ARA-DAC Weekly Analysis Result: 2212 (GFA)

Technical Report

GPS Week: 2212 (GFA)

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

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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

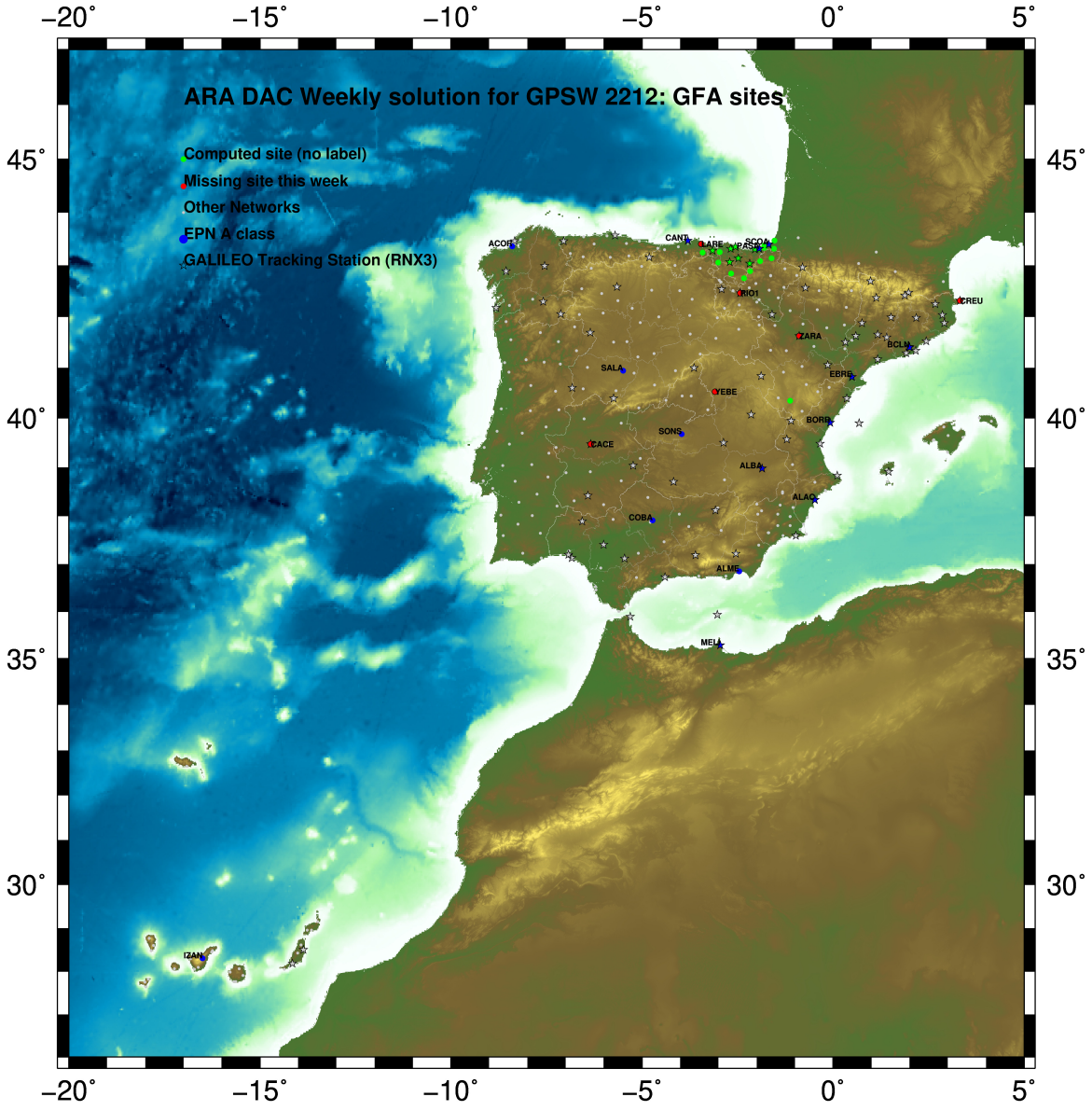

Fig.1: Computed Sites for GPS Week2212 (GFA)

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 avalaible 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.

ARA LAC 2212 WEEK FINAL COMBINATION: PRECISE ORBITS 19-JUN-22 14:09

LOCAL GEODETIC DATUM: IGb14 EPOCH: 2022-06-01 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACOR 13434M001	4594489.52459	-678367.38096	4357066.31582	W
39	ALDA 19383M001	4687280.12709	-190876.51092	4308106.99903	A
50	ALSA 19419M001	4677250.79719	-176770.33645	4319079.91170	A
53	AMUR 19388M001	4661499.41418	-244591.20172	4332269.92073	A
100	BIAZ 10074M002	4634456.01113	-124344.92032	4365785.49043	A
101	BIDA 00000M000	4644177.78371	-145778.26689	4354832.51718	A
113	BRZR 19387M001	4662220.95441	-220769.84249	4333309.47699	A
116	CANT 13438M001	4625924.27802	-307096.17930	4365771.59044	W
154	CHER 00000M000	4645879.98278	-125721.85346	4353624.11979	A
204	EBRE 13410M001	4833519.95177	41537.44935	4147461.75195	W
180	ELGE 19353S001	4657557.35634	-202241.41441	4338991.92258	A
182	EMAZ 17001M001	4645924.17034	-276949.80973	4347759.61289	A
209	GERN 19389M001	4642811.28114	-217222.86929	4353278.91584	A
257	HOND 15012M002	4640529.27414	-145675.92756	4358781.78720	A
235	IGEL 19352S001	4645951.38695	-165574.44699	4352550.45457	A
240	ISPS 19484M001	4640596.43861	-206963.72147	4356391.94830	A
245	KAST 19499M001	4646949.04066	-240747.21582	4348015.02921	A
256	LAZK 19354S001	4666098.30121	-178186.13388	4330463.70560	A
261	LEIT 19428M001	4663520.90100	-155858.66196	4334519.92218	A
334	ORON 19427M001	4659695.74179	-130864.67788	4338948.91890	A
345	PAS2 19351S001	4644909.02052	-156645.01196	4353623.11120	A
493	PASA 19351S001	4644909.02071	-156645.01202	4353623.11135	W
558	SALA 13469M001	4803054.45402	-462131.01417	4158379.11759	W
566	SCOA 10088M002	4639940.46274	-136224.88633	4359552.45390	W
418	SOPU 19386M001	4643997.86946	-255913.85053	4350063.17821	A
443	TERU 13487M001	4867391.27505	-95523.28811	4108341.71421	A
493	VITO 19385M001	4679397.66564	-218436.44878	4314898.40699	A

5.2 ETRF2000 (ETRS89) Coordinates

European **T**errestrial **R**eference **S**ystem, **1989** (**ETRS89**) is realized by ETRF2000 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

ETRF2000 FINAL COORD. wk 2212 19-JUN-22 14:09

LOCAL GEODETIC DATUM: ETRF2000 EPOCH: 2022-06-01 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACOR 13434M001	4594489.85539	-678367.97659	4357065.85968	W
39	ALDA 19383M001	4687280.51688	-190877.11611	4308106.54175	A
50	ALSA 19419M001	4677251.18962	-176770.94045	4319079.45544	A
53	AMUR 19388M001	4661499.79890	-244591.80411	4332269.46488	A
100	BIAZ 10074M002	4634456.41385	-124345.51926	4365785.03842	A
101	BIDA 00000M000	4644178.18284	-145778.86701	4354832.06408	A
113	BRZR 19387M001	4662221.34227	-220770.44490	4333309.02140	A
116	CANT 13438M001	4625924.65726	-307096.77778	4365771.13671	W
154	CHER 00000M000	4645880.38440	-125722.45371	4353623.66681	A
204	EBRE 13410M001	4833520.35914	41536.82831	4147461.28555	W
180	ELGE 19353S001	4657557.74702	-202242.01623	4338991.46762	A
182	EMAZ 17001M001	4645924.55209	-276950.41043	4347759.15790	A
209	GERN 19389M001	4642811.67098	-217223.46946	4353278.46190	A
257	HOND 15012M002	4640529.67359	-145676.52726	4358781.33440	A
235	IGEL 19352S001	4645951.78337	-165575.04737	4352550.00106	A
240	ISPS 19484M001	4640596.83000	-206964.32136	4356391.49468	A
245	KAST 19499M001	4646949.42708	-240747.81653	4348014.57462	A
256	LAZK 19354S001	4666098.69433	-178186.73660	4330463.25025	A
261	LEIT 19428M001	4663521.29729	-155859.26433	4334519.46734	A
334	ORON 19427M001	4659696.14163	-130865.27973	4338948.46471	A
345	PAS2 19351S001	4644909.41816	-156645.61219	4353622.65789	A
493	PASA 19351S001	4644909.41835	-156645.61225	4353622.65804	W
558	SALA 13469M001	4803054.79752	-462131.63320	4158378.64704	W
566	SCOA 10088M002	4639940.86346	-136225.48593	4359552.00128	W
418	SOPU 19386M001	4643998.25408	-255914.45094	4350062.72366	A
443	TERU 13487M001	4867391.66184	-95523.91346	4108341.24319	A
493	VITO 19385M001	4679398.05240	-218437.05314	4314897.95000	A

5.3 ETRF2014 (ETRS89) Coordinates

European **T**errestrial **R**eference **S**ystem, **1989** (**ETRS89**) is realized by ETRF2014 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

ETRF2014 FINAL COORD. wk 2212 19-JUN-22 14:09

LOCAL GEODETIC DATUM: ETRF2014 EPOCH: 2022-06-01 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACOR 13434M001	4594489.81479	-678368.01411	4357065.91123	W
39	ALDA 19383M001	4687280.47389	-190877.15497	4308106.59317	A
50	ALSA 19419M001	4677251.14670	-176770.97940	4319079.50690	A
53	AMUR 19388M001	4661499.75636	-244591.84289	4332269.51635	A
100	BIAZ 10074M002	4634456.37119	-124345.55858	4365785.09003	A
101	BIDA 00000M000	4644178.14016	-145778.90621	4354832.11565	A
113	BRZR 19387M001	4662221.29965	-220770.48376	4333309.07287	A
116	CANT 13438M001	4625924.61528	-307096.81649	4365771.18826	W
154	CHER 00000M000	4645880.34163	-125722.49297	4353623.71839	A
204	EBRE 13410M001	4833520.31375	41536.78927	4147461.33671	W
180	ELGE 19353S001	4657557.70438	-202242.05518	4338991.51912	A
182	EMAZ 17001M001	4645924.50982	-276950.44917	4347759.20940	A
209	GERN 19389M001	4642811.62854	-217223.50842	4353278.51344	A
257	HOND 15012M002	4640529.63094	-145676.56648	4358781.38598	A
235	IGEL 19352S001	4645951.74073	-165575.08650	4352550.05261	A
240	ISPS 19484M001	4640596.78756	-206964.36036	4356391.54623	A
245	KAST 19499M001	4646949.38467	-240747.85539	4348014.62613	A
256	LAZK 19354S001	4666098.65152	-178186.77560	4330463.30174	A
261	LEIT 19428M001	4663521.25444	-155859.30341	4334519.51885	A
334	ORON 19427M001	4659696.09873	-130865.31891	4338948.51624	A
345	PAS2 19351S001	4644909.37551	-156645.65135	4353622.70946	A
493	PASA 19351S001	4644909.37570	-156645.65141	4353622.70961	W
558	SALA 13469M001	4803054.75410	-462131.67060	4158378.69803	W
566	SCOA 10088M002	4639940.82079	-136225.52518	4359552.05286	W
418	SOPU 19386M001	4643998.21176	-255914.48976	4350062.77518	A
443	TERU 13487M001	4867391.61656	-95523.95188	4108341.29417	A
493	VITO 19385M001	4679398.00959	-218437.09194	4314898.00143	A

6 Quality Control

6.1 Mean and Daily Repeatabilities

In this section, the mean and daily repeatabilities of the sites are shown. Repatabilities refer to the IGb14 solution and are given with respect to the Local frame (North-East-Up).

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ARA LAC 2212 WEEK FINAL COMBINATION: PRECISE ORBITS              19-JUN-22 14:09
-------------------------------------------------------------------------------

                     Weekday     Repeatability (mm)
Station        #Days 0123456      N      E      U
-----------------------------------------------------
ACOR 13434M001     7 XXXXXXX     0.84   0.89   4.63
ALDA 19383M001     2 XX          1.60   0.99  10.63
ALSA 19419M001     7 XXXXXXX     1.24   1.10   2.45
AMUR 19388M001     2 XX          0.94   0.57   7.60
BIAZ 10074M002     7 XXXXXXX     1.14   1.03   4.08
BIDA 00000M000     7 XXXXXXX     0.87   1.42   1.90
BRZR 19387M001     7 XXXXXXX     0.63   1.34   2.92
CANT 13438M001     7 XXXXXXX     0.83   0.58   3.13
CHER 00000M000     7 XXXXXXX     1.31   1.10   5.00
EBRE 13410M001     7 XXXXXXX     0.69   0.61   2.65
ELGE 19353S001     7 XXXXXXX     0.70   0.64   4.81
EMAZ 17001M001     2 XX          0.56   0.26   1.75
GERN 19389M001     7 XXXXXXX     1.08   0.73   3.16
HOND 15012M002     7 XXXXXXX     0.86   0.93   2.97
IGEL 19352S001     7 XXXXXXX     1.02   0.71   1.83
ISPS 19484M001     7 XXXXXXX     0.95   1.80   3.99
KAST 19499M001     2 XX          0.17   0.67   1.89
LAZK 19354S001     7 XXXXXXX     0.85   0.95   6.71
LEIT 19428M001     7 XXXXXXX     1.09   0.89   2.81
ORON 19427M001     7 XXXXXXX     0.71   0.55   1.94
PAS2 19351S001     7 XXXXXXX     0.59   1.18   2.20
PASA 19351S001     7 XXXXXXX     0.58   1.16   1.92
SALA 13469M001     7 XXXXXXX     0.94   0.26   1.47
SCOA 10088M002     7 XXXXXXX     1.57   1.25   3.83
SOPU 19386M001     7 XXXXXXX     0.76   0.83   3.85
TERU 13487M001     7 XXXXXXX     0.86   0.87   3.80
VITO 19385M001     2 XX          0.52   0.27   4.88

Comparison of individual solutions:
-----------------------------------
ACOR 13434M001   N    0.84     -0.12   -1.49    0.42   -0.53   -0.98   -0.76    0.04
ACOR 13434M001   E    0.89     -0.29   -0.15    0.05   -0.50   -0.86   -1.70    0.87
ACOR 13434M001   U    4.63      5.34    3.34    0.80    7.34   -2.91   -1.82    4.77
ALDA 19383M001   N    1.60      0.48   -1.53
ALDA 19383M001   E    0.99     -0.54    0.84
ALDA 19383M001   U   10.63     -9.47    4.83
ALSA 19419M001   N    1.24      1.21   -0.74   -0.35   -1.69    1.96    0.28    0.60
ALSA 19419M001   E    1.10     -1.68   -1.48   -0.27    0.63    0.70    0.33    1.06
ALSA 19419M001   U    2.45     -4.35    0.49    2.50   -0.41    3.08   -0.93    0.21
AMUR 19388M001   N    0.94     -0.84    0.40
AMUR 19388M001   E    0.57     -0.57    0.07
AMUR 19388M001   U    7.60     -7.36    1.90
BIAZ 10074M002   N    1.14      0.41   -1.25   -0.43   -0.81   -0.79    1.71    1.28
BIAZ 10074M002   E    1.03      0.51    0.20   -0.60   -1.00    0.15   -2.07    0.63
BIAZ 10074M002   U    4.08     -5.60   -0.10    4.89    1.43   -1.70    5.48   -3.09
BIDA 00000M000   N    0.87      0.04   -1.46    0.86    0.87   -0.33    0.78   -0.39
BIDA 00000M000   E    1.42     -1.55   -0.55   -0.33   -2.00    1.65   -0.66    1.46
BIDA 00000M000   U    1.90     -0.86   -0.70   -1.56    0.72    3.36   -2.33    0.88
BRZR 19387M001   N    0.63      0.66   -0.12    0.57    0.40   -0.27   -1.15   -0.14
BRZR 19387M001   E    1.34     -1.25   -0.74   -0.63   -1.29    0.97    2.09    1.17
BRZR 19387M001   U    2.92     -2.43   -3.13   -1.49   -5.16    1.87    1.39    1.12
CANT 13438M001   N    0.83      0.66    0.56    0.48    0.04   -1.65    0.29    0.57
CANT 13438M001   E    0.58     -0.75   -0.06   -0.02   -0.30    1.18    0.04    0.08
CANT 13438M001   U    3.13     -3.39    1.86    3.27   -4.33    0.75   -2.74    2.50
CHER 00000M000   N    1.31      0.25   -2.93    0.49    0.46    0.00   -1.12    0.02
CHER 00000M000   E    1.10     -0.08    1.62    1.02   -0.72   -0.55   -0.38   -1.63
CHER 00000M000   U    5.00     -0.33   -8.50   -2.74   -3.17   -1.55    7.47    1.29
EBRE 13410M001   N    0.69      1.05    0.38   -0.05   -0.27   -0.63   -1.05    0.01
EBRE 13410M001   E    0.61     -0.80    0.44    0.20    0.00   -0.40    0.82   -0.72
EBRE 13410M001   U    2.65      3.88    2.63    2.02   -0.67   -3.68    0.19   -1.41
ELGE 19353S001   N    0.70      0.09   -0.01    0.79    0.31    0.35   -0.37   -1.39
ELGE 19353S001   E    0.64     -0.66    0.03    0.01    0.72   -0.37   -0.23    1.14
ELGE 19353S001   U    4.81     -2.54   -0.48    6.51   -4.44    2.34   -1.89   -7.81
EMAZ 17001M001   N    0.56     -0.39   -0.41
EMAZ 17001M001   E    0.26     -0.17   -0.20
EMAZ 17001M001   U    1.75      1.60   -0.71
GERN 19389M001   N    1.08     -0.30   -1.11   -0.38   -0.53    0.20    1.49    1.73
GERN 19389M001   E    0.73     -0.49    0.49    1.01   -0.57   -0.59   -0.68    0.75
GERN 19389M001   U    3.16     -4.31   -0.91   -1.23    1.41    2.89   -1.47    5.14
HOND 15012M002   N    0.86      0.25   -1.57    1.01   -0.34   -0.73    0.44    0.14
HOND 15012M002   E    0.93     -0.83    0.03    0.06   -1.51    0.90    1.17    0.19
HOND 15012M002   U    2.97      1.48    0.15   -0.17    1.74    2.50    2.66   -5.86
IGEL 19352S001   N    1.02     -0.93   -1.49   -0.66    0.28    0.64    1.46    0.20
IGEL 19352S001   E    0.71     -1.02    0.13   -0.04   -0.41   -0.02    1.35   -0.01
IGEL 19352S001   U    1.83     -0.79   -0.61   -0.18    0.73    2.12    3.45   -1.46
ISPS 19484M001   N    0.95     -0.51   -1.07    0.69   -0.55    1.33    1.20   -0.15
ISPS 19484M001   E    1.80     -0.52   -1.09    1.32    0.73   -1.91   -1.67    3.05
ISPS 19484M001   U    3.99     -2.14    3.63    1.44   -2.51   -3.04   -3.10    7.11
KAST 19499M001   N    0.17      0.16   -0.06
KAST 19499M001   E    0.67     -0.66    0.14
KAST 19499M001   U    1.89     -1.83   -0.50
LAZK 19354S001   N    0.85     -0.76    0.03   -0.47    0.34    1.78    0.47    0.03
LAZK 19354S001   E    0.95     -0.34   -1.38   -0.87   -0.09    0.02    0.49    1.54
LAZK 19354S001   U    6.71     -0.25    2.46    5.29    6.87   -1.46    0.78  -13.63
LEIT 19428M001   N    1.09      0.03   -0.80   -1.28    0.99    1.92    0.48   -0.08
LEIT 19428M001   E    0.89     -1.08   -0.28   -0.55    0.76    1.06    0.57   -1.09
LEIT 19428M001   U    2.81      0.51   -1.08    3.14   -2.89    1.11    3.42   -3.85
ORON 19427M001   N    0.71      0.47   -0.07   -0.91    1.13    0.75   -0.05   -0.35
ORON 19427M001   E    0.55     -0.66    0.21    0.01   -0.71    0.79   -0.45   -0.14
ORON 19427M001   U    1.94     -0.37    3.65    1.62   -1.32   -1.82    0.49   -1.11
PAS2 19351S001   N    0.59     -0.19   -0.98    0.64    0.38    0.05    0.01   -0.71
PAS2 19351S001   E    1.18     -0.67    0.34   -0.29   -2.20    0.68    1.34    0.80
PAS2 19351S001   U    2.20     -1.71    0.72    2.41   -0.21   -0.31    4.01   -1.92
PASA 19351S001   N    0.58     -0.16   -0.92    0.66    0.22    0.03    0.18   -0.79
```

PASA	19351S001	E	1.16	-0.56	0.30	-0.35	-2.15	0.68	1.38	0.73
PASA	19351S001	U	1.92	-1.93	0.91	2.57	-0.11	-0.23	3.07	-1.22
SALA	13469M001	N	0.94	0.64	-0.14	-0.05	1.20	-1.25	-1.02	-0.92
SALA	13469M001	E	0.26	0.07	0.39	0.19	0.24	-0.10	-0.18	-0.33
SALA	13469M001	U	1.47	2.47	-0.10	-2.33	-0.15	-1.03	0.21	-0.49
SCOA	10088M002	N	1.57	1.57	-0.81	-1.42	-1.55	-1.50	1.27	1.84
SCOA	10088M002	E	1.25	-0.71	0.32	-0.31	1.89	0.57	-1.52	-1.57
SCOA	10088M002	U	3.83	-6.50	0.47	5.16	2.10	3.06	-1.67	-1.48
SOPU	19386M001	N	0.76	1.32	-0.45	0.22	-0.70	0.94	-0.24	-0.01
SOPU	19386M001	E	0.83	-0.91	0.03	-0.82	-0.20	0.03	0.23	1.59
SOPU	19386M001	U	3.85	-2.41	0.13	0.18	0.09	1.63	-5.51	7.07
TERU	13487M001	N	0.86	1.22	1.07	-0.35	-0.77	-1.01	0.02	-0.15
TERU	13487M001	E	0.87	0.15	-1.24	0.90	1.13	-0.01	0.86	-0.42
TERU	13487M001	U	3.80	3.88	7.26	-0.77	1.42	-3.97	0.77	0.05
VITO	19385M001	N	0.52	0.04	-0.52					
VITO	19385M001	E	0.27	-0.03	-0.27					
VITO	19385M001	U	4.88	-4.71	-1.29					

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	-2.00	1.73	2.45
12	ALAC 13433M001	I W	0.89	-0.64	2.57
15	ALBA 13452M001	I W	2.22	-1.77	-5.56
21	ALME 13437M001	I W	-0.86	-0.31	10.30
47	BCLN 13412M001	I W	-0.11	-3.05	3.28
71	BORR 13480M001	I W	-0.61	-1.89	0.13
116	CANT 13438M001	I W	-0.94	1.67	-0.73
143	COBA 13453M001	I W	1.95	0.67	0.44
204	EBRE 13410M001	I W	-1.83	-0.43	0.69
316	IZAN 31309M002	I W	2.18	1.67	-5.26
432	MELI 19379M001	I W	3.41	-0.79	-1.02
493	PASA 19351S001	I W	-0.13	-0.63	-0.32
558	SALA 13469M001	I W	0.35	1.18	-6.52
566	SCOA 10088M002	I W	-3.29	-0.02	-7.54
599	SONS 13446M001	I W	-1.24	2.61	7.09
	RMS / COMPONENT		1.85	1.58	4.93
	MEAN		-0.00	0.00	0.00
	MIN		-3.29	-3.05	-7.54
	MAX		3.41	2.61	10.30

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 45
RMS OF TRANSFORMATION : 3.17 MM

BARYCENTER COORDINATES:

LATITUDE : 39 33 19.86
LONGITUDE : - 3 34 9.67
HEIGHT : -25.352 KM

PARAMETERS:

TRANSLATION IN N : 0.00 +- 0.82 MM
TRANSLATION IN E : 0.00 +- 0.82 MM
TRANSLATION IN U : -0.00 +- 0.82 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                       14948505
 NUMBER OF UNKNOWNS                             177673
 NUMBER OF DEGREES OF FREEDOM                 14770832
 PHASE MEASUREMENTS SIGMA                      0.00100
 SAMPLING INTERVAL (SECONDS)                       180
 VARIANCE FACTOR                    2.229869130248802
```

Helmert Transformation Parameters With Respect to Combined Solution:

		Translation (m)			Rotation (")			
Sol	Rms (m)	X	Y	Z	X	Y	Z	Scale (ppm)
1	0.00240	-0.0137	-0.0079	0.0135	0.0001	-0.0006	-0.0003	0.00023
2	0.00206	0.0072	-0.0099	-0.0054	0.0002	0.0003	-0.0003	-0.00033
3	0.00183	0.0115	0.0377	-0.0093	-0.0006	0.0005	0.0011	0.00005
4	0.00196	0.0091	0.0049	-0.0066	-0.0001	0.0004	0.0002	-0.00027
5	0.00191	-0.0034	0.0057	0.0078	-0.0001	-0.0003	0.0001	-0.00042
6	0.00193	-0.0105	-0.0161	0.0076	0.0004	-0.0004	-0.0003	0.00036
7	0.00211	-0.0019	-0.0100	-0.0039	0.0003	0.0000	-0.0002	0.00053

Statistics of individual solutions:

File	RMS (m)	DOF	Chi**2/DOF	#Observations authentic	/ pseudo	#Parameters explicit	/ implicit	/ singular
1	0.00143	2186814	2.05	2212733	3	771	25151	0
2	0.00142	2159460	2.02	2185652	3	756	25439	0
3	0.00142	2132287	2.01	2156939	3	744	23911	0
4	0.00153	2023361	2.33	2048534	3	717	24459	0
5	0.00154	2067036	2.38	2093422	3	744	25645	0
6	0.00155	2088608	2.41	2115848	3	744	26499	0
7	0.00155	2108847	2.39	2135377	3	744	25789	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 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 ALDA  A    1 P 22:149:00000 22:150:86370 LEICA GR10           ----- -----------
 ALSA  A    1 P 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 AMUR  A    1 P 22:149:00000 22:150:86370 LEICA GR10           ----- -----------
 BIAZ  A    1 P 22:149:00000 22:155:82770 SPECTRA SP90M        ----- -----------
 BIDA  A    1 P 22:149:00000 22:155:86370 LEICA GR10           ----- -----------
 BRZR  A    1 P 22:149:00000 22:155:86370 LEICA GR30           ----- -----------
 CANT  A    1 P 22:149:00000 22:155:86370 LEICA GR10           ----- -----------
 CHER  A    1 P 22:149:00000 22:155:26940 LEICA GR30           ----- -----------
 EBRE  A    1 P 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 ELGE  A    1 P 22:149:00000 22:155:86370 LEICA GR30           ----- -----------
 EMAZ  A    1 P 22:149:00000 22:150:86370 LEICA GR30           ----- -----------
 GERN  A    1 P 22:149:00000 22:155:86370 LEICA GR30           ----- -----------
 HOND  A    1 P 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 IGEL  A    1 P 22:149:00000 22:155:86370 LEICA GR30           ----- -----------
 ISPS  A    1 P 22:149:00000 22:155:86370 TRIMBLE NETR9        ----- -----------
 KAST  A    1 P 22:149:00000 22:150:86370 LEICA GR30           ----- -----------
 LAZK  A    1 P 22:149:00000 22:155:86370 LEICA GR30           ----- -----------
 LEIT  A    1 P 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 ORON  A    1 P 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 PAS2  A    1 P 22:149:00030 22:155:86370 STONEX SC2200        ----- -----------
 PASA  A    1 P 22:149:00000 22:155:86370 LEICA GR30           ----- -----------
 SALA  A    1 P 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 SCOA  A    1 P 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 SOPU  A    1 P 22:149:00000 22:155:86370 LEICA GR30           ----- -----------
 TERU  A    1 P 22:149:00000 22:155:86370 LEICA GR50           ----- -----------
 VITO  A    1 P 22:149:00000 22:150:86370 LEICA GR10           ----- -----------
```

7.2 Antennas

Serial number ONLY provided in case individual calibrations are vailable.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_________ S/N__
 ACOR  A    1 P 22:149:00000 22:155:86370 LEIAT504         LEIS -----
 ALDA  A    1 P 22:149:00000 22:150:86370 LEIAS10          NONE -----
 ALSA  A    1 P 22:149:00000 22:155:86370 LEIAR10          NONE -----
 AMUR  A    1 P 22:149:00000 22:150:86370 LEIAS10          NONE -----
 BIAZ  A    1 P 22:149:00000 22:155:82770 LEIAR25          LEIT -----
 BIDA  A    1 P 22:149:00000 22:155:86370 LEIAS10          NONE -----
 BRZR  A    1 P 22:149:00000 22:155:86370 LEIAS10          NONE -----
 CANT  A    1 P 22:149:00000 22:155:86370 LEIAR25.R4       LEIT 25066
 CHER  A    1 P 22:149:00000 22:155:26940 LEIAR10          NONE -----
```

```
 EBRE  A    1 P 22:149:00000 22:155:86370 LEIAR25.R4      NONE 26359
 ELGE  A    1 P 22:149:00000 22:155:86370 LEIAR25.R4      LEIT -----
 EMAZ  A    1 P 22:149:00000 22:150:86370 LEIAS10         NONE -----
 GERN  A    1 P 22:149:00000 22:155:86370 LEIAS10         NONE -----
 HOND  A    1 P 22:149:00000 22:155:86370 LEIAR20         LEIM 41012
 IGEL  A    1 P 22:149:00000 22:155:86370 LEIAR20         LEIM 43011
 ISPS  A    1 P 22:149:00000 22:155:86370 TRM59900.00     SCIS -----
 KAST  A    1 P 22:149:00000 22:150:86370 LEIAS10         NONE -----
 LAZK  A    1 P 22:149:00000 22:155:86370 LEIAR25.R4      LEIT -----
 LEIT  A    1 P 22:149:00000 22:155:86370 LEIAR10         NONE -----
 ORON  A    1 P 22:149:00000 22:155:86370 LEIAR10         NONE -----
 PAS2  A    1 P 22:149:00030 22:155:86370 LEIAR20         LEIM 73034
 PASA  A    1 P 22:149:00000 22:155:86370 LEIAR20         LEIM 73034
 SALA  A    1 P 22:149:00000 22:155:86370 LEIAR25         NONE -----
 SCOA  A    1 P 22:149:00000 22:155:86370 TRM55971.00     NONE -----
 SOPU  A    1 P 22:149:00000 22:155:86370 LEIAS10         NONE -----
 TERU  A    1 P 22:149:00000 22:155:86370 LEIAR20         LEIM 49044
 VITO  A    1 P 22:149:00000 22:150:86370 LEIAS10         NONE -----
```

7.3 Eccentricities

```
*                                          UP______ NORTH___ EAST____
*SITE PT SOLN T DATA_START__ DATA_END____ AXE ARP->BENCHMARK(M)_________
 ACOR  A    1 P 22:149:00000 22:155:86370 UNE   3.0460   0.0000   0.0000
 ALDA  A    1 P 22:149:00000 22:150:86370 UNE   0.0000   0.0000   0.0000
 ALSA  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 AMUR  A    1 P 22:149:00000 22:150:86370 UNE   0.0000   0.0000   0.0000
 BIAZ  A    1 P 22:149:00000 22:155:82770 UNE   0.0000   0.0000   0.0000
 BIDA  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 BRZR  A    1 P 22:149:00000 22:155:86370 UNE   0.0771   0.0000   0.0000
 CANT  A    1 P 22:149:00000 22:155:86370 UNE   3.0490   0.0000   0.0000
 CHER  A    1 P 22:149:00000 22:155:26940 UNE   0.0000   0.0000   0.0000
 EBRE  A    1 P 22:149:00000 22:155:86370 UNE   0.0770   0.0000   0.0000
 ELGE  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 EMAZ  A    1 P 22:149:00000 22:150:86370 UNE   0.0350   0.0000   0.0000
 GERN  A    1 P 22:149:00000 22:155:86370 UNE   0.0771   0.0000   0.0000
 HOND  A    1 P 22:149:00000 22:155:86370 UNE   0.0771   0.0000   0.0000
 IGEL  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 ISPS  A    1 P 22:149:00000 22:155:86370 UNE   0.0350   0.0000   0.0000
 KAST  A    1 P 22:149:00000 22:150:86370 UNE   0.0350   0.0000   0.0000
 LAZK  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 LEIT  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 ORON  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 PAS2  A    1 P 22:149:00030 22:155:86370 UNE   0.0000   0.0000   0.0000
 PASA  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 SALA  A    1 P 22:149:00000 22:155:86370 UNE   0.0600   0.0000   0.0000
 SCOA  A    1 P 22:149:00000 22:155:86370 UNE   0.0000   0.0000   0.0000
 SOPU  A    1 P 22:149:00000 22:155:86370 UNE   0.0771   0.0000   0.0000
 TERU  A    1 P 22:149:00000 22:155:86370 UNE   0.0600   0.0000   0.0000
 VITO  A    1 P 22:149:00000 22:150:86370 UNE   0.0000   0.0000   0.0000
```

8 References

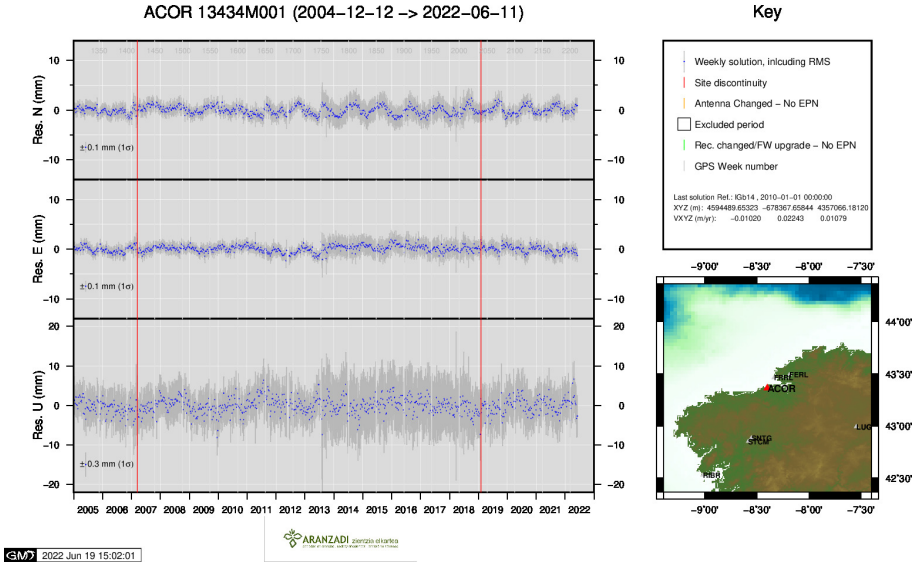
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign.* etrs89.ensg.ign.fr/memo-V8.pdf

EPN Coordination Group and the EPN Central Bureau (2018): *Guidelines for the EPN Analysis Centres.* epncb.oma.be/$_d$*ocumentation/guidelines/guidelines*$_a$*nalysis*$_c$*entres.pdf*

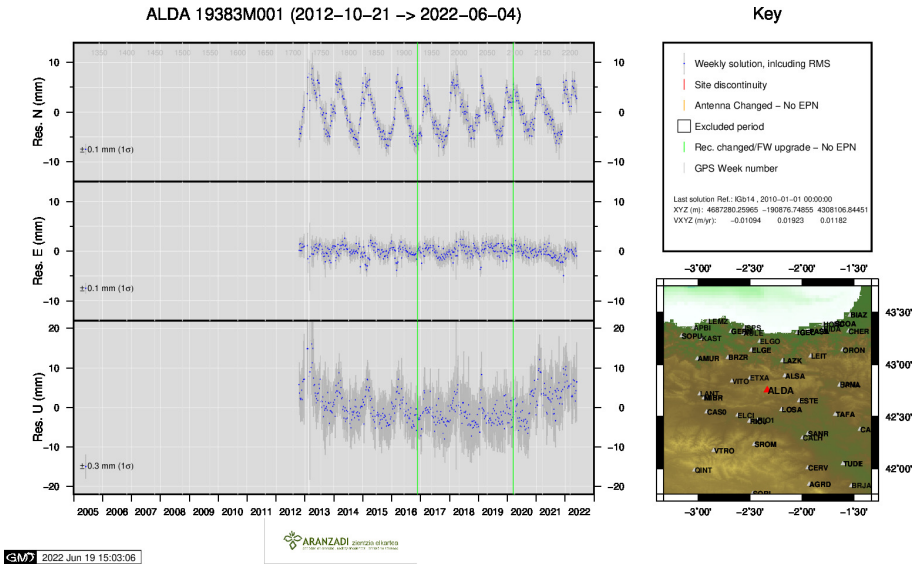
Z. Altamimi (2018): *EUREF Technical Note 1: Relationship and Transformation between the International and the European Terrestrial Reference Systems.* etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf

9 Cumulative Time Series

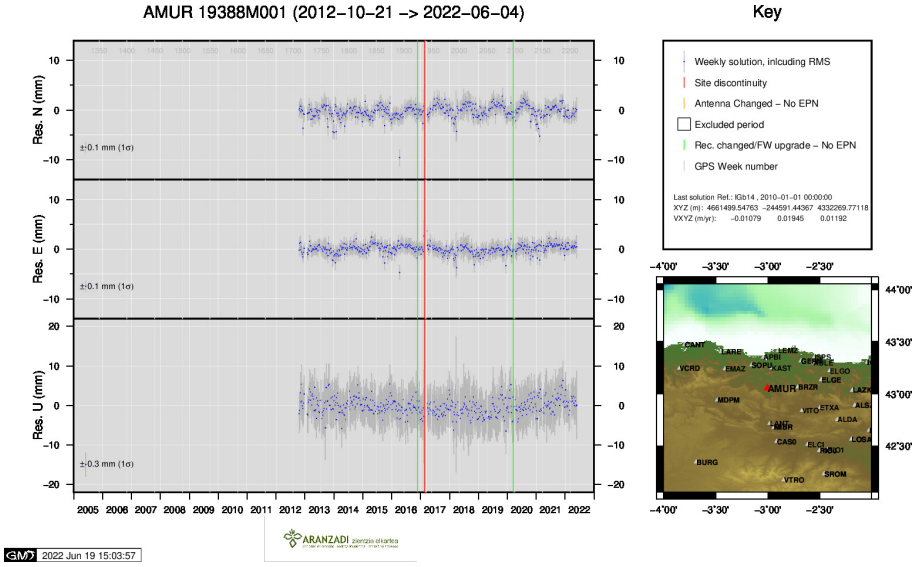
Time series of stations. Latest plots at: http://geolabpasaia.org/gnss/ARA-net/TSeries/, or click on the caption of each image.



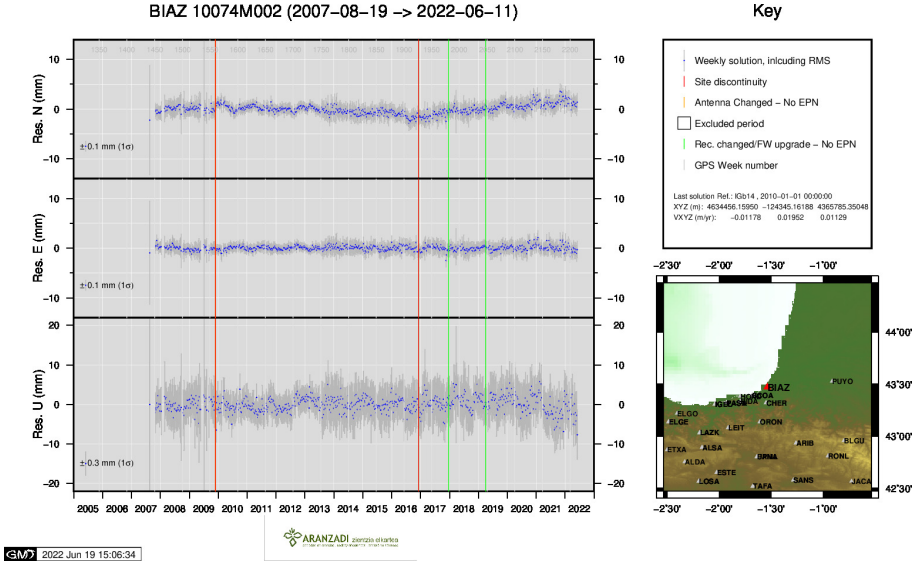
1) ACOR



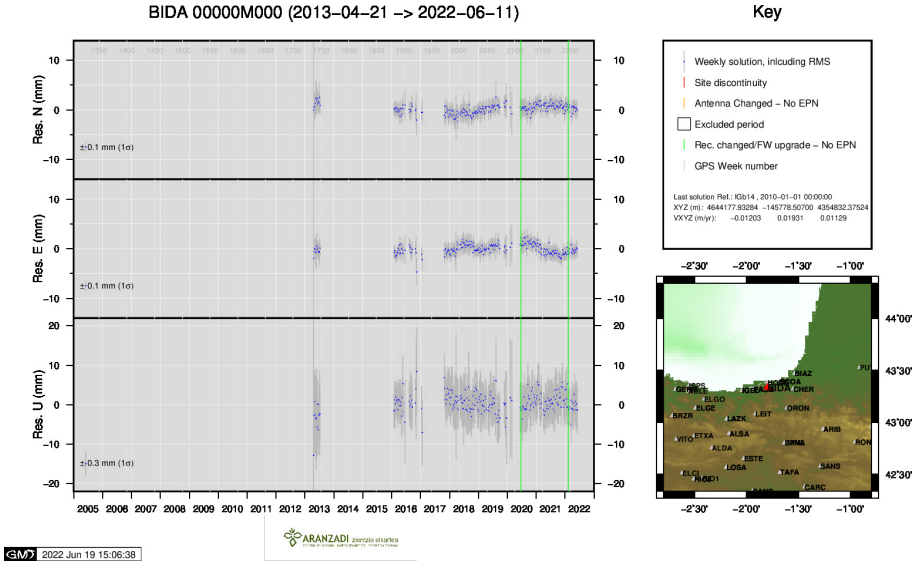
2) ALDA



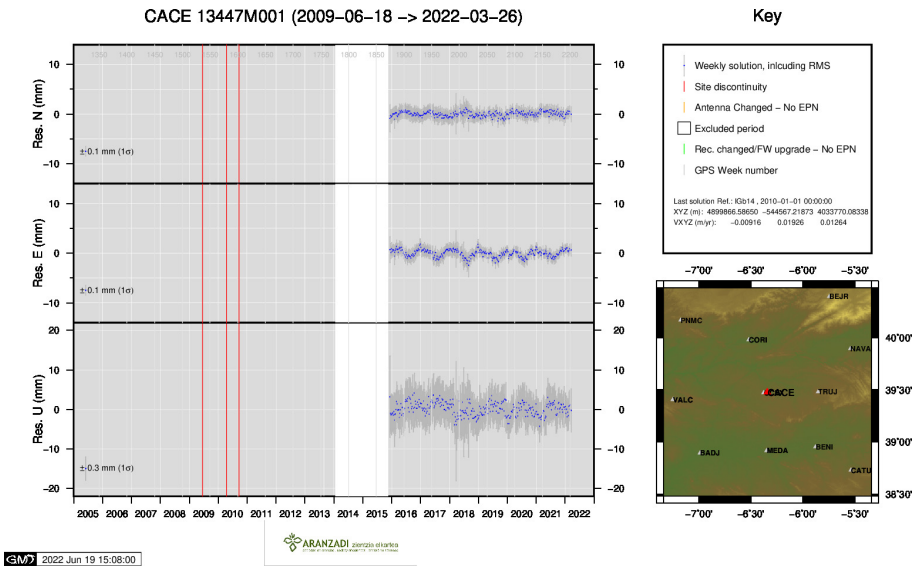
3) AMUR



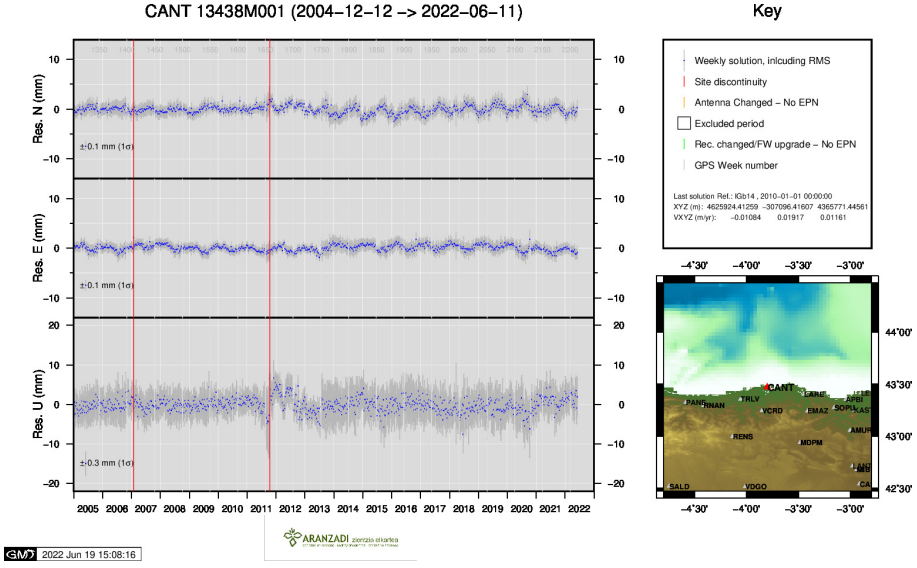
4) BIAZ



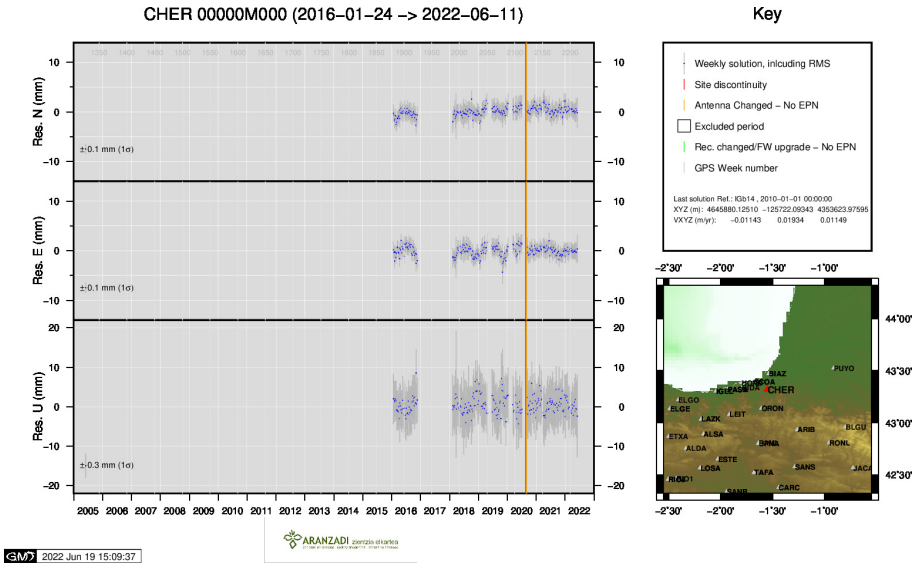
5) BIDA



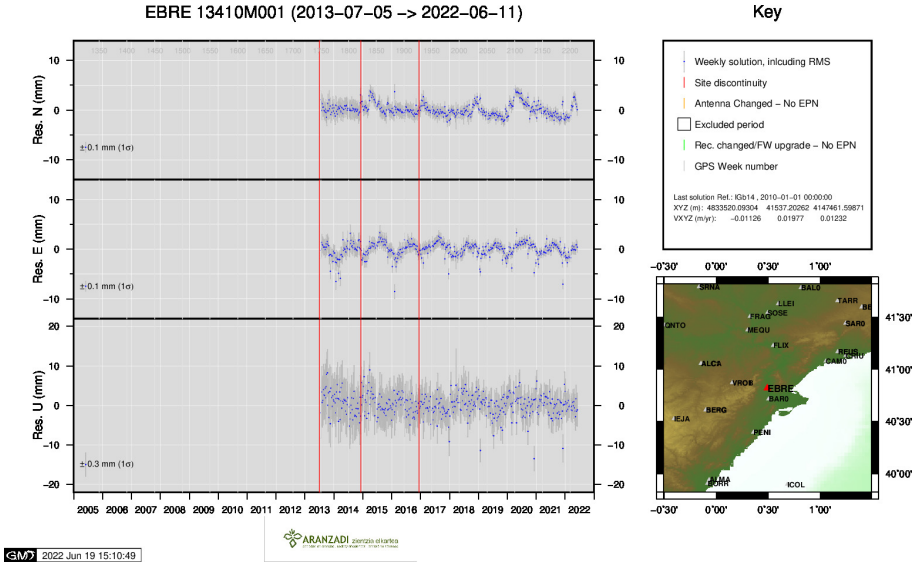
6) CACE



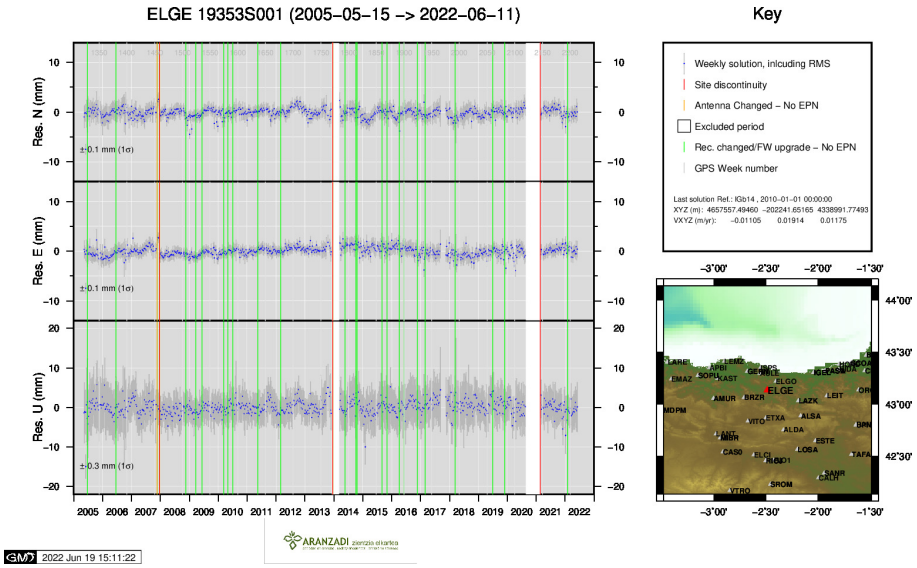
7) CANT



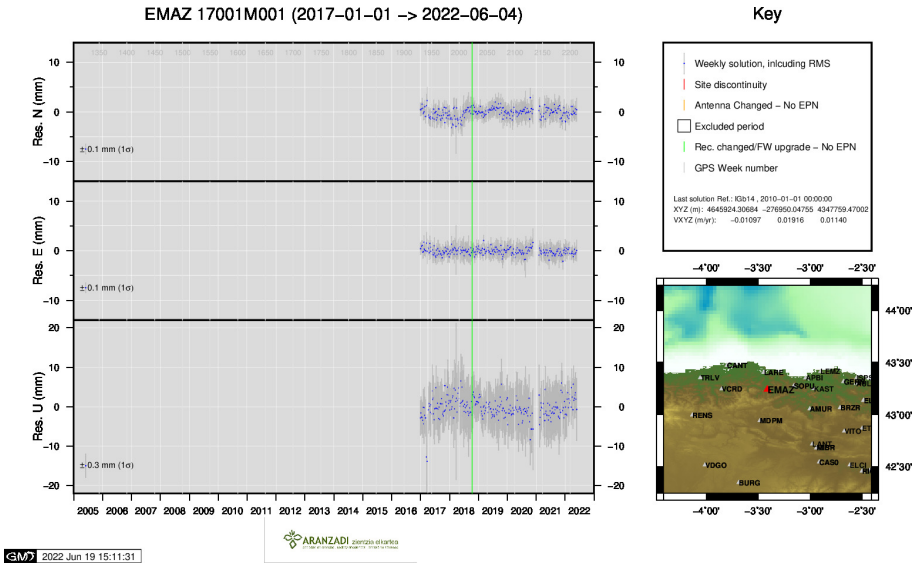
8) CHER



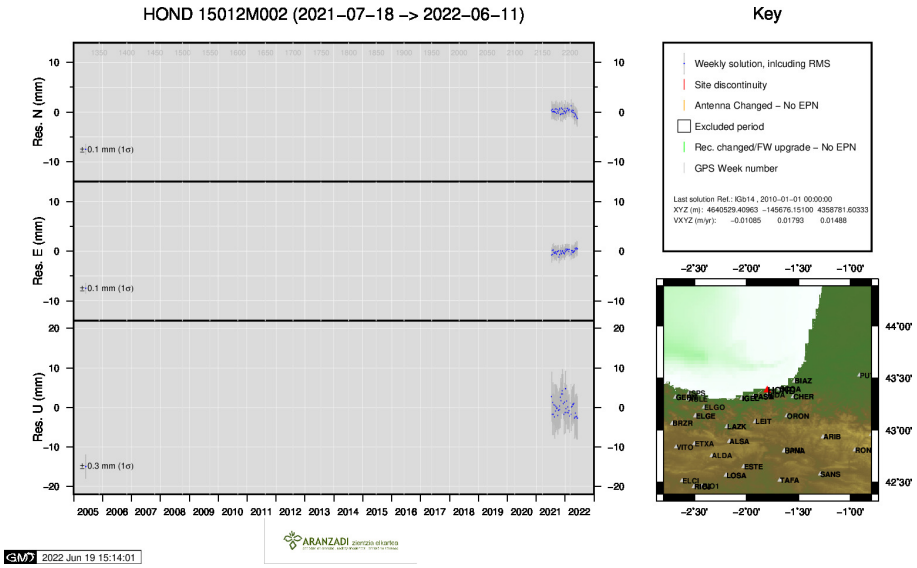
9) EBRE



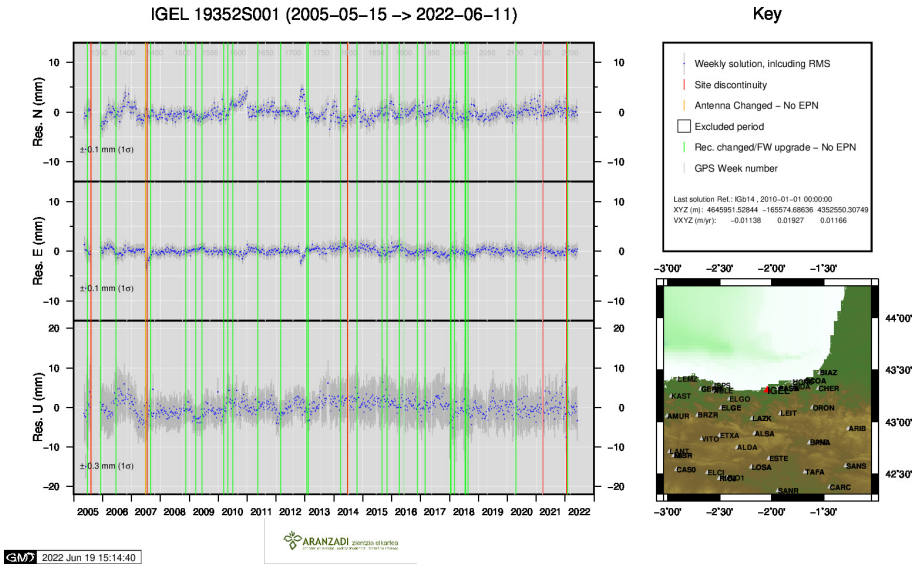
10) ELGE



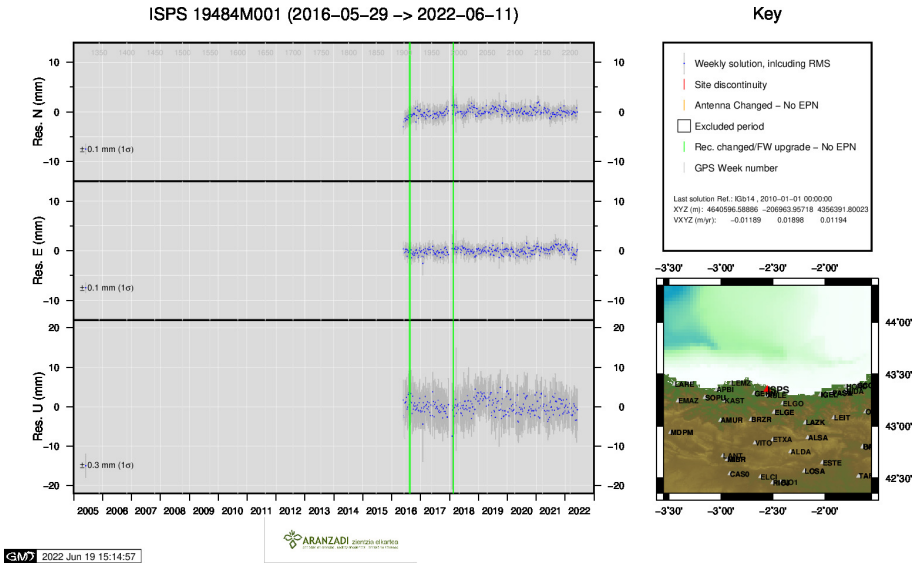
11) EMAZ



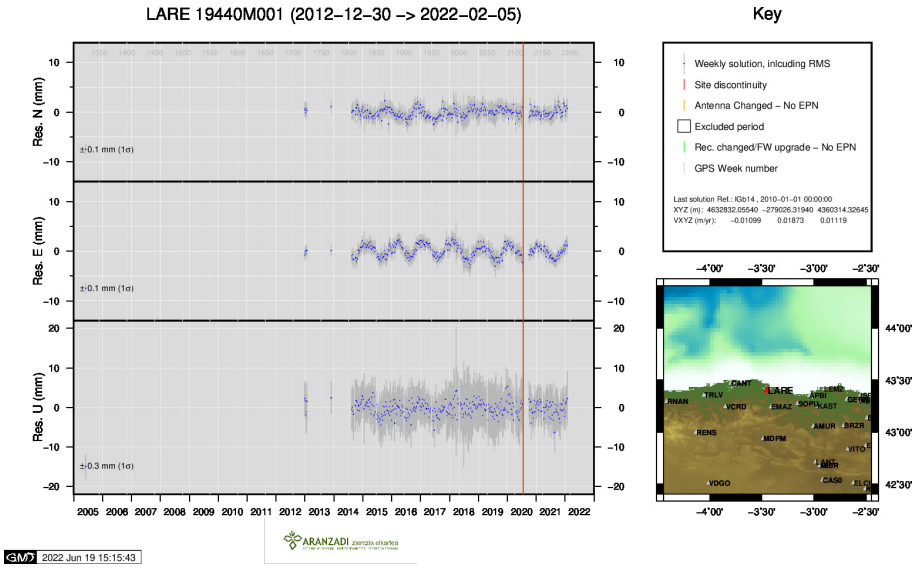
12) HOND



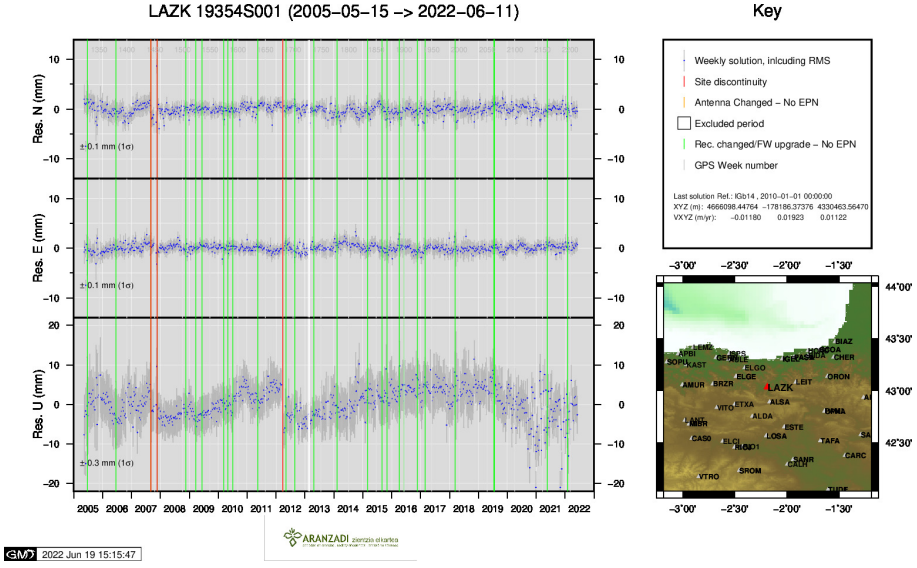
13) IGEL



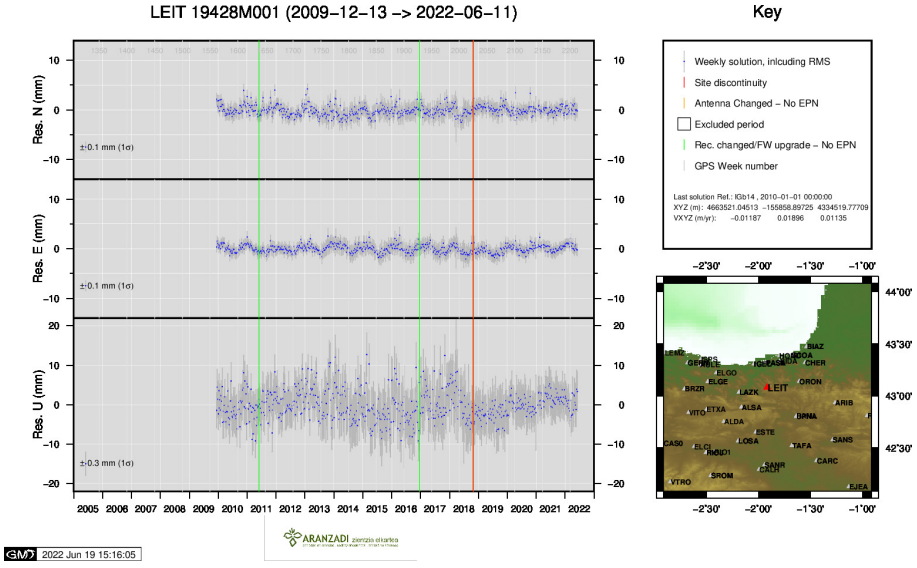
14) ISPS



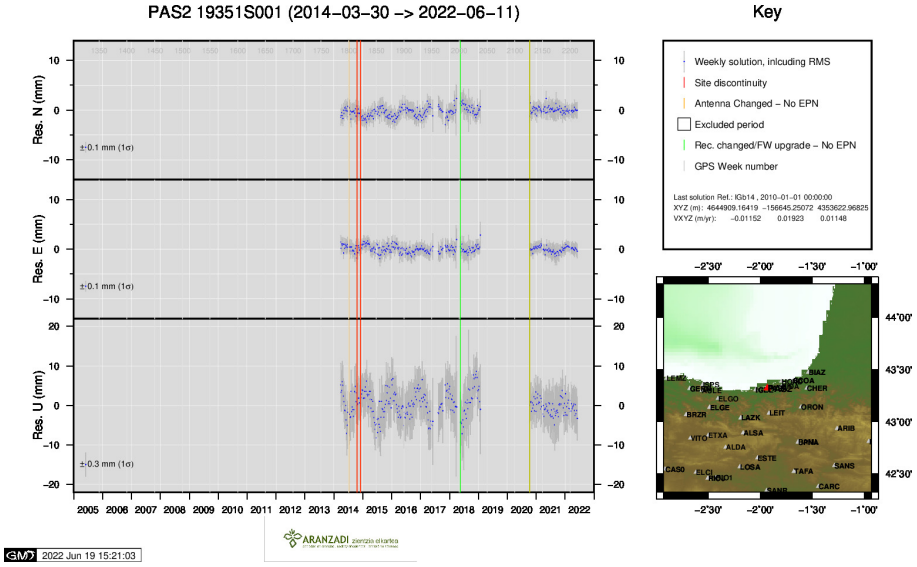
15) LARE



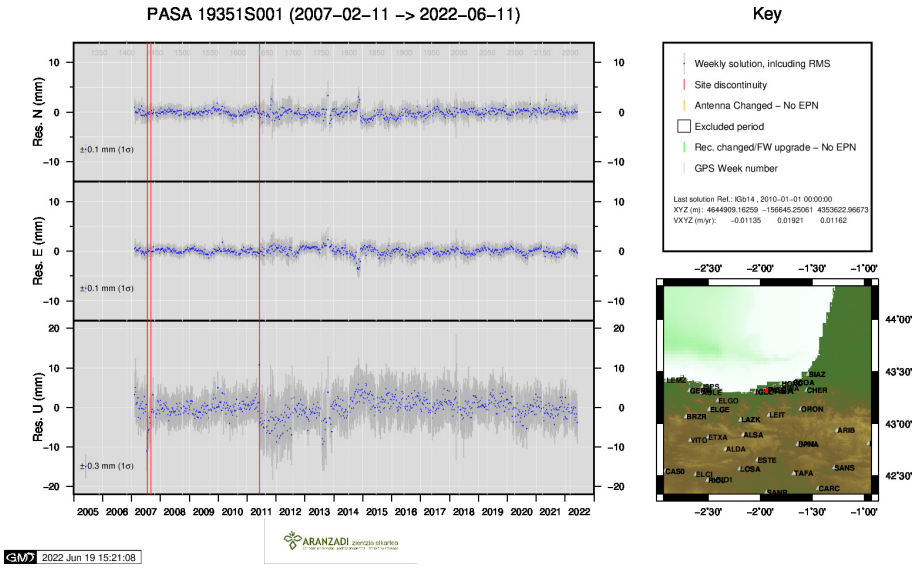
16) LAZK



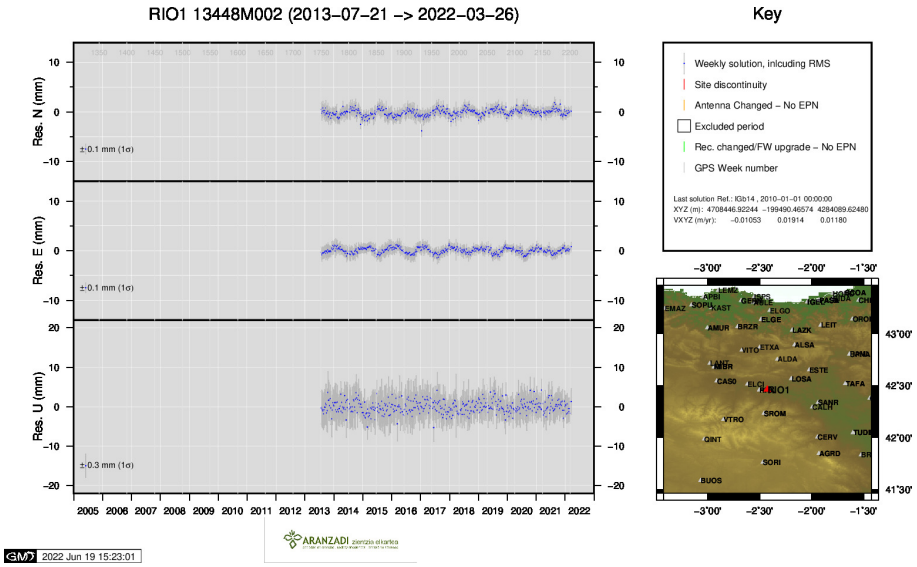
17) LEIT



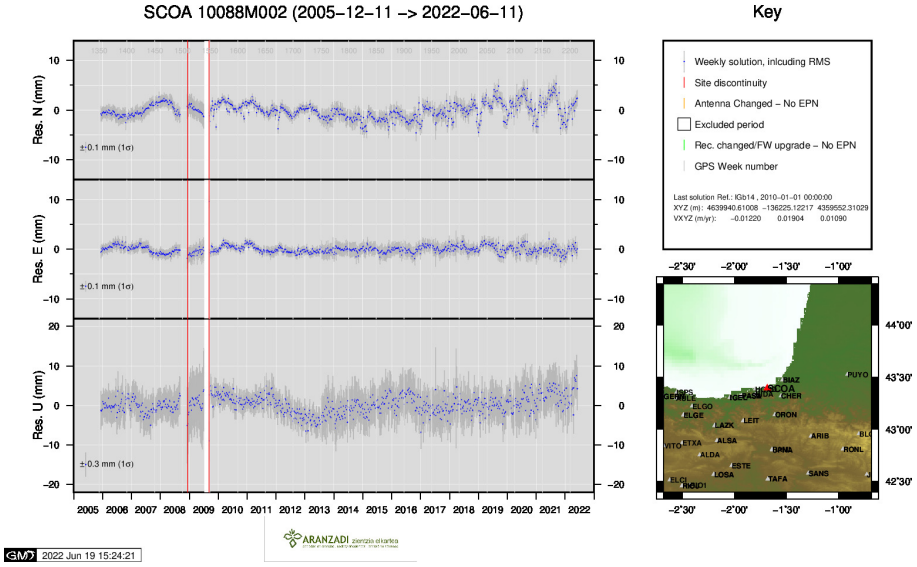
18) PAS2



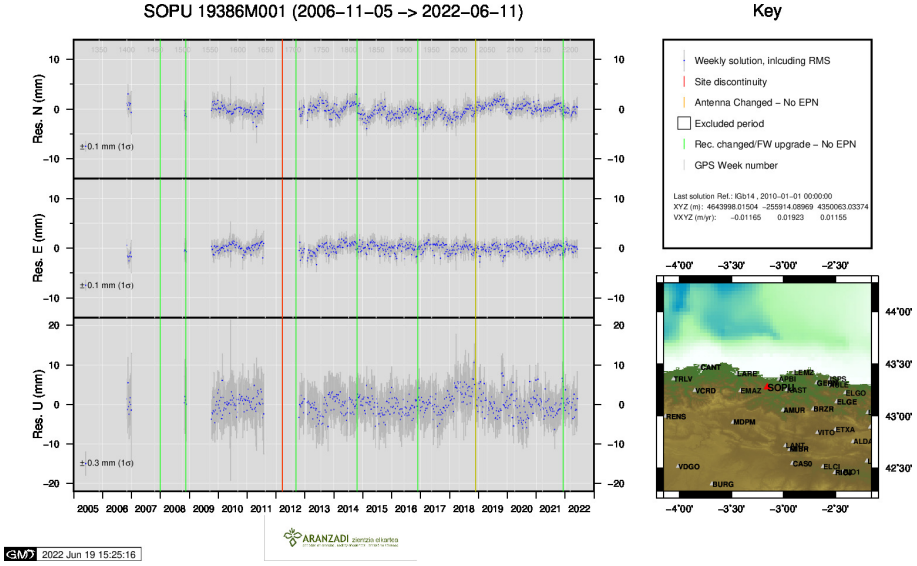
19) PASA



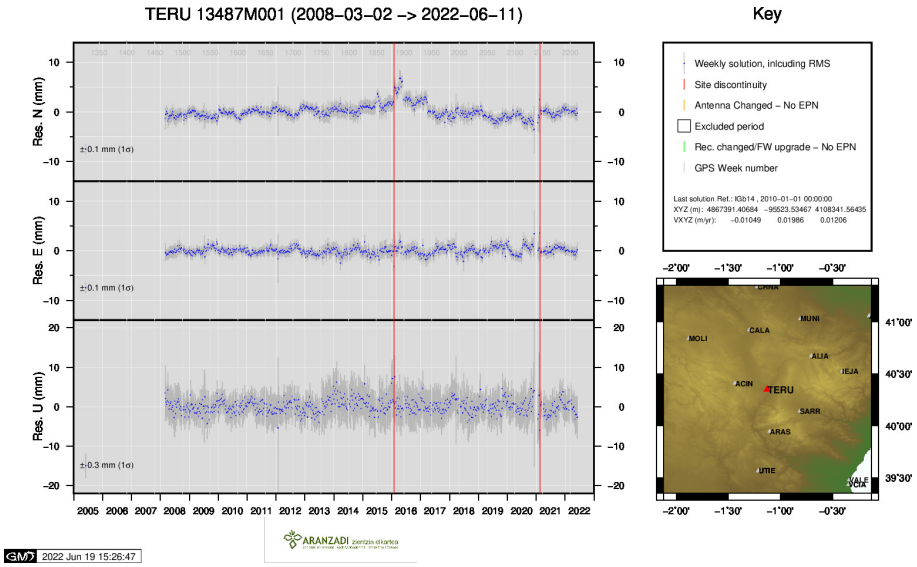
20) RIO1



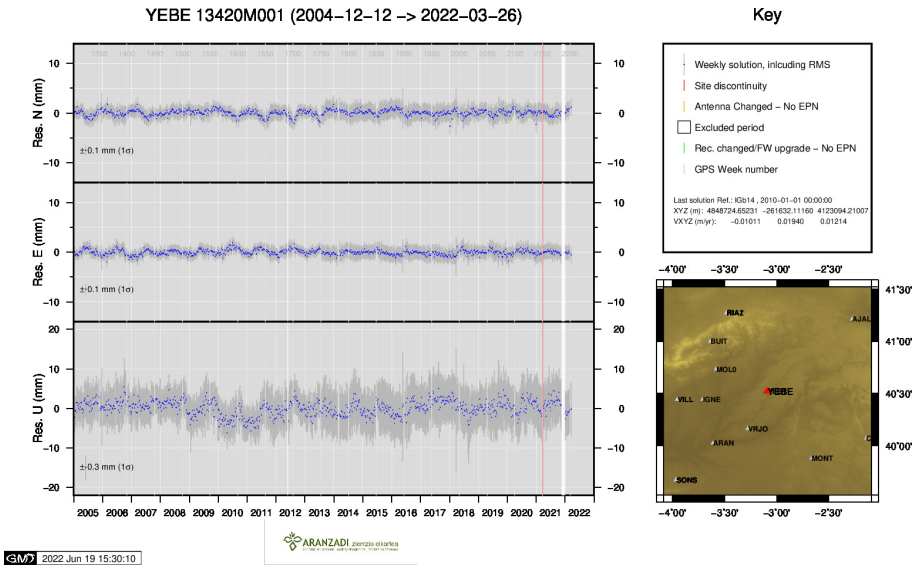
21) SCOA



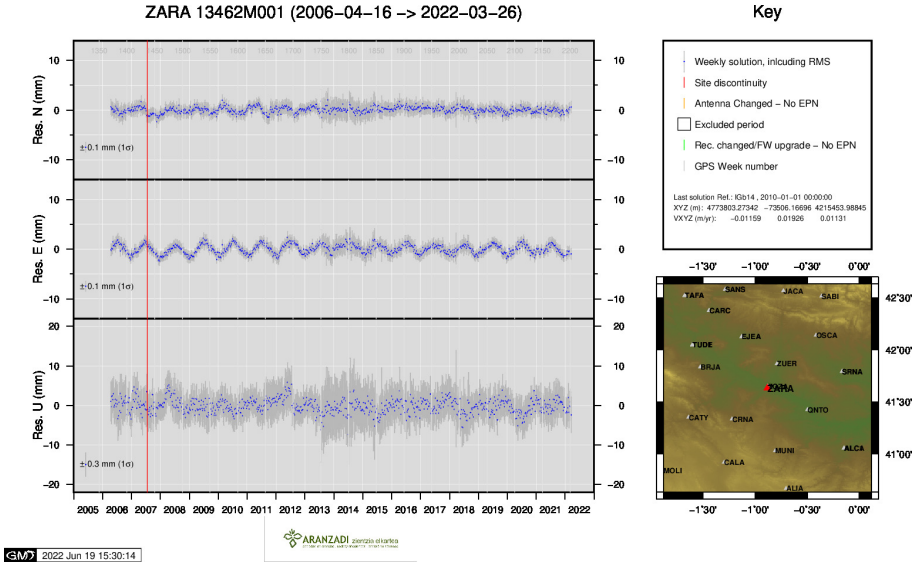
22) SOPU



23) TERU



24) YEBE



25) ZARA