

ARA-DAC Weekly Analysis Result: 2204 (GFA)

Technical Report

GPS Week: 2204 (GFA)

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

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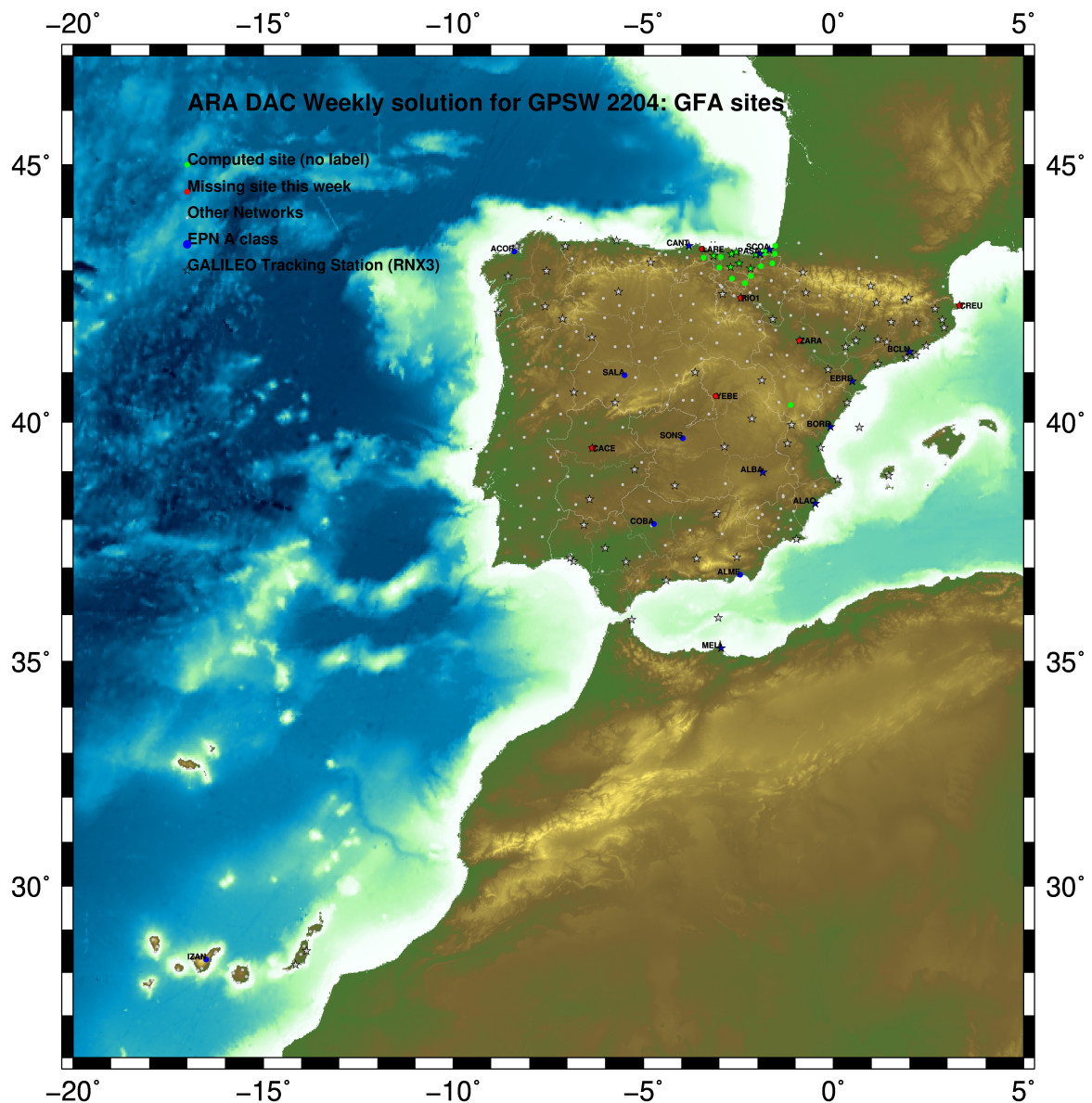
Report generated on 2022/04/24 at 13:34:00



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 Apr 24 13:33:52

Fig.1: Computed Sites for GPS Week2204 (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 2204 WEEK FINAL COMBINATION: PRECISE ORBITS                24-APR-22 10:34
-----
LOCAL GEODETIC DATUM: IGB14                EPOCH: 2022-04-06 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
  4 ACRD 13434M001        4594489.52708      -678367.38398      4357066.31476      W
 39 ALDA 19383M001        4687280.12261      -190876.51253      4308106.99632      A
 50 ALSA 19419M001        4677250.79763      -176770.33970      4319079.90689      A
 53 AMUR 19388M001        4661499.41619      -244591.20408      4332269.91840      A
100 BIAZ 10074M002        4634456.01545      -124344.92264      4365785.49129      A
101 BIDA 00000M000        4644177.78432      -145778.27069      4354832.51487      A
113 BRZR 19387M001        4662220.95434      -220769.84576      4333309.47247      A
116 CANT 13438M001        4625924.28102      -307096.18113      4365771.58924      W
154 CHER 00000M000        4645879.98392      -125721.86568      4353624.11778      A
204 EBRE 13410M001        4833519.95308      41537.44613      4147461.74963      W
180 ELGE 19353S001        4657557.35686      -202241.41664      4338991.91798      A
182 EMAZ 17001M001        4645924.17352      -276949.81244      4347759.61131      A
209 GERN 19389M001        4642811.28144      -217222.87067      4353278.90749      A
257 HOND 15012M002        4640529.27547      -145676.93086      4358781.78640      A
235 IGEL 19352S001        4645951.38775      -165574.44958      4352550.45079      A
240 ISPS 19484M001        4640596.44078      -206963.72320      4356391.94504      A
245 KAST 19499M001        4646949.04332      -240747.21889      4348015.02792      A
256 LAZK 19354S001        4666098.30208      -178186.13782      4330463.70249      A
261 LEIT 19428M001        4663520.90097      -155858.66422      4334519.91838      A
334 ORDN 19427M001        4659695.74142      -130864.68160      4338948.91492      A
345 PAS2 19351S001        4644909.02132      -156645.01410      4353623.10852      A
493 PASA 19351S001        4644909.02137      -156645.01409      4353623.10864      W
558 SALA 13469M001        4803054.45562      -462131.01730      4158379.11523      W
566 SCDA 10088M002        4639940.46356      -136224.88954      4359552.44549      W
418 SOPU 19386M001        4643997.87206      -255913.85416      4350063.17540      A
443 TERU 13487M001        4867391.27731      -95523.29079      4108341.71237      A
493 VITO 19385M001        4679397.66727      -218436.45028      4314898.40205      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 2204                24-APR-22 10:34
-----
LOCAL GEODETIC DATUM: ETRF2000            EPOCH: 2022-04-06 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
  4 ACRD 13434M001        4594489.85660      -678367.97664      4357065.86055      W
 39 ALDA 19383M001        4687280.51085      -190877.11471      4308106.54098      A
 50 ALSA 19419M001        4677251.18850      -176770.94070      4319079.45256      A
 53 AMUR 19388M001        4661499.79939      -244591.80347      4332269.46448      A
100 BIAZ 10074M002        4634456.41656      -124345.51860      4365785.40119      A
101 BIDA 00000M000        4644178.18186      -145778.86782      4354832.06369      A
113 BRZR 19387M001        4662221.34066      -220770.44518      4333309.01881      A
116 CANT 13438M001        4625924.65876      -307096.77663      4365771.13743      W
154 CHER 00000M000        4645880.38393      -125722.45294      4353623.66672      A
204 EBRE 13410M001        4833520.35881      41536.82817      4147461.28521      W
180 ELGE 19353S001        4657557.74598      -202242.01547      4338991.46495      A
182 EMAZ 17001M001        4645924.55375      -276950.41016      4347759.15825      A
209 GERN 19389M001        4642811.66973      -217223.46785      4353278.45548      A
257 HOND 15012M002        4640529.67332      -145676.52758      4358781.33552      A
235 IGEL 19352S001        4645951.78259      -165575.04698      4352549.99920      A
240 ISPS 19484M001        4640596.83061      -206964.32011      4356391.49335      A
245 KAST 19499M001        4646949.42820      -240747.81662      4348014.57525      A
256 LAZK 19354S001        4666098.69363      -178186.73755      4330463.24907      A
261 LEIT 19428M001        4663521.29568      -155859.26359      4334519.46547      A
334 ORDN 19427M001        4659696.13966      -130865.28045      4338948.46265      A
345 PAS2 19351S001        4644909.41738      -156645.61135      4353622.65713      A
493 PASA 19351S001        4644909.41743      -156645.61134      4353622.65725      W
558 SALA 13469M001        4803054.79778      -462131.63326      4158378.64668      W
566 SCDA 10088M002        4639940.86268      -136225.48616      4359551.99478      W
418 SOPU 19386M001        4643998.25515      -255914.45159      4350062.72278      A
443 TERU 13487M001        4867391.66256      -95523.91304      4108341.24335      A
493 VITO 19385M001        4679398.05250      -218437.05164      4314897.94700      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 2204 24-APR-22 10:34

 LOCAL GEODETIC DATUM: ETRF2014 EPOCH: 2022-04-06 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACDR 13434M001	4594489.81595	-678368.01423	4357065.91202	W
39	ALDA 19383M001	4687280.46782	-190877.15363	4308106.59232	A
50	ALSA 19419M001	4677251.14553	-176770.97970	4319079.50394	A
53	AMUR 19388M001	4661499.75680	-244591.84231	4332269.51587	A
100	BLAZ 10074M002	4634456.37386	-124345.55797	4365785.09273	A
101	BIDA 00000M000	4644178.13913	-145778.90707	4354832.11518	A
113	BRZR 19387M001	4662221.29800	-220770.48409	4333309.07021	A
116	CANT 13438M001	4625924.61674	-307096.81540	4365771.18890	W
154	CHER 00000M000	4645880.34112	-125722.49226	4353623.71822	A
204	EBRE 13410M001	4833520.31339	41536.78908	4147461.33629	W
180	ELGE 19353S001	4657557.70330	-202242.05447	4338991.51637	A
182	EMAZ 17001M001	4645924.51144	-276950.44894	4347759.20967	A
209	GERN 19389M001	4642811.62725	-217223.50686	4353278.50694	A
257	HOND 15012M002	4640529.63063	-145676.56685	4358781.38702	A
235	IHEL 19352S001	4645951.73991	-165575.08615	4352550.05068	A
240	ISPS 19484M001	4640596.78813	-206964.35916	4356391.54482	A
245	KAST 19499M001	4646949.38576	-240747.85553	4348014.62669	A
256	LAZK 19354S001	4666098.65078	-178186.77659	4330463.30048	A
261	LEIT 19428M001	4663521.25279	-155859.30273	4334519.51690	A
334	ORON 19427M001	4659696.09672	-130865.31969	4338948.51411	A
345	PAS2 19351S001	4644909.37468	-156645.65056	4353622.70862	A
493	PASA 19351S001	4644909.37473	-156645.65055	4353622.70874	W
558	SALA 13469M001	4803054.75433	-462131.67072	4158378.69760	W
566	SCDA 10088M002	4639940.81996	-136225.52546	4359552.04629	W
418	SOPU 19386M001	4643998.21279	-255914.49046	4350062.77422	A
443	TERU 13487M001	4867391.61726	-95523.95151	4108341.29425	A
493	VITO 19385M001	4679398.00964	-218437.09049	4314897.99835	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 2204 WEEK FINAL COMBINATION: PRECISE ORBITS 24-APR-22 10:34

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	0.87	0.78	4.63
ALDA 19383M001	4	X XXX	1.65	3.08	4.87
ALSA 19419M001	7	XXXXXX	1.35	1.87	2.71
AMUR 19388M001	7	XXXXXX	2.39	1.79	5.60
BLAZ 10074M002	7	XXXXXX	0.57	0.79	3.72
BIDA 00000M000	7	XXXXXX	0.82	1.02	3.36
BRZR 19387M001	7	XXXXXX	1.14	1.89	2.58
CANT 13438M001	7	XXXXXX	0.54	0.55	2.45
CHER 00000M000	7	XXXXXX	1.37	0.63	3.31
EBRE 13410M001	7	XXXXXX	1.41	2.45	2.75
ELGE 19353S001	7	XXXXXX	1.59	1.50	3.18
EMAZ 17001M001	7	XXXXXX	0.63	0.96	2.34
GERN 19389M001	7	XXXXXX	0.82	1.21	2.19
HOND 15012M002	7	XXXXXX	0.56	0.49	2.35
IGEL 19352S001	7	XXXXXX	0.55	0.59	2.72
ISPS 19484M001	7	XXXXXX	0.89	2.20	4.65
KAST 19499M001	7	XXXXXX	1.05	0.72	6.18
LAZK 19354S001	7	XXXXXX	0.56	0.38	6.00
LEIT 19428M001	7	XXXXXX	0.99	0.45	0.89
ORON 19427M001	7	XXXXXX	0.46	0.83	1.62
PAS2 19351S001	6	XX XXX	0.69	0.72	3.13
PASA 19351S001	7	XXXXXX	0.65	0.68	3.04
SALA 13469M001	7	XXXXXX	0.69	0.55	2.76
SCOA 10088M002	7	XXXXXX	1.92	1.43	3.21
SOPU 19386M001	7	XXXXXX	1.02	1.06	4.01
TERU 13487M001	7	XXXXXX	0.60	0.79	1.40
VITO 19385M001	7	XXXXXX	0.34	0.59	2.74

Comparison of individual solutions:

ACOR 13434M001	N	0.87	0.78	-0.02	0.79	-1.23	-0.84	-0.92	0.50
ACOR 13434M001	E	0.78	1.29	-0.63	0.46	0.45	-0.55	-0.55	-0.75
ACOR 13434M001	U	4.63	-4.66	4.96	3.33	-0.08	2.65	-4.97	-6.28
ALDA 19383M001	N	1.65	-0.61				0.09	-2.57	-1.11
ALDA 19383M001	E	3.08	-1.24				-4.36	2.28	1.65
ALDA 19383M001	U	4.87	-5.01				4.45	4.24	-2.89
ALSA 19419M001	N	1.35	-0.66	0.03	0.77	0.45	-0.28	-2.62	1.67
ALSA 19419M001	E	1.87	-0.20	-0.56	0.91	0.34	2.76	-3.47	-0.05
ALSA 19419M001	U	2.71	-2.59	0.42	-0.42	1.26	4.28	-3.81	1.61
AMUR 19388M001	N	2.39	-2.08	-0.46	0.00	-0.97	-0.25	5.34	-0.36
AMUR 19388M001	E	1.79	-0.54	-1.41	-1.55	-1.04	-0.87	3.57	0.13
AMUR 19388M001	U	5.60	-2.54	-1.87	-5.66	-0.79	-1.33	11.80	-2.09
BLAZ 10074M002	N	0.57	0.02	-0.22	-0.46	-0.94	-0.15	-0.15	0.89
BLAZ 10074M002	E	0.79	-1.18	-0.21	-0.25	-1.24	-0.17	-0.42	0.71
BLAZ 10074M002	U	3.72	-3.72	-0.72	-3.34	2.93	0.03	5.76	-3.97
BIDA 00000M000	N	0.82	0.40	-0.24	-0.16	-0.82	0.19	-1.38	1.09
BIDA 00000M000	E	1.02	-0.77	-0.70	-0.06	-0.98	-1.58	1.22	0.41
BIDA 00000M000	U	3.36	-1.49	0.06	-7.34	2.23	1.98	0.92	-1.36
BRZR 19387M001	N	1.14	-0.73	-0.09	0.78	1.08	2.34	0.01	-0.24
BRZR 19387M001	E	1.89	2.75	-0.43	0.04	0.86	1.07	-3.43	-0.06
BRZR 19387M001	U	2.58	4.17	-0.55	-2.03	0.90	-0.96	3.78	1.50
CANT 13438M001	N	0.54	0.48	0.73	0.25	0.47	-0.74	-0.10	-0.40
CANT 13438M001	E	0.55	1.08	-0.10	0.23	0.04	-0.68	-0.25	-0.28
CANT 13438M001	U	2.45	-0.37	0.01	1.87	-0.60	3.99	-2.61	3.03
CHER 00000M000	N	1.37	-0.21	-0.93	-0.11	-0.04	0.17	-3.02	1.04
CHER 00000M000	E	0.63	-0.85	0.00	-0.11	-0.46	-0.04	0.59	-1.05
CHER 00000M000	U	3.31	-1.45	-3.01	-6.91	2.37	-0.97	-0.03	-0.39
EBRE 13410M001	N	1.41	1.39	1.41	1.04	-0.74	-0.22	-0.39	-2.48
EBRE 13410M001	E	2.45	-2.08	-0.62	-0.36	-0.49	-1.24	-0.55	5.39
EBRE 13410M001	U	2.75	0.84	-0.37	-0.64	-0.87	4.44	-4.47	-1.88
ELGE 19353S001	N	1.59	-0.59	1.11	1.29	0.65	2.08	1.15	-2.43
ELGE 19353S001	E	1.50	-0.00	-1.02	-0.06	-0.41	-1.10	3.22	0.83
ELGE 19353S001	U	3.18	-3.58	1.07	-0.40	1.70	1.33	5.72	3.02
EMAZ 17001M001	N	0.63	0.40	-0.17	0.82	0.82	-0.20	-0.75	-0.47
EMAZ 17001M001	E	0.96	0.34	-0.58	-0.30	-0.68	-0.71	1.99	-0.00
EMAZ 17001M001	U	2.34	1.67	0.92	0.13	0.99	2.51	-4.02	2.42
GERN 19389M001	N	0.82	0.24	0.34	0.30	0.06	1.30	1.34	-0.51
GERN 19389M001	E	1.21	0.32	0.70	1.44	0.56	-0.69	-1.90	1.30
GERN 19389M001	U	2.19	2.23	-1.49	-0.44	1.29	-0.64	2.33	3.73
HOND 15012M002	N	0.56	-0.42	-0.21	-0.08	-0.90	-0.19	-0.89	-0.05
HOND 15012M002	E	0.49	-0.91	-0.20	0.44	-0.49	-0.15	0.28	0.05
HOND 15012M002	U	2.35	-4.28	-1.29	-1.67	2.31	1.46	-0.58	-1.62
IGEL 19352S001	N	0.55	-0.51	0.02	-0.84	-0.51	0.21	-0.73	-0.13
IGEL 19352S001	E	0.59	-0.95	-0.57	-0.58	-0.18	0.33	0.61	0.05
IGEL 19352S001	U	2.72	-4.17	-0.47	-2.36	-1.36	-0.50	3.52	-2.58
ISPS 19484M001	N	0.89	-0.27	0.98	1.79	0.56	0.39	-0.23	-0.08
ISPS 19484M001	E	2.20	0.13	-0.36	1.11	0.14	-3.99	2.98	1.69
ISPS 19484M001	U	4.65	1.72	2.93	-0.32	1.93	-8.00	1.99	6.81
KAST 19499M001	N	1.05	2.32	0.07	0.15	1.04	0.13	0.07	-0.27
KAST 19499M001	E	0.72	0.81	0.06	0.46	0.11	0.08	-0.88	1.19
KAST 19499M001	U	6.18	14.51	-0.96	-1.80	-1.10	-3.61	-0.03	0.70
LAZK 19354S001	N	0.56	0.72	-0.21	-0.19	-0.26	0.40	-1.02	0.11
LAZK 19354S001	E	0.38	0.08	-0.42	-0.44	-0.22	0.62	-0.07	0.25
LAZK 19354S001	U	6.00	-8.72	5.06	0.88	4.89	7.08	-2.59	-5.75
LEIT 19428M001	N	0.99	0.65	0.28	0.33	0.40	-0.60	-2.10	0.56
LEIT 19428M001	E	0.45	0.05	-0.62	-0.05	-0.24	-0.09	0.85	-0.14
LEIT 19428M001	U	0.89	-1.34	-1.08	0.45	1.04	0.27	0.08	0.69
ORON 19427M001	N	0.46	-0.06	0.21	0.20	-0.57	0.11	-0.84	0.37
ORON 19427M001	E	0.83	-1.01	-1.35	-0.06	0.23	0.92	0.21	0.56
ORON 19427M001	U	1.62	-0.68	-0.45	0.58	1.16	2.44	-1.06	-2.50
PAS2 19351S001	N	0.69	-1.11	-0.04		-0.48	-0.85	-0.11	0.49
PAS2 19351S001	E	0.72	-0.59	-1.03		-0.42	0.38	0.93	-0.02
PAS2 19351S001	U	3.13	-3.81	-0.87		1.18	-0.53	4.72	-3.13
PASA 19351S001	N	0.65	-1.04	-0.12	-0.02	-0.62	-0.95	-0.12	0.35

PASA 19351S001	E	0.68	-0.67	-1.02	-0.04	-0.44	0.27	1.00	-0.06
PASA 19351S001	U	3.04	-3.97	-0.98	-3.35	1.16	-0.30	4.45	-2.52
SALA 13469M001	N	0.69	1.28	0.14	-0.31	-0.10	-0.26	0.58	-0.81
SALA 13469M001	E	0.55	0.40	0.12	0.34	0.44	-0.02	-1.14	-0.16
SALA 13469M001	U	2.76	0.75	-0.04	6.04	-1.47	-1.90	-1.33	-1.10
SCDA 10088M002	N	1.92	-0.82	-0.28	-2.50	-1.97	0.60	1.14	3.11
SCDA 10088M002	E	1.43	0.14	0.36	-0.45	-0.90	-2.71	-0.78	1.80
SCDA 10088M002	U	3.21	-5.49	1.18	-1.53	1.08	-0.50	3.68	-3.58
SOPU 19386M001	N	1.02	1.43	-0.00	0.88	1.00	1.22	-0.70	-0.61
SOPU 19386M001	E	1.06	1.23	-0.49	1.05	-0.21	-1.19	-0.08	1.57
SOPU 19386M001	U	4.01	5.72	-0.43	-2.21	-3.04	-0.77	3.63	5.97
TERU 13487M001	N	0.60	-0.33	-0.17	0.52	-0.17	-1.23	0.33	0.29
TERU 13487M001	E	0.79	-0.30	0.42	0.29	-0.08	-0.16	1.09	-1.46
TERU 13487M001	U	1.40	1.03	0.11	-1.37	-0.46	-0.80	-2.59	-1.12
VITU 19385M001	N	0.34	-0.33	-0.11	0.33	0.19	0.05	-0.65	-0.02
VITU 19385M001	E	0.59	-0.67	-0.83	-0.35	0.37	-0.52	-0.41	0.49
VITU 19385M001	U	2.74	-2.15	-2.86	-1.81	-0.91	2.69	4.50	-0.88

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	-1.86	1.23	1.36
12	ALAC 13433M001	I W	-0.07	-0.31	0.43
15	ALBA 13452M001	I W	0.27	-2.64	-1.07
21	ALME 13437M001	I W	-1.68	-1.59	3.40
47	BCLN 13412M001	I W	-0.71	-2.82	1.25
71	BORR 13480M001	I W	-0.54	-1.03	-0.08
116	CANT 13438M001	I W	-0.58	0.47	-2.10
143	COBA 13453M001	I W	0.85	0.19	-2.32
204	EBRE 13410M001	I W	-1.69	-0.23	1.28
316	IZAN 31309M002	I W	1.01	1.71	-4.38
432	MELI 19379M001	I W	1.70	0.84	0.13
493	PASA 19351S001	I W	-0.13	-1.43	1.24
558	SALA 13469M001	I W	0.76	1.29	-6.28
566	SCDA 10088M002	I W	1.26	0.34	-2.49
599	SONS 13446M001	I W	1.39	3.97	9.61
	RMS / COMPONENT		1.17	1.77	3.65
	MEAN		0.00	0.00	-0.00
	MIN		-1.86	-2.82	-6.28
	MAX		1.70	3.97	9.61

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 45
RMS OF TRANSFORMATION : 2.44 MM

BARYCENTER COORDINATES:

LATITUDE : 39 33 19.86
LONGITUDE : - 3 34 9.67
HEIGHT : -25.362 KM

PARAMETERS:

TRANSLATION IN N : -0.00 +- 0.63 MM
TRANSLATION IN E : 0.00 +- 0.63 MM
TRANSLATION IN U : -0.00 +- 0.63 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          16572378
NUMBER OF UNKNOWN              191648
NUMBER OF DEGREES OF FREEDOM    16380730
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)     180
VARIANCE FACTOR                  1.710605803117715

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
 1  0.00196  -0.0054  0.0033  0.0119  -0.0001 -0.0004  0.0001  -0.00056
 2  0.00183  -0.0349 -0.0121  0.0374  0.0000 -0.0016 -0.0005  0.00065
 3  0.00165  -0.0092 -0.0138  0.0088  0.0003 -0.0004 -0.0004  0.00022
 4  0.00151  0.0022 -0.0176 -0.0034  0.0003  0.0001 -0.0005  -0.00017
 5  0.00195  0.0107 -0.0078 -0.0141  0.0002  0.0006 -0.0002  0.00000
 6  0.00210  0.0321  0.0324 -0.0279  -0.0005  0.0013  0.0010  -0.00096
 7  0.00197  0.0083  0.0100 -0.0098  -0.0002  0.0004  0.0003  -0.00014
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
 1  0.00129  2317703  1.65  2345546  3  858  26988  0
 2  0.00124  2275429  1.55  2302657  3  846  26385  0
 3  0.00127  2340620  1.60  2368176  3  873  26686  0
 4  0.00128  2371772  1.63  2399482  3  876  26837  0
 5  0.00134  2356743  1.81  2385398  3  882  27776  0
 6  0.00138  2331365  1.92  2360287  3  888  28037  0
 7  0.00133  2381902  1.76  2410832  3  888  28045  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 22:093:00000 22:099:86370 LEICA GR50 -----
ALDA A 1 P 22:093:00000 22:099:86370 LEICA GR10 -----
ALSA A 1 P 22:093:00000 22:099:86370 LEICA GR50 -----
AMUR A 1 P 22:093:00000 22:099:86370 LEICA GR10 -----
BIAZ A 1 P 22:093:00000 22:099:86370 SPECTRA SP90M -----
BIDA A 1 P 22:093:00000 22:099:86370 LEICA GR10 -----
BRZR A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
CANT A 1 P 22:093:00000 22:099:86370 LEICA GR10 -----
CHER A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
EBRE A 1 P 22:093:00000 22:099:86370 LEICA GR50 -----
ELGE A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
EMAZ A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
GERN A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
HOND A 1 P 22:093:00000 22:099:86370 LEICA GR50 -----
IGEL A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
ISPS A 1 P 22:093:00000 22:099:86370 TRIMBLE NETR9 -----
KAST A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
LAZK A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
LEIT A 1 P 22:093:00000 22:099:86370 LEICA GR50 -----
ORON A 1 P 22:093:00000 22:099:86370 LEICA GR50 -----
PAS2 A 1 P 22:093:00030 22:099:86370 STONEX SC2200 -----
PASA A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
SALA A 1 P 22:093:00000 22:099:86370 LEICA GR50 -----
SCDA A 1 P 22:093:00000 22:099:86370 LEICA GR50 -----
SOPU A 1 P 22:093:00000 22:099:86370 LEICA GR30 -----
TERU A 1 P 22:093:00000 22:099:86370 LEICA GR50 -----
VITO A 1 P 22:093:00000 22:099:86370 LEICA GR10 -----
```

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 22:093:00000 22:099:86370 LEIAT504 LEIS -----
ALDA A 1 P 22:093:00000 22:099:86370 LEIAS10 NONE -----
ALSA A 1 P 22:093:00000 22:099:86370 LEIAR10 NONE -----
AMUR A 1 P 22:093:00000 22:099:86370 LEIAS10 NONE -----
BIAZ A 1 P 22:093:00000 22:099:86370 LEIAR25 LEIT -----
BIDA A 1 P 22:093:00000 22:099:86370 LEIAS10 NONE -----
BRZR A 1 P 22:093:00000 22:099:86370 LEIAS10 NONE -----
CANT A 1 P 22:093:00000 22:099:86370 LEIAR25_R4 LEIT 25066
CHER A 1 P 22:093:00000 22:099:86370 LEIAR10 NONE -----
```

EBRE	A	1	P	22:093:00000	22:099:86370	LEIAR25_R4	NONE	26359
ELGE	A	1	P	22:093:00000	22:099:86370	LEIAR25_R4	LEIT	-----
EMAZ	A	1	P	22:093:00000	22:099:86370	LEIAS10	NONE	-----
GERN	A	1	P	22:093:00000	22:099:86370	LEIAS10	NONE	-----
HOND	A	1	P	22:093:00000	22:099:86370	LEIAR20	LEIM	41012
IGEL	A	1	P	22:093:00000	22:099:86370	LEIAR20	LEIM	43011
ISPS	A	1	P	22:093:00000	22:099:86370	TRM59900.00	SCIS	-----
KAST	A	1	P	22:093:00000	22:099:86370	LEIAS10	NONE	-----
LAZK	A	1	P	22:093:00000	22:099:86370	LEIAR25_R4	LEIT	-----
LEIT	A	1	P	22:093:00000	22:099:86370	LEIAR10	NONE	-----
ORON	A	1	P	22:093:00000	22:099:86370	LEIAR10	NONE	-----
PAS2	A	1	P	22:093:00030	22:099:86370	LEIAR20	LEIM	73034
PASA	A	1	P	22:093:00000	22:099:86370	LEIAR20	LEIM	73034
SALA	A	1	P	22:093:00000	22:099:86370	LEIAR25	NONE	-----
SCDA	A	1	P	22:093:00000	22:099:86370	TRM55971.00	NONE	-----
SOPU	A	1	P	22:093:00000	22:099:86370	LEIAS10	NONE	-----
TERU	A	1	P	22:093:00000	22:099:86370	LEIAR20	LEIM	49044
VITO	A	1	P	22:093:00000	22:099:86370	LEIAS10	NONE	-----

7.3 Eccentricities

*SITE	PT	SOLN	T	DATA_START_	DATA_END_	AXE	UP	NORTH	EAST	
							ARB->	BENCHMARK(M)		
ACOR	A	1	P	22:093:00000	22:099:86370	UNE	3.0460	0.0000	0.0000	
ALDA	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
ALSA	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
AMUR	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
BIAZ	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
BIDA	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
BRZR	A	1	P	22:093:00000	22:099:86370	UNE	0.0771	0.0000	0.0000	
CANT	A	1	P	22:093:00000	22:099:86370	UNE	3.0490	0.0000	0.0000	
CHER	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
EBRE	A	1	P	22:093:00000	22:099:86370	UNE	0.0770	0.0000	0.0000	
ELGE	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
EMAZ	A	1	P	22:093:00000	22:099:86370	UNE	0.0350	0.0000	0.0000	
GERN	A	1	P	22:093:00000	22:099:86370	UNE	0.0771	0.0000	0.0000	
HOND	A	1	P	22:093:00000	22:099:86370	UNE	0.0771	0.0000	0.0000	
IGEL	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
ISPS	A	1	P	22:093:00000	22:099:86370	UNE	0.0350	0.0000	0.0000	
KAST	A	1	P	22:093:00000	22:099:86370	UNE	0.0350	0.0000	0.0000	
LAZK	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
LEIT	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
ORON	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
PAS2	A	1	P	22:093:00030	22:099:86370	UNE	0.0000	0.0000	0.0000	
PASA	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
SALA	A	1	P	22:093:00000	22:099:86370	UNE	0.0600	0.0000	0.0000	
SCDA	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	
SOPU	A	1	P	22:093:00000	22:099:86370	UNE	0.0771	0.0000	0.0000	
TERU	A	1	P	22:093:00000	22:099:86370	UNE	0.0600	0.0000	0.0000	
VITO	A	1	P	22:093:00000	22:099:86370	UNE	0.0000	0.0000	0.0000	

8 References

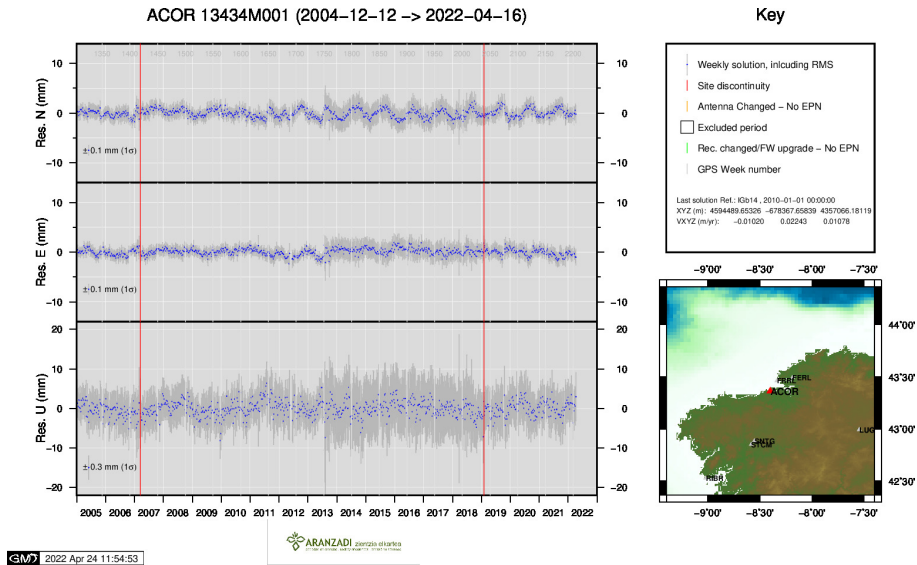
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign*. etrs89.ensg.ign.fr/memo-V8.pdf

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

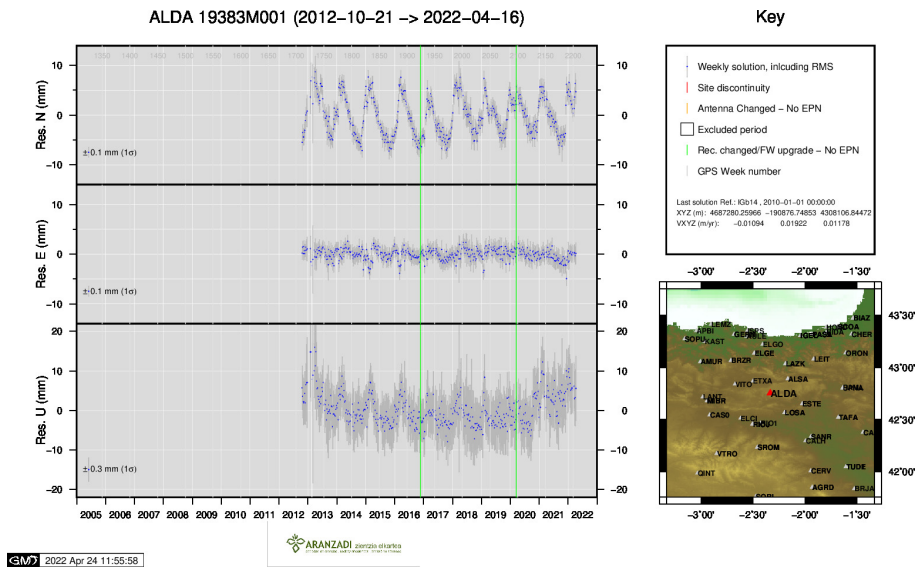
Z. Altamimi (2018): *EUREF Technical Note 1: Relationship and Transformation between the International and the European Terrestrial Reference Systems*. etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf

9 Cumulative Time Series

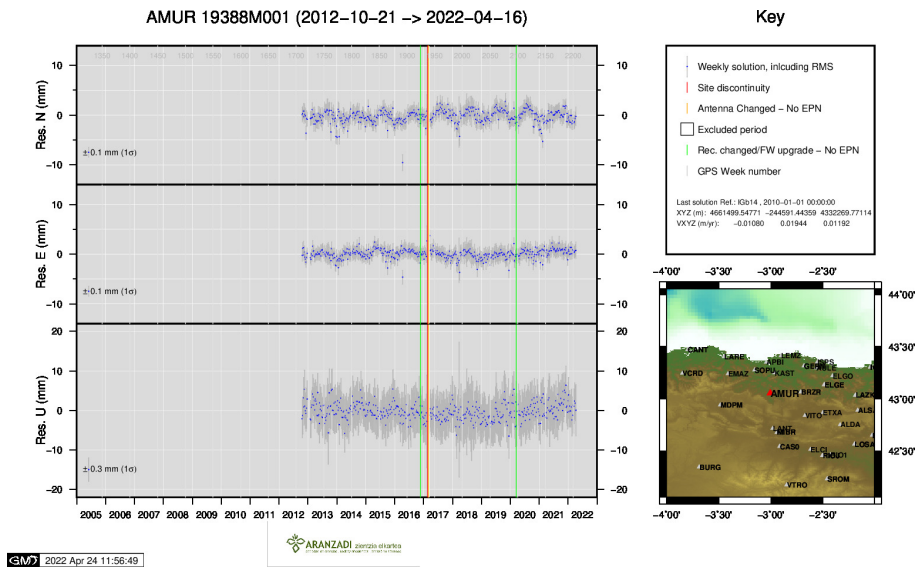
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



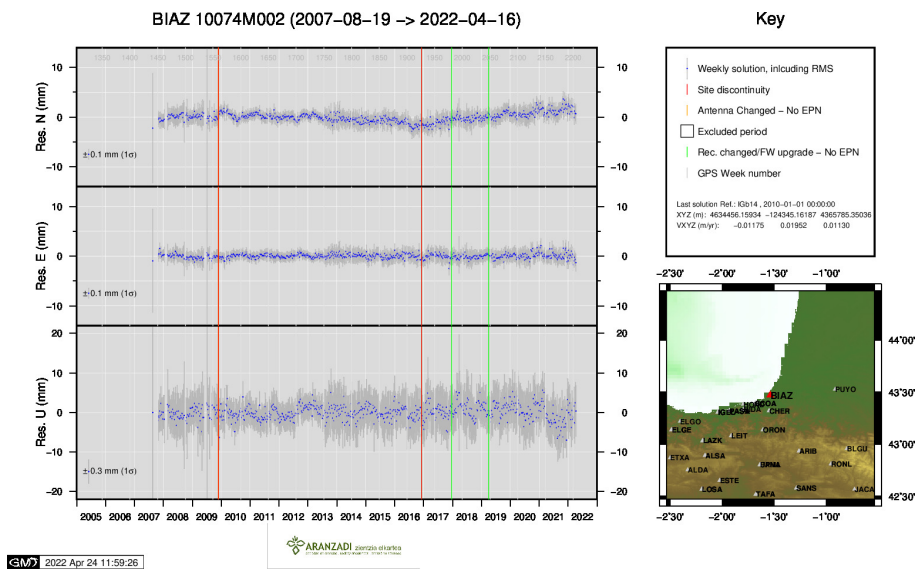
1) ACOR



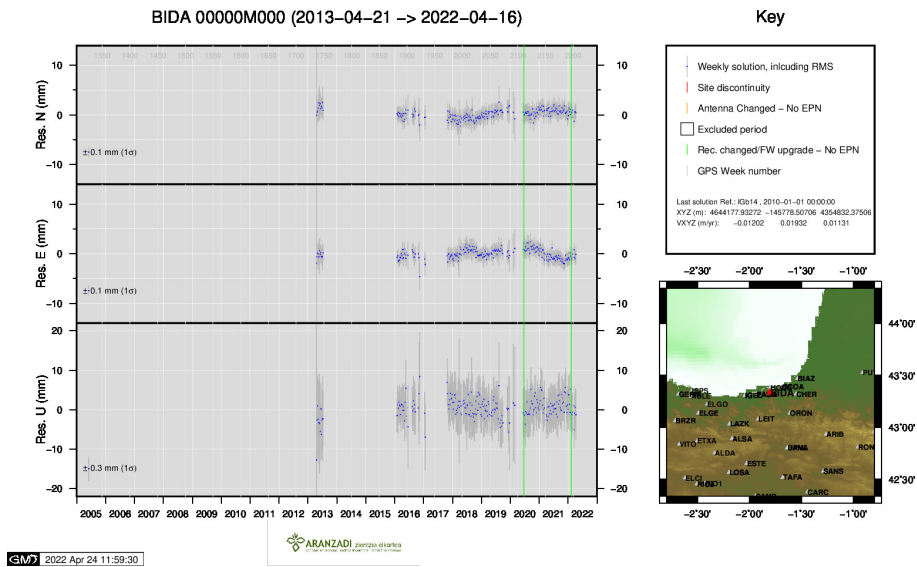
2) ALDA



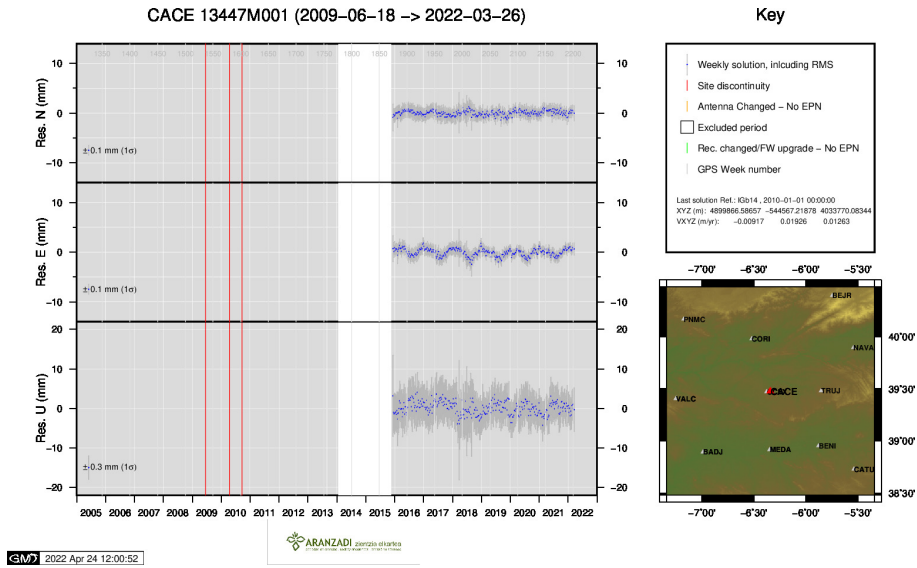
3) AMUR



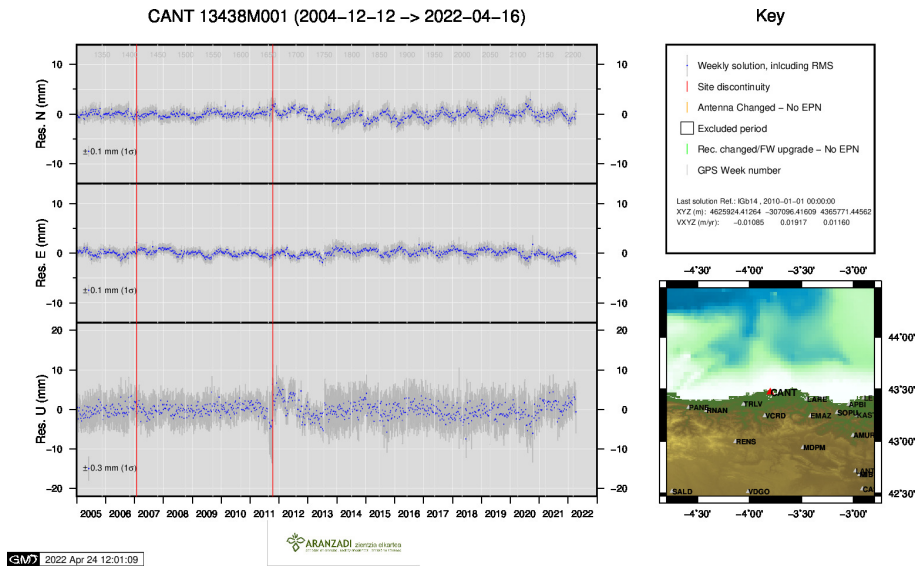
4) BIAZ



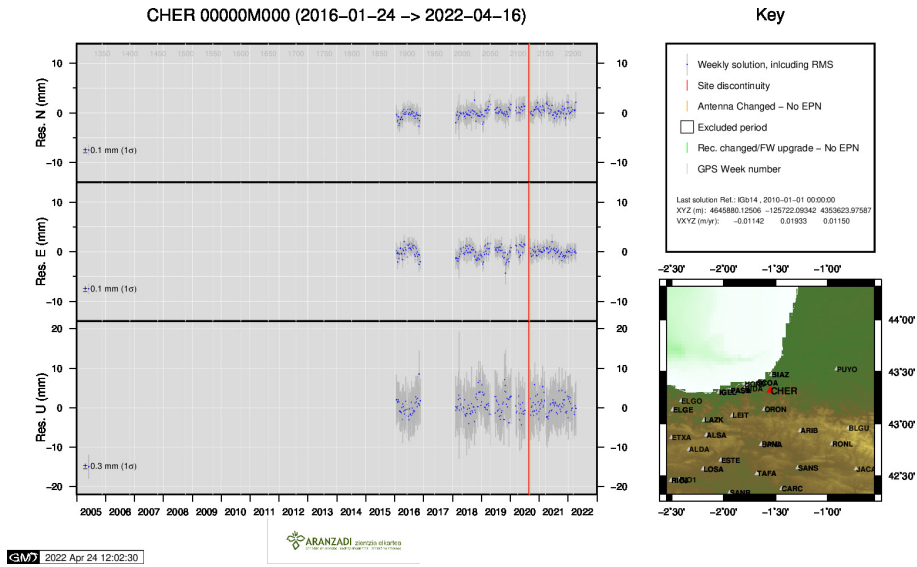
5) BIDA



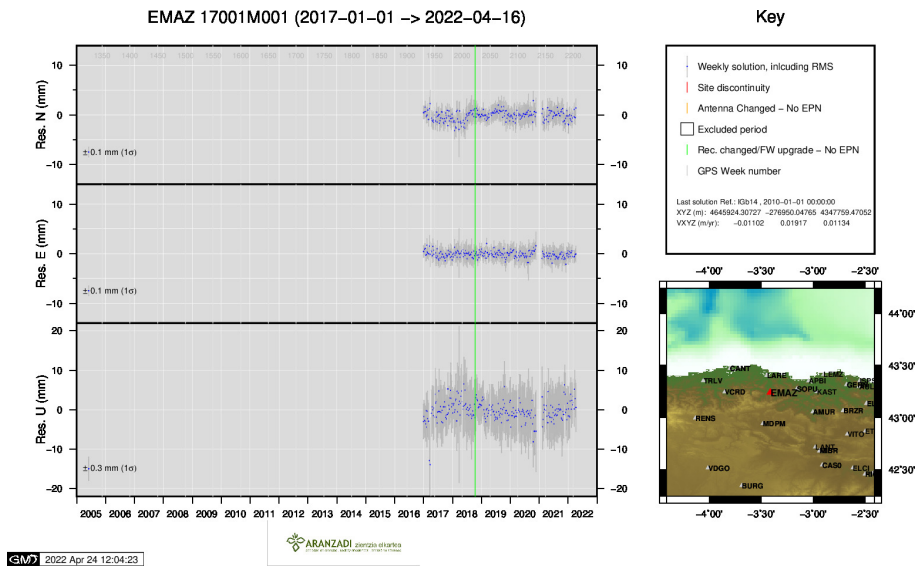
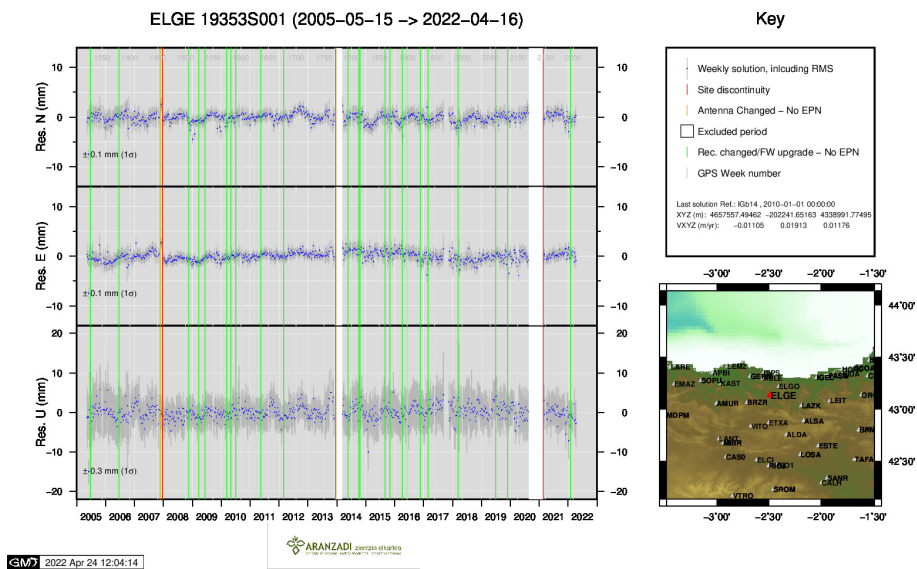
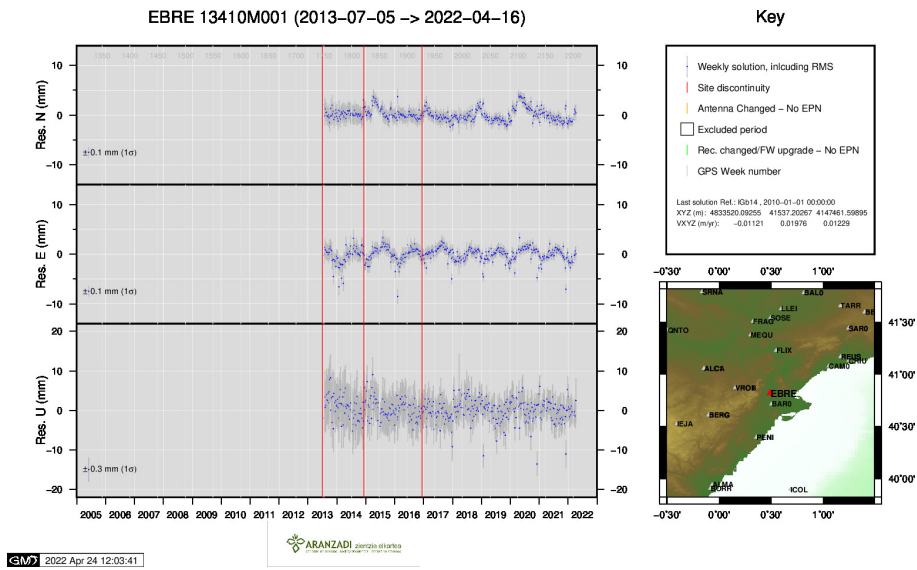
6) CACE

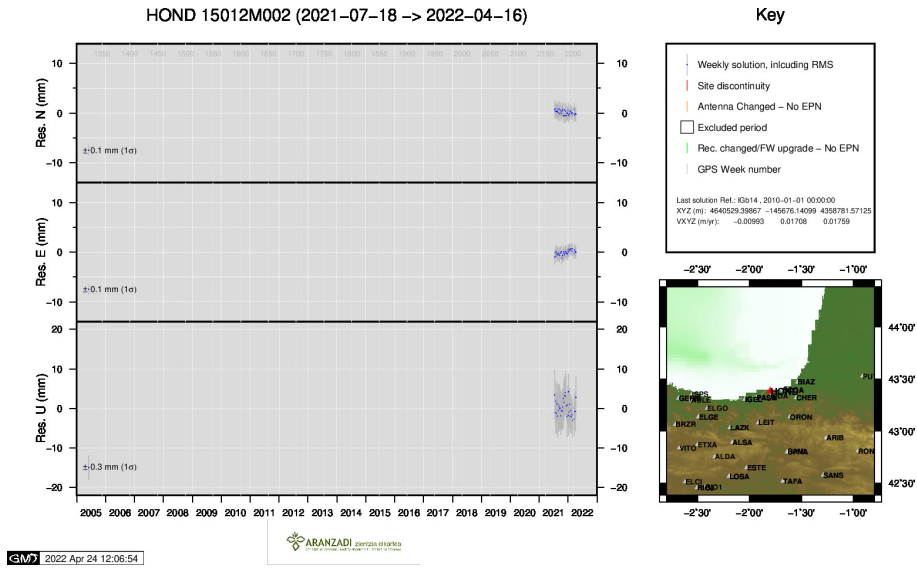


7) CANT

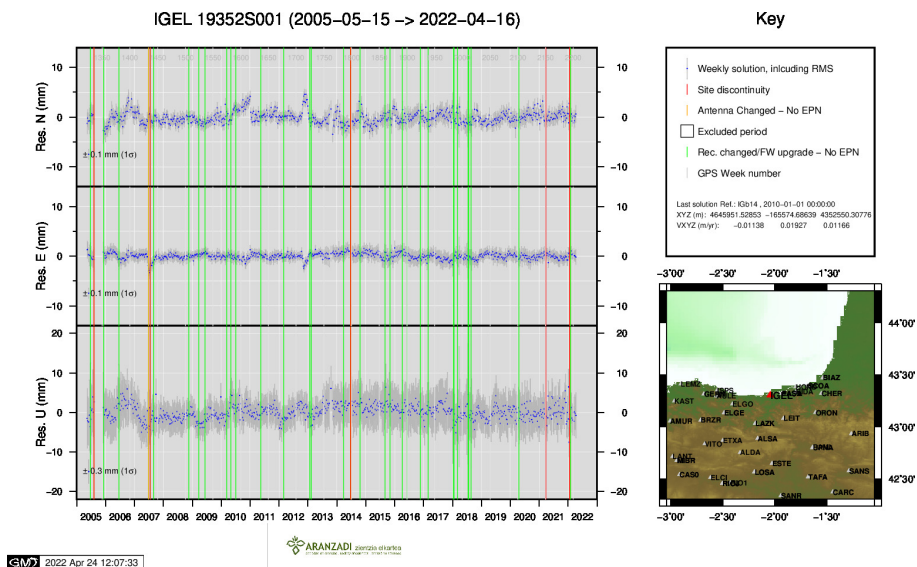


8) CHER

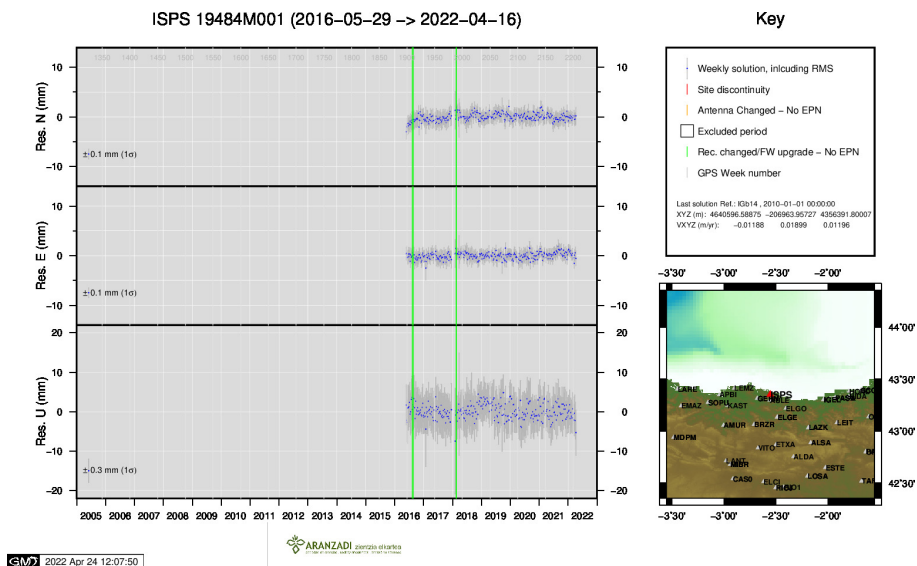




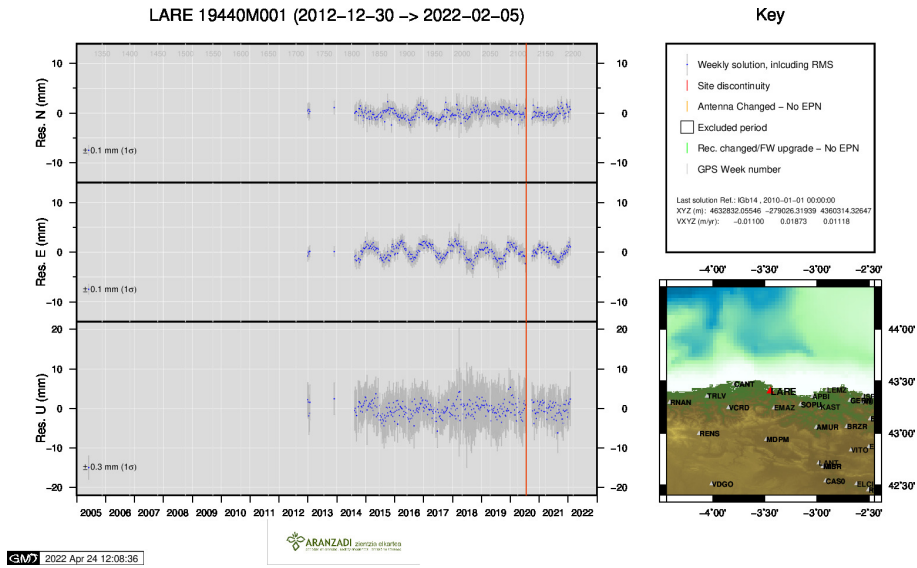
12) HOND



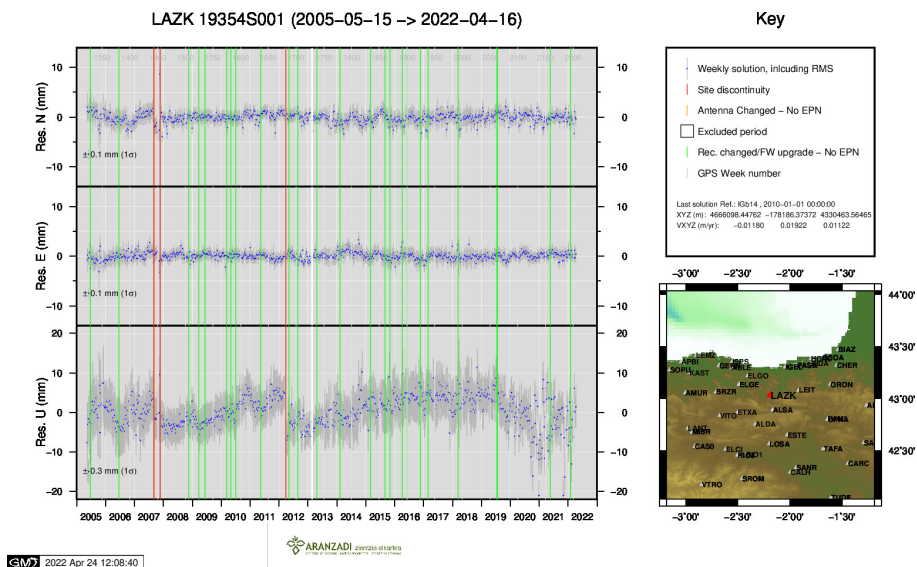
13) IGEL



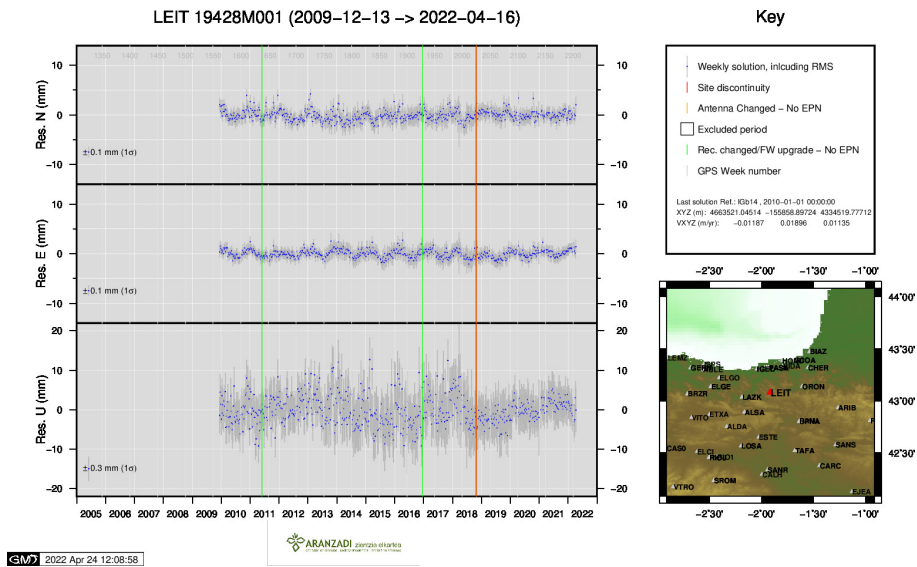
14) ISPS



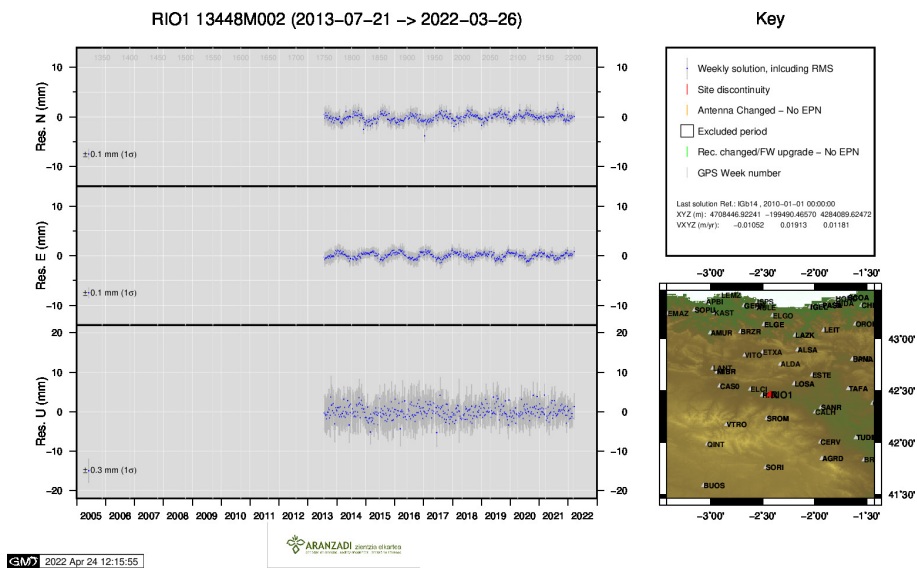
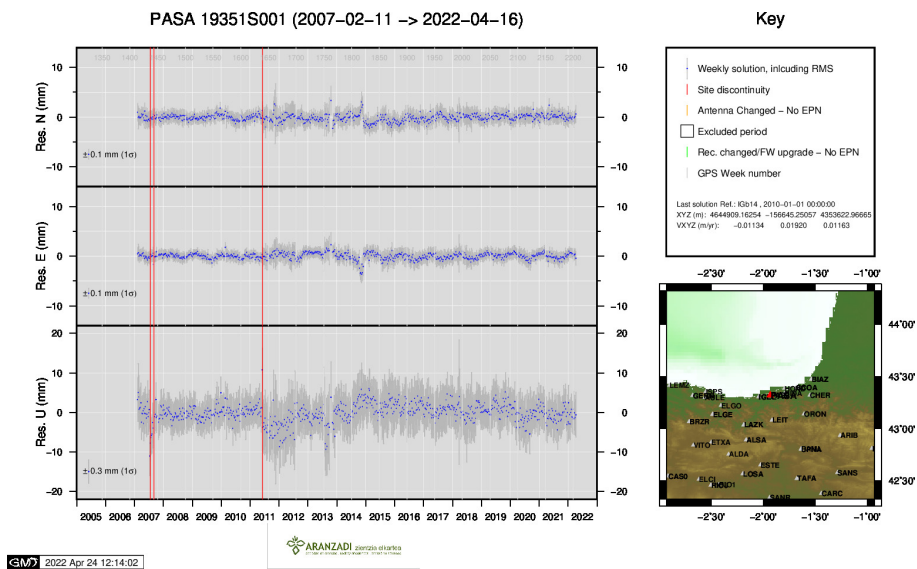
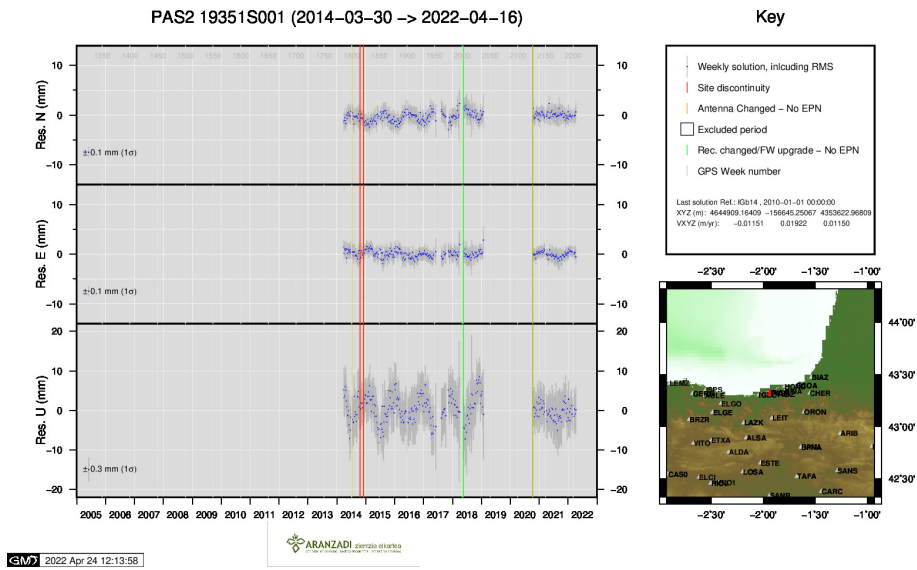
15) LARE

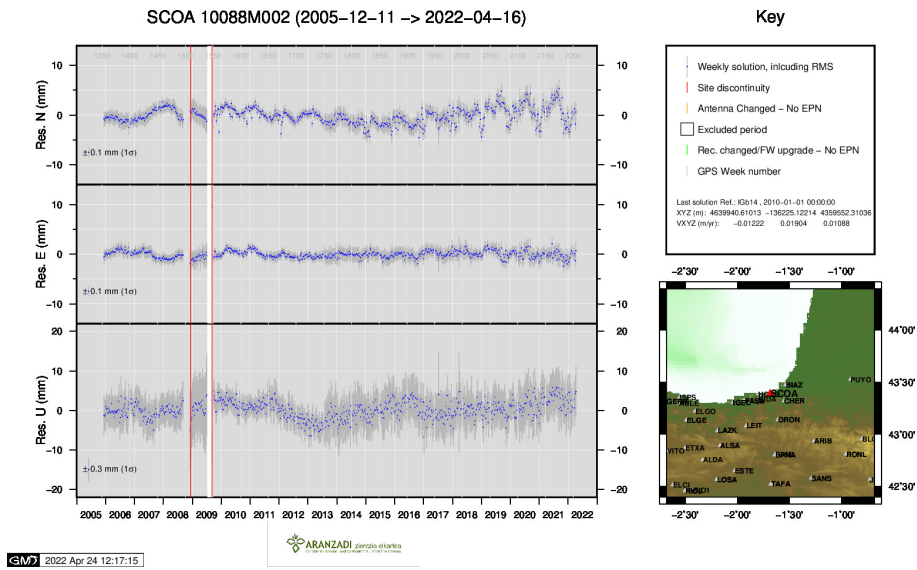


16) LAZK

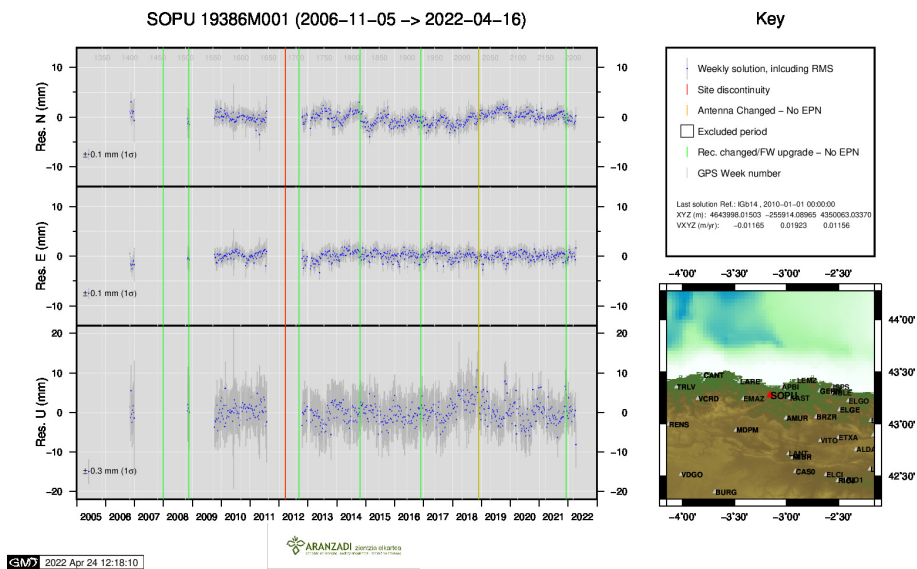


17) LEIT

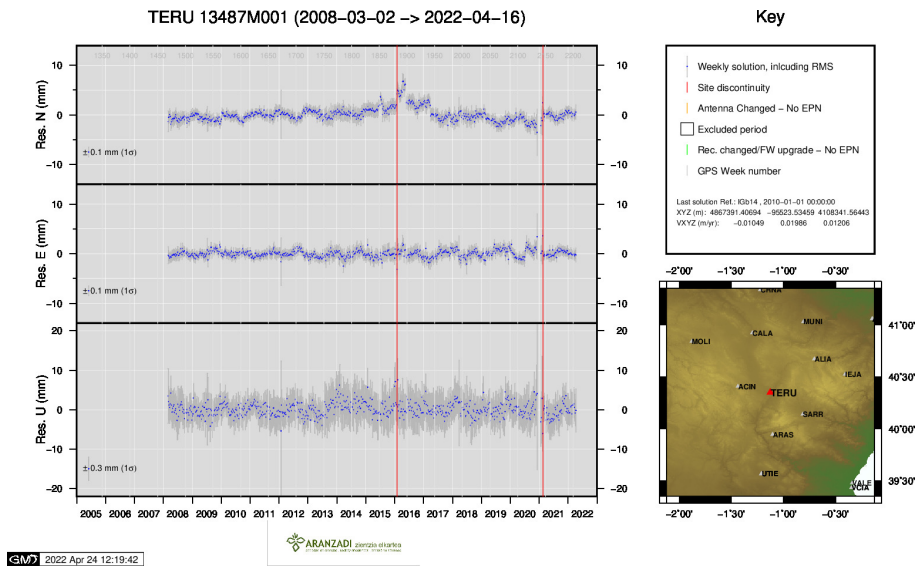




21) SCOA



22) SOPU



23) TERU

