

ARA-DAC Weekly Analysis Result: 2113 (GFA)

Technical Report

GPS Week: 2113 (GFA)

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

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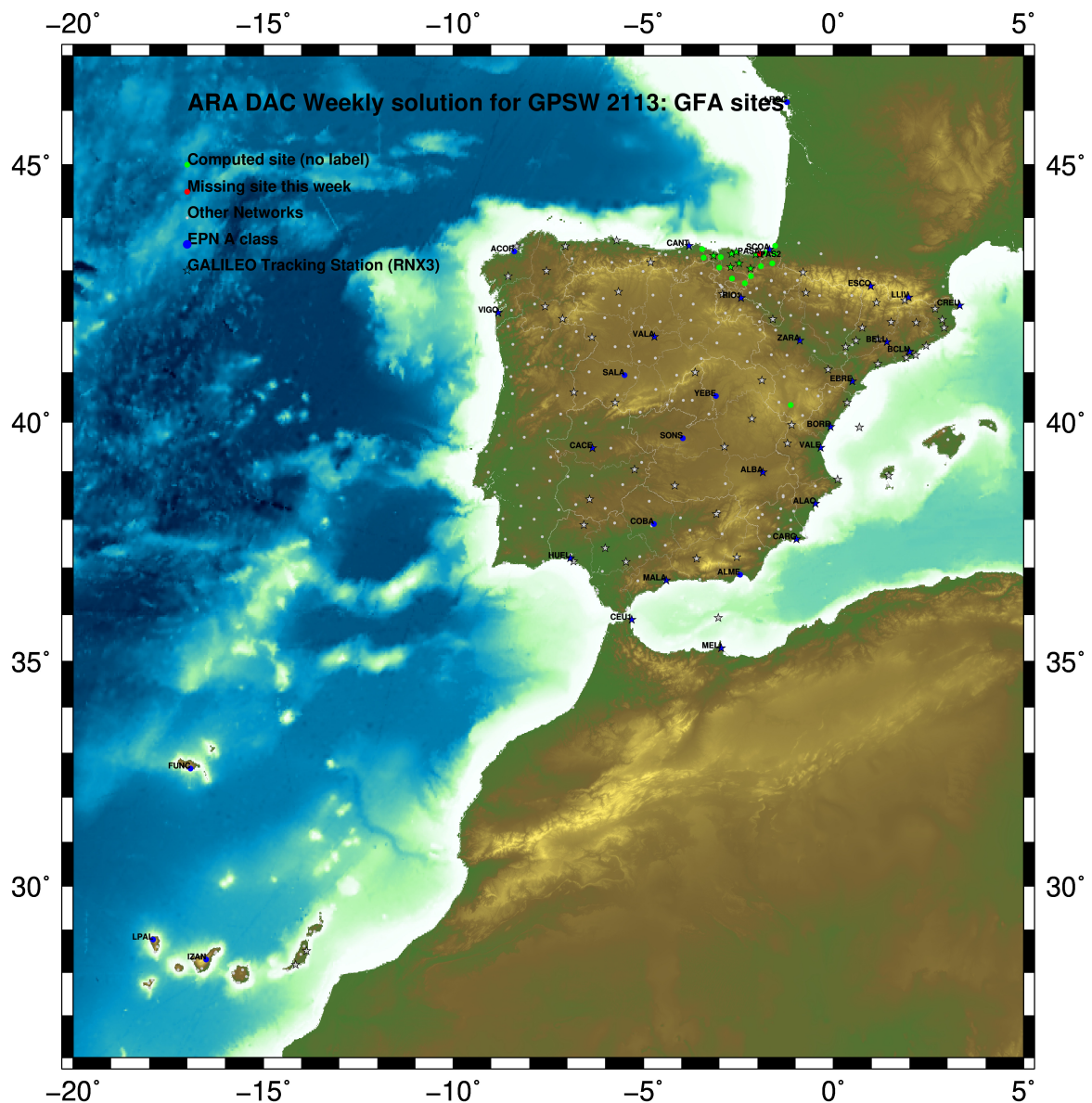
Report generated on 2020/07/26 at 02:26:41



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 2020 Jul 26 02:26:33

Fig.1: Computed Sites for GPS Week2113 (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) IGS14 used to define the reference frame (from GPSW 1934). If individual calibrations, other from these, are available, they are also included in the analysis.
- Troposphere:
 - 3 deg elev. cutoff; elevation dependent weighting
 - VMF1 mapping function. ZPD parameters are estimated using the VMF1 mapping function.
 - CHENHER gradient estimation model.
- Ionosphere: no a priori model, ionospheric effect almost removed by iono free combination.
- Ocean Loading: FES2004 (Scherneck).
- Atmosph. Loading: computed from a global grid using the GRDS1S2 program of Bernese 5.2.

4 Estimated Parameters

- Adjustment: Least Squares
- Rejection Criteria: 3*rms of single differences, in the weekly combination of daily normal equations (ADDNEQ)
- Station coordinates: minimum constraints (MC) to EPN A class sites (only translations).
- Troposphere: 3 deg. After having obtained coordinates valid for the entire week, tropospheric zenith delay is solved at each site at intervals of 1 hour throughout the week, holding the coordinates constrained at the weekly values.
- Ionospheric: second and third "High Order Ionosphere (HOI)" corrections used, using CODE files, to improve Ambiguity Resolution.
- Satellite clock bias: not estimated because are eliminated by double differencing the phase data.
- Receiver clock bias: not estimated because are eliminated by double differencing the phase data.
- Orbits and ERPs: CODE's orbits and ERP for both rapid and final solutions. DE405 planetary ephemeris and JGM3 Earth geopotential model is used.
- Tidal displacements: according to IERS2010 Conventions. Atmospheric loading corrections used.

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

5 Computed Coordinates

In this section the adjusted coordinates are summarized. Note that the sites with an A flag are the computed ones, whereas sites flagged as W are the ones used in the Minimal Constraints condition.

5.1 IGS14

The Reference Frame considered in this section is IGS14, release C2085.

ARA LAC 2113 WEEK FINAL COMBINATION: PRECISE ORBITS 25-JUL-20 23:10

LOCAL GEODETIC DATUM: IGS14 EPOCH: 2020-07-08 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACOR 13434M001	4594489.54915	-678367.42352	4357066.29879	W
39	ALDA 19383M001	4687280.14359	-190876.54636	4308106.96879	A
50	ALSA 19419M001	4677250.82220	-176770.37328	4319079.89252	A
53	AMUR 19388M001	4661499.43518	-244591.23856	4332269.89981	A
100	BLAZ 10074M002	4634456.03678	-124344.95744	4365785.47152	A
101	BIDA 00000M000	4644177.80709	-145778.30324	4354832.49517	A
113	BRZR 19387M001	4662220.97619	-220769.87940	4333309.45461	A
98	CACE 13447M001	4899866.49115	-544567.01699	4033770.21814	W
109	CANT 13438M001	4625924.30109	-307096.21570	4365771.57086	W
154	CHER 00000M000	4645880.30610	-125721.90589	4353624.38725	A
154	CREU 13432M001	4715420.11609	273178.07960	4271946.85436	W
190	EBRE 13410M001	4833519.97427	41537.41211	4147461.73154	W
180	ELGE 19353S001	4657557.38862	-202241.45391	4338991.88349	A
182	EMAZ 17001M001	4645924.19223	-276949.84693	4347759.59054	A
209	GERN 19389M001	4642811.30243	-217222.90572	4353278.89238	A
235	IGEL 19352S001	4645951.41690	-165574.48435	4352550.43524	A
240	ISPS 19484M001	4640596.46352	-206963.75774	4356391.92701	A
245	KAST 19499M001	4646949.06453	-240747.25481	4348015.00620	A
252	LARE 19440M001	4632831.93776	-279026.11991	4360314.43935	A
256	LAZK 19354S001	4666098.32561	-178186.17108	4330463.68558	A
261	LEIT 19428M001	4663520.92248	-155858.69831	4334519.89808	A
334	ORON 19427M001	4659695.76518	-130864.71404	4338948.89762	A
456	PASA 19351S001	4644909.04354	-156645.04905	4353623.09037	W
513	RID1 13448M002	4708446.81491	-199490.26532	4284089.75194	W
518	SALA 13469M001	4803054.47032	-462131.05043	4158379.09108	W
526	SCDA 10088M002	4639940.48271	-136224.92112	4359552.43030	W
418	SOPU 19386M001	4643997.89092	-255913.88643	4350063.15402	A
443	TERU 13487M001	4867391.30981	-95523.33305	4108341.69488	A
493	VITO 19385M001	4679397.68749	-218436.48675	4314898.38332	A
698	YEBE 13420M001	4848724.55616	-261631.91063	4123094.34407	W
701	ZARA 13462M001	4773803.15229	-73505.96292	4215454.10818	W

5.2 ETRF2000 (ETRS89) Coordinates

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

ETRF2000 FINAL COORD. wk 2113 25-JUL-20 23:10

LOCAL GEODETIC DATUM: ETRF2000 EPOCH: 2020-07-08 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
4	ACOR 13434M001	4594489.86507	-678367.98256	4357065.86826	W
39	ALDA 19383M001	4687280.51517	-190877.11429	4308106.53717	A
50	ALSA 19419M001	4677251.19627	-176770.94009	4319079.46187	A
53	AMUR 19388M001	4661499.80198	-244591.80386	4332269.46954	A
100	BLAZ 10074M002	4634456.42054	-124345.51946	4365785.04488	A
101	BIDA 00000M000	4644178.18748	-145778.86638	4354832.06750	A
113	BRZR 19387M001	4662221.34595	-220770.44472	4333309.02459	A
98	CACE 13447M001	4899866.80014	-544567.60851	4033769.76525	W
109	CANT 13438M001	4625924.66271	-307096.77734	4365771.14260	W
154	CHER 00000M000	4645880.68883	-125722.46915	4353623.95970	A
154	CREU 13432M001	4715420.54123	273177.51036	4271946.42625	W
190	EBRE 13410M001	4833520.36247	41536.82929	4147461.29128	W
180	ELGE 19353S001	4657557.76103	-202242.01867	4338991.45407	A
182	EMAZ 17001M001	4645924.55622	-276950.41066	4347759.16109	A
209	GERN 19389M001	4642811.67405	-217223.46893	4353278.46393	A
235	IGEL 19352S001	4645951.79472	-165575.04774	4352550.00719	A
240	ISPS 19484M001	4640596.83660	-206964.32068	4356391.49886	A
245	KAST 19499M001	4646949.43292	-240747.81853	4348014.57713	A
252	LARE 19440M001	4632832.30239	-279026.68221	4360314.01090	A
256	LAZK 19354S001	4666098.70033	-178186.73668	4330463.25578	A
261	LEIT 19428M001	4663521.30019	-155859.26357	4334519.46877	A
334	ORON 19427M001	4659696.14624	-130865.27880	4338948.46892	A
456	PASA 19351S001	4644909.42252	-156645.61230	4353622.66251	W
513	RID1 13448M002	4708447.18373	-199490.83555	4284089.31854	W
518	SALA 13469M001	4803054.79827	-462131.63149	4158378.64690	W
526	SCDA 10088M002	4639940.86459	-136225.48377	4359552.00309	W
418	SOPU 19386M001	4643998.25762	-255914.44988	4350062.72499	A
443	TERU 13487M001	4867391.67761	-95523.91997	4108341.25025	A
493	VITO 19385M001	4679398.05622	-218437.05391	4314897.95197	A
698	YEBE 13420M001	4848724.90590	-261632.49606	4123093.89883	W
701	ZARA 13462M001	4773803.53145	-73506.53976	4215453.67121	W

5.3 ETRF2014 (ETRS89) Coordinates

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

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ETRF2014 FINAL COORD. wk 2113                                25-JUL-20 23:10
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LOCAL GEODETIC DATUM: ETRF2014          EPOCH: 2020-07-08 12:00:00
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
4  ACRD 13434M001         4594489.82287    -678368.02072   4357065.91717    W
39 ALDA 19383M001         4687280.47070    -190877.15384   4308106.58597    A
50 ALSA 19419M001         4677251.15186    -176770.97973   4319079.51070    A
53 AMUR 19388M001         4661499.75793    -244591.84332   4332269.51839    A
100 BIAZ 10074M002         4634456.37640    -124345.55946   4365785.09385    A
101 BIDA 00000M000         4644178.14330    -145778.90626   4354832.11644    A
113 BRZR 19387M001         4662221.30183    -220770.48426   4333309.07344    A
98 CACE 13447M001         4899866.75438    -544567.64592   4033769.81348    W
109 CANT 13438M001         4625924.61921    -307096.81671   4365771.19151    W
154 CHER 00000M000         4645880.64457    -125722.50909   4353624.00864    A
154 CREU 13432M001         4715420.49487    273177.46928    4271946.47529    W
190 EBRE 13410M001         4833520.31569     41536.78951    4147461.33988    W
180 ELGE 19353S001         4657557.71690    -202242.05830   4338991.50294    A
182 EMAZ 17001M001         4645924.51243    -276950.45006   4347759.20996    A
209 GERN 19389M001         4642811.63011    -217223.50856   4353278.51283    A
235 IGEL 19352S001         4645951.75059    -165575.08755   4352550.05610    A
240 ISPS 19484M001         4640596.79266    -206964.36036   4356391.54777    A
245 KAST 19499M001         4646949.38901    -240747.85807   4348014.62601    A
252 LARE 19440M001         4632832.25874    -279026.72167   4360314.05981    A
256 LAZK 19354S001         4666098.65603    -178186.77636   4330463.30465    A
261 LEIT 19428M001         4663521.25586    -155859.30334   4334519.51765    A
334 ORDN 19427M001         4659696.10186    -130865.31868   4338948.51782    A
456 PASA 19351S001         4644909.37837    -156645.65214   4353622.71144    W
513 RIO1 13448M002         4708447.13906    -199490.87498   4284089.36729    W
518 SALA 13469M001         4803054.75337    -462131.66959   4158378.69535    W
526 SOGA 10088M002         4639940.82043    -136225.52370   4359552.05203    W
418 SOPU 19386M001         4643998.21378    -255914.48937   4350062.77387    A
443 TERU 13487M001         4867391.63093    -95523.95913   4108341.29869    A
493 VITO 19385M001         4679398.01191    -218437.09339   4314898.00078    A
698 YEBE 13420M001         4848724.85993    -261632.53471   4123093.94723    W
701 ZARA 13462M001         4773803.48569    -73506.57938    4215453.71987    W

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LEIT 19428M001	N	0.56	0.05	1.02	-0.20	-0.30	-0.46	-0.56	0.41
LEIT 19428M001	E	0.75	-0.17	0.59	-0.93	-0.92	1.11	-0.25	0.08
LEIT 19428M001	U	3.00	3.38	-6.39	0.58	-0.47	-0.94	-0.02	-0.49
ORDN 19427M001	N	0.78	1.26	0.69	-0.33	-0.85	-0.05	-0.88	0.14
ORDN 19427M001	E	0.71	-0.09	0.09	-0.87	0.10	1.21	-0.87	-0.13
ORDN 19427M001	U	1.92	-1.51	1.66	-0.91	-3.18	1.75	-1.79	-0.09
PASA 19351S001	N	1.03	1.57	-0.55	-0.74	0.30	-0.27	1.68	-0.17
PASA 19351S001	E	0.84	-0.89	0.83	-0.93	0.32	0.86	-0.54	0.86
PASA 19351S001	U	3.18	3.43	-0.22	-5.57	-1.09	3.37	-0.25	-2.28
RIO1 13448M002	N	1.05	-0.51	-1.09	-1.25	0.25	-0.09	1.47	1.18
RIO1 13448M002	E	1.06	-0.48	-0.19	-0.66	-0.71	2.32	-0.39	-0.18
RIO1 13448M002	U	2.49	2.86	-2.96	-0.31	0.50	1.16	-3.12	-2.96
SALA 13469M001	N	0.88	-0.76	-1.42	1.39	0.11	0.23	-0.18	-0.08
SALA 13469M001	E	1.18	1.27	1.83	0.09	-1.28	-0.20	0.55	-1.18
SALA 13469M001	U	3.38	-1.16	-5.75	2.01	5.03	1.64	-1.52	0.15
SCDA 10088M002	N	2.23	0.15	-4.69	0.46	0.73	2.49	-0.46	-0.75
SCDA 10088M002	E	1.32	0.88	-1.56	-0.22	0.77	1.10	-0.73	2.19
SCDA 10088M002	U	5.02	4.91	0.08	-5.54	-0.64	-0.69	7.57	-6.20
SOPU 19386M001	N	1.08	1.95	-1.23	0.04	0.72	-1.05	0.21	-0.05
SOPU 19386M001	E	0.99	-1.85	0.59	-0.50	-0.40	1.25	-0.08	0.30
SOPU 19386M001	U	4.15	1.90	-3.43	-6.71	3.31	-3.64	2.25	3.70
TERU 13487M001	N	0.26	-0.12	0.25	-0.14	0.04	0.30	-0.45	0.10
TERU 13487M001	E	1.06	0.09	-1.15	-0.56	0.03	1.56	1.55	-0.43
TERU 13487M001	U	3.64	1.15	1.74	1.81	3.73	-3.14	-5.20	-4.59
VITO 19385M001	N	0.75	0.13	-1.55	0.42	0.02	0.84	-0.32	-0.04
VITO 19385M001	E	0.75	0.32	-0.16	0.43	0.03	0.98	-1.40	-0.34
VITO 19385M001	U	4.53	5.16	4.01	-6.55	-3.24	1.73	-4.90	0.08
YEBE 13420M001	N	1.13	-1.87	-0.34	-0.44	0.24	1.15	1.39	0.70
YEBE 13420M001	E	0.42	-0.04	0.05	0.89	0.08	0.04	0.07	-0.51
YEBE 13420M001	U	1.92	-2.05	0.61	3.45	0.13	-2.19	0.35	0.90
ZARA 13462M001	N	0.91	-0.52	1.02	0.80	-1.15	-1.07	0.54	0.52
ZARA 13462M001	E	0.93	-0.67	0.32	-1.33	-1.01	0.97	-0.30	0.90
ZARA 13462M001	U	3.61	-1.09	-7.21	-3.67	0.38	-2.79	-1.65	1.03

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: IGS14
RESIDUALS IN LOCAL SYSTEM (NORTH, EAST, UP)

NUM	NAME	FLG	RESIDUALS IN MILLIMETERS		
4	ACOR 13434M001	I W	-1.60	1.10	-3.15
10	ALAC 13433M001	I W	-0.40	0.50	3.09
13	ALBA 13452M001	I W	1.03	-0.40	-0.14
19	ALME 13437M001	I W	0.64	2.77	-0.62
41	BCLN 13412M001	I W	-0.60	0.75	-0.17
46	BELL 13431M001	I W	-0.88	-0.82	2.05
65	BORR 13480M001	I W	0.88	-1.63	-2.89
70	BRST 10004M004	I W	-2.59	0.51	-0.37
98	CACE 13447M001	I W	0.56	2.17	1.80
109	CANT 13438M001	I W	-0.20	1.49	-2.40
110	CARG 19412M001	I W	-0.31	0.90	-3.18
121	CEU1 13449M002	I W	-0.36	0.24	-0.03
135	COBA 13453M001	I W	0.94	0.33	-4.06
154	CREU 13432M001	I W	0.12	1.51	-0.53
190	EBRE 13410M001	I W	-2.49	-0.77	-0.58
208	ESCO 13435M001	I W	1.32	3.69	-2.97
219	FUNC 13911S001	I W	-2.20	-10.95	0.93
286	HUEL 13451M001	I W	2.33	-2.32	-6.17
300	IZAN 13130M002	I W	1.86	0.68	3.51
359	LLIV 13436M001	I W	0.05	0.80	2.14
364	LPAL 81701M001	I W	0.13	-0.22	3.35
366	LROC 10023M001	I W	0.53	-0.40	-1.56
400	MELI 19379M001	I W	2.35	-1.40	-4.81
456	PASA 19351S001	I W	-1.24	1.11	0.82
464	PDEL 13190M004	I W	0.75	-1.32	9.99
513	RID1 13448M002	I W	-0.57	2.05	-3.65
518	SALA 13469M001	I W	0.63	1.58	-0.23
526	SCOA 10088M002	I W	-5.09	0.10	-2.74
557	SONS 13446M001	I W	-1.17	-0.25	0.22
588	TERC 13190M001	I W	3.55	-5.00	2.02
654	VALA 13463M002	I W	0.61	-0.64	-0.80
658	VALE 13439M001	I W	-0.38	0.73	-1.15
669	VIGO 13450M001	I W	0.30	0.68	-2.04
698	YEBE 13420M001	I W	1.41	1.79	2.13
701	ZARA 13462M001	I W	0.12	-0.92	2.85
710	ZIMM 14001M004	I W	-0.42	1.31	4.87
84	MALA 13443M001	I W	0.38	0.26	4.48
RMS / COMPONENT			1.56	2.41	3.15
MEAN			-0.00	0.00	0.00
MIN			-5.09	-10.95	-6.17
MAX			3.55	3.69	9.99

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 111
RMS OF TRANSFORMATION : 2.46 MM

BARYCENTER COORDINATES:

LATITUDE : 40 6 47.82
LONGITUDE : - 4 54 27.69
HEIGHT : -47.728 KM

PARAMETERS:

TRANSLATION IN N : -0.00 +- 0.40 MM
TRANSLATION IN E : 0.00 +- 0.40 MM
TRANSLATION IN U : 0.00 +- 0.40 MM

6.3 Adjustment Statistics

In this section, the summary of the global adjustment and not subnetworks are shown. Also, the Helmert parameters of the combined solution with respect the daily solutions are shown.

```
* STATISTICAL PARAMETER-----VALUE(S)-----
NUMBER OF OBSERVATIONS          14802042
NUMBER OF UNKNOWN               198260
NUMBER OF DEGREES OF FREEDOM    14603782
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  2.367528831458670

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
 1  0.00228    -0.0040 -0.0015  0.0077  0.0000 -0.0003 -0.0001  -0.00030
 2  0.00233    -0.0016 -0.0114 -0.0039  0.0002  0.0000 -0.0003   0.00047
 3  0.00234    -0.0030 -0.0140  0.0070  0.0003 -0.0002 -0.0004  -0.00058
 4  0.00220    -0.0099 -0.0227  0.0112  0.0004 -0.0005 -0.0006  -0.00009
 5  0.00263    -0.0088  0.0303  0.0106 -0.0005 -0.0005  0.0008   0.00039
 6  0.00240    -0.0021 -0.0066  0.0051  0.0001 -0.0002 -0.0002  -0.00035
 7  0.00202    -0.0049 -0.0018  0.0169  0.0000 -0.0005 -0.0000  -0.00120
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
 1  0.00148    2119477    2.20          2147565      3          870  27221  0
 2  0.00152    2100760    2.32          2132151      3          876  30518  0
 3  0.00152    2080986    2.31          2109586      3          861  27742  0
 4  0.00156    2070321    2.42          2100572      3          864  29390  0
 5  0.00164    2082724    2.69          2112164      3          861  28582  0
 6  0.00153    2078575    2.33          2106925      3          864  27489  0
 7  0.00150    2065785    2.24          2093079      3          858  26439  0
```

7 Equipment

7.1 Receiver List

Serial numbers not shown.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_____ S/N__ FIRMWARE____
ACOR  A  1 P 20:187:00000 20:193:86370 LEICA GR50 -----
ALDA  A  1 P 20:187:00000 20:193:86370 LEICA GR10 -----
ALSA  A  1 P 20:187:00000 20:193:86370 LEICA GR50 -----
AMUR  A  1 P 20:187:00000 20:193:86370 LEICA GR10 -----
BIAZ  A  1 P 20:187:00000 20:193:86370 TRI SP90M -----
BIDA  A  1 P 20:187:00000 20:193:86370 LEICA GR10 -----
BRZR  A  1 P 20:187:00000 20:193:86370 LEICA GR30 -----
CACE  A  1 P 20:187:00000 20:193:86370 TRIMBLE NETR9 -----
CANT  A  1 P 20:187:00000 20:193:86370 LEICA GR10 -----
CHER  A  1 P 20:187:00000 20:191:28650 LEICA GRX1200+GNSS -----
CREU  A  1 P 20:187:00000 20:193:86370 LEICA GR50 -----
EBRE  A  1 P 20:187:00000 20:193:86370 LEICA GR50 -----
ELGE  A  1 P 20:187:00000 20:193:86370 LEICA GR30 -----
EMAZ  A  1 P 20:187:00000 20:193:86370 LEICA GR30 -----
GERN  A  1 P 20:187:00000 20:193:86370 LEICA GR30 -----
IGEL  A  1 P 20:188:27960 20:193:86370 LEICA GR30 -----
ISPS  A  1 P 20:187:00000 20:193:86370 TRIMBLE NETR9 -----
KAST  A  1 P 20:187:00000 20:193:86370 LEICA GR30 -----
LARE  A  1 P 20:187:00000 20:193:86370 LEICA GRX1200GGPRO -----
LAZK  A  1 P 20:187:00000 20:193:86370 LEICA GR30 -----
LEIT  A  1 P 20:187:00000 20:193:86370 LEICA GR50 -----
ORON  A  1 P 20:187:00000 20:193:86370 LEICA GR50 -----
PASA  A  1 P 20:187:00000 20:193:86370 LEICA GR30 -----
RIO1  A  1 P 20:187:00000 20:193:86370 LEICA GR25 -----
SALA  A  1 P 20:187:00000 20:193:86370 LEICA GRX1200+GNSS -----
SCOA  A  1 P 20:187:00000 20:193:86370 LEICA GR25 -----
SOPU  A  1 P 20:187:00000 20:193:86370 LEICA GR30 -----
TERU  A  1 P 20:187:00000 20:193:86370 LEICA GRX1200GGPRO -----
VITO  A  1 P 20:187:00000 20:193:86370 LEICA GR10 -----
YEBE  A  1 P 20:187:00000 20:193:86370 TRIMBLE NETR9 -----
ZARA  A  1 P 20:187:00000 20:193:86370 TRIMBLE NETR9 -----
```

7.2 Antennas

Serial number ONLY provided in case individual calibrations are available.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_____ S/N__
ACOR  A  1 P 20:187:00000 20:193:86370 LEIAT504  LEIS -----
ALDA  A  1 P 20:187:00000 20:193:86370 LEIAS10   NONE -----
ALSA  A  1 P 20:187:00000 20:193:86370 LEIAR10   NONE -----
AMUR  A  1 P 20:187:00000 20:193:86370 LEIAS10   NONE -----
BIAZ  A  1 P 20:187:00000 20:193:86370 LEIAR25   LEIT -----
```

BIDA	A	1	P	20:187:00000	20:193:86370	LEIAS10	NONE	----
BRZR	A	1	P	20:187:00000	20:193:86370	LEIAS10	NONE	----
CACE	A	1	P	20:187:00000	20:193:86370	TRM29659.00	NONE	----
CANT	A	1	P	20:187:00000	20:193:86370	LEIAR25_R4	LEIT	25066
CHER	A	1	P	20:187:00000	20:191:28650	LEIAX1203+GNSS	NONE	----
CREU	A	1	P	20:187:00000	20:193:86370	LEIAR25_R4	NONE	26357
EBRE	A	1	P	20:187:00000	20:193:86370	LEIAR25_R4	NONE	26359
ELGE	A	1	P	20:187:00000	20:193:86370	LEIAR25_R4	LEIT	----
EMAZ	A	1	P	20:187:00000	20:193:86370	LEIAS10	NONE	----
GERN	A	1	P	20:187:00000	20:193:86370	LEIAS10	NONE	----
IGEL	A	1	P	20:188:27960	20:193:86370	LEIAR20	LEIM	----
ISPS	A	1	P	20:187:00000	20:193:86370	TRM59900.00	SCIS	----
KAST	A	1	P	20:187:00000	20:193:86370	LEIAS10	NONE	----
LARE	A	1	P	20:187:00000	20:193:86370	LEIAT504	NONE	----
LAZK	A	1	P	20:187:00000	20:193:86370	LEIAR25_R4	LEIT	----
LEIT	A	1	P	20:187:00000	20:193:86370	LEIAR10	NONE	----
ORDN	A	1	P	20:187:00000	20:193:86370	LEIAR10	NONE	----
PASA	A	1	P	20:187:00000	20:193:86370	LEIAR20	LEIM	73034
RID1	A	1	P	20:187:00000	20:193:86370	LEIAR25_R4	LEIT	25138
SALA	A	1	P	20:187:00000	20:193:86370	LEIAR25	NONE	----
SCDA	A	1	P	20:187:00000	20:193:86370	TRM55971.00	NONE	----
SOPU	A	1	P	20:187:00000	20:193:86370	LEIAS10	NONE	----
TERU	A	1	P	20:187:00000	20:193:86370	LEIAT504GG	LEIS	----
VITO	A	1	P	20:187:00000	20:193:86370	LEIAS10	NONE	----
YEBE	A	1	P	20:187:00000	20:193:86370	TRM29659.00	NONE	----
ZARA	A	1	P	20:187:00000	20:193:86370	TRM29659.00	NONE	----

7.3 Eccentricities

* SITE	PT	SOLN	T	DATA_START_	DATA_END_	AXE	ARP->BENCHMARK(M)	UP	NORTH	EAST
ACOR	A	1	P	20:187:00000	20:193:86370	UNE	3.0460	0.0000	0.0000	0.0000
ALDA	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
ALSA	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
AMUR	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
BIAZ	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
BIDA	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
BRZR	A	1	P	20:187:00000	20:193:86370	UNE	0.0771	0.0000	0.0000	0.0000
CACE	A	1	P	20:187:00000	20:193:86370	UNE	0.0600	0.0000	0.0000	0.0000
CANT	A	1	P	20:187:00000	20:193:86370	UNE	3.0490	0.0000	0.0000	0.0000
CHER	A	1	P	20:187:00000	20:191:28650	UNE	0.0000	0.0000	0.0000	0.0000
CREU	A	1	P	20:187:00000	20:193:86370	UNE	0.0770	0.0000	0.0000	0.0000
EBRE	A	1	P	20:187:00000	20:193:86370	UNE	0.0770	0.0000	0.0000	0.0000
ELGE	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
EMAZ	A	1	P	20:187:00000	20:193:86370	UNE	0.0350	0.0000	0.0000	0.0000
GERN	A	1	P	20:187:00000	20:193:86370	UNE	0.0771	0.0000	0.0000	0.0000
IGEL	A	1	P	20:188:27960	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
ISPS	A	1	P	20:187:00000	20:193:86370	UNE	0.0350	0.0000	0.0000	0.0000
KAST	A	1	P	20:187:00000	20:193:86370	UNE	0.0350	0.0000	0.0000	0.0000
LARE	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
LAZK	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
LEIT	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
ORDN	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
PASA	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
RID1	A	1	P	20:187:00000	20:193:86370	UNE	0.0606	0.0000	0.0000	0.0000
SALA	A	1	P	20:187:00000	20:193:86370	UNE	0.0600	0.0000	0.0000	0.0000
SCDA	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
SOPU	A	1	P	20:187:00000	20:193:86370	UNE	0.0771	0.0000	0.0000	0.0000
TERU	A	1	P	20:187:00000	20:193:86370	UNE	0.0600	0.0000	0.0000	0.0000
VITO	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
YEBE	A	1	P	20:187:00000	20:193:86370	UNE	0.0000	0.0000	0.0000	0.0000
ZARA	A	1	P	20:187:00000	20:193:86370	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:

2020-07-19	23:03	UTC		LARE1870.200		RECEIVER FIRM. VERS.		8.71	->	8.71/3.822
2020-07-20	23:06	UTC		LARE1880.200		RECEIVER FIRM. VERS.		8.71	->	8.71/3.822
2020-07-21	22:55	UTC		LARE1890.200		RECEIVER FIRM. VERS.		8.71	->	8.71/3.822
2020-07-22	22:56	UTC		LARE1900.200		RECEIVER FIRM. VERS.		8.71	->	8.71/3.822
2020-07-23	22:56	UTC		LARE1910.200		RECEIVER FIRM. VERS.		8.71	->	8.71/3.822
2020-07-24	23:03	UTC		LARE1920.200		RECEIVER FIRM. VERS.		8.71	->	8.71/3.822
2020-07-25	23:09	UTC		LARE1930.200		RECEIVER FIRM. VERS.		8.71	->	8.71/3.822

9 References

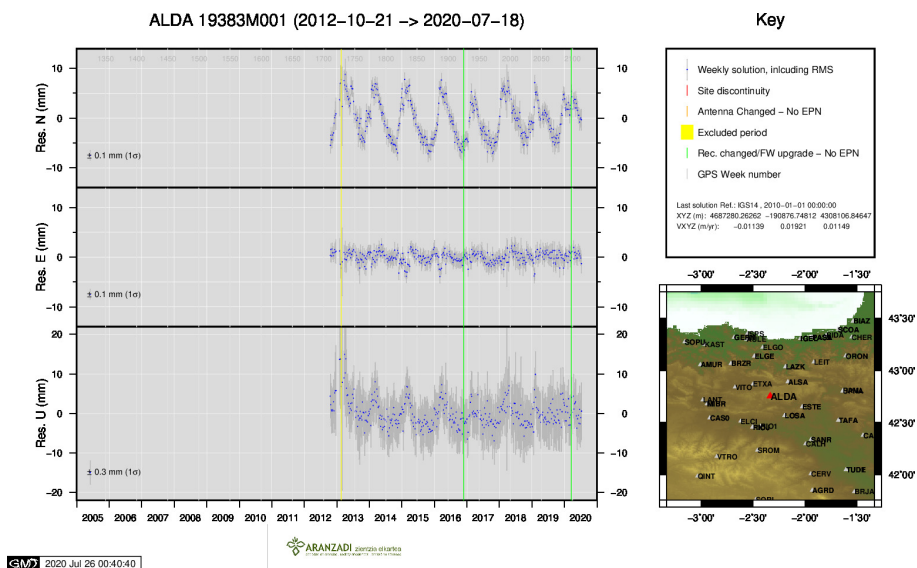
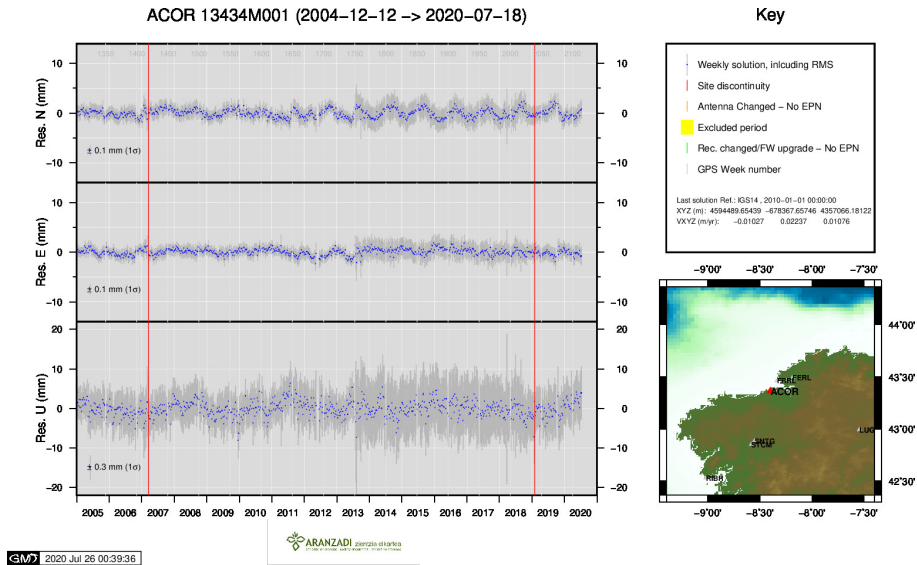
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign*. etrs89.ensg.ign.fr/memo-V8.pdf

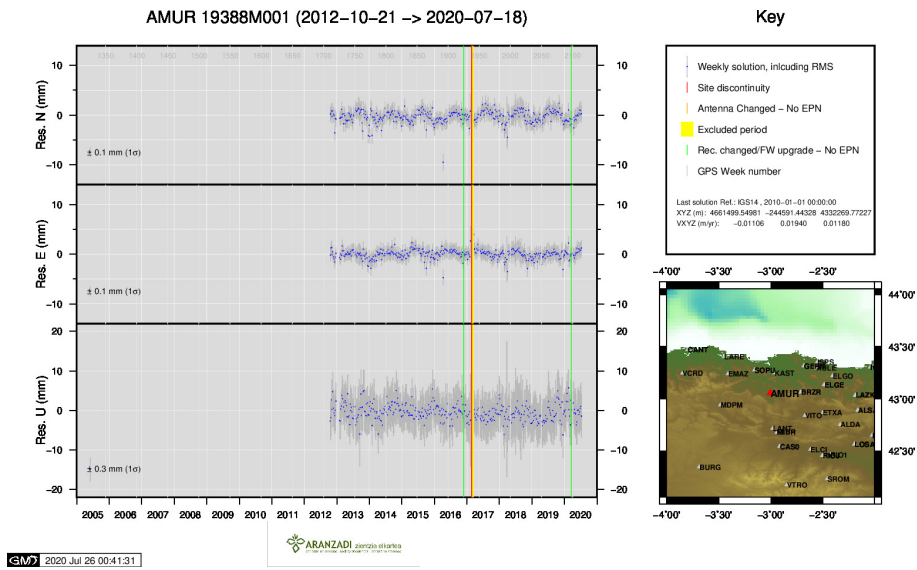
EPN Coordination Group and the EPN Central Bureau (2018): *Guidelines for the EPN Analysis Centres*. epncb.oma.be/documentation/guidelines/guidelines_analysis_centres.pdf

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

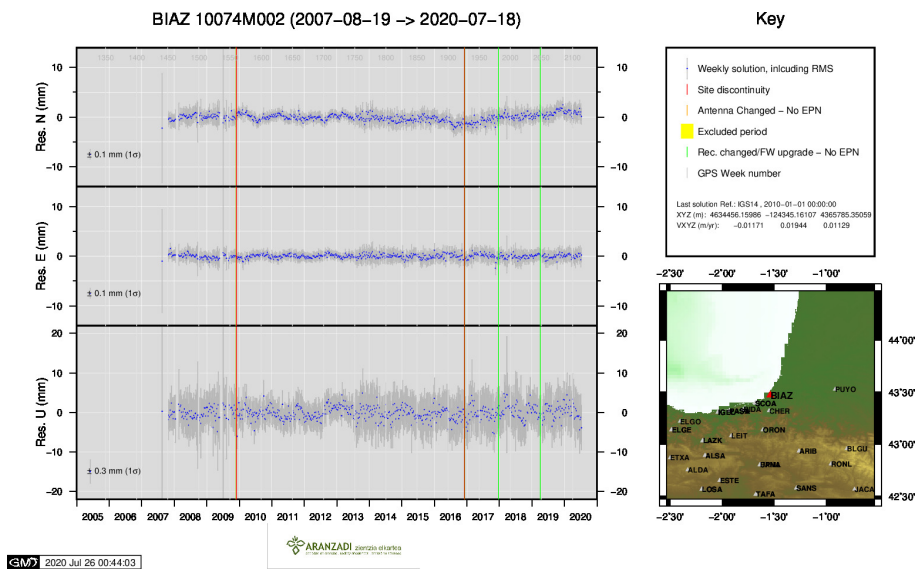
10 Cumulative Time Series

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

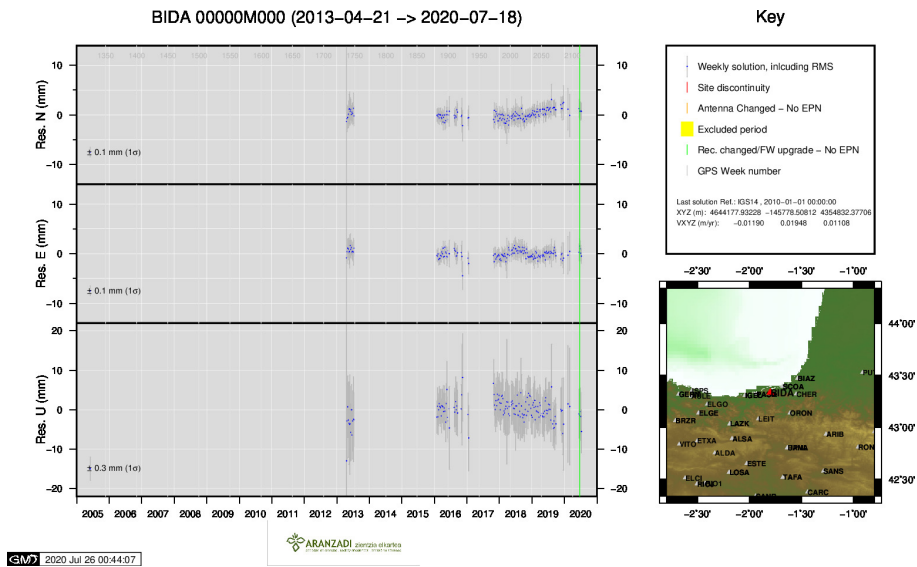




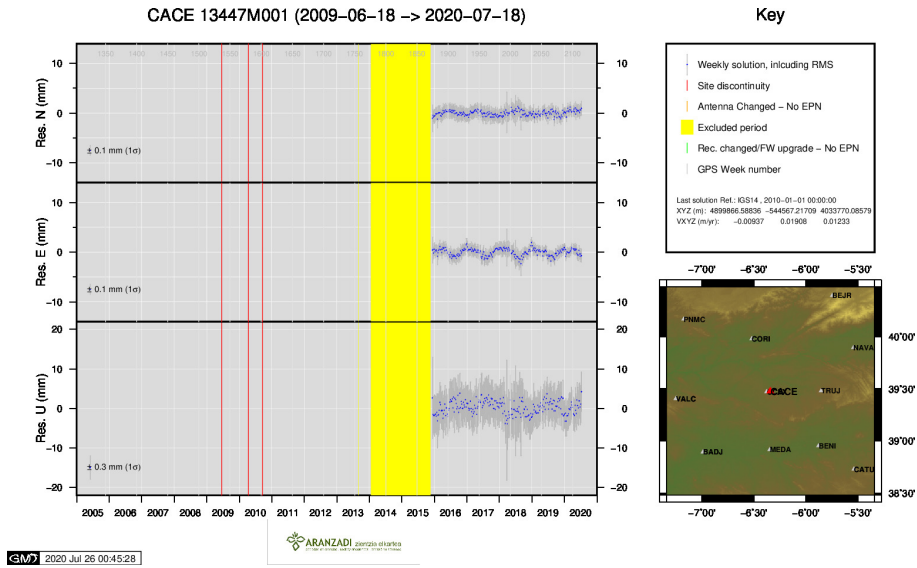
3) AMUR



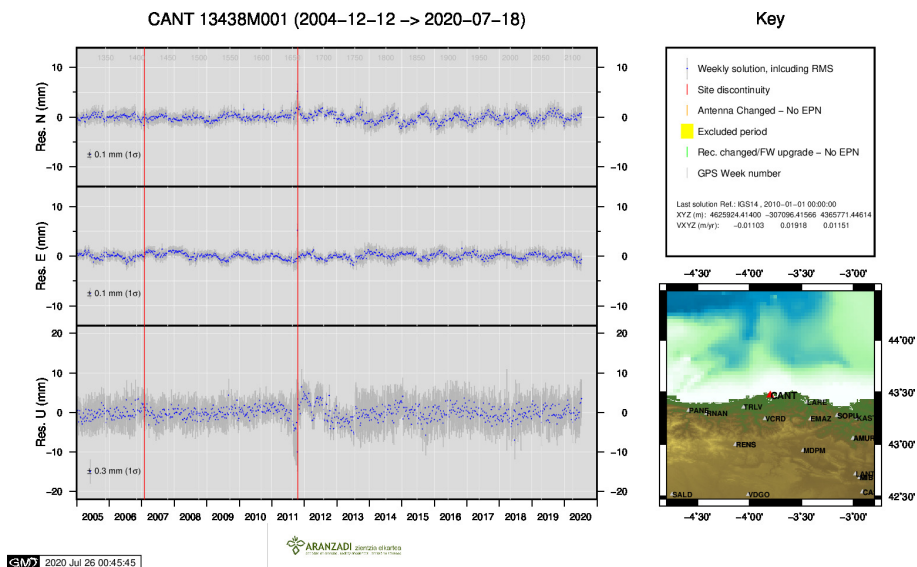
4) BIAZ



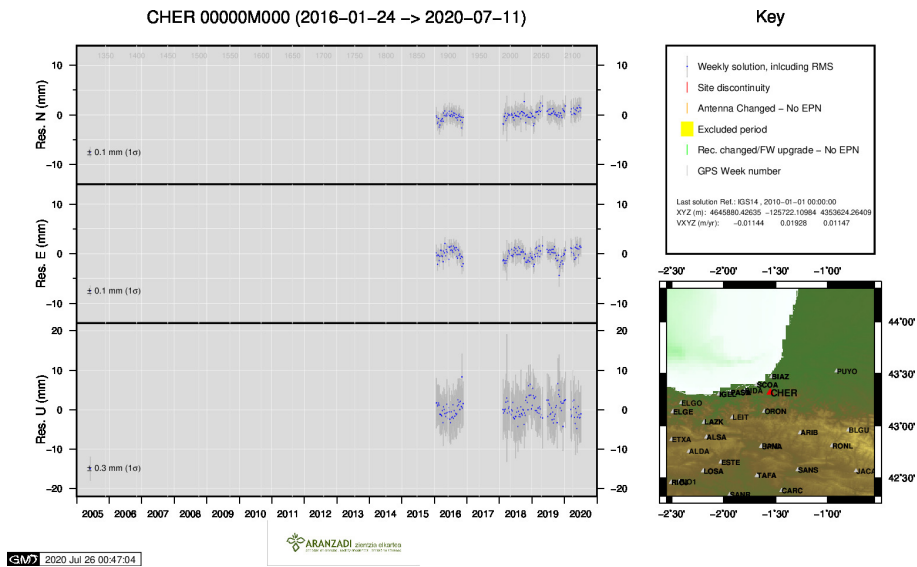
5) BIDA



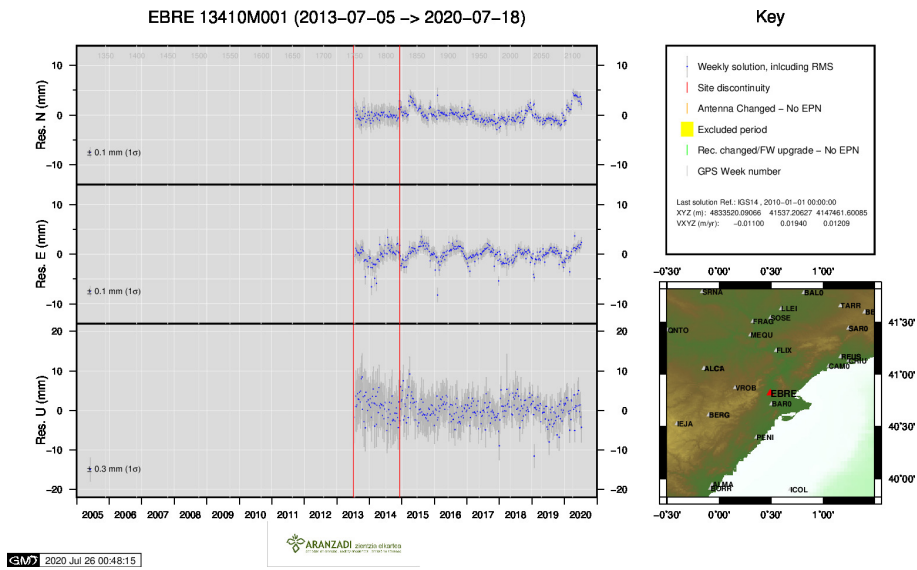
6) CACE



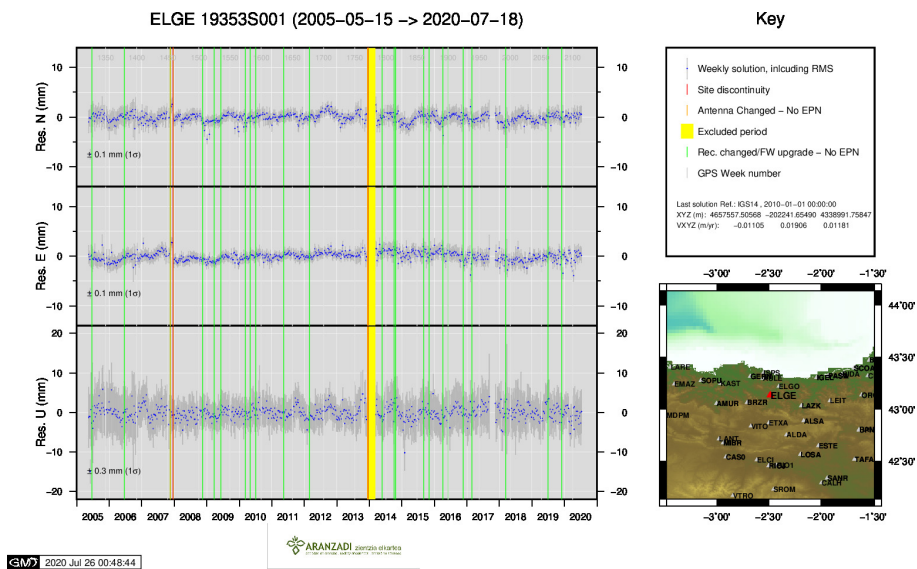
7) CANT



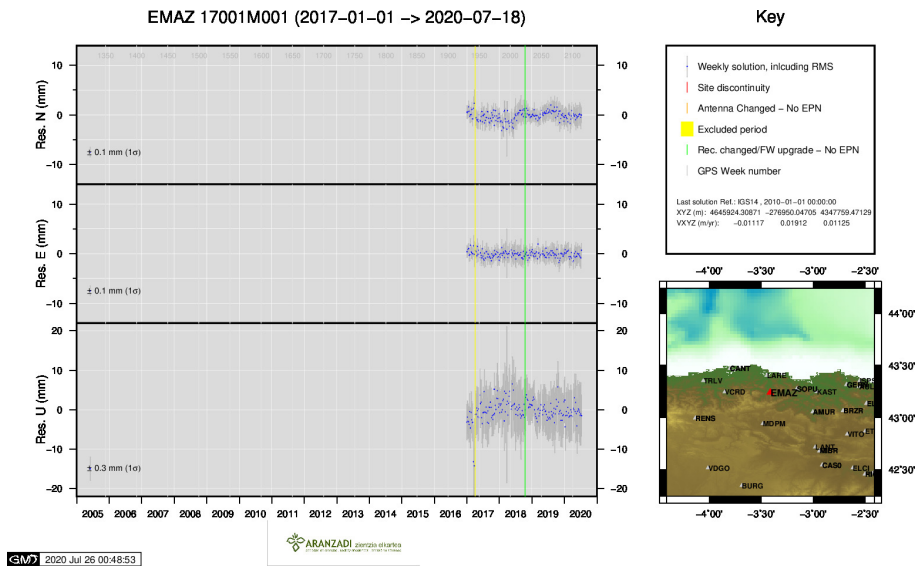
8) CHER



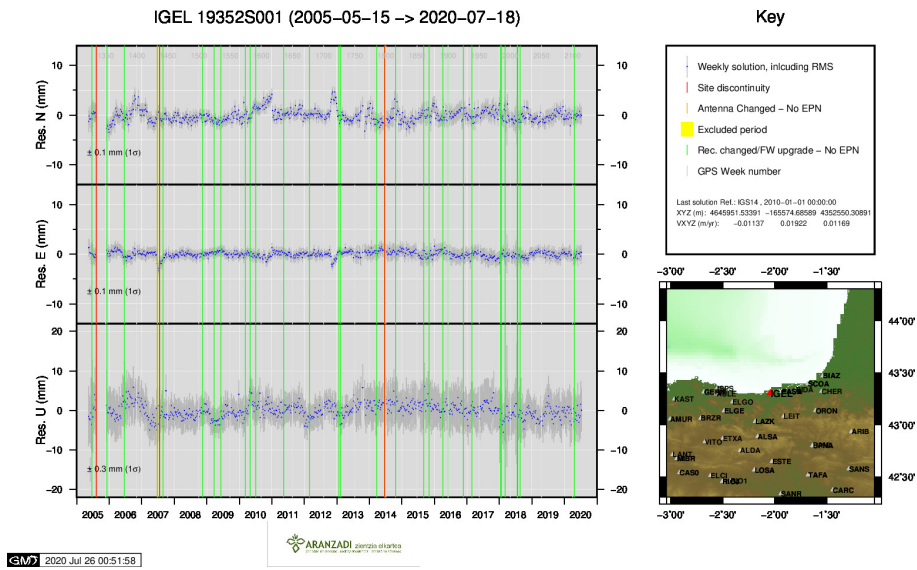
9) EBRE



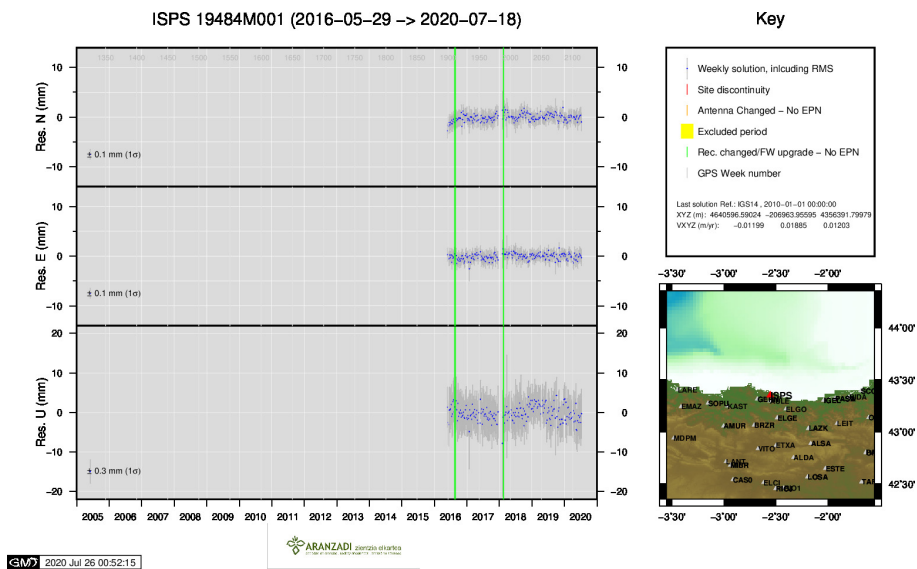
10) ELGE



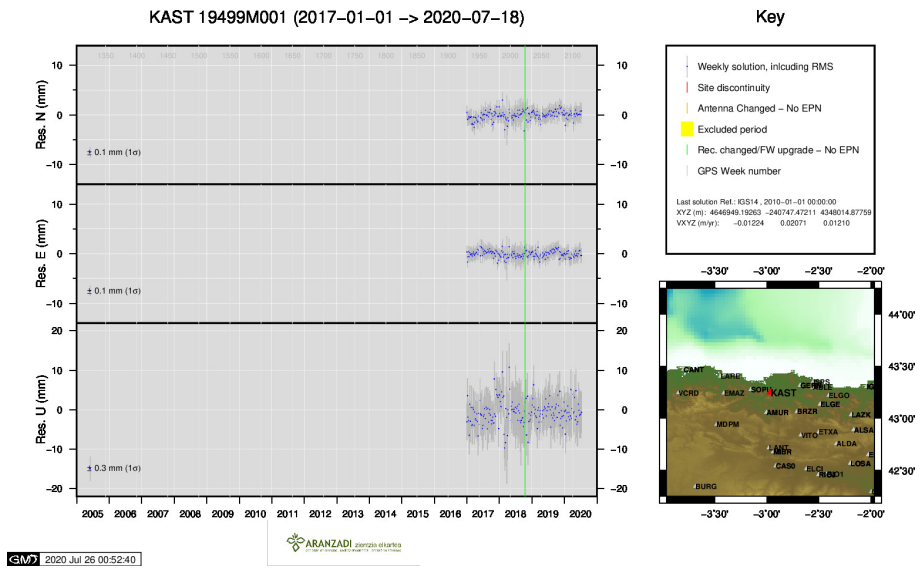
11) EMAZ



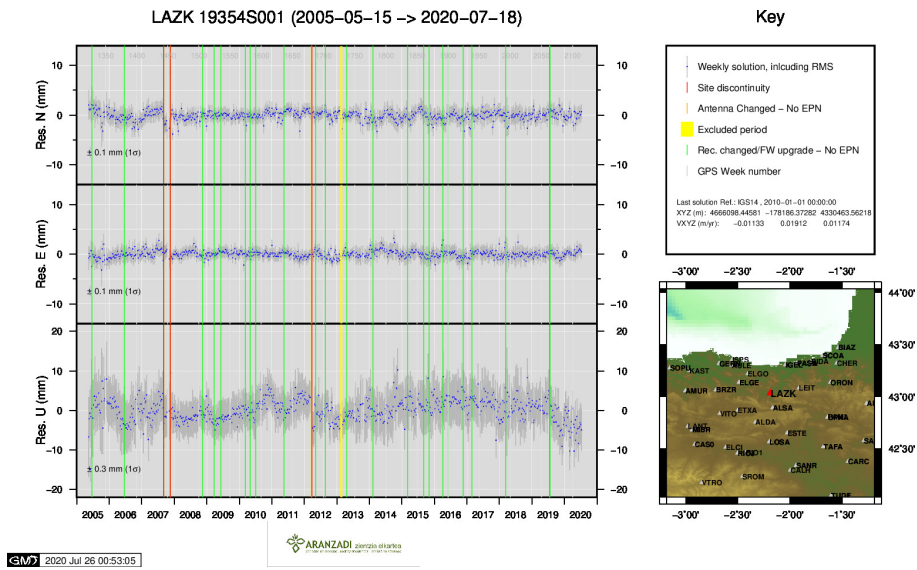
12) IGEL



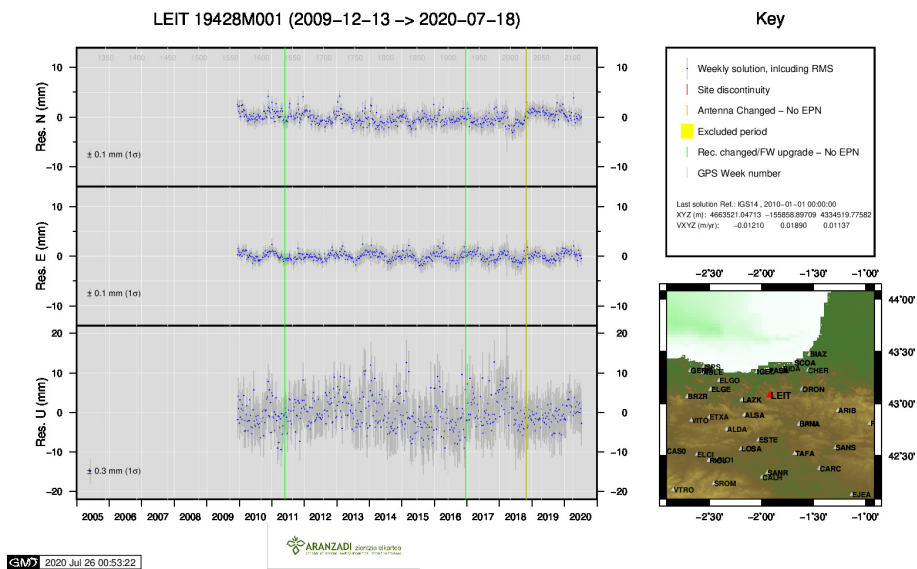
13) ISPS



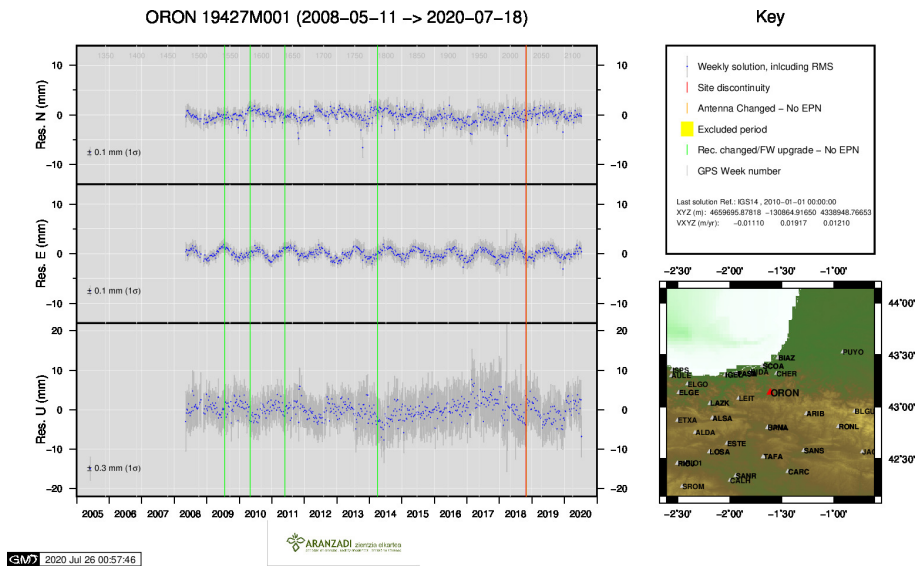
14) KAST



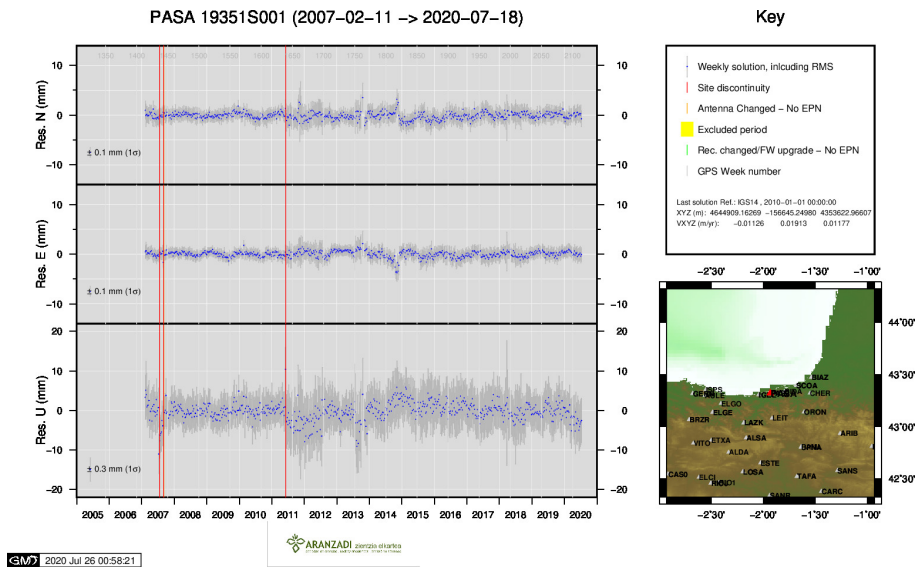
15) LAZK



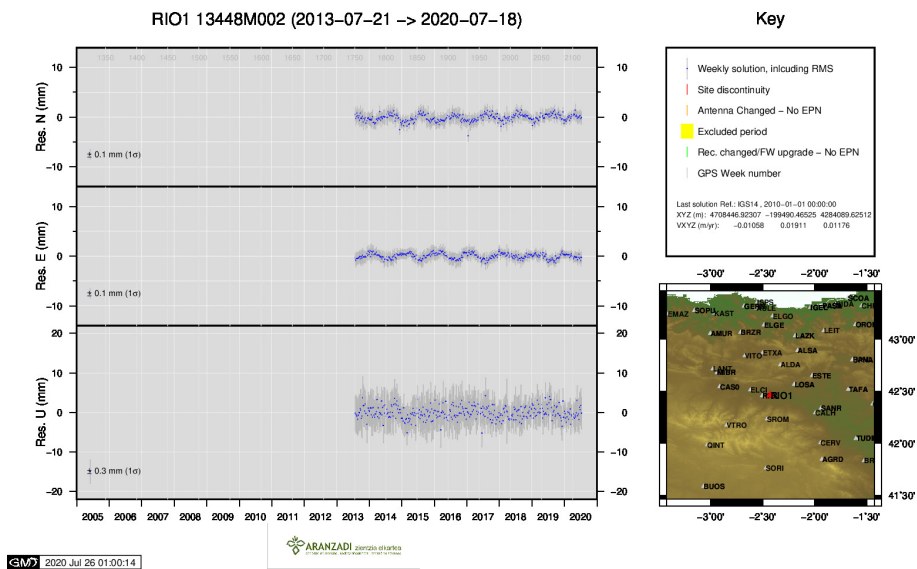
16) LEIT



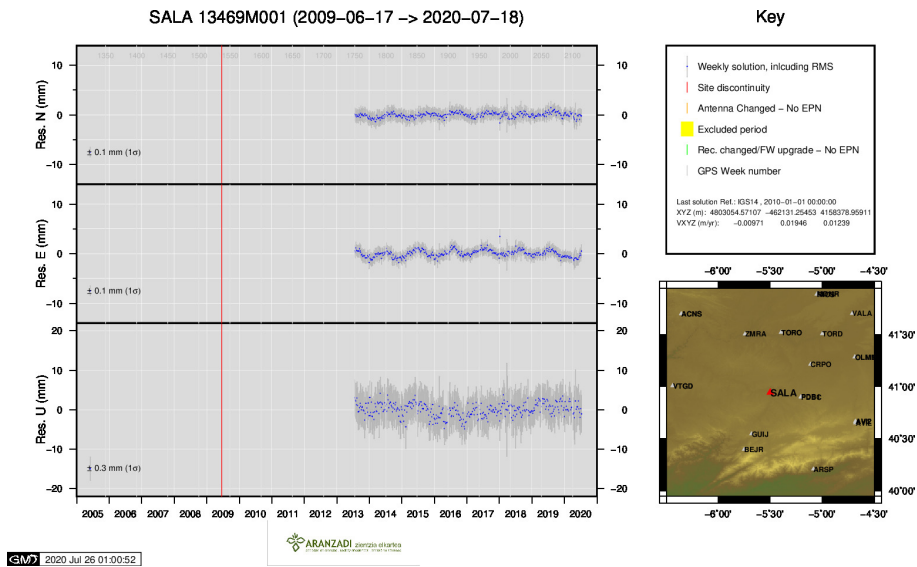
17) ORON



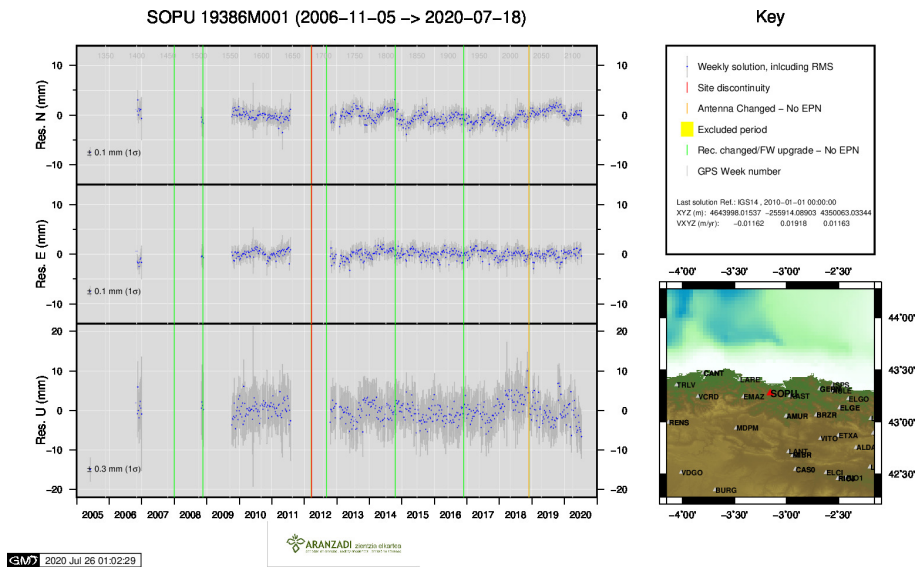
18) PASA



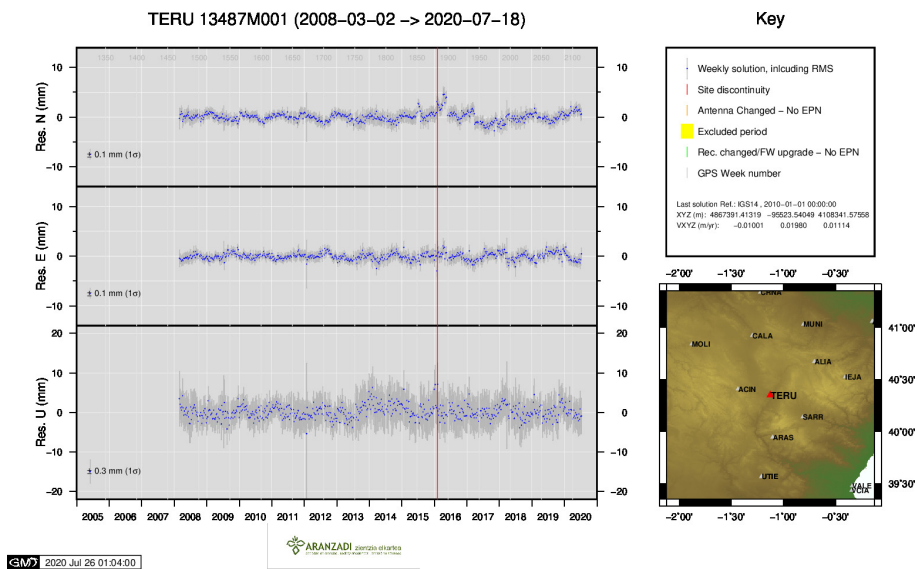
19) RIO1



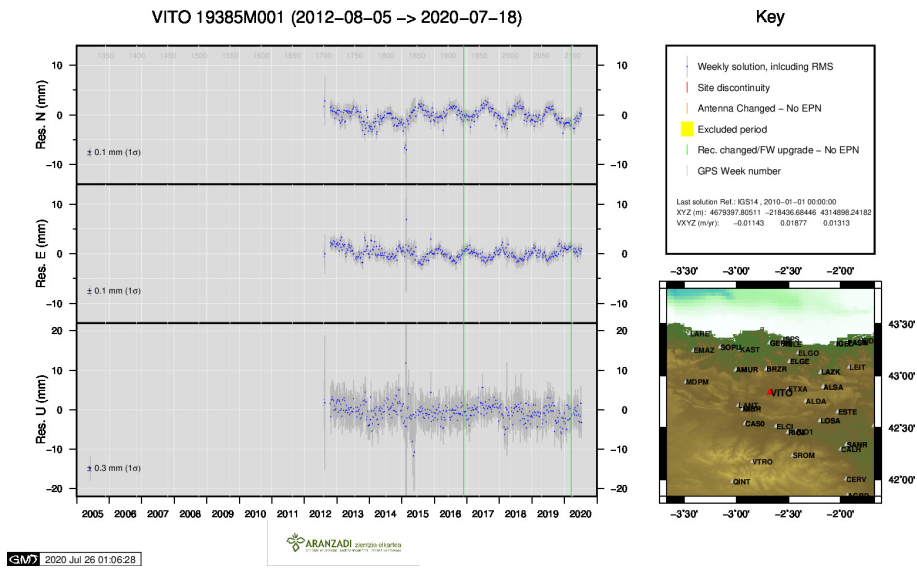
20) SALA



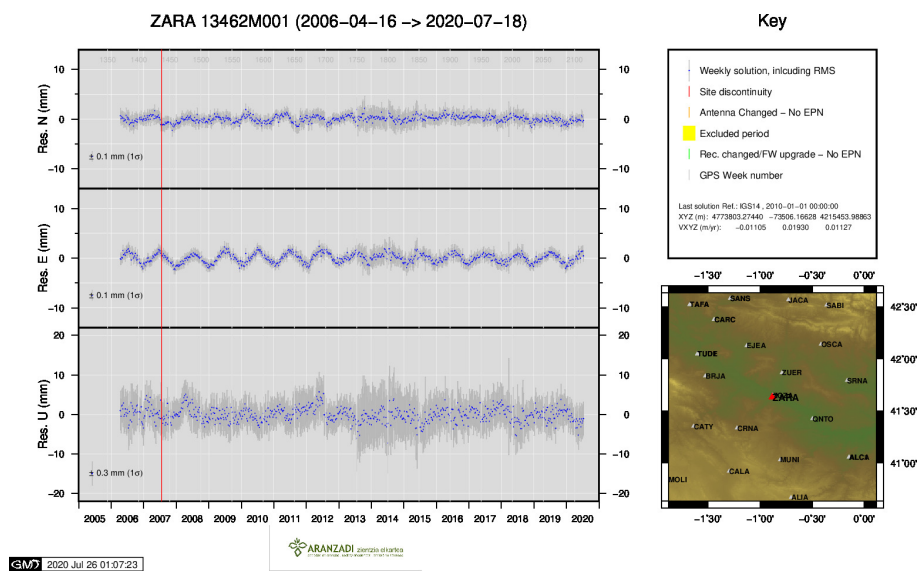
21) SOPU



22) TERU



23) VITO



24) ZARA