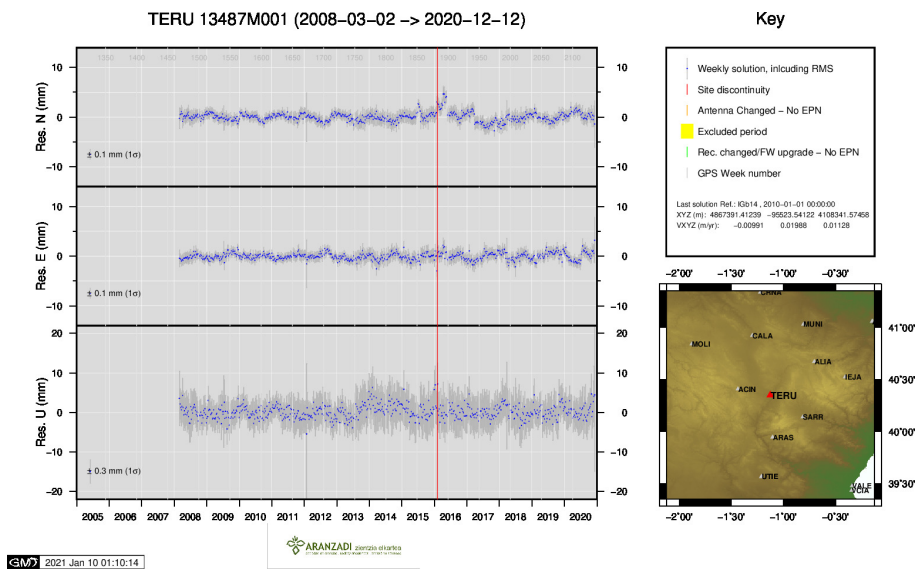
19) RIO1



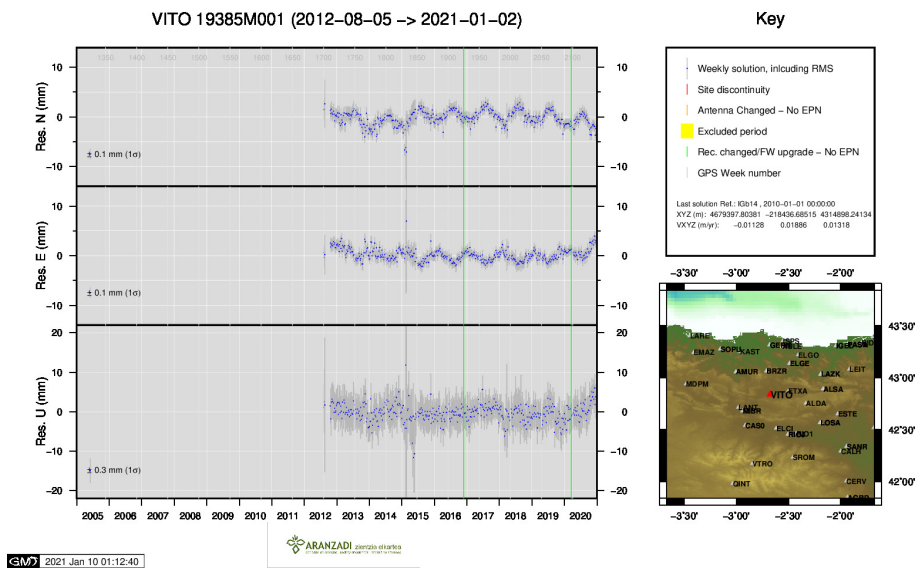
20) SALA



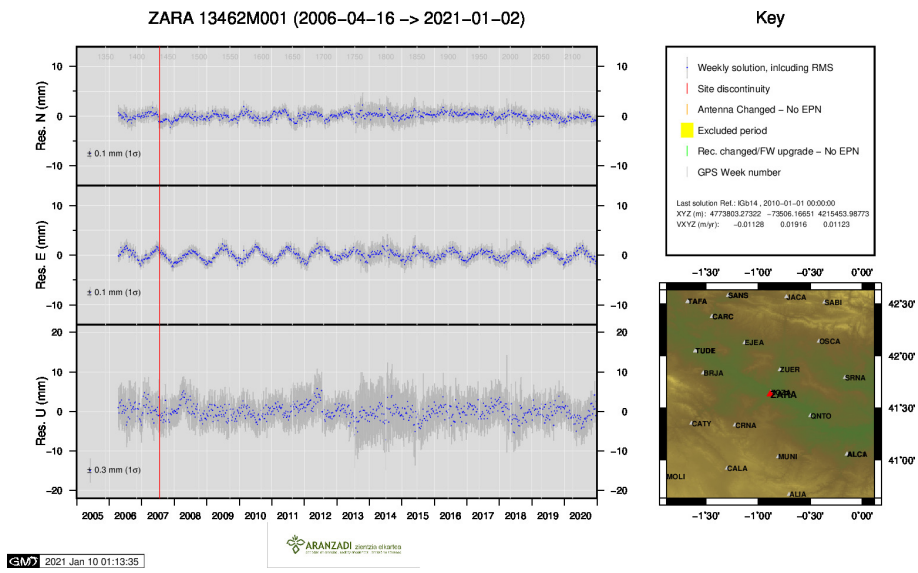
21) SOPU



22) TERU



23) VITO



24) ZARA