

ARA-DAC Weekly Analysis Result: 2195 (GFA)

Technical Report

GPS Week: 2195 (GFA)

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

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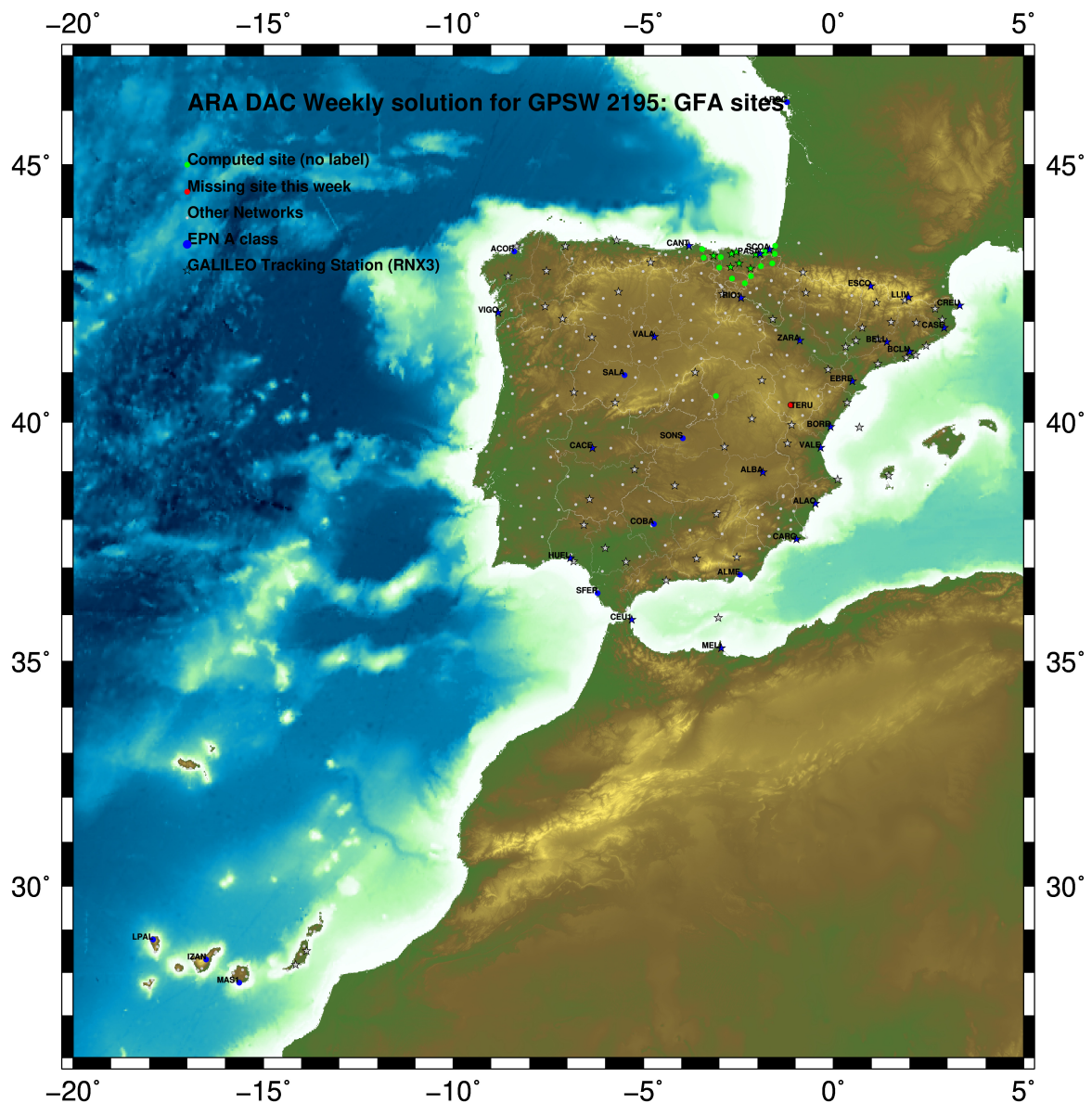
Report generated on 2022/02/21 at 02:45:19



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 Feb 21 02:45:10

Fig.1: Computed Sites for GPS Week2195 (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 Widelane (WL) AR for baselines shorter than 6000km, a Melbourne-Wuebbena wide-lane and narrow-lane AR is computed.
 - Phase-Based Widelane (L_5) AR for baselines shorter than 200km, the code-based wide-lane AR is replaced by a phase-only wide-lane with a subsequent narrow-lane AR.
 - Quasi-Ionosphere-Free (QIF)AR for the remaining real-valued ambiguities for baselines shorter than 2000km.
 - Direct L_1/L_2 AR for baselines shorter than 20km
- AR Verification: Each baseline is processed by introducing the resolved integer ambiguities and checking the residuals. If there is any problem, the ambiguities are re-initialized.

5 Computed Coordinates

In this section the adjusted coordinates are summarized. Note that the sites with an A flag are the computed ones, whereas sites flagged as W 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 2195 WEEK FINAL COMBINATION: PRECISE ORBITS                20-FEB-22 23:22
-----
LOCAL GEODETIC DATUM: IGB14                EPOCH: 2022-02-02 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
  4 ACRD 13434M001        4594489.52978      -678367.38694      4357066.31269      W
 39 ALDA 19383M001        4687280.12913      -190876.51572      4308106.99659      A
 50 ALSA 19419M001        4677250.79981      -176770.34242      4319079.90616      A
 53 AMUR 19388M001        4661499.41695      -244591.20694      4332269.91637      A
100 BIAZ 10074M002        4634456.01549      -124344.92519      4365785.48925      A
101 BIDA 00000M000        4644177.78616      -145778.27302      4354832.51339      A
113 BRZR 19387M001        4662220.95697      -220769.84812      4333309.47253      A
104 CACE 13447M001        4899866.47406      -544566.98470      4033770.23644      W
116 CANT 13438M001        4625924.28307      -307096.18383      4365771.58735      W
154 CHER 00000M000        4645879.98873      -125721.85959      4353624.11797      A
162 CREU 13432M001        4715420.09535      273178.10923      4271946.87444      W
204 EBRE 13410M001        4833519.95924      41537.43893      4147461.74893      W
180 ELGE 19353S001        4657557.35872      -202241.41880      4338991.91576      A
182 EMAZ 17001M001        4645924.17571      -276949.81628      4347759.60969      A
209 GERN 19389M001        4642811.28447      -217222.87173      4353278.90750      A
257 HOND 15012M002        4640529.27690      -145676.93350      4358761.78409      A
235 IGEL 19352S001        4645951.38941      -165574.45244      4352550.44894      A
240 ISPS 19484M001        4640596.44358      -206963.72627      4356391.94485      A
245 KAST 19499M001        4646949.04628      -240747.22170      4348015.02884      A
252 LARE 19440M001        4632831.92339      -279026.09179      4360314.46481      A
256 LAZK 19354S001        4666098.29937      -178186.14050      4330463.69678      A
261 LEIT 19428M001        4663520.90086      -155858.66656      4334519.91598      A
334 ORDN 19427M001        4659695.74334      -130864.68501      4338948.91377      A
345 PAS2 19351S001        4644909.02289      -156645.01733      4353623.10666      A
493 PASA 19351S001        4644909.02304      -156645.01733      4353623.10668      W
553 RID1 13448M002        4708446.79593      -199490.23379      4284089.76919      W
558 SALA 13469M001        4803054.45559      -462131.02018      4158379.11244      W
566 SODA 10088M002        4639940.46341      -136224.89217      4359552.44120      W
418 SOPU 19386M001        4643997.87407      -255913.85597      4350063.17510      A
493 VITO 19385M001        4679397.66787      -218436.45290      4314898.39878      A
752 YEBE 13420M001        4848724.52864      -261631.87725      4123094.35779      A
755 ZARA 13462M001        4773803.13263      -73505.93429      4215454.12553      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 2195                20-FEB-22 23:22
-----
LOCAL GEODETIC DATUM: ETRF2000            EPOCH: 2022-02-02 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
  4 ACRD 13434M001        4594489.85786      -678367.97627      4357065.86066      W
 39 ALDA 19383M001        4687280.51562      -190877.11452      4308106.54343      A
 50 ALSA 19419M001        4677251.18892      -176770.94004      4319079.45401      A
 53 AMUR 19388M001        4661499.79843      -244591.80296      4332269.46462      A
100 BIAZ 10074M002        4634456.41479      -124345.51780      4365785.04130      A
101 BIDA 00000M000        4644178.18191      -145778.86680      4354832.06436      A
113 BRZR 19387M001        4662221.34156      -220770.44417      4333309.02104      A
104 CACE 13447M001        4899866.79478      -544567.60817      4033769.76102      W
116 CANT 13438M001        4625924.65912      -307096.77598      4365771.13770      W
154 CHER 00000M000        4645880.38693      -125722.45350      4353623.66907      A
162 CREU 13432M001        4715420.53806      273177.50893      4271946.42497      W
204 EBRE 13410M001        4833520.36314      41536.82444      4147461.28674      W
180 ELGE 19353S001        4657557.74609      -202242.01426      4338991.46489      A
182 EMAZ 17001M001        4645924.55424      -276950.41064      4347759.15880      A
209 GERN 19389M001        4642811.67101      -217223.46556      4353278.45765      A
257 HOND 15012M002        4640529.67296      -145676.52686      4358761.33537      A
235 IGEL 19352S001        4645951.78247      -165575.04648      4352549.99951      A
240 ISPS 19484M001        4640596.83166      -206964.31982      4356391.49532      A
245 KAST 19499M001        4646949.42943      -240747.81607      4348014.57834      A
252 LARE 19440M001        4632832.30260      -279026.68465      4360314.01496      A
256 LAZK 19354S001        4666098.68916      -178186.73686      4330463.24553      A
261 LEIT 19428M001        4663521.29379      -155859.26256      4334519.46523      A
334 ORDN 19427M001        4659696.13979      -130865.28050      4338948.46366      A
345 PAS2 19351S001        4644909.41716      -156645.61122      4353622.65743      A
493 PASA 19351S001        4644909.41731      -156645.61122      4353622.65745      W
553 RID1 13448M002        4708447.17951      -199490.83500      4284089.31417      W
558 SALA 13469M001        4803054.79624      -462131.63268      4158378.64614      W
566 SODA 10088M002        4639940.86073      -136225.48544      4359551.99265      W
418 SOPU 19386M001        4643998.25545      -255914.45004      4350062.72464      A
493 VITO 19385M001        4679398.05137      -218437.05088      4314897.94590      A
752 YEBE 13420M001        4848724.89215      -261632.49440      4123093.89038      A
755 ZARA 13462M001        4773803.52705      -73506.54248      4215453.66677      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 2195		20-FEB-22 23:22			
LOCAL GEODETIC DATUM: ETRF2014		EPOCH: 2022-02-02 12:00:00			
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACDR 13434M001	4594489.81715	-678368.01392	4357065.91204	W
39	ALDA 19383M001	4687280.47255	-190877.15349	4308106.59469	A
50	ALSA 19419M001	4677251.14591	-176770.97910	4319079.50530	A
53	AMUR 19388M001	4661499.75579	-244591.84186	4332269.51593	A
100	BIAZ 10074M002	4634456.37204	-124345.55722	4365785.09275	A
101	BIDA 00000M000	4644178.13913	-145778.90610	4354832.11577	A
113	BRZR 19387M001	4662221.29885	-220770.48314	4333309.07235	A
104	CACE 13447M001	4899866.75042	-544567.64499	4033769.81160	W
116	CANT 13438M001	4625924.61705	-307096.81481	4365771.18909	W
154	CHER 00000M000	4645880.34408	-125722.49287	4353623.72048	A
162	CREU 13432M001	4715420.49302	273177.46847	4271946.47647	W
204	EBRE 13410M001	4833520.31769	41536.78528	4147461.33774	W
180	ELGE 19353S001	4657557.70337	-202242.05332	4338991.51623	A
182	EMAZ 17001M001	4645924.51188	-276950.44948	4347759.21014	A
209	GERN 19389M001	4642811.62848	-217223.50462	4353278.50902	A
257	HOND 15012M002	4640529.63022	-145676.56619	4358781.38678	A
235	IGEL 19352S001	4645951.73974	-165575.08571	4352550.05090	A
240	ISPS 19484M001	4640596.78913	-206964.35893	4356391.54670	A
245	KAST 19499M001	4646949.38694	-240747.85503	4348014.62969	A
252	LARE 19440M001	4632832.26037	-279026.72355	4360314.06634	A
256	LAZK 19354S001	4666098.64626	-178186.77596	4330463.29685	A
261	LEIT 19428M001	4663521.25086	-155859.30176	4334519.51658	A
334	ORON 19427M001	4659696.09680	-130865.31980	4338948.51503	A
345	PAS2 19351S001	4644909.37442	-156645.65049	4353622.70883	A
493	PASA 19351S001	4644909.37457	-156645.65049	4353622.70885	W
553	RI01 13448M002	4708447.13624	-199490.87385	4284089.36537	W
558	SALA 13469M001	4803054.75275	-462131.67021	4158378.69697	W
566	SOA 10088M002	4639940.81796	-136225.52480	4359552.04407	W
418	SOPU 19386M001	4643998.21303	-255914.48897	4350062.77600	A
493	VITO 19385M001	4679398.00846	-218437.08979	4314897.99717	A
752	YEBE 13420M001	4848724.84756	-261632.53244	4123093.94117	A
755	ZARA 13462M001	4773803.48266	-73506.58149	4215453.71786	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 2195 WEEK FINAL COMBINATION: PRECISE ORBITS 20-FEB-22 23:22

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	0.97	0.47	2.76
ALDA 19383M001	7	XXXXXX	1.74	0.59	5.78
ALSA 19419M001	7	XXXXXX	0.47	0.76	2.13
AMUR 19388M001	7	XXXXXX	0.91	0.75	2.46
BLAZ 10074M002	7	XXXXXX	0.94	0.56	2.81
BIDA 00000M000	7	XXXXXX	0.78	0.99	4.50
BRZR 19387M001	7	XXXXXX	1.10	0.45	4.59
CACE 13447M001	7	XXXXXX	0.52	0.48	1.44
CANT 13438M001	7	XXXXXX	1.09	0.44	2.10
CHER 00000M000	7	XXXXXX	0.51	0.95	3.82
CREU 13432M001	7	XXXXXX	1.08	1.13	1.30
EBRE 13410M001	7	XXXXXX	1.41	1.39	4.03
ELGE 19353S001	7	XXXXXX	0.79	0.80	3.16
EMAZ 17001M001	7	XXXXXX	1.03	0.79	3.53
GERN 19389M001	7	XXXXXX	1.03	0.55	5.06
HOND 15012M002	7	XXXXXX	0.53	0.60	2.34
IGEL 19352S001	7	XXXXXX	0.97	0.65	2.82
ISPS 19484M001	7	XXXXXX	0.86	0.48	3.49
KAST 19499M001	7	XXXXXX	1.50	0.51	5.61
LARE 19440M001	1	X	0.28	0.24	1.04
LAZK 19354S001	7	XXXXXX	0.51	0.69	5.55
LEIT 19428M001	7	XXXXXX	0.78	0.56	1.86
ORON 19427M001	7	XXXXXX	1.23	0.40	2.46
PAS2 19351S001	6	XX XXX	0.64	0.64	2.04
PASA 19351S001	7	XXXXXX	0.50	0.59	1.97
RI01 13448M002	7	XXXXXX	0.96	0.59	3.45
SALA 13469M001	7	XXXXXX	0.34	0.31	1.41
SCDA 10088M002	3	XXX	0.69	0.84	4.01
SOPU 19386M001	7	XXXXXX	0.85	0.49	3.94
VITD 19385M001	7	XXXXXX	0.90	0.73	2.76
YEBE 13420M001	7	XXXXXX	0.56	0.54	2.06
ZARA 13462M001	7	XXXXXX	0.84	0.51	2.96

Comparison of individual solutions:

ACOR 13434M001	N	0.97	-0.47	0.39	-1.97	-0.07	0.13	0.66	0.98
ACOR 13434M001	E	0.47	-0.11	0.35	-0.00	0.15	-0.16	-0.75	-0.75
ACOR 13434M001	U	2.76	-0.40	-3.17	4.91	-0.36	-0.83	3.28	0.05
ALDA 19383M001	N	1.74	-1.12	2.67	1.96	-2.10	0.57	-0.68	-0.83
ALDA 19383M001	E	0.59	-0.55	-0.22	0.24	-0.57	0.92	-0.71	0.06
ALDA 19383M001	U	5.78	10.88	2.70	-5.18	4.44	-2.01	-0.68	-4.86
ALSA 19419M001	N	0.47	-0.51	0.88	-0.20	-0.17	-0.31	-0.34	0.18
ALSA 19419M001	E	0.76	0.61	-0.45	-1.40	0.51	0.35	0.30	-0.68
ALSA 19419M001	U	2.13	3.09	1.41	-1.87	-1.74	1.66	0.57	-2.48
AMUR 19388M001	N	0.91	-1.12	1.35	0.89	-0.67	-0.78	0.11	0.26
AMUR 19388M001	E	0.75	0.14	0.73	0.98	-0.24	-0.85	-0.72	0.75
AMUR 19388M001	U	2.46	-1.65	3.33	-1.59	-4.05	-0.63	-1.59	0.76
BLAZ 10074M002	N	0.94	-1.80	0.24	1.16	0.16	-0.61	-0.47	0.06
BLAZ 10074M002	E	0.56	0.27	0.35	-0.74	-0.99	-0.37	-0.07	0.15
BLAZ 10074M002	U	2.81	5.09	0.65	0.84	1.47	-3.50	-2.07	1.25
BIDA 00000M000	N	0.78	-1.17	0.65	-0.26	-0.08	-1.23	-0.48	-0.28
BIDA 00000M000	E	0.99	-0.98	0.01	0.97	0.75	-1.11	-0.30	-1.46
BIDA 00000M000	U	4.50	6.86	4.72	1.10	-1.67	-1.69	-6.73	-0.45
BRZR 19387M001	N	1.10	0.80	-1.63	-1.03	0.75	0.72	0.92	-1.00
BRZR 19387M001	E	0.45	0.15	0.08	0.42	-0.41	0.64	0.32	-0.57
BRZR 19387M001	U	4.59	2.43	8.50	-4.33	-2.87	-3.85	-2.48	0.70
CACE 13447M001	N	0.52	-0.08	-0.97	-0.44	-0.07	0.52	0.31	0.37
CACE 13447M001	E	0.48	0.87	-0.33	-0.14	-0.21	-0.10	0.60	-0.22
CACE 13447M001	U	1.44	-1.53	0.11	-0.85	-1.07	1.59	0.21	2.38
CANT 13438M001	N	1.09	0.23	-0.74	-1.52	0.14	1.30	1.59	-0.00
CANT 13438M001	E	0.44	-0.19	0.18	-0.60	0.11	0.35	0.39	-0.67
CANT 13438M001	U	2.10	1.73	0.86	2.66	-3.11	-1.93	1.42	0.57
CHER 00000M000	N	0.51	0.03	0.03	-0.22	-0.70	0.44	-0.06	-0.89
CHER 00000M000	E	0.95	0.33	-0.64	0.02	0.67	-1.93	-0.81	0.34
CHER 00000M000	U	3.82	3.18	-0.52	0.75	2.70	-8.22	1.34	-0.20
CREU 13432M001	N	1.08	0.12	-1.58	-1.22	0.43	0.96	0.38	1.29
CREU 13432M001	E	1.13	-1.86	1.55	0.82	-0.91	-0.03	0.60	-0.01
CREU 13432M001	U	1.30	0.37	2.30	0.33	-1.78	-0.37	-1.01	-0.44
EBRE 13410M001	N	1.41	-0.06	-2.48	1.54	-0.94	-0.05	0.02	1.58
EBRE 13410M001	E	1.39	-0.21	-1.71	-0.23	1.10	1.47	-2.09	0.92
EBRE 13410M001	U	4.03	1.64	7.22	2.62	-4.39	-0.08	-3.98	-0.70
ELGE 19353S001	N	0.79	-0.31	-1.28	-0.24	0.26	1.33	-0.25	-0.03
ELGE 19353S001	E	0.80	-0.02	1.32	0.67	-0.76	-0.98	0.28	-0.07
ELGE 19353S001	U	3.16	3.76	3.75	-2.38	-1.94	-0.03	-4.65	-0.73
EMAZ 17001M001	N	1.03	0.73	-0.66	1.47	-0.27	0.94	0.56	-1.42
EMAZ 17001M001	E	0.79	0.64	0.33	-0.34	0.13	0.68	-0.06	-1.62
EMAZ 17001M001	U	3.53	-4.19	5.48	0.05	-0.41	-2.03	-2.61	4.01
GERN 19389M001	N	1.03	-1.23	-1.48	0.17	0.72	0.44	1.33	-0.41
GERN 19389M001	E	0.55	0.12	0.41	-0.33	0.70	0.75	-0.38	-0.56
GERN 19389M001	U	5.06	0.72	10.30	-3.49	-4.54	-3.17	-0.02	-2.12
HOND 15012M002	N	0.53	0.15	-0.27	-0.01	0.40	-0.40	-0.24	-1.10
HOND 15012M002	E	0.60	0.52	0.36	-0.49	-0.70	0.05	-0.26	-0.99
HOND 15012M002	U	2.34	1.66	4.70	-0.27	-2.25	-0.91	-0.79	-1.15
IGEL 19352S001	N	0.97	-0.80	-1.70	-0.47	1.17	0.50	0.15	-0.49
IGEL 19352S001	E	0.65	-0.07	0.74	0.16	-0.51	-0.02	-0.70	-1.09
IGEL 19352S001	U	2.82	3.65	3.50	1.61	-3.12	-2.90	0.58	-0.93
ISPS 19484M001	N	0.86	-0.89	-0.81	-0.80	-0.16	1.08	1.05	0.12
ISPS 19484M001	E	0.48	0.86	0.15	-0.24	-0.44	0.42	0.30	-0.32
ISPS 19484M001	U	3.49	2.44	5.21	0.97	-2.20	-3.06	-4.90	-0.89
KAST 19499M001	N	1.50	0.19	1.12	-2.83	-0.00	-0.48	-0.48	1.93
KAST 19499M001	E	0.51	0.51	0.41	-0.93	0.43	-0.10	0.23	-0.07
KAST 19499M001	U	5.61	-3.25	7.60	-2.78	-4.70	-4.51	-1.86	8.18
LARE 19440M001	N	0.28							
LARE 19440M001	E	0.24							

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	-1.10	0.24	0.79
12	ALAC 13433M001	I W	-1.15	0.47	-1.91
15	ALBA 13452M001	I W	-0.52	-0.95	-4.17
21	ALME 13437M001	I W	-1.79	-0.87	1.09
47	BCLN 13412M001	I W	-1.77	-2.37	-1.41
52	BELL 13431M001	I W	0.51	-1.43	-0.09
71	BORR 13480M001	I W	-1.43	-1.41	-2.95
76	BRST 10004M004	I W	-2.58	-1.66	0.49
104	CACE 13447M001	I W	0.16	-0.51	5.59
116	CANT 13438M001	I W	-0.55	-0.15	-2.31
117	CARG 19412M001	I W	2.32	-1.74	-5.98
122	CASE 13494M001	I W	-2.02	1.85	-4.57
128	CEU1 13449M002	I W	0.06	-0.57	-2.81
143	COBA 13453M001	I W	0.49	0.62	-1.86
162	CREU 13432M001	I W	-1.42	1.52	-1.10
204	EBRE 13410M001	I W	0.13	3.29	-3.06
222	ESCO 13435M001	I W	-4.05	-0.32	3.83
299	HUEL 13451M001	I W	-0.39	-4.07	2.71
316	IZAN 31309M002	I W	0.03	2.50	-1.34
385	LLIV 13436M001	I W	-0.29	0.63	1.06
390	LPAL 81701M001	I W	9.78	-2.17	7.90
392	LROC 10023M001	I W	-1.35	0.04	1.58
421	MAS1 31303M002	I W	1.22	1.60	-2.13
432	MELI 19379M001	I W	1.99	1.00	-3.64
493	PASA 19351S001	I W	-0.35	-1.47	1.54
553	RID1 13448M002	I W	-1.54	-0.35	-2.12
558	SALA 13469M001	I W	0.18	0.91	-4.48
566	SCOA 10088M002	I W	1.67	-0.16	0.78
574	SFER 13402M004	I W	1.77	-1.58	1.47
599	SONS 13446M001	I W	1.03	4.13	9.46
700	VALA 13463M002	I W	-0.32	1.85	2.31
704	VALE 13439M001	I W	0.08	2.54	-1.28
715	VIGO 13450M001	I W	1.48	-1.97	1.08
755	ZARA 13462M001	I W	-0.55	0.81	3.63
764	ZIMM 14001M004	I W	0.26	-0.26	1.89
	RMS / COMPONENT		2.18	1.75	3.43
	MEAN		-0.00	0.00	0.00
	MIN		-4.05	-4.07	-5.98
	MAX		9.78	4.13	9.46

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 105
RMS OF TRANSFORMATION : 2.56 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          19680957
NUMBER OF UNKNOWN              220037
NUMBER OF DEGREES OF FREEDOM    18460920
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  1.612833935916923

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
  1  0.00154     -0.0112 -0.0257  0.0111  0.0005 -0.0005 -0.0007  0.00011
  2  0.00181     0.0099  0.0313 -0.0137 -0.0005  0.0005  0.0009  0.00046
  3  0.00230     -0.0204 -0.0521  0.0257  0.0009 -0.0011 -0.0014 -0.00052
  4  0.00138     -0.0012 -0.0080  0.0033  0.0002 -0.0001 -0.0002 -0.00031
  5  0.00134     0.0083  0.0055 -0.0115 -0.0001  0.0005  0.0001  0.00017
  6  0.00153     0.0044 -0.0022 -0.0173  0.0002  0.0005  0.0000  0.00119
  7  0.00151     -0.0138 -0.0135  0.0047  0.0002 -0.0004 -0.0004  0.00107
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00122     2697143  1.49          2728274      3          981      30153      0
  2  0.00130     2594646  1.69          2627690      3          963      32084      0
  3  0.00132     2653455  1.74          2686891      3          948      32491      0
  4  0.00126     2640496  1.60          2671935      3          966      30476      0
  5  0.00125     2644080  1.57          2675565      3          960      30528      0
  6  0.00127     2613505  1.61          2645931      3          975      31454      0
  7  0.00125     2611856  1.57          2644671      3          975      31843      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 22:03:00000 22:03:86370 LEICA GR50 -----
ALDA  A  1 P 22:03:00000 22:03:86370 LEICA GR10 -----
ALSA  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
AMUR  A  1 P 22:03:00000 22:03:86370 LEICA GR10 -----
BIAZ  A  1 P 22:03:00000 22:03:86370 SPECTRA SP90M -----
BIDA  A  1 P 22:03:00000 22:03:86370 LEICA GR10 -----
BRZR  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
CACE  A  1 P 22:03:00000 22:03:86370 TRIMBLE NETR9 -----
CANT  A  1 P 22:03:00000 22:03:86370 LEICA GR10 -----
CHER  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
CREU  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
EBRE  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
ELGE  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
EMAZ  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
GERN  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
HOND  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
IGEL  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
ISPS  A  1 P 22:03:00000 22:03:86370 TRIMBLE NETR9 -----
KAST  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
LARE  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
LAZK  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
LEIT  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
ORON  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
PAS2  A  1 P 22:03:00030 22:03:86370 STONEX SC2200 -----
PASA  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
RIO1  A  1 P 22:03:00000 22:03:86370 LEICA GR25 -----
SALA  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
SCOA  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
SOPU  A  1 P 22:03:00000 22:03:86370 LEICA GR30 -----
VITO  A  1 P 22:03:00000 22:03:86370 LEICA GR10 -----
YEBE  A  1 P 22:03:00000 22:03:86370 LEICA GR50 -----
ZARA  A  1 P 22:03:00000 22:03:86370 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 22:03:00000 22:03:86370 LEIAS04      LEIS -----
ALDA  A  1 P 22:03:00000 22:03:86370 LEIAS10      NONE -----
ALSA  A  1 P 22:03:00000 22:03:86370 LEIAS10      NONE -----
AMUR  A  1 P 22:03:00000 22:03:86370 LEIAS10      NONE -----
```

BIAZ	A	1	P	22:03:00000	22:03:03670	LEIAR25	LEIT	----
BIDA	A	1	P	22:03:00000	22:03:03670	LEIAS10	NONE	----
BRZR	A	1	P	22:03:00000	22:03:03670	LEIAS10	NONE	----
CACE	A	1	P	22:03:00000	22:03:03670	TRM29659.00	NONE	----
CANT	A	1	P	22:03:00000	22:03:03670	LEIAR25.R4	LEIT	25066
CHER	A	1	P	22:03:00000	22:03:03670	LEIAR10	NONE	----
CREU	A	1	P	22:03:00000	22:03:03670	LEIAR25.R4	NONE	26357
EBRE	A	1	P	22:03:00000	22:03:03670	LEIAR25.R4	NONE	26359
ELGE	A	1	P	22:03:00000	22:03:03670	LEIAR25.R4	LEIT	----
EMAZ	A	1	P	22:03:00000	22:03:03670	LEIAS10	NONE	----
GERN	A	1	P	22:03:00000	22:03:03670	LEIAS10	NONE	----
HOND	A	1	P	22:03:00000	22:03:03670	LEIAR20	LEIM	41012
IGEL	A	1	P	22:03:00000	22:03:03670	LEIAR20	LEIM	43011
ISPS	A	1	P	22:03:00000	22:03:03670	TRM59900.00	SCIS	----
KAST	A	1	P	22:03:00000	22:03:03670	LEIAS10	NONE	----
LARE	A	1	P	22:03:00000	22:03:03670	LEIAR20	LEIM	----
LAZK	A	1	P	22:03:00000	22:03:03670	LEIAR25.R4	LEIT	----
LEIT	A	1	P	22:03:00000	22:03:03670	LEIAR10	NONE	----
ORDN	A	1	P	22:03:00000	22:03:03670	LEIAR10	NONE	----
PAS2	A	1	P	22:03:00030	22:03:03670	LEIAR20	LEIM	73034
PASA	A	1	P	22:03:00000	22:03:03670	LEIAR20	LEIM	73034
RID1	A	1	P	22:03:00000	22:03:03670	LEIAR25.R4	LEIT	25138
SALA	A	1	P	22:03:00000	22:03:03670	LEIAR25	NONE	----
SCDA	A	1	P	22:03:00000	22:03:03670	TRM55971.00	NONE	----
SOPU	A	1	P	22:03:00000	22:03:03670	LEIAS10	NONE	----
VITO	A	1	P	22:03:00000	22:03:03670	LEIAS10	NONE	----
YEBE	A	1	P	22:03:00000	22:03:03670	LEIAR20	LEIM	49016
ZARA	A	1	P	22:03:00000	22:03:03670	TRM29659.00	NONE	----

7.3 Eccentricities

*S	PT	SOLN	T	DATA_START_	DATA_END_	AXE	ARP->BENCHMARK(M)	UP	NORTH	EAST
ACOR	A	1	P	22:03:00000	22:03:03670	UNE	3.0460	0.0000	0.0000	0.0000
ALDA	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
ALSA	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
AMUR	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
BIAZ	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
BIDA	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
BRZR	A	1	P	22:03:00000	22:03:03670	UNE	0.0771	0.0000	0.0000	0.0000
CACE	A	1	P	22:03:00000	22:03:03670	UNE	0.0600	0.0000	0.0000	0.0000
CANT	A	1	P	22:03:00000	22:03:03670	UNE	3.0490	0.0000	0.0000	0.0000
CHER	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
CREU	A	1	P	22:03:00000	22:03:03670	UNE	0.0770	0.0000	0.0000	0.0000
EBRE	A	1	P	22:03:00000	22:03:03670	UNE	0.0770	0.0000	0.0000	0.0000
ELGE	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
EMAZ	A	1	P	22:03:00000	22:03:03670	UNE	0.0350	0.0000	0.0000	0.0000
GERN	A	1	P	22:03:00000	22:03:03670	UNE	0.0771	0.0000	0.0000	0.0000
HOND	A	1	P	22:03:00000	22:03:03670	UNE	0.0771	0.0000	0.0000	0.0000
IGEL	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
ISPS	A	1	P	22:03:00000	22:03:03670	UNE	0.0350	0.0000	0.0000	0.0000
KAST	A	1	P	22:03:00000	22:03:03670	UNE	0.0350	0.0000	0.0000	0.0000
LARE	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
LAZK	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
LEIT	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
ORDN	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
PAS2	A	1	P	22:03:00030	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
PASA	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
RID1	A	1	P	22:03:00000	22:03:03670	UNE	0.0606	0.0000	0.0000	0.0000
SALA	A	1	P	22:03:00000	22:03:03670	UNE	0.0600	0.0000	0.0000	0.0000
SCDA	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
SOPU	A	1	P	22:03:00000	22:03:03670	UNE	0.0771	0.0000	0.0000	0.0000
VITO	A	1	P	22:03:00000	22:03:03670	UNE	0.0000	0.0000	0.0000	0.0000
YEBE	A	1	P	22:03:00000	22:03:03670	UNE	0.0600	0.0000	0.0000	0.0000
ZARA	A	1	P	22:03:00000	22:03:03670	UNE	3.2590	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:

2022-02-20	23:17	UTC		ELGE0330.220		RECEIVER FIRM. VERS.		4.31/7.403	->	4.52/7.711
2022-02-20	23:17	UTC		IGEL0330.220		RECEIVER FIRM. VERS.		4.31/7.403	->	4.52/7.711
2022-02-20	23:17	UTC		LAZK0330.220		RECEIVER FIRM. VERS.		4.31/7.403	->	4.52/7.711
2022-02-18	23:22	UTC		BIDA0360.220		RECEIVER FIRM. VERS.		4.52/6.525	->	4.31/6.525
2022-02-19	23:31	UTC		BIDA0360.220		RECEIVER FIRM. VERS.		4.52/6.525	->	4.31/6.525

9 References

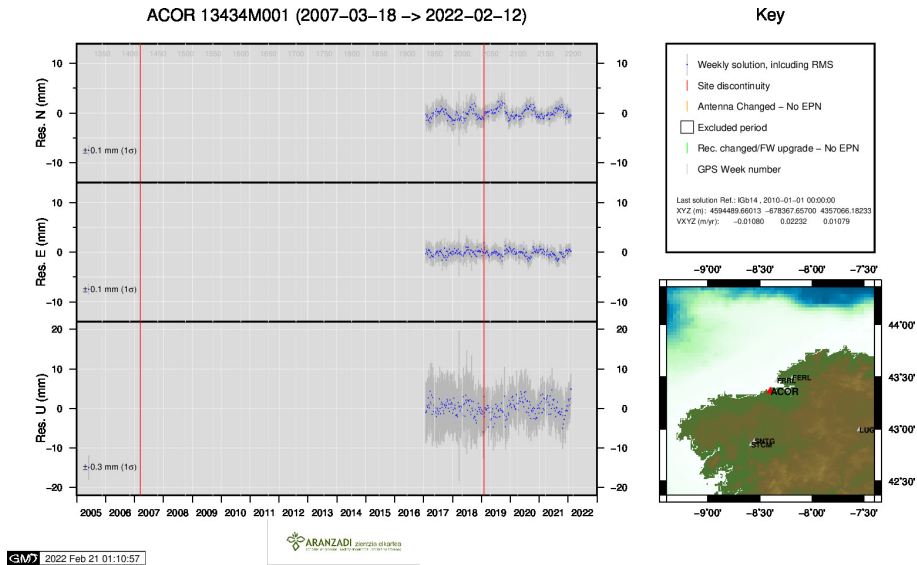
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign*. etrs89.ensg.ign.fr/memo-V8.pdf

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

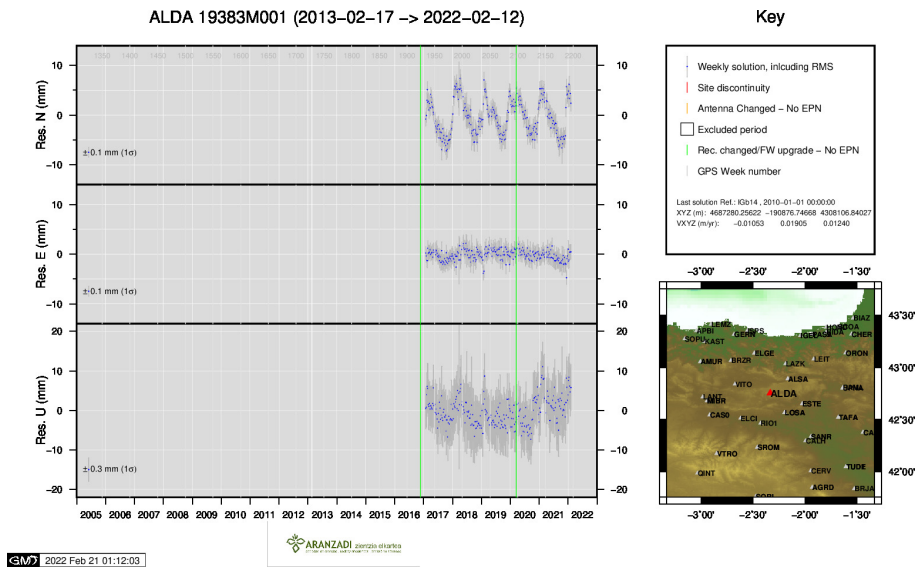
Z. Altamimi (2018): *EUREF Technical Note 1: Relationship and Transformation between the International and the European Terrestrial Reference Systems*. etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf

10 Cumulative Time Series

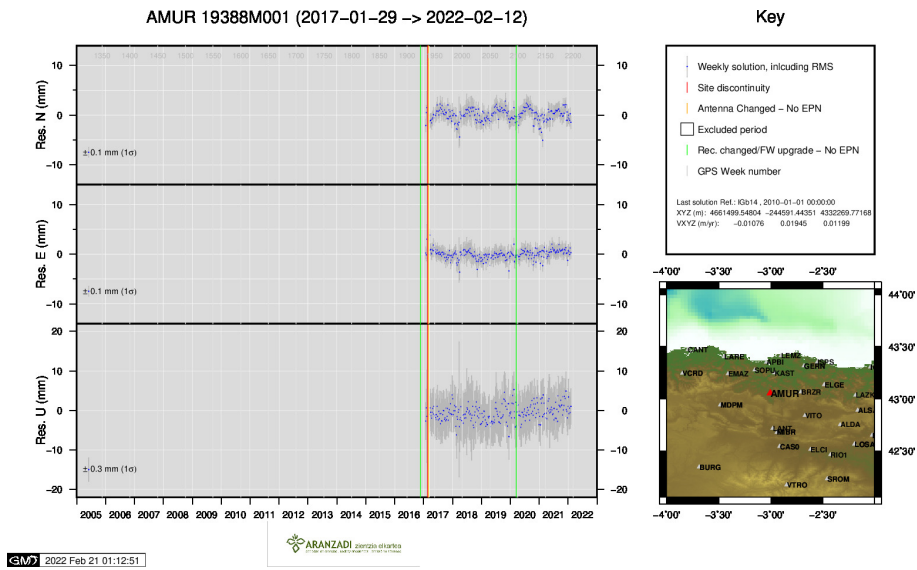
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



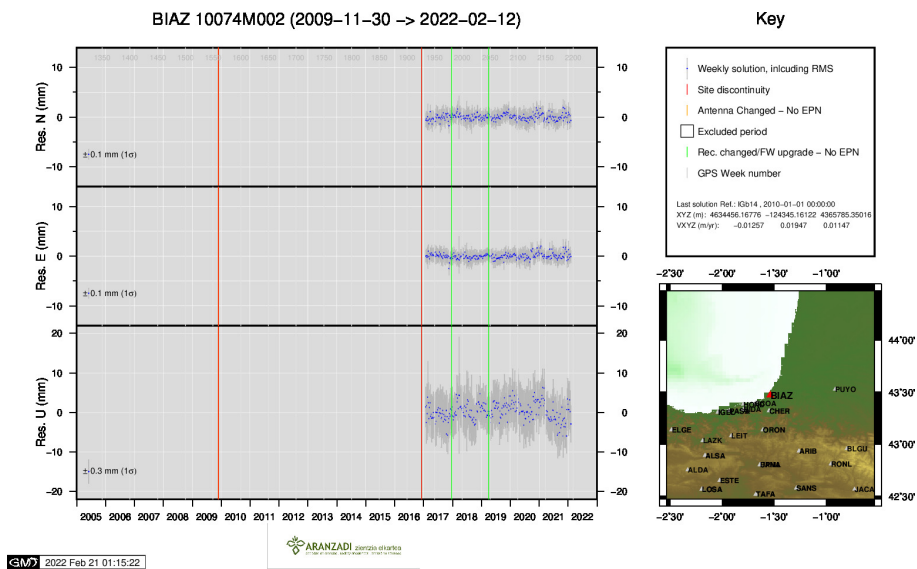
1) ACOR



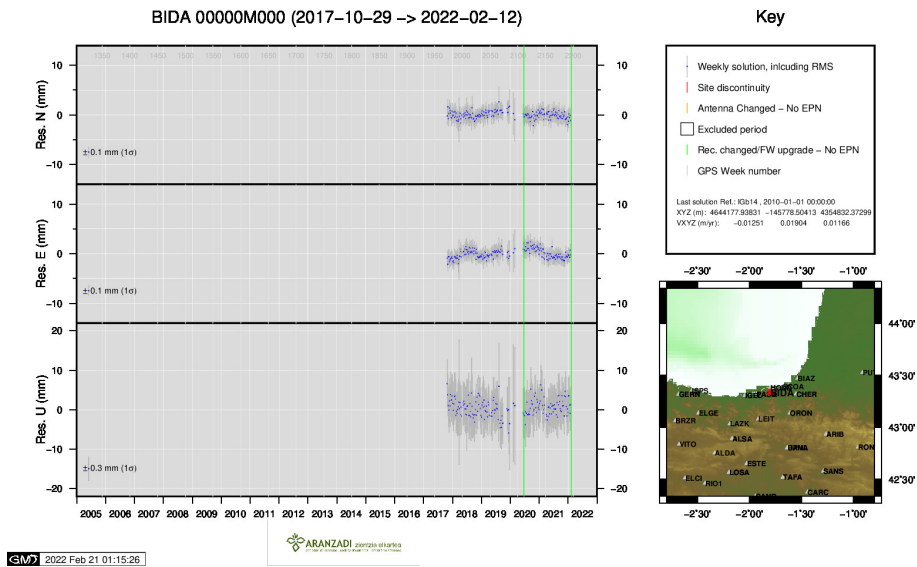
2) ALDA



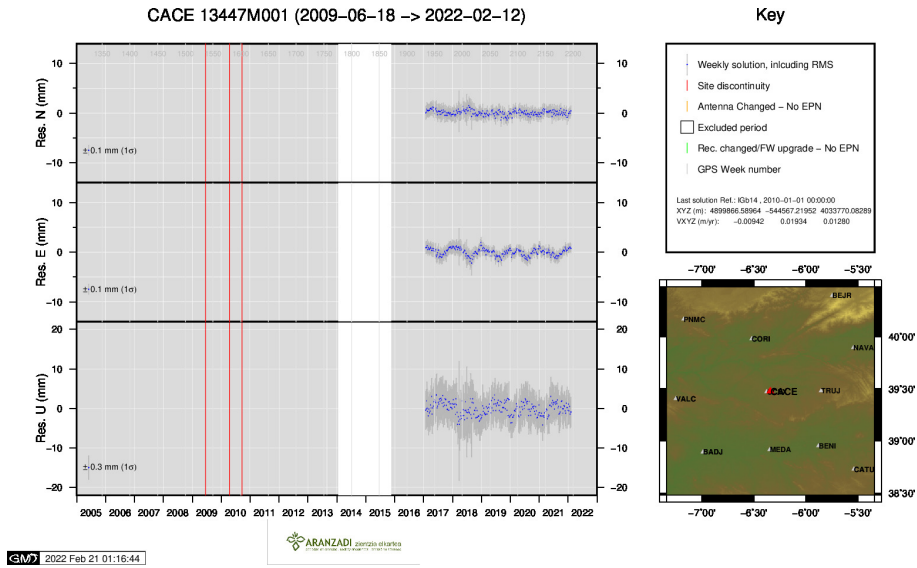
3) AMUR



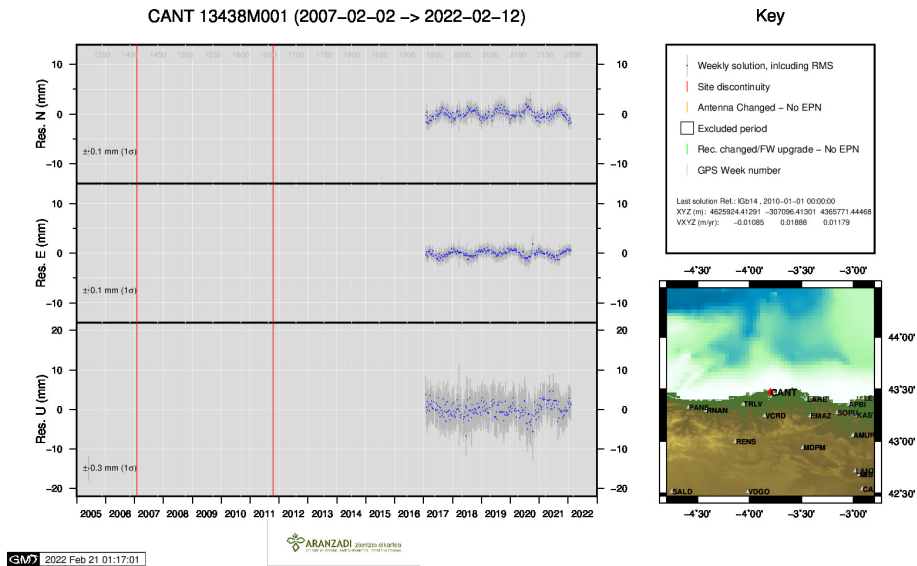
4) BIAZ



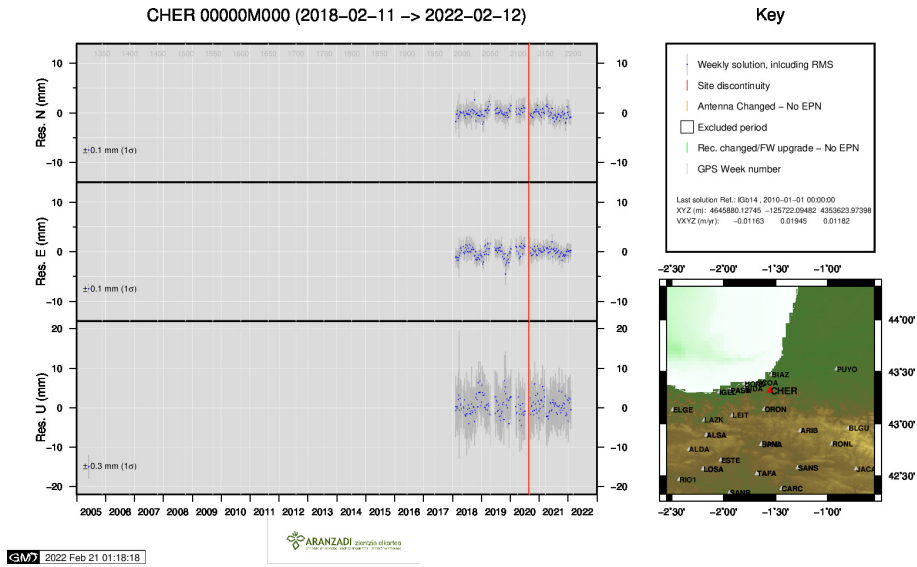
5) BIDA



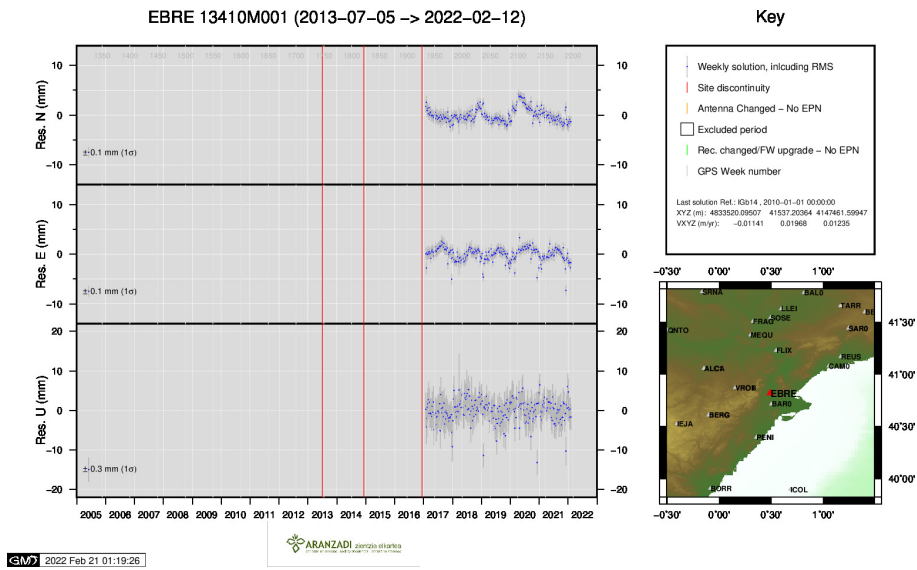
6) CACE



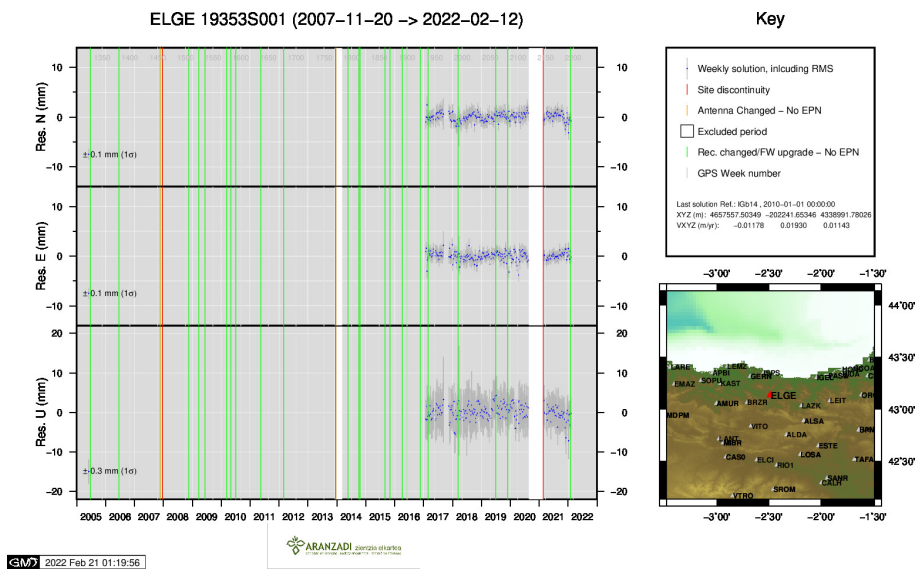
7) CANT



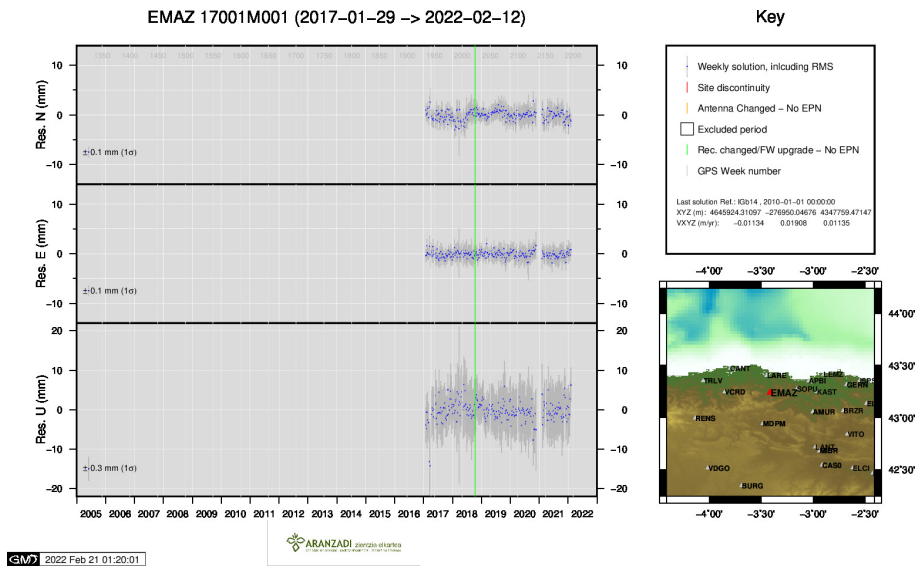
8) CHER



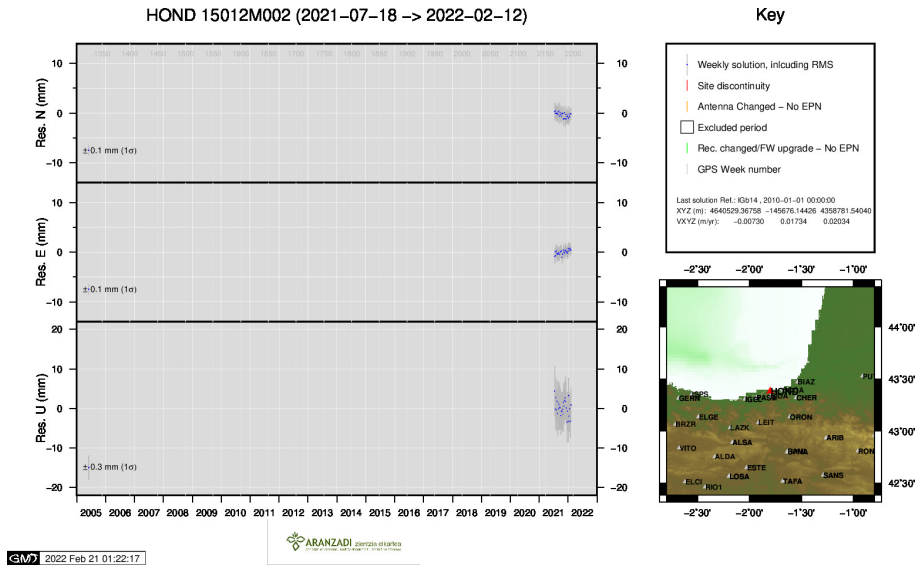
9) EBRE



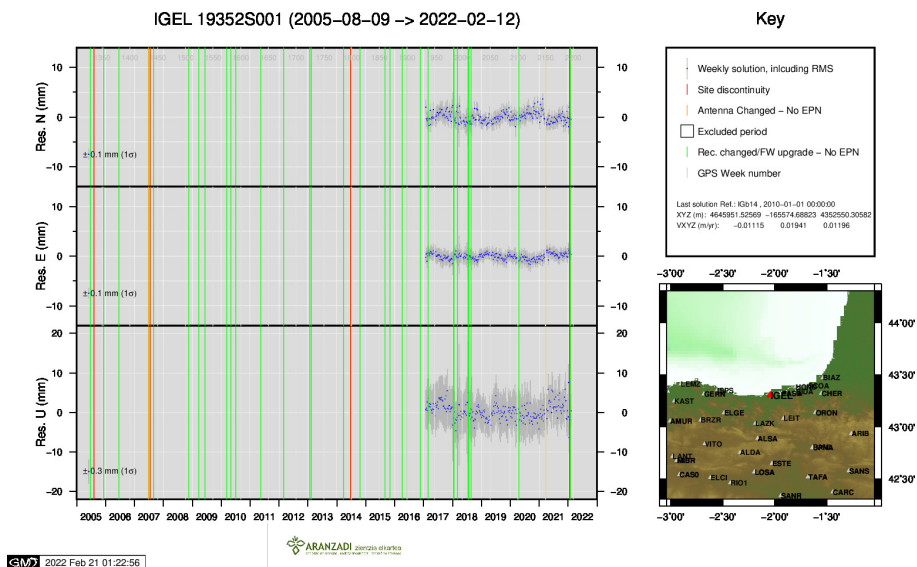
10) ELGE



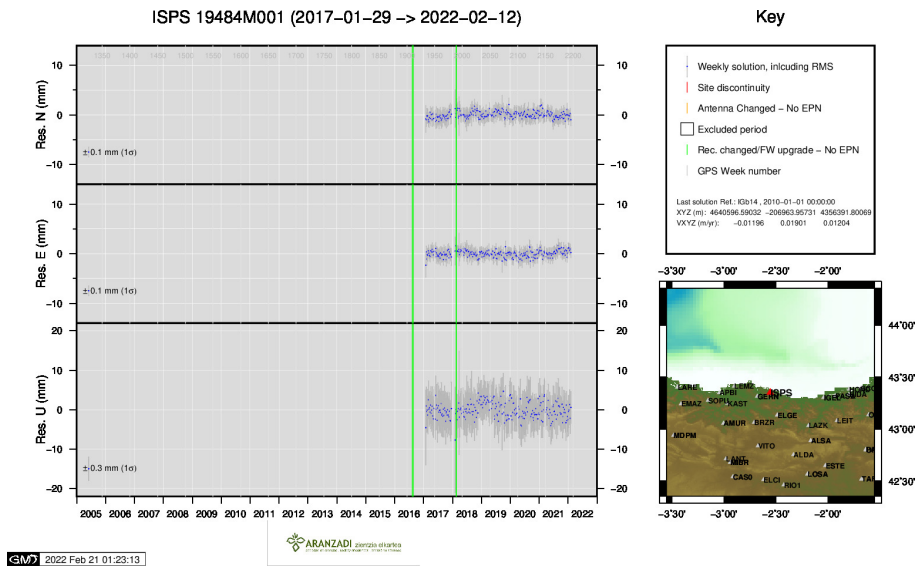
11) EMAZ



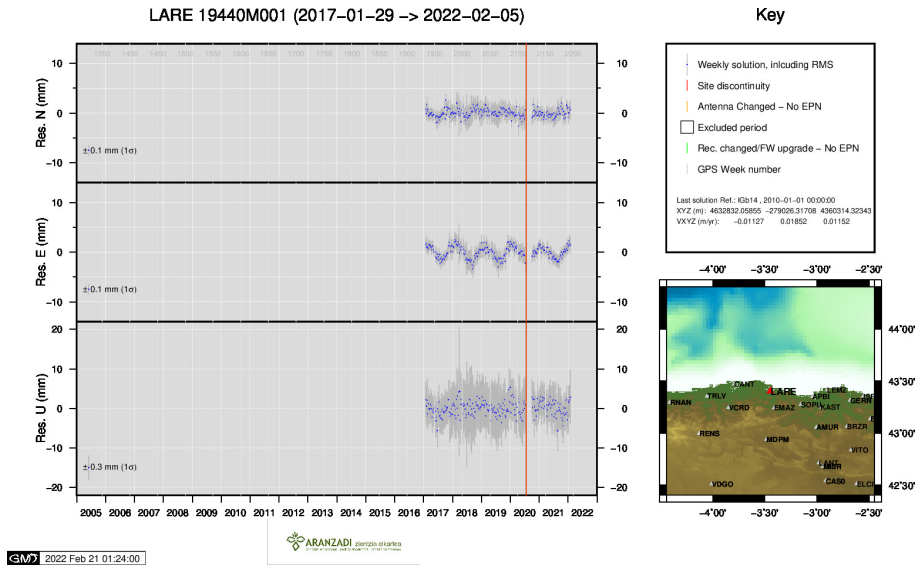
12) HOND



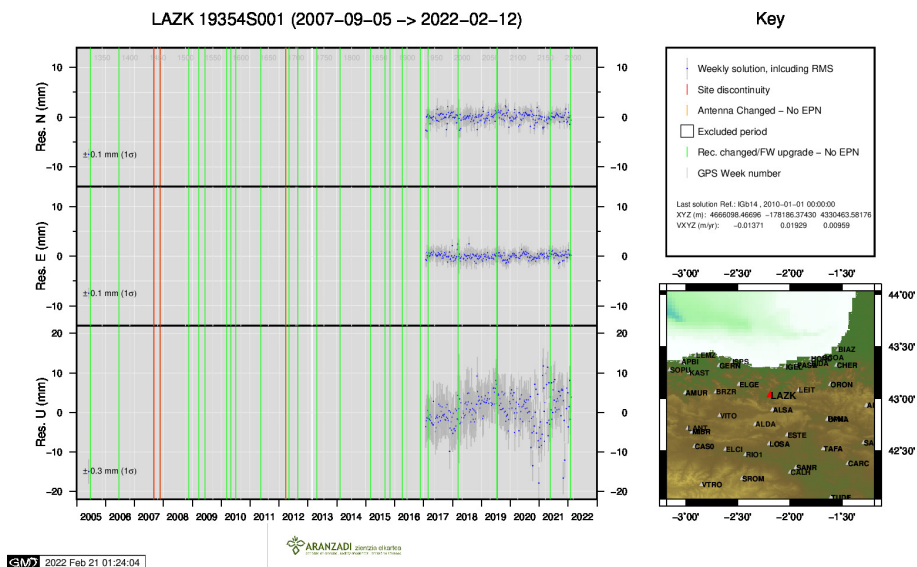
13) IGEL



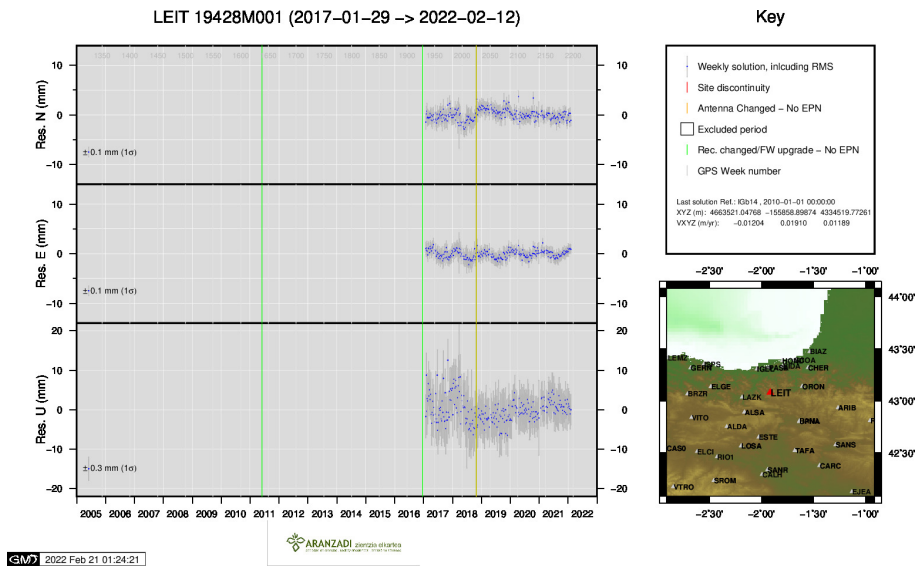
14) ISPS



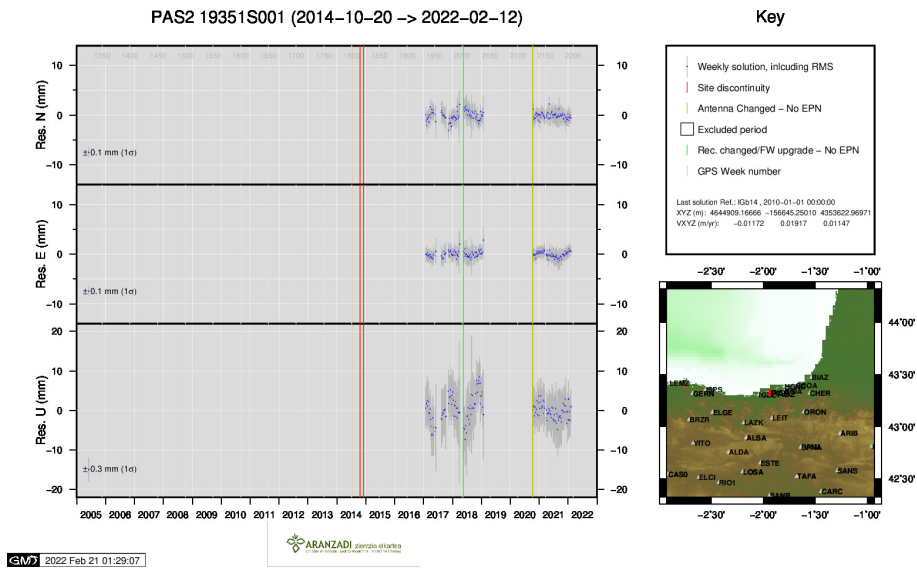
15) LARE



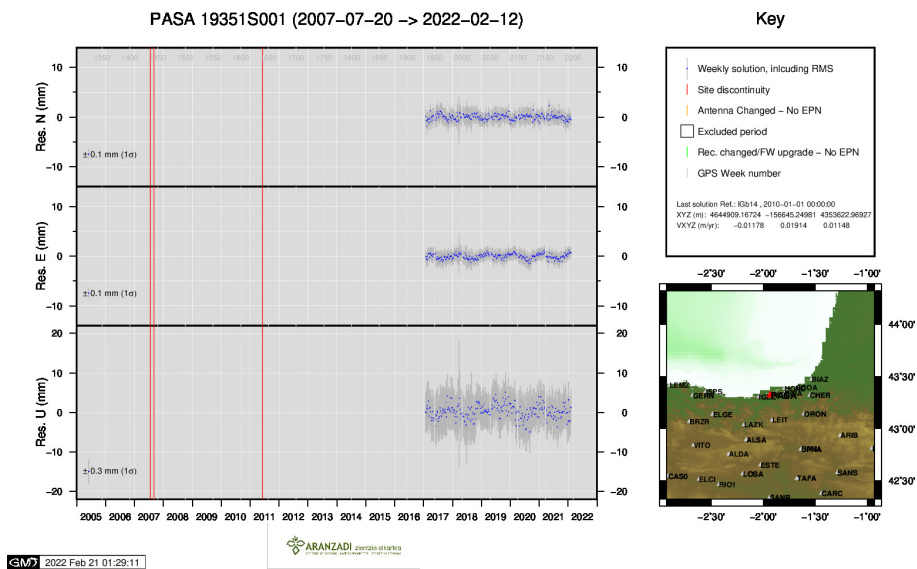
16) LAZK



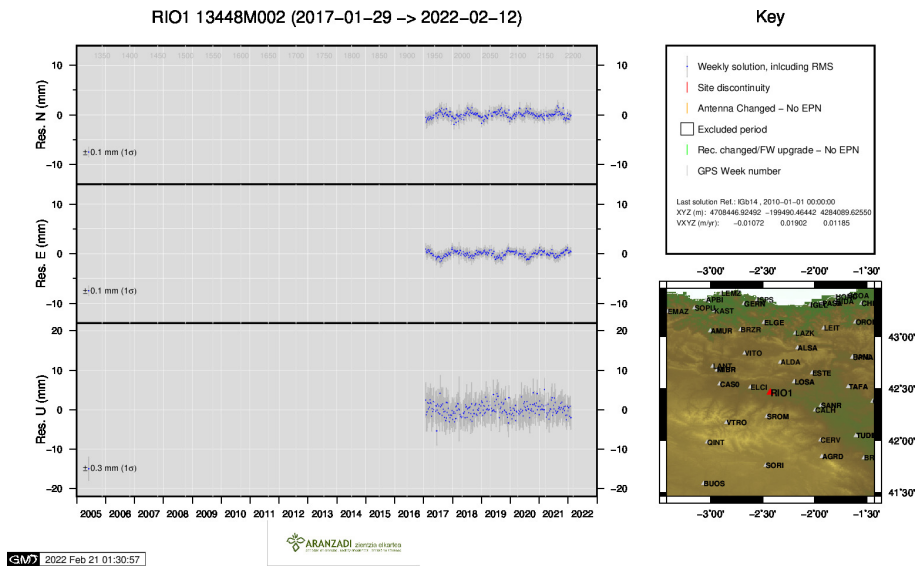
17) LEIT



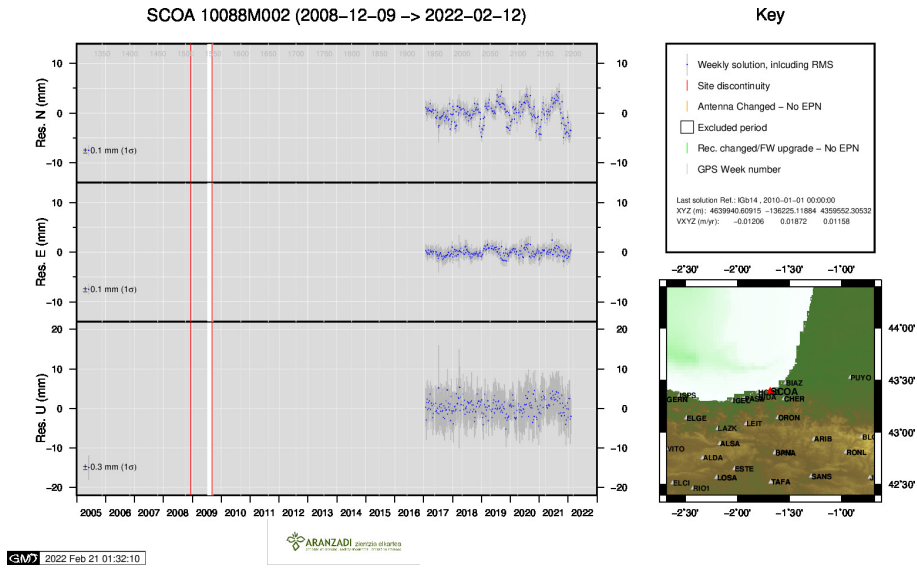
18) PAS2



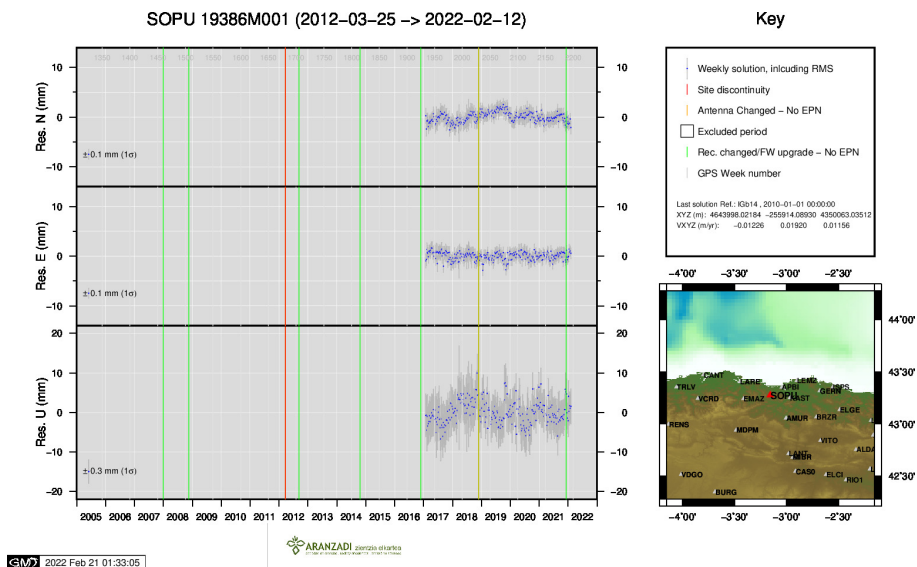
19) PASA



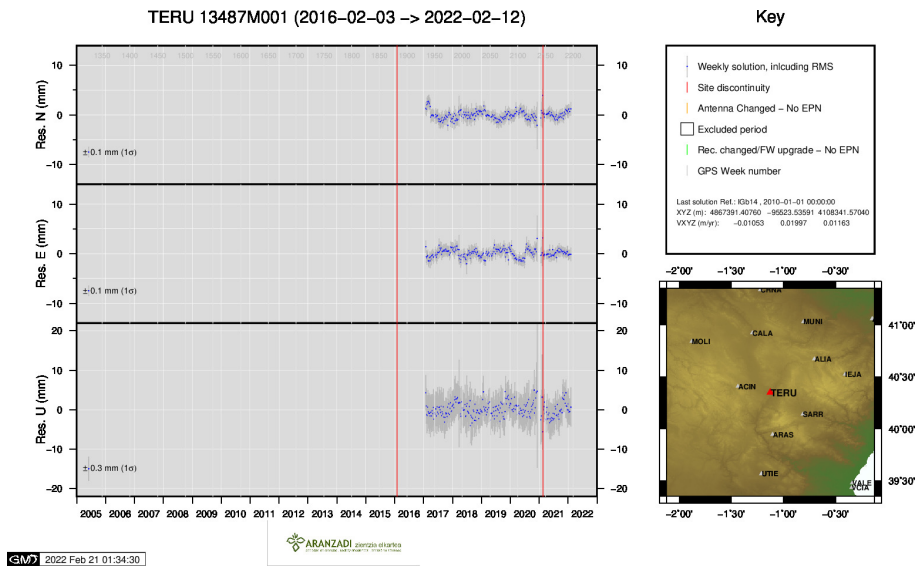
20) RIO1



21) SCOA



22) SOPU



23) TERU

