

# ARA-DAC Weekly Analysis Result: 1991 (GFA)

## Technical Report

**GPS Week: 1991 (GFA)**

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

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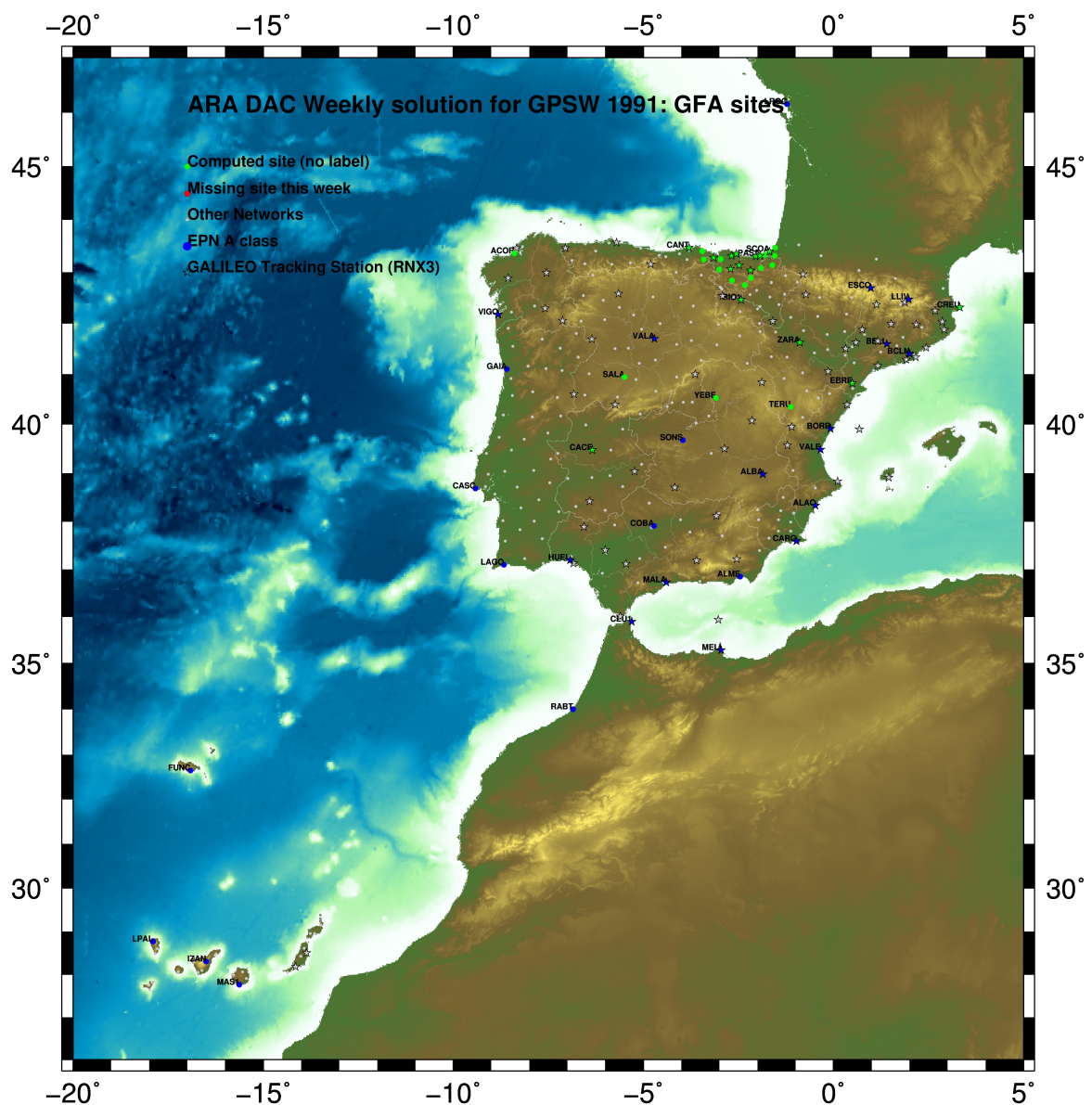
Report generated on 2018/03/27 at 14:19:41



## 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 2018 Mar 27 14:19:27

Fig.1: Computed Sites for GPS Week1991 (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 C1980.

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ARA LAC 1991 WEEK FINAL COMBINATION: PRECISE ORBITS                27-MAR-18 10:18
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LOCAL GEODETIC DATUM: IGS14                EPOCH: 2018-03-07 12:00:00
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NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACOR 13434M001	4594489.57151	-678367.47551	4357066.27075	W
33	ALDA 19383M001	4687280.16929	-190876.59107	4308106.94731	A
42	ALSA 19419M001	4677250.84248	-176770.41838	4319079.85637	A
44	AMUR 19388M001	4661499.46327	-244591.28664	4332269.86824	A
77	BLAZ 10074M002	4634456.06863	-124345.00243	4365785.44840	A
78	BIDA 00000M000	4644177.83808	-145778.34870	4354832.46918	A
88	BRZR 19387M001	4662221.00115	-220769.92830	4333309.41819	A
9	CACE 13447M001	4899866.51334	-544567.06032	4033770.18780	W
10	CANT 13438M001	4625924.32802	-307096.25631	4365771.54517	W
112	CHER 00000M000	4645880.33577	-125721.95390	4353624.36012	A
15	CREU 13432M001	4715420.14383	273178.03472	4271946.82572	W
16	EBRE 13410M001	4833520.00382	41537.36523	4147461.70083	W
131	ELGE 19353S001	4657557.41915	-202241.49976	4338991.85635	A
133	EMAZ 17001M001	4645924.22322	-276949.89154	4347759.56992	A
153	GERN 19389M001	4642811.32293	-217222.95700	4353278.86600	A
173	IGEL 19352S001	4645951.44112	-165574.52908	4352550.40721	A
178	ISPS 19484M001	4640596.49261	-206963.80117	4356391.89982	A
182	KAST 19499M001	4646949.09052	-240747.30392	4348014.97048	A
185	LARE 19440M001	4632831.96388	-279026.16088	4360314.41587	A
186	LAZK 19354S001	4666098.35579	-178186.21503	4330463.66100	A
190	LEIT 19428M001	4663520.95045	-155858.74130	4334519.87173	A
242	ORON 19427M001	4659695.80159	-130864.76275	4338948.87402	A
249	PAS2 19351S001	4644909.07074	-156645.09325	4353623.06518	A
31	PASA 19351S001	4644909.07199	-156645.09296	4353623.06488	W
34	RID1 13448M002	4708446.83935	-199490.30821	4284089.72391	W
35	SALA 13469M001	4803054.49477	-462131.09580	4158379.06401	W
36	SCDA 10088M002	4639940.51296	-136224.96544	4359552.40371	W
298	SOPU 19386M001	4643997.92497	-255913.93269	4350063.13122	A
40	TERU 13487M001	4867391.33704	-95523.37709	4108341.66926	W
349	VITO 19385M001	4679397.71164	-218436.53065	4314899.34575	A
44	YEBE 13420M001	4848724.57945	-261631.95645	4123094.31632	W
45	ZARA 13462M001	4773803.18038	-73506.00917	4215454.08305	W

### 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 1991                27-MAR-18 10:18
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LOCAL GEODETIC DATUM: ETRF2000                EPOCH: 2018-03-07 12:00:00
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NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACOR 13434M001	4594489.86780	-678367.98935	4357065.86958	W
33	ALDA 19383M001	4687280.51711	-190877.11315	4308106.54514	A
42	ALSA 19419M001	4677251.19261	-176770.93941	4319079.45509	A
44	AMUR 19388M001	4661499.80666	-244591.80628	4332269.46732	A
77	BLAZ 10074M002	4634456.42773	-124345.51903	4365785.05084	A
78	BIDA 00000M000	4644178.19405	-145778.86634	4354832.07066	A
88	BRZR 19387M001	4662221.34728	-220770.44796	4333309.01749	A
9	CACE 13447M001	4899866.80320	-544567.60423	4033769.76594	W
10	CANT 13438M001	4625924.66661	-307096.77455	4365771.14611	W
112	CHER 00000M000	4645880.69391	-125722.47165	4353623.96171	A
15	CREU 13432M001	4715420.54123	273177.51142	4271946.42679	W
16	EBRE 13410M001	4833520.36702	41536.82937	4147461.29066	W
131	ELGE 19353S001	4657557.76774	-202242.01890	4338991.45621	A
133	EMAZ 17001M001	4645924.56401	-276950.40972	4347759.16976	A
153	GERN 19389M001	4642811.67078	-217223.47470	4353278.46675	A
173	IGEL 19352S001	4645951.79472	-165575.04695	4352550.00834	A
178	ISPS 19484M001	4640596.84182	-206964.31862	4356391.50086	A
182	KAST 19499M001	4646949.43538	-240747.82210	4348014.57066	A
185	LARE 19440M001	4632832.30526	-279026.67774	4360314.01663	A
186	LAZK 19354S001	4666098.70651	-178186.73495	4330463.26051	A
190	LEIT 19428M001	4663521.30394	-155859.26090	4334519.47169	A
242	ORON 19427M001	4659696.15818	-130865.28189	4338948.47455	A
249	PAS2 19351S001	4644909.42541	-156645.61099	4353622.66648	A
31	PASA 19351S001	4644909.42666	-156645.61070	4353622.66618	W
34	RID1 13448M002	4708447.18461	-199490.83241	4284089.32009	W
35	SALA 13469M001	4803054.80219	-462131.63002	4158378.65021	W
36	SCDA 10088M002	4639940.87031	-136225.48262	4359552.00561	W
298	SOPU 19386M001	4643998.26827	-255914.45061	4350062.73144	A
40	TERU 13487M001	4867391.68228	-95523.91675	4108341.25504	W
349	VITO 19385M001	4679398.05681	-218437.05201	4314899.94383	A
44	YEBE 13420M001	4848724.90704	-261632.49473	4123093.90154	W
45	ZARA 13462M001	4773803.53521	-73506.53950	4215453.67592	W

### 5.3 ETRF2014 (ETRS89) Coordinates

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

ETRF2014 FINAL COORD. wk 1991		27-MAR-18 10:18			
LOCAL GEODETIC DATUM: ETRF2014		EPOCH: 2018-03-07 12:00:00			
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACDR 13434M001	4594489.82493	-678368.02841	4357065.91744	W
33	ALDA 19383M001	4687280.47214	-190877.15349	4308106.59289	A
42	ALSA 19419M001	4677251.14769	-176770.97984	4319079.50287	A
44	AMUR 19388M001	4661499.76208	-244591.84654	4332269.51511	A
77	BIAZ 10074M002	4634456.38306	-124345.55979	4365785.09875	A
78	BIDA 00000M000	4644178.14935	-145778.90699	4354832.11854	A
88	BRZR 19387M001	4662221.30263	-220770.48829	4333309.06529	A
9	CACE 13447M001	4899866.75705	-544567.64260	4033769.81316	W
10	CANT 13438M001	4625924.62254	-307096.81474	4365771.19396	W
112	CHER 00000M000	4645880.64913	-125722.51236	4353624.00959	A
15	CREU 13432M001	4715420.49451	273177.46967	4271946.47477	W
16	EBRE 13410M001	4833520.31992	41536.78881	4147461.33822	W
131	ELGE 19353S001	4657557.72308	-202242.05931	4338991.50403	A
133	EMAZ 17001M001	4645924.51967	-276950.44993	4347759.21757	A
153	GERN 19389M001	4642811.62630	-217223.51512	4353278.51460	A
173	IGEL 19352S001	4645951.75006	-165575.08753	4352550.05620	A
178	ISPS 19484M001	4640596.79733	-206964.35909	4356391.54871	A
182	KAST 19499M001	4646949.39093	-240747.86243	4348014.61849	A
185	LARE 19440M001	4632832.26105	-279026.71800	4360314.06448	A
186	LAZK 19354S001	4666098.66170	-178186.77541	4330463.30832	A
190	LEIT 19428M001	4663521.25910	-155859.30145	4334519.51952	A
242	ORON 19427M001	4659696.11329	-130865.32254	4338948.52239	A
249	PAS2 19351S001	4644909.38073	-156645.65160	4353622.71435	A
31	PASA 19351S001	4644909.38198	-156645.65131	4353622.71405	W
34	RI01 13448M002	4708447.13945	-199490.87265	4284089.36780	W
35	SALA 13469M001	4803054.75682	-462131.66903	4158378.69763	W
36	SOA 10088M002	4639940.82562	-136225.52332	4359552.05350	W
298	SOPU 19386M001	4643998.22388	-255914.49090	4350062.77927	A
40	TERU 13487M001	4867391.63527	-95523.95673	4108341.30246	W
349	VITO 19385M001	4679398.01199	-218437.09229	4314897.99159	A
44	YEBE 13420M001	4848724.86069	-261632.53423	4123093.94892	W
45	ZARA 13462M001	4773803.48905	-73506.57990	4215453.72354	W

## 6 Quality Control

### 6.1 Mean and Daily Repeatabilities

In this section, the mean and daily repeatabilities of the sites are shown. Repeatabilities refer to the IGS14 solution and are given with respect the Local frame (North-East-Up).

ARA LAC 1991 WEEK FINAL COMBINATION: PRECISE ORBITS 27-MAR-18 10:18

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	1.59	1.79	2.48
ALDA 19383M001	7	XXXXXX	1.52	0.96	2.48
ALSA 19419M001	7	XXXXXX	1.29	2.39	4.14
AMUR 19388M001	7	XXXXXX	5.22	4.34	5.67
BLAZ 10074M002	7	XXXXXX	0.63	0.79	2.38
BIDA 00000M000	7	XXXXXX	1.09	1.07	3.06
BRZR 19387M001	7	XXXXXX	2.77	2.96	7.26
CACE 13447M001	7	XXXXXX	1.21	0.63	3.93
CANT 13438M001	7	XXXXXX	1.04	0.40	2.56
CHER 00000M000	7	XXXXXX	1.25	1.05	3.32
CREU 13432M001	7	XXXXXX	1.84	1.92	3.07
EBRE 13410M001	7	XXXXXX	0.54	1.00	3.02
ELGE 19353S001	7	XXXXXX	1.55	1.23	4.55
EMAZ 17001M001	7	XXXXXX	2.50	0.93	5.45
GERN 19389M001	7	XXXXXX	1.80	2.33	3.80
IGEL 19352S001	7	XXXXXX	2.73	0.62	3.40
ISPS 19484M001	7	XXXXXX	1.32	1.69	1.92
KAST 19499M001	7	XXXXXX	2.64	1.46	6.64
LARE 19440M001	7	XXXXXX	1.24	0.88	1.99
LAZK 19354S001	7	XXXXXX	1.72	2.83	4.19
LEIT 19428M001	7	XXXXXX	4.40	3.16	5.49
ORON 19427M001	7	XXXXXX	1.38	1.14	6.34
PAS2 19351S001	5	XXI XX	1.55	0.96	3.74
PASA 19351S001	7	XXXXXX	1.47	0.78	3.23
RI01 13448M002	7	XXXXXX	0.95	0.54	3.17
SALA 13469M001	7	XXXXXX	0.64	0.55	5.28
SCDA 10088M002	7	XXXXXX	1.03	0.66	2.40
SOPU 19386M001	7	XXXXXX	2.21	2.35	3.76
TERU 13487M001	7	XXXXXX	0.64	0.93	2.39
VITD 19385M001	7	XXXXXX	2.70	1.39	2.42
YEBE 13420M001	7	XXXXXX	0.57	0.69	2.90
ZARA 13462M001	7	XXXXXX	0.86	1.01	1.84

Comparison of individual solutions:

ACOR 13434M001	N	1.59	-1.17	1.52	-0.59	-1.04	0.63	3.10	0.15
ACOR 13434M001	E	1.79	1.01	-0.56	1.23	-0.28	-1.83	2.40	-2.67
ACOR 13434M001	U	2.48	3.56	0.54	-1.95	0.06	-0.85	4.36	-0.67
ALDA 19383M001	N	1.52	2.57	1.46	1.63	1.24	0.11	0.86	0.50
ALDA 19383M001	E	0.96	-0.77	-0.52	0.97	-0.20	0.48	0.57	1.76
ALDA 19383M001	U	2.48	3.44	-1.98	3.54	-1.26	0.79	2.35	0.94
ALSA 19419M001	N	1.29	-2.28	-0.28	0.45	0.52	0.99	1.00	1.51
ALSA 19419M001	E	2.39	0.43	-0.29	-2.04	2.93	3.27	-1.22	-3.02
ALSA 19419M001	U	4.14	1.99	1.89	-0.68	3.80	-8.62	0.74	2.41
AMUR 19388M001	N	5.22	1.62	5.01	4.04	3.35	4.94	-5.83	-7.05
AMUR 19388M001	E	4.34	0.63	3.93	1.02	0.14	3.45	-0.04	-9.19
AMUR 19388M001	U	5.67	-1.70	8.93	-0.25	0.91	6.02	-8.53	-0.36
BLAZ 10074M002	N	0.63	-0.30	0.68	0.22	-0.10	0.42	1.02	0.73
BLAZ 10074M002	E	0.79	0.70	-0.79	0.89	0.48	-1.21	0.33	0.26
BLAZ 10074M002	U	2.38	-3.24	0.45	0.79	-3.25	0.53	0.60	3.37
BIDA 00000M000	N	1.09	-0.31	1.42	1.46	-0.33	-1.63	0.06	0.33
BIDA 00000M000	E	1.07	0.29	-1.73	-0.09	-0.36	-0.72	1.70	0.48
BIDA 00000M000	U	3.06	0.20	-2.88	2.94	-0.75	-1.58	-1.19	-5.89
BRZR 19387M001	N	2.77	0.11	0.16	1.01	3.10	0.50	-4.72	3.56
BRZR 19387M001	E	2.96	-0.31	3.19	-1.08	3.44	2.27	-1.77	-4.58
BRZR 19387M001	U	7.26	5.01	2.40	1.60	9.61	0.49	-2.15	-13.63
CACE 13447M001	N	1.21	-0.55	-0.87	-1.34	-0.14	-0.02	2.15	1.16
CACE 13447M001	E	0.63	0.59	-0.74	-0.26	-0.09	-0.55	0.20	1.04
CACE 13447M001	U	3.93	1.26	-0.35	-1.05	1.63	0.59	7.66	5.30
CANT 13438M001	N	1.04	0.75	1.55	-1.02	-0.47	-0.12	1.32	0.68
CANT 13438M001	E	0.40	-0.26	-0.15	-0.20	-0.79	-0.24	0.37	-0.05
CANT 13438M001	U	2.56	0.46	-2.07	-1.93	-1.32	-0.11	4.85	2.40
CHER 00000M000	N	1.25	0.10	0.70	0.09	-0.12	1.67	0.84	-2.30
CHER 00000M000	E	1.05	0.59	0.55	-1.03	0.08	0.75	0.58	-2.00
CHER 00000M000	U	3.32	-3.28	0.42	1.94	-0.21	1.57	-5.95	-3.70
CREU 13432M001	N	1.84	-0.93	-0.48	-0.04	0.27	1.10	-0.04	-4.25
CREU 13432M001	E	1.92	0.86	0.32	0.66	-0.31	0.72	0.87	-4.42
CREU 13432M001	U	3.07	-0.76	0.81	1.91	1.87	3.08	-2.15	-5.83
EBRE 13410M001	N	0.54	0.10	-0.50	-0.52	-0.32	-0.45	-0.88	0.36
EBRE 13410M001	E	1.00	-0.91	-0.59	1.38	0.67	-1.11	-1.12	0.17
EBRE 13410M001	U	3.02	1.40	4.05	1.82	-5.59	0.76	1.05	0.44
ELGE 19353S001	N	1.55	0.76	0.51	3.36	0.43	0.41	-1.30	-0.54
ELGE 19353S001	E	1.23	0.04	-0.71	1.87	0.38	-1.09	1.67	-0.97
ELGE 19353S001	U	4.55	-1.44	-5.72	1.81	-0.94	6.40	6.61	-0.71
EMAZ 17001M001	N	2.50	0.60	-1.03	-3.50	-0.75	-1.80	4.38	0.86
EMAZ 17001M001	E	0.93	0.37	0.71	0.90	0.95	-0.90	1.40	0.19
EMAZ 17001M001	U	5.45	-1.63	1.06	0.24	4.77	-0.33	-5.99	10.75
GERN 19389M001	N	1.80	-0.34	0.97	3.19	0.36	0.83	1.26	-2.41
GERN 19389M001	E	2.33	-0.20	-1.62	0.57	-0.23	-0.54	5.13	-1.74
GERN 19389M001	U	3.80	2.01	-4.43	3.69	1.83	5.08	0.48	-4.48
IGEL 19352S001	N	2.73	-0.66	0.49	-2.53	-2.39	-0.16	5.59	0.73
IGEL 19352S001	E	0.62	0.50	-0.38	0.30	-0.18	-1.17	0.64	-0.16
IGEL 19352S001	U	3.40	-4.71	-1.75	0.74	-1.65	-2.15	-3.41	4.97
ISPS 19484M001	N	1.32	0.24	-1.05	0.16	-0.05	-0.09	1.75	2.48
ISPS 19484M001	E	1.69	-0.10	-1.70	3.64	-0.13	-0.21	0.69	-0.72
ISPS 19484M001	U	1.92	-0.81	1.62	2.65	-2.45	0.19	1.29	2.01
KAST 19499M001	N	2.64	2.43	2.82	0.91	3.84	1.52	-1.87	-2.57
KAST 19499M001	E	1.46	0.95	0.62	-1.75	-1.01	2.44	-0.77	0.93
KAST 19499M001	U	6.64	1.74	6.33	2.62	4.85	2.00	-1.92	-13.53
LARE 19440M001	N	1.24	0.93	0.86	1.15	1.21	-0.63	-1.82	-1.03
LARE 19440M001	E	0.88	-0.20	-0.98	-1.34	-0.14	-0.29	-0.56	1.20
LARE 19440M001	U	1.99	0.13	-0.00	0.69	2.14	2.44	2.59	2.48
LAZK 19354S001	N	1.72	-0.18	-0.06	0.94	-0.85	-1.62	2.51	2.68
LAZK 19354S001	E	2.83	0.29	-3.33	0.14	-0.71	-2.12	5.07	2.50

LAZK	19354S001	U	4.19	-2.01	-1.54	2.65	0.94	1.02	9.36	-1.52
LEIT	19428M001	N	4.40	-0.16	-1.38	-3.53	-2.46	-3.37	3.94	8.31
LEIT	19428M001	E	3.16	-0.54	-0.80	-1.55	-3.06	-2.69	2.81	5.65
LEIT	19428M001	U	5.49	-2.96	4.14	5.84	-0.54	-0.40	-5.64	-9.40
ORDN	19427M001	N	1.38	-0.30	-0.34	-1.49	-0.50	-0.36	1.64	2.42
ORDN	19427M001	E	1.14	-0.22	-0.02	-0.09	1.70	-0.51	0.24	-2.13
ORDN	19427M001	U	6.34	-3.77	0.90	3.51	5.10	2.46	-6.59	-11.77
PAS2	19351S001	N	1.55		0.83	0.12	-1.60		2.49	0.36
PAS2	19351S001	E	0.96		-0.71	-0.26	-0.82		0.92	1.26
PAS2	19351S001	U	3.74		0.76	1.26	-0.36		-7.30	-0.66
PASA	19351S001	N	1.47	-0.69	0.41	-0.14	-1.27	-1.00	3.00	0.84
PASA	19351S001	E	0.78	-0.84	0.04	-0.19	0.03	-1.17	1.14	0.50
PASA	19351S001	U	3.23	-2.04	2.41	0.47	0.14	-3.28	-6.34	-1.21
RID1	13448M002	N	0.95	1.39	0.74	0.05	1.40	-0.32	0.34	-0.86
RID1	13448M002	E	0.54	-0.35	0.16	0.28	-0.91	-0.64	-0.16	0.50
RID1	13448M002	U	3.17	1.61	-0.51	-1.91	-0.42	0.05	-0.47	7.30
SALA	13469M001	N	0.64	0.84	0.32	-0.39	-0.49	0.31	0.87	0.62
SALA	13469M001	E	0.55	-0.13	-0.49	-0.20	0.65	-0.20	0.36	-0.97
SALA	13469M001	U	5.28	-4.42	-0.64	-2.61	1.51	-2.42	7.46	8.74
SCDA	10088M002	N	1.03	0.84	0.89	0.24	-1.18	-0.83	1.60	0.36
SCDA	10088M002	E	0.66	0.30	-0.61	-1.06	0.02	0.15	0.81	0.57
SCDA	10088M002	U	2.40	-2.73	0.81	1.23	-0.27	0.93	-4.78	-1.08
SOPU	19386M001	N	2.21	0.43	0.73	0.49	-0.40	-0.18	5.09	-1.48
SOPU	19386M001	E	2.35	0.98	-1.01	2.24	0.93	-1.43	3.48	-3.33
SOPU	19386M001	U	3.76	-2.19	-2.66	4.45	3.37	0.50	6.11	-2.07
TERU	13487M001	N	0.64	-0.40	-0.28	0.64	-0.28	-0.10	0.26	-1.29
TERU	13487M001	E	0.93	0.43	-0.42	-0.86	-1.85	0.30	-0.58	0.50
TERU	13487M001	U	2.39	-0.59	4.22	0.85	0.11	-1.66	-2.58	2.44
VITO	19385M001	N	2.70	0.99	2.86	0.89	2.21	3.02	-0.26	-4.44
VITO	19385M001	E	1.39	0.56	-0.07	1.32	0.83	0.27	0.53	-2.91
VITO	19385M001	U	2.42	-1.07	1.29	1.39	2.85	1.00	-1.94	4.19
YEBE	13420M001	N	0.57	-0.18	0.33	0.13	-0.15	-0.13	-0.58	-1.20
YEBE	13420M001	E	0.69	0.12	-0.46	1.07	-0.69	0.59	0.80	-0.06
YEBE	13420M001	U	2.90	1.06	0.13	-2.09	-1.90	-4.29	-2.52	-4.06
ZARA	13462M001	N	0.86	1.78	0.67	0.15	0.65	-0.48	0.39	-0.10
ZARA	13462M001	E	1.01	0.68	0.24	0.82	-0.62	-0.44	-2.01	0.56
ZARA	13462M001	U	1.84	0.46	2.07	1.37	1.83	3.12	-0.67	-0.54



## 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		
1	ACOR 13434M001	I W	-0.94	1.38	-0.80
2	ALAC 13433M001	I W	0.66	-0.17	-0.33
3	ALBA 13452M001	I W	0.02	-1.89	-4.01
4	ALME 13437M001	I W	-0.73	0.68	8.04
5	BCLN 13412M001	I W	-0.34	-0.24	0.26
6	BELL 13431M001	I W	3.03	0.39	-1.64
7	BORR 13480M001	I W	-0.42	-4.33	-3.51
8	BRST 10004M004	I W	-1.66	1.60	0.57
9	CACE 13447M001	I W	1.24	0.13	1.05
10	CANT 13438M001	I W	-1.01	-0.64	-4.78
11	CARG 19412M001	I W	1.19	-1.17	4.54
12	CASC 13909S001	I W	0.14	-0.33	0.00
13	CEUI 13449M002	I W	-0.66	4.35	2.74
14	COBA 13453M001	I W	1.04	1.03	-2.18
15	CREU 13432M001	I W	0.27	0.37	1.23
16	EBRE 13410M001	I W	1.35	0.35	-2.54
17	ESCO 13435M001	I W	0.52	-2.09	3.92
18	FUNC 13911S001	I W	0.85	-0.84	12.01
19	GAIA 13902M001	I W	-0.44	-0.47	-0.03
21	HUEL 13451M001	I W	0.10	3.34	2.40
22	IZAN 31309M002	I W	-0.58	-0.85	6.07
23	LAGO 13903M001	I W	-5.83	-7.76	0.89
24	LLIV 13436M001	I W	-0.95	-0.50	-1.45
25	LPAL 81701M001	I W	-2.42	1.42	2.03
26	LROC 10023M001	I W	-0.97	0.60	-1.68
27	MALA 13443M001	I W	-0.77	1.65	-2.23
28	MAS1 31303M002	I W	0.42	0.88	6.13
30	MELI 19379M001	I W	-0.72	0.70	3.04
31	PASA 19351S001	I W	-0.79	-0.40	-0.58
32	PDEL 31906M004	I W	-0.19	2.04	1.43
33	RABT 35001M002	I W	0.91	0.42	-3.46
34	RIO1 13448M002	I W	0.14	-1.26	-3.87
35	SALA 13469M001	I W	-0.43	1.07	-2.61
36	SCOA 10088M002	I W	-3.58	-1.31	-3.64
38	SONS 13446M001	I W	3.00	2.69	-4.46
39	TERC 31909M001	I W	4.77	-2.24	-1.07
40	TERU 13487M001	I W	3.24	-1.61	-4.95
41	VALA 13463M002	I W	-0.33	0.85	-3.04
42	VALE 13439M001	I W	0.73	-0.59	-2.81
43	VIGO 13450M001	I W	-0.72	1.52	2.41
44	YEBE 13420M001	I W	0.53	0.84	0.51
45	ZARA 13462M001	I W	-0.06	0.66	-1.24
46	ZIMM 14001M004	I W	0.38	-0.29	-2.37
	RMS / COMPONENT		1.72	1.96	3.62
	MEAN		0.00	0.00	-0.00
	MIN		-5.83	-7.76	-4.95
	MAX		4.77	4.35	12.01

NUMBER OF PARAMETERS : 3  
NUMBER OF COORDINATES : 129  
RMS OF TRANSFORMATION : 2.58 MM

BARYCENTER COORDINATES:

LATITUDE : 39 37 38.73  
LONGITUDE : - 5 26 18.53  
HEIGHT : -47.820 KM

PARAMETERS:

TRANSLATION IN N : 0.00 +- 0.39 MM  
TRANSLATION IN E : 0.00 +- 0.39 MM  
TRANSLATION IN U : 0.00 +- 0.39 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          17242955
NUMBER OF UNKNOWN               234863
NUMBER OF DEGREES OF FREEDOM    17008092
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)     180
VARIANCE FACTOR                  2.156576329938145

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
  1  0.00224      0.0216 -0.0034 -0.0175  0.0001  0.0009 -0.0000  -0.00094
  2  0.00250      0.0082 -0.0102 -0.0143  0.0003  0.0005 -0.0002  0.00027
  3  0.00222      -0.0078  0.0006  0.0062  -0.0000 -0.0003 -0.0000  0.00023
  4  0.00231      0.0047 -0.0001  0.0003  0.0001  0.0001  0.0001  -0.00059
  5  0.00182      -0.0016  0.0101 -0.0024  -0.0002  0.0000  0.0003  0.00045
  6  0.00281      0.0434  0.0133 -0.0458  0.0002  0.0020  0.0007  -0.00048
  7  0.00348      0.0275  0.0141 -0.0335  -0.0000  0.0014  0.0006  0.00018
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00143      2484541  2.05          2519737      3          1026      34173      0
  2  0.00143      2462985  2.05          2498059      3          1032      34045      0
  3  0.00150      2483958  2.25          2518568      3          1023      33590      0
  4  0.00134      2501117  1.79          2534315      3          1023      32178      0
  5  0.00134      2493441  1.80          2526759      3          1023      32298      0
  6  0.00155      2159027  2.39          2191232      3          903      31305      0
  7  0.00164      2417032  2.71          2454285      3          1020      36236      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 18:063:00000 18:069:86370 LEICA GRX1200PRO  -----
ALDA  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
ALSA  A   1 P 18:063:00000 18:069:86370 LEICA GRX1200GGPRO -----
AMUR  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
BIAZ  A   1 P 18:063:00000 18:069:86370 TRI SP90M      -----
BIDA  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
BRZR  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
CACE  A   1 P 18:063:00000 18:069:86370 TRIMBLE NETR9  -----
CANT  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
CHER  A   1 P 18:063:00000 18:069:86370 LEICA GRX1200+GNSS -----
CREU  A   1 P 18:063:00000 18:069:86370 LEICA GR50      -----
EBRE  A   1 P 18:063:00000 18:069:86370 LEICA GR50      -----
ELGE  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
EMAZ  A   1 P 18:063:00000 18:069:86370 LEICA GR30      -----
GERN  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
IGEL  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
ISPS  A   1 P 18:063:00000 18:069:86370 TRIMBLE NETR9  -----
KAST  A   1 P 18:063:00000 18:069:86370 LEICA GR30      -----
LARE  A   1 P 18:063:00000 18:069:86370 LEICA GRX1200GGPRO -----
LAZK  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
LEIT  A   1 P 18:063:00000 18:069:86370 LEICA GRX1200+GNSS -----
ORON  A   1 P 18:063:00000 18:069:86370 LEICA GRX1200GGPRO -----
PAS2  A   1 P 18:064:00000 18:069:86370 TPS NET-G3A    -----
PASA  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
RIO1  A   1 P 18:063:00000 18:069:86370 LEICA GR25      -----
SALA  A   1 P 18:063:00000 18:069:86370 LEICA GRX1200+GNSS -----
SCOA  A   1 P 18:063:00000 18:069:86370 LEICA GR25      -----
SOPU  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
TERU  A   1 P 18:063:00000 18:069:86370 LEICA GRX1200GGPRO -----
VITO  A   1 P 18:063:00000 18:069:86370 LEICA GR10      -----
YEBE  A   1 P 18:063:00000 18:069:86370 TRIMBLE NETR9  -----
ZARA  A   1 P 18:063:00000 18:069:86370 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 18:063:00000 18:069:86370 LEIAT504      LEIS -----
ALDA  A   1 P 18:063:00000 18:069:86370 LEIAS10      NONE -----
ALSA  A   1 P 18:063:00000 18:069:86370 LEIAX1202GG  NONE -----
AMUR  A   1 P 18:063:00000 18:069:86370 LEIAS10      NONE -----
```

BIAZ	A	1 P	18:063:00000	18:069:86370	LEIAR25	LEIT	----
BIDA	A	1 P	18:063:00000	18:069:86370	LEIAS10	NONE	----
BRZR	A	1 P	18:063:00000	18:069:86370	LEIAS10	NONE	----
CACE	A	1 P	18:063:00000	18:069:86370	TRM29659.00	NONE	----
CANT	A	1 P	18:063:00000	18:069:86370	LEIAR25.R4	LEIT	25066
CHER	A	1 P	18:063:00000	18:069:86370	LEIAX1203+GNSS	NONE	----
CREU	A	1 P	18:063:00000	18:069:86370	LEIAR25.R4	NONE	26357
EBRE	A	1 P	18:063:00000	18:069:86370	LEIAR25.R4	NONE	26359
ELGE	A	1 P	18:063:00000	18:069:86370	LEIAR25.R4	LEIT	----
EMAZ	A	1 P	18:063:00000	18:069:86370	LEIAS10	NONE	----
GERN	A	1 P	18:063:00000	18:069:86370	LEIAS10	NONE	----
IGEL	A	1 P	18:063:00000	18:069:86370	LEIAR20	LEIM	----
ISPS	A	1 P	18:063:00000	18:069:86370	TRM59900.00	SCIS	----
KAST	A	1 P	18:063:00000	18:069:86370	LEIAS10	NONE	----
LARE	A	1 P	18:063:00000	18:069:86370	LEIAT504	NONE	----
LAZK	A	1 P	18:063:00000	18:069:86370	LEIAR25.R4	LEIT	----
LEIT	A	1 P	18:063:00000	18:069:86370	LEIAX1203+GNSS	NONE	----
ORDN	A	1 P	18:063:00000	18:069:86370	LEIAX1202GG	NONE	----
PAS2	A	1 P	18:064:00000	18:069:86370	LEIAR20	LEIM	73034
PASA	A	1 P	18:063:00000	18:069:86370	LEIAR20	LEIM	73034
RID1	A	1 P	18:063:00000	18:069:86370	LEIAR25.R4	LEIT	25138
SALA	A	1 P	18:063:00000	18:069:86370	LEIAR25	NONE	----
SCDA	A	1 P	18:063:00000	18:069:86370	TRM5971.00	NONE	----
SOPU	A	1 P	18:063:00000	18:069:86370	LEIAS10	NONE	----
TERU	A	1 P	18:063:00000	18:069:86370	LEIAT504GG	LEIS	----
VITO	A	1 P	18:063:00000	18:069:86370	LEIAS10	NONE	----
YEBE	A	1 P	18:063:00000	18:069:86370	TRM29659.00	NONE	----
ZARA	A	1 P	18:063:00000	18:069:86370	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	18:063:00000	18:069:86370	UNE	3.0460	0.0000	0.0000	0.0000	0.0000	0.0000
ALDA	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALSA	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AMUR	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BIAZ	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BIDA	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
BRZR	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CACE	A	1 P	18:063:00000	18:069:86370	UNE	0.0600	0.0000	0.0000	0.0000	0.0000	0.0000
CANT	A	1 P	18:063:00000	18:069:86370	UNE	3.0490	0.0000	0.0000	0.0000	0.0000	0.0000
CHER	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CREU	A	1 P	18:063:00000	18:069:86370	UNE	0.0770	0.0000	0.0000	0.0000	0.0000	0.0000
EBRE	A	1 P	18:063:00000	18:069:86370	UNE	0.0770	0.0000	0.0000	0.0000	0.0000	0.0000
ELGE	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EMAZ	A	1 P	18:063:00000	18:069:86370	UNE	0.0350	0.0000	0.0000	0.0000	0.0000	0.0000
GERN	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
IGEL	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ISPS	A	1 P	18:063:00000	18:069:86370	UNE	0.0350	0.0000	0.0000	0.0000	0.0000	0.0000
KAST	A	1 P	18:063:00000	18:069:86370	UNE	0.0350	0.0000	0.0000	0.0000	0.0000	0.0000
LARE	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAZK	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LEIT	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ORDN	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PAS2	A	1 P	18:064:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PASA	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RID1	A	1 P	18:063:00000	18:069:86370	UNE	0.0606	0.0000	0.0000	0.0000	0.0000	0.0000
SALA	A	1 P	18:063:00000	18:069:86370	UNE	0.0600	0.0000	0.0000	0.0000	0.0000	0.0000
SCDA	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SOPU	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TERU	A	1 P	18:063:00000	18:069:86370	UNE	0.0600	0.0000	0.0000	0.0000	0.0000	0.0000
VITO	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
YEBE	A	1 P	18:063:00000	18:069:86370	UNE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ZARA	A	1 P	18:063:00000	18:069:86370	UNE	3.2590	0.0000	0.0000	0.0000	0.0000	0.0000

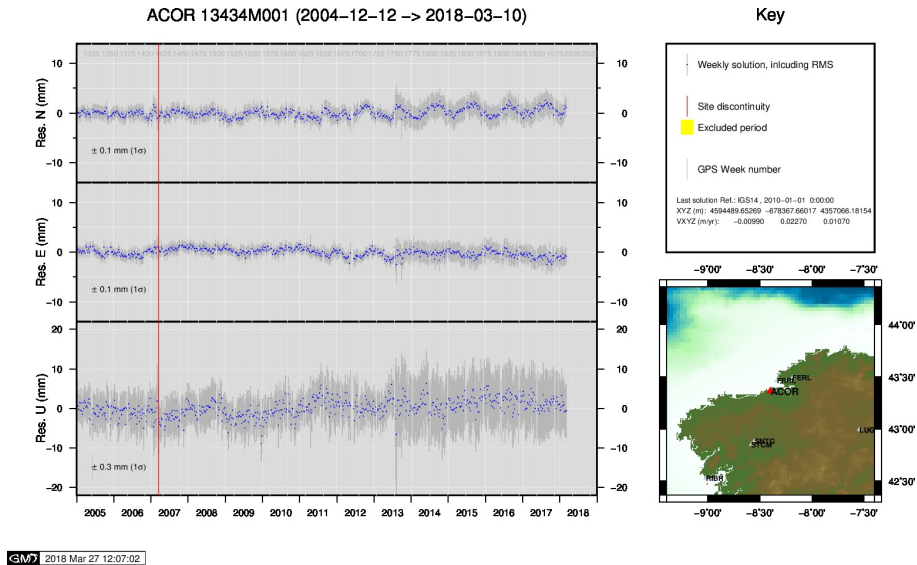
## 8 Inconsistencies (logsheet-RINEX metadata)

The following inconsistencies were found comparing the data available in the logsheets and the RINEX headers:

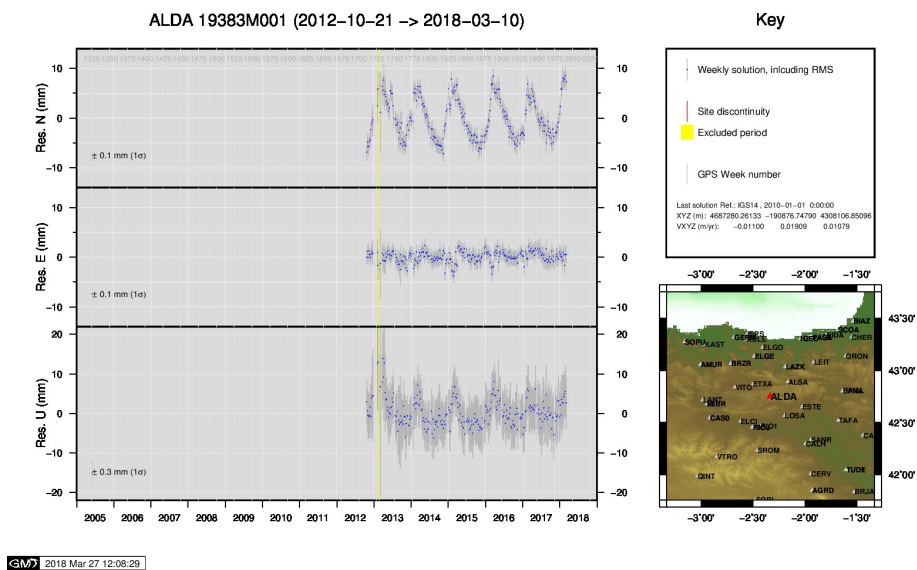
2018-03-24	21:10	UTC	BRZR0630.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-24	21:10	UTC	GERN0630.180	RECEIVER FIRM. VERS.	4.10	->	4.10/6.523
2018-03-24	21:10	UTC	SOPU0630.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	00:13	UTC	BRZR0640.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	00:13	UTC	GERN0640.180	RECEIVER FIRM. VERS.	4.10	->	4.10/6.523
2018-03-25	00:14	UTC	SOPU0640.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	04:16	UTC	BRZR0650.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	04:16	UTC	GERN0650.180	RECEIVER FIRM. VERS.	4.10	->	4.10/6.523
2018-03-25	04:17	UTC	IGEL0650.180	RECEIVER FIRM. VERS.	4.11/6.523	->	4.20/6.524
2018-03-25	04:17	UTC	SOPU0650.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	07:21	UTC	BRZR0660.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	07:21	UTC	GERN0660.180	RECEIVER FIRM. VERS.	4.10	->	4.10/6.523
2018-03-25	07:21	UTC	SOPU0660.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	10:27	UTC	BRZR0670.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	10:27	UTC	GERN0670.180	RECEIVER FIRM. VERS.	4.10	->	4.10/6.523
2018-03-25	10:28	UTC	SOPU0670.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	13:36	UTC	BRZR0680.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	13:36	UTC	GERN0680.180	RECEIVER FIRM. VERS.	4.10	->	4.10/6.523
2018-03-25	13:36	UTC	SOPU0680.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	17:30	UTC	BRZR0690.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522
2018-03-25	17:30	UTC	GERN0690.180	RECEIVER FIRM. VERS.	4.10	->	4.10/6.523
2018-03-25	17:31	UTC	SOPU0690.180	RECEIVER FIRM. VERS.	4.02	->	4.02/6.522

## 9 Cumulative Time Series

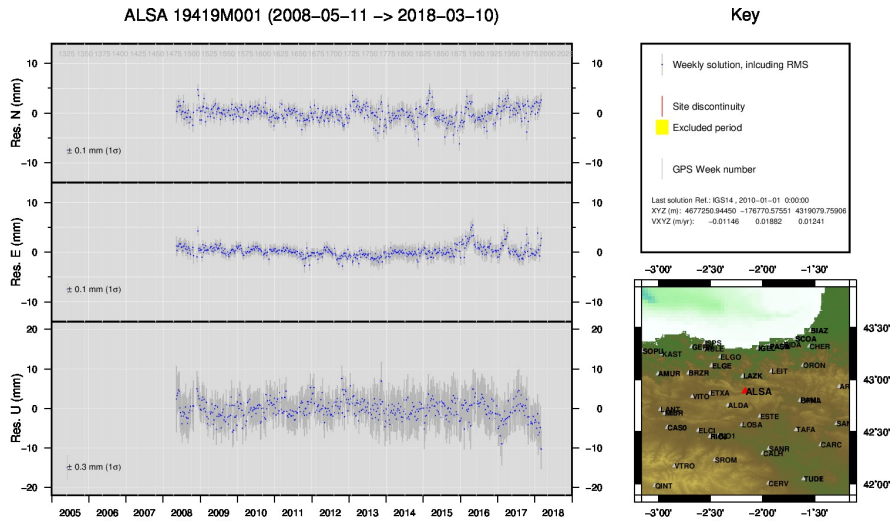
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



1 ) ACOR

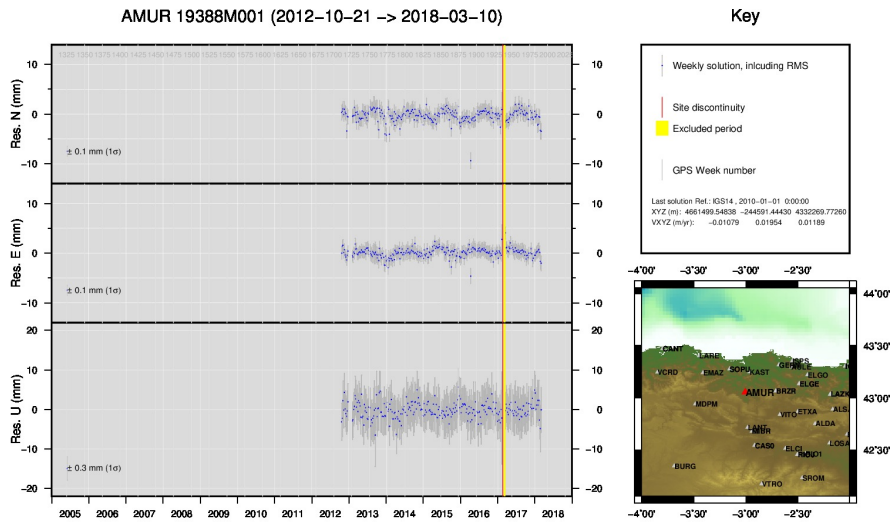


2 ) ALDA



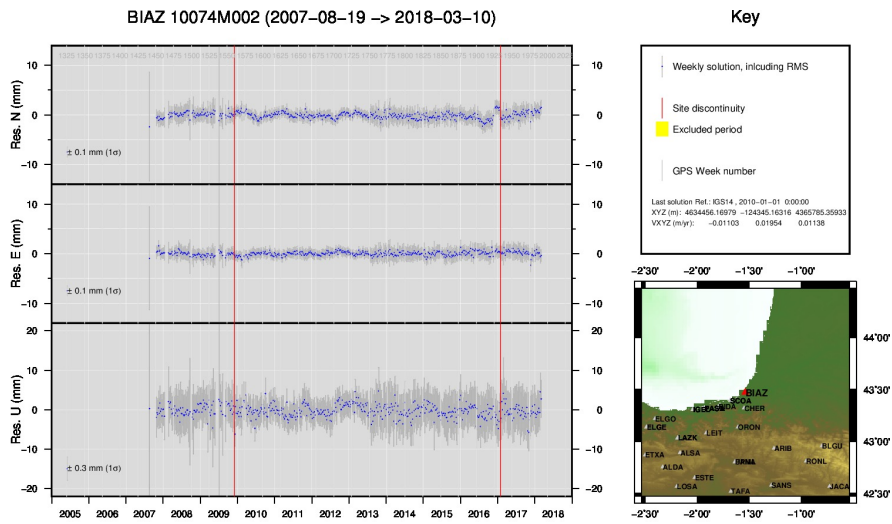
GMW 2018 Mar 27 12:09:30

3 ) ALSA



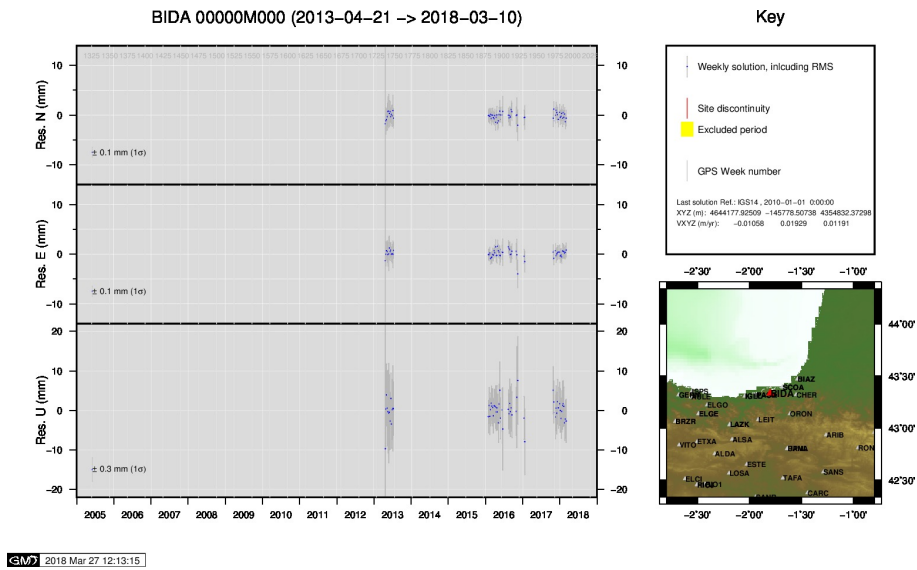
GMW 2018 Mar 27 12:09:43

4 ) AMUR

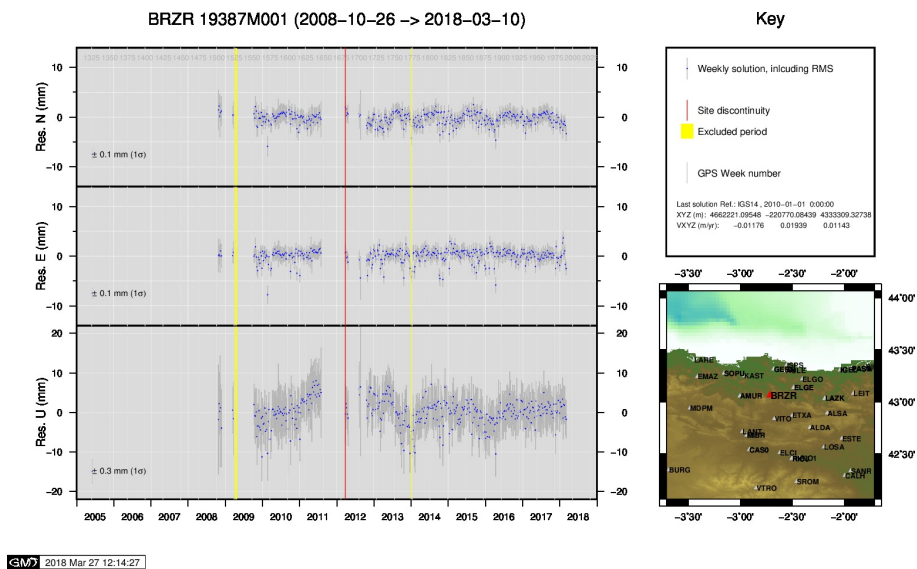


GMW 2018 Mar 27 12:13:08

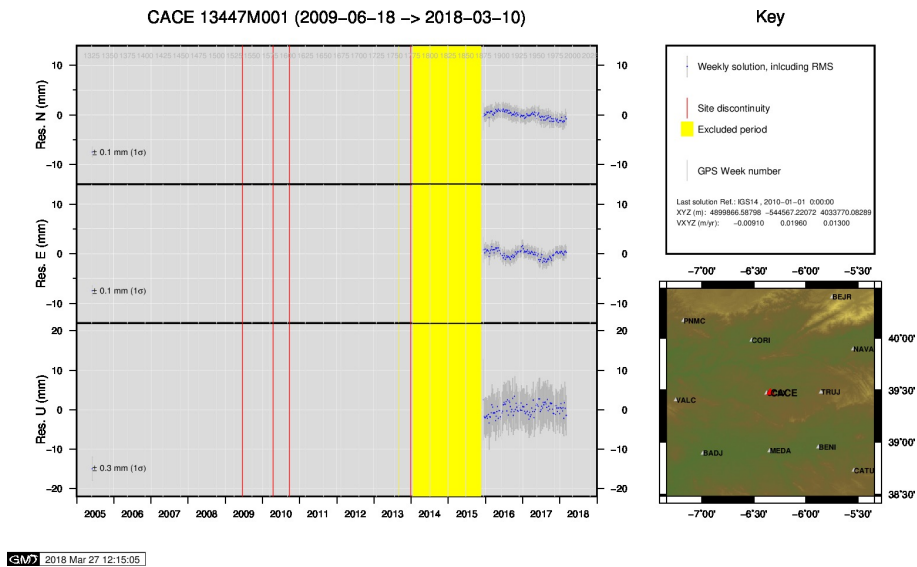
5 ) BIAZ



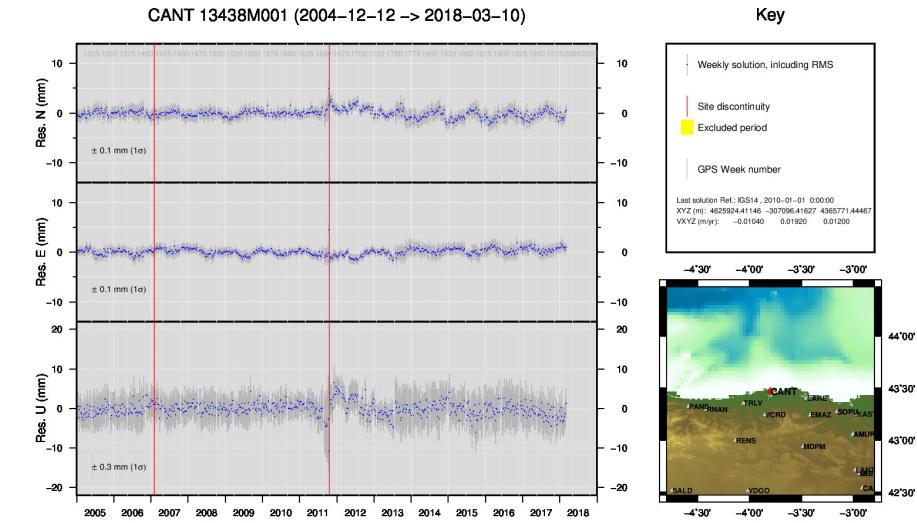
6 ) BIDA



7 ) BRZR

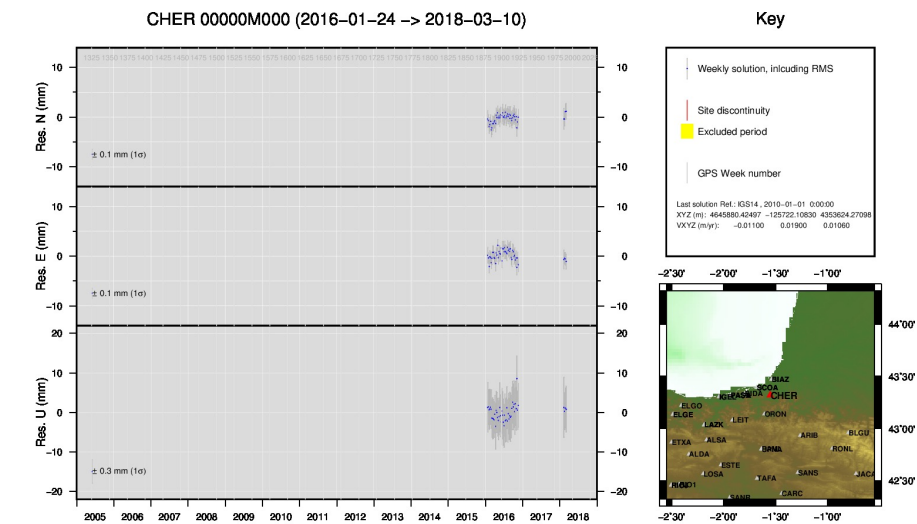


8 ) CACE



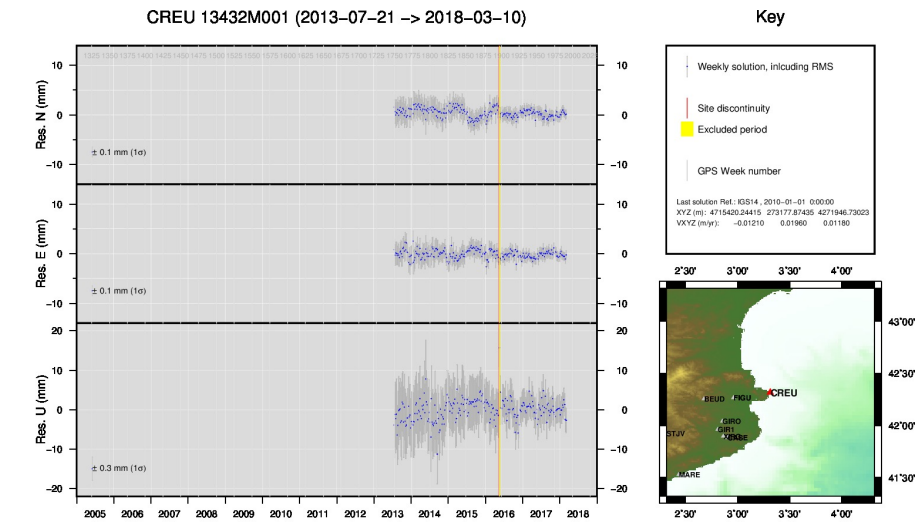
GMW 2018 Mar 27 12:15:29

9 ) CANT



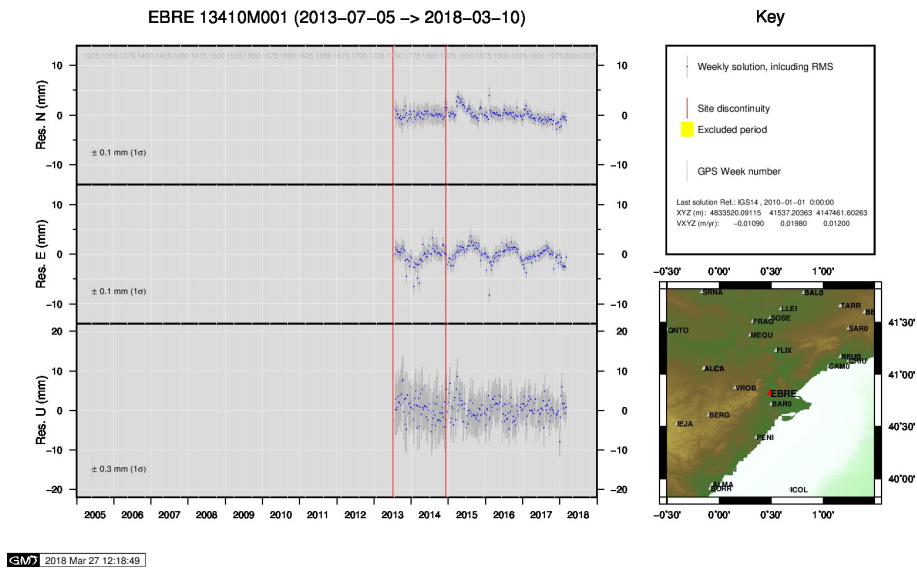
GMW 2018 Mar 27 12:17:20

10 ) CHER

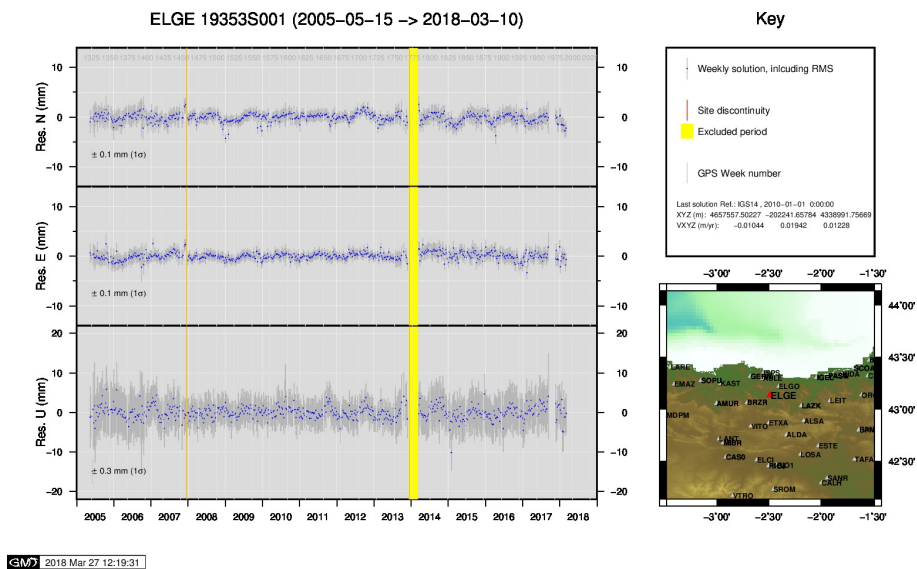


GMW 2018 Mar 27 12:17:56

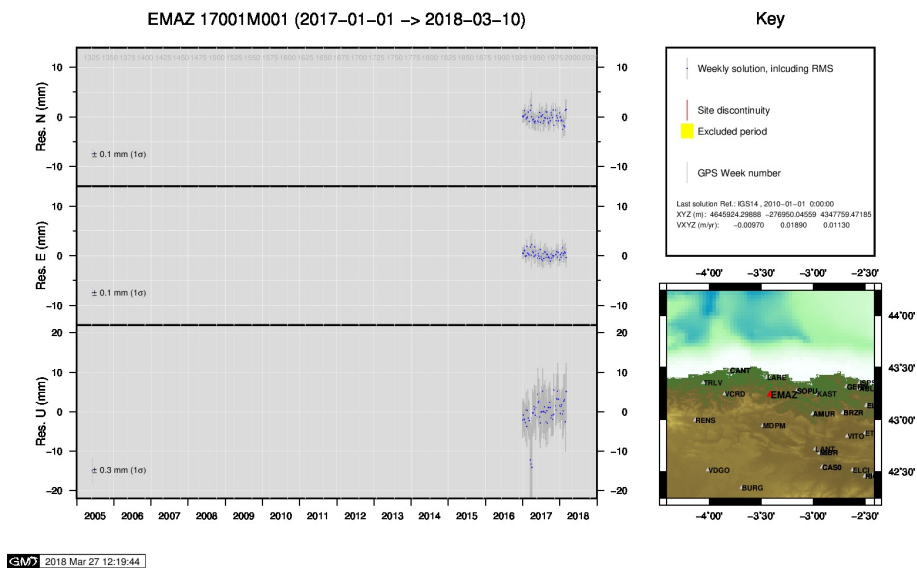
11 ) CREU



12 ) EBRE

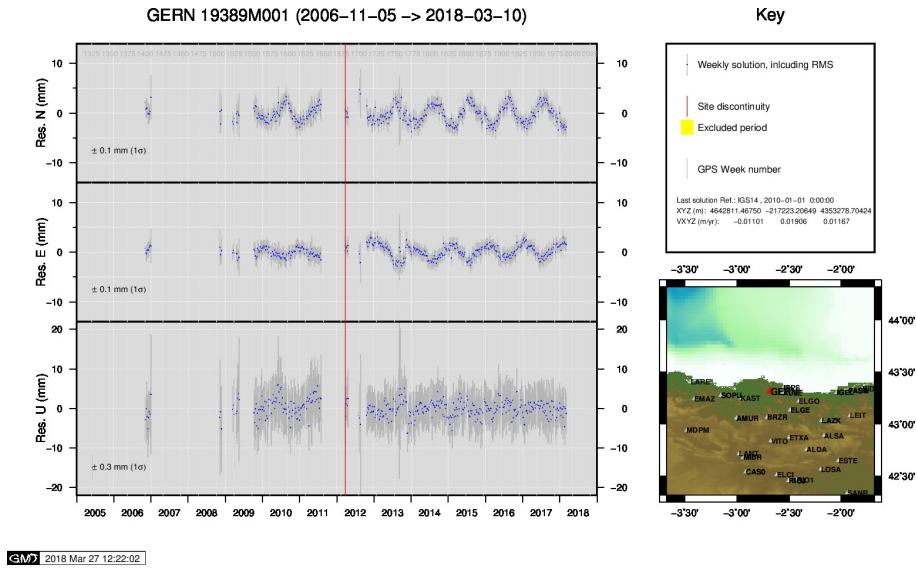


13 ) ELGE

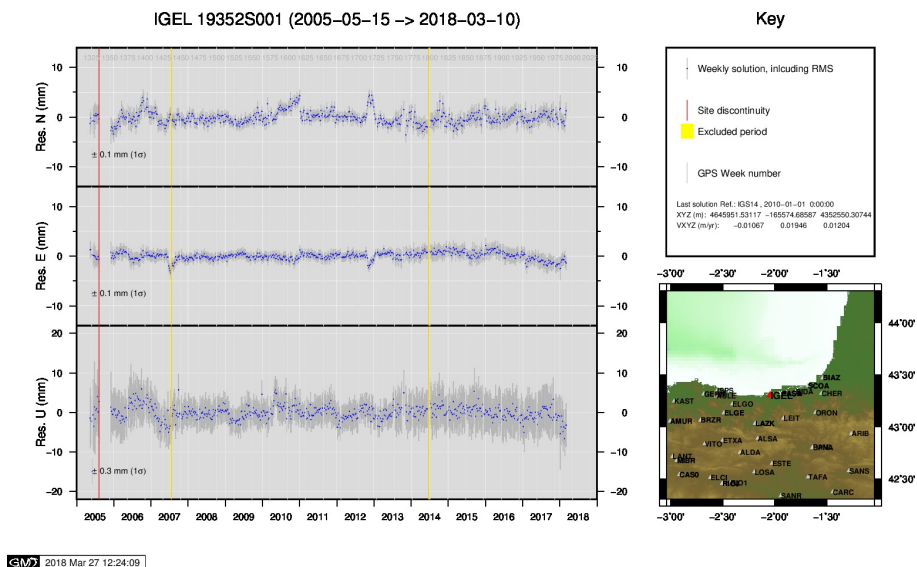


14 ) EMAZ

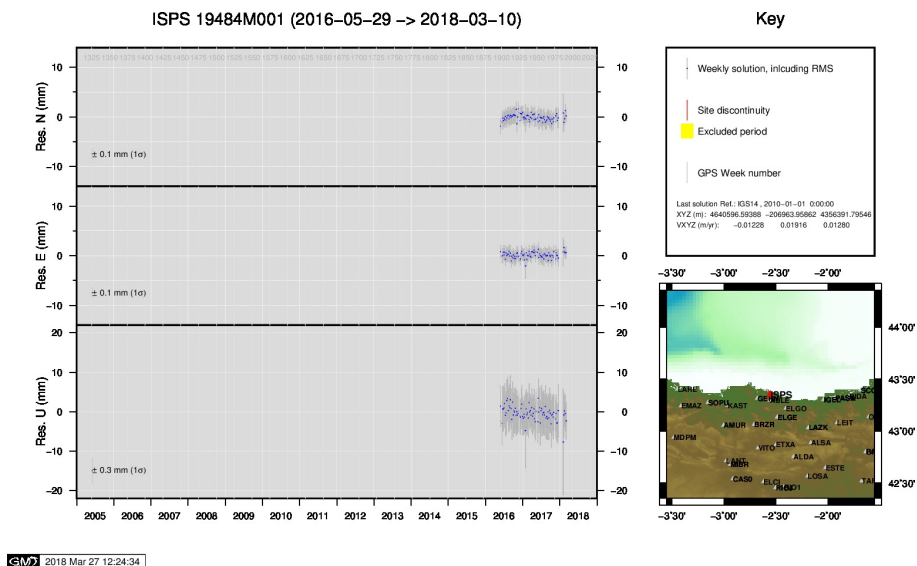




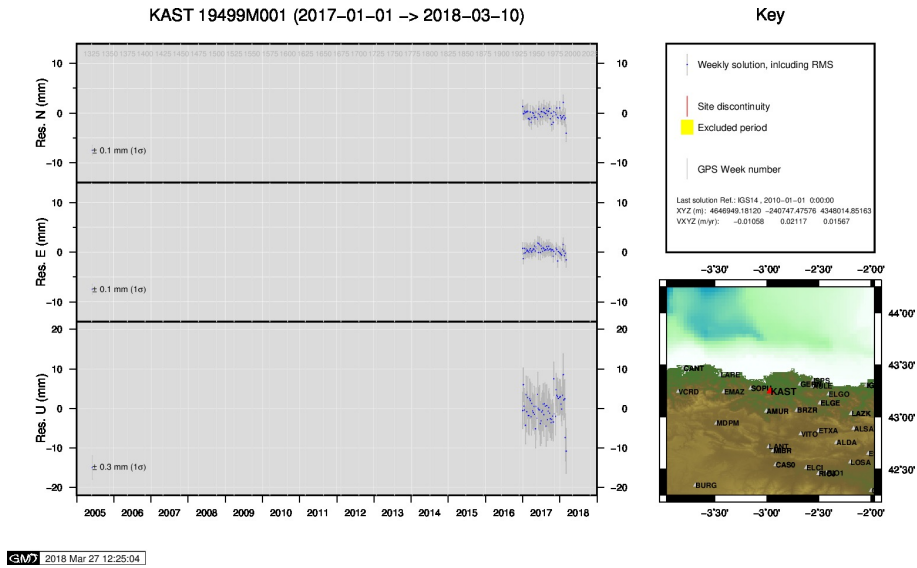
15 ) GERN



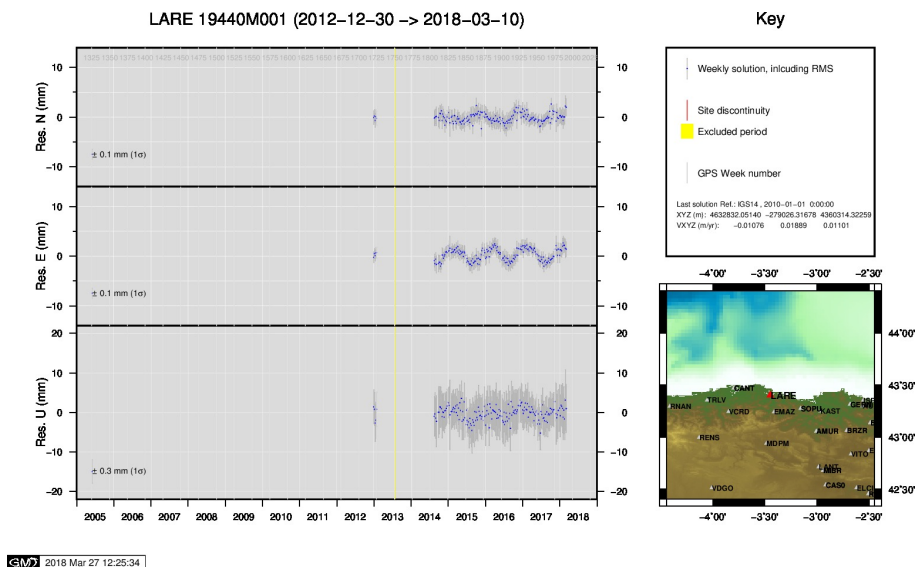
16 ) IGEL



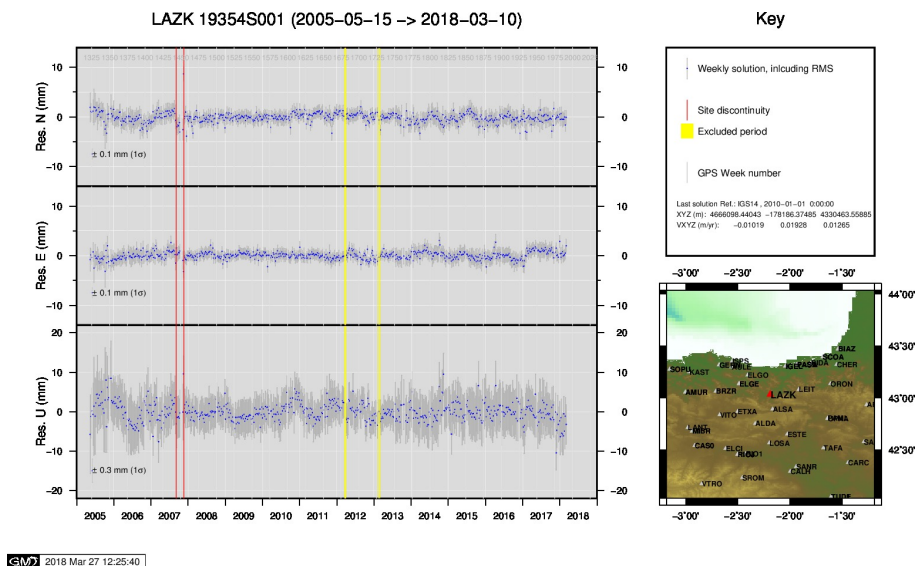
17 ) ISPS



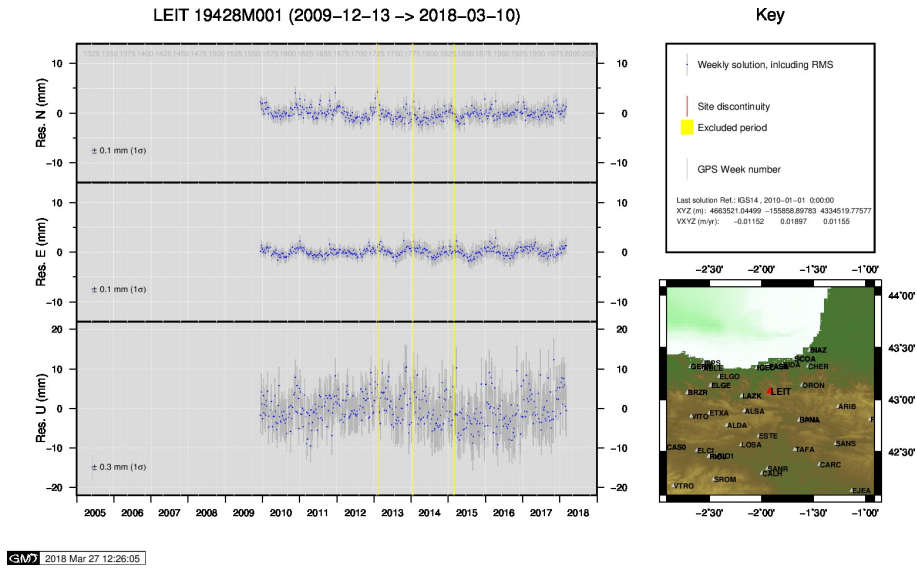
18 ) KAST



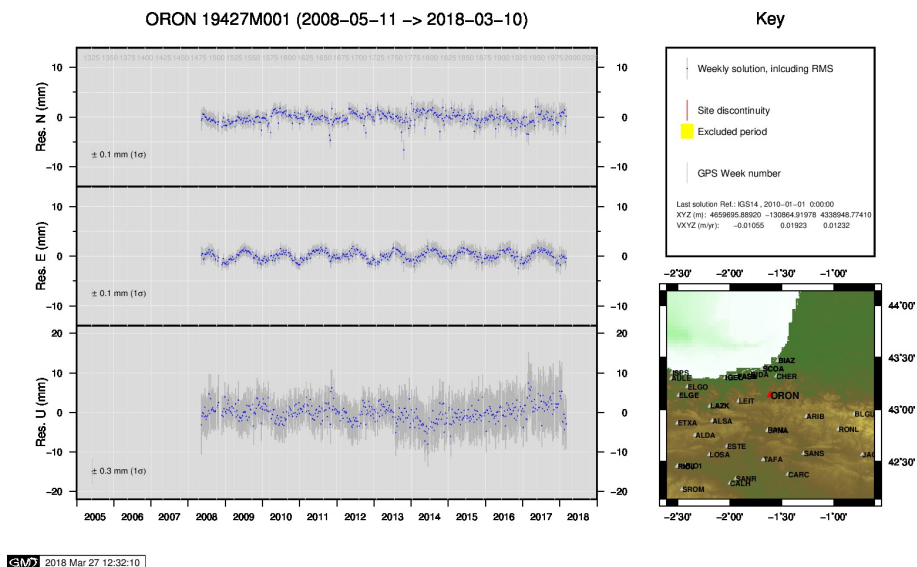
19 ) LARE



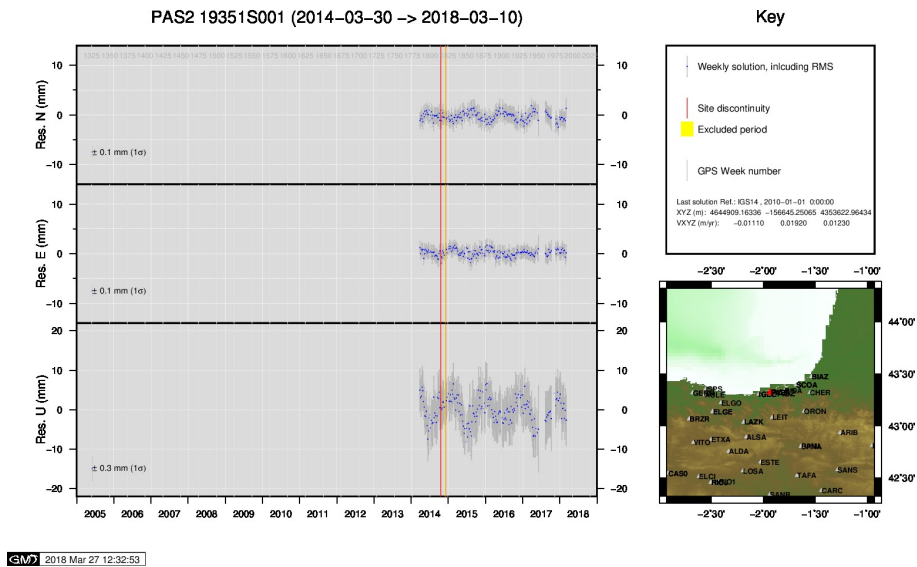
20 ) LAZK



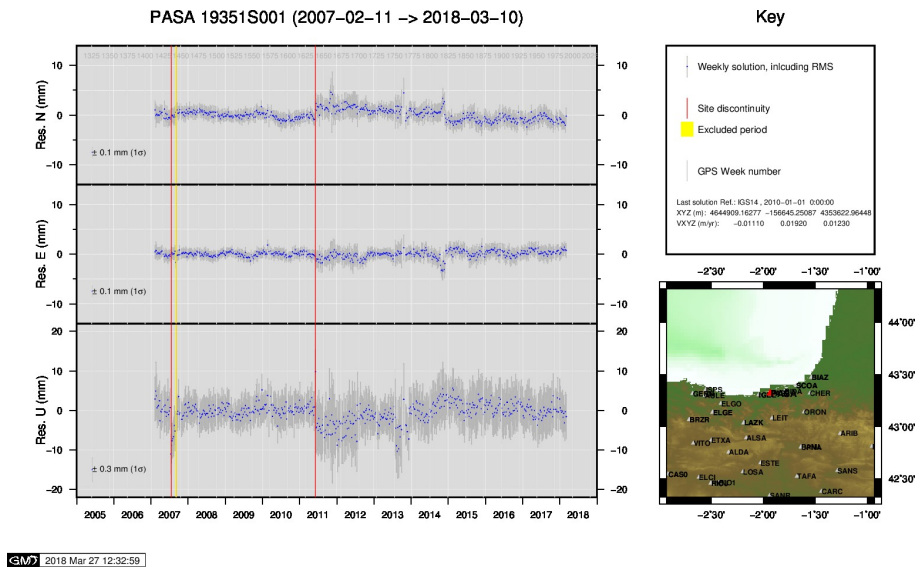
21 ) LEIT



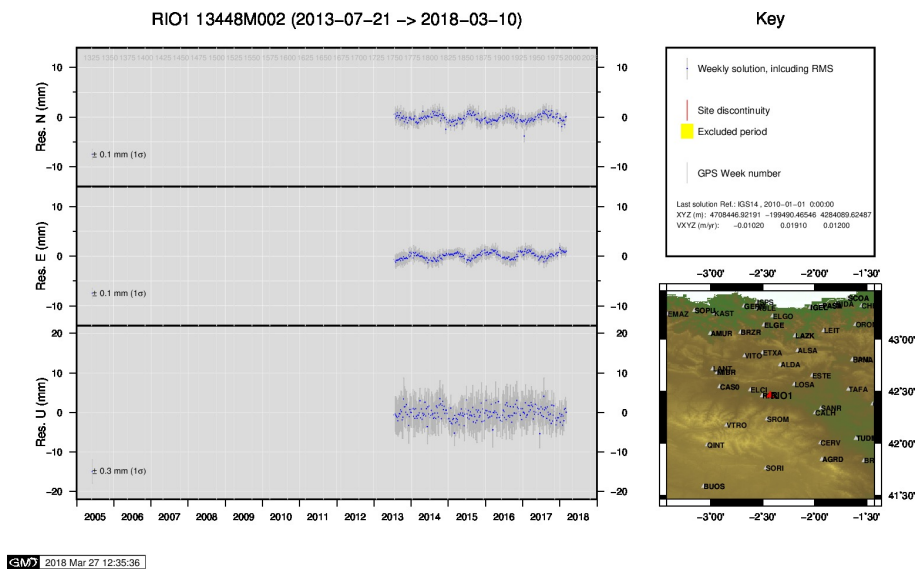
22 ) ORON



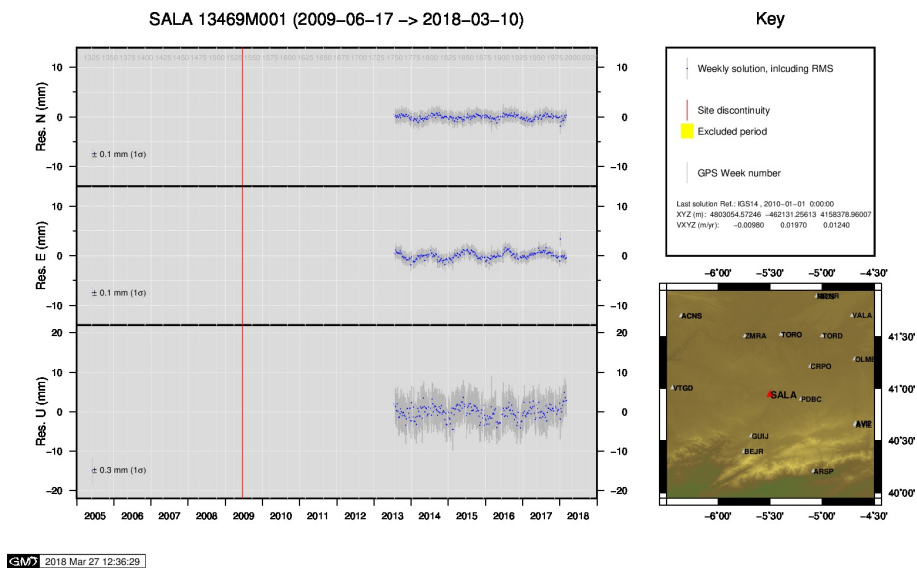
23 ) PAS2



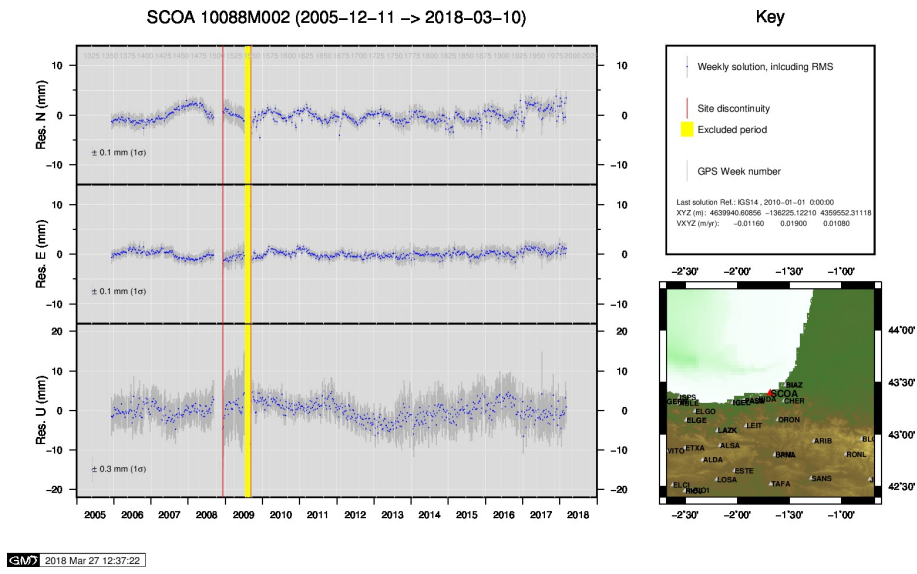
24 ) PASA



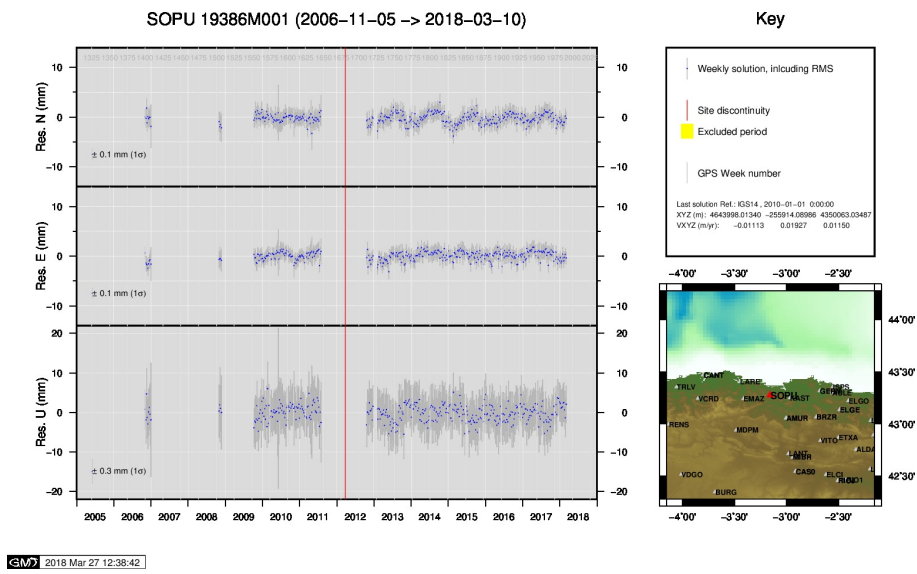
25 ) RIO1



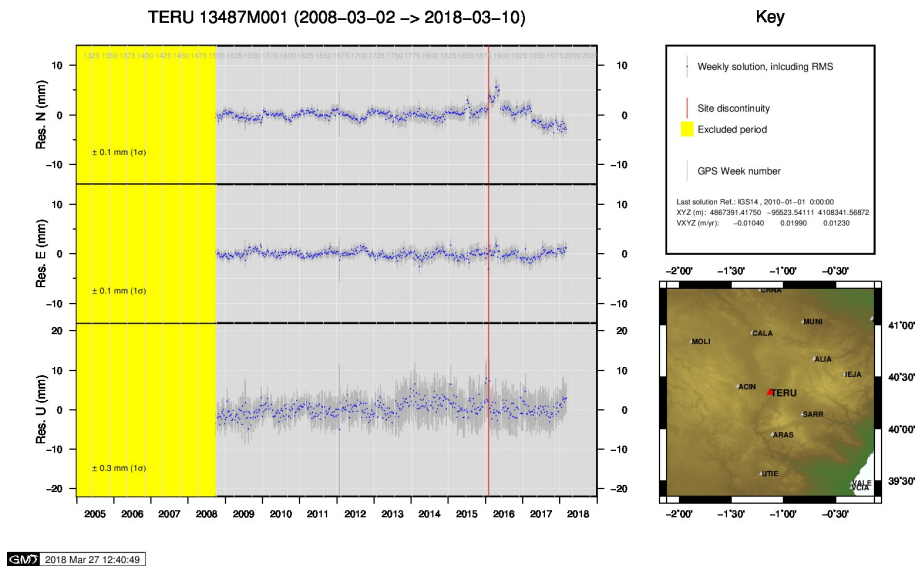
26 ) SALA



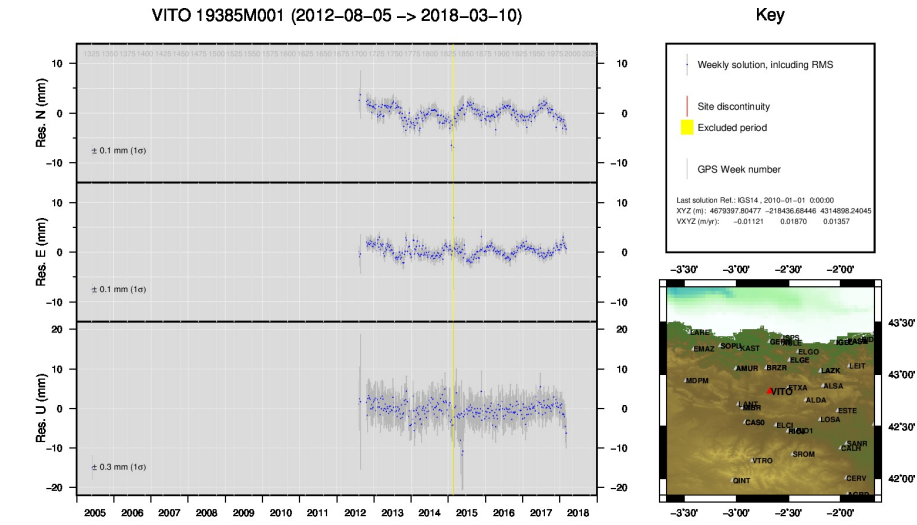
27 ) SCOA



28 ) SOPU

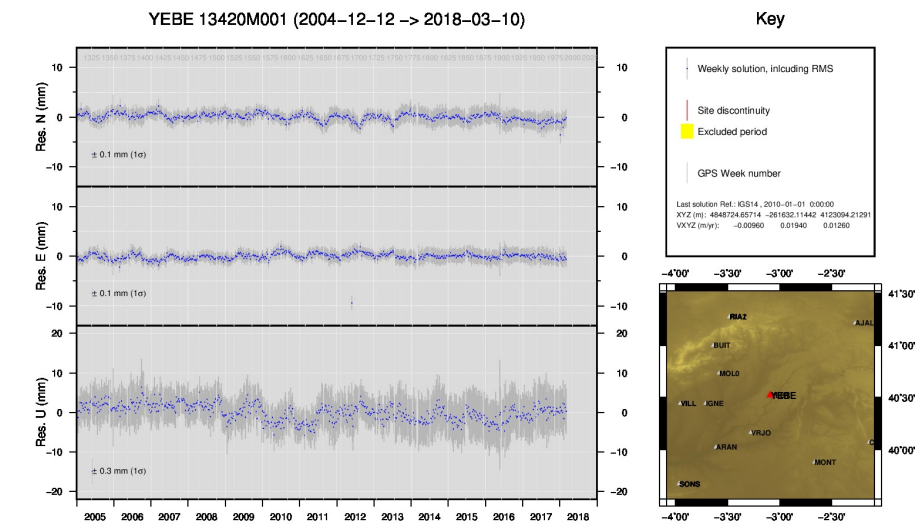


29 ) TERU



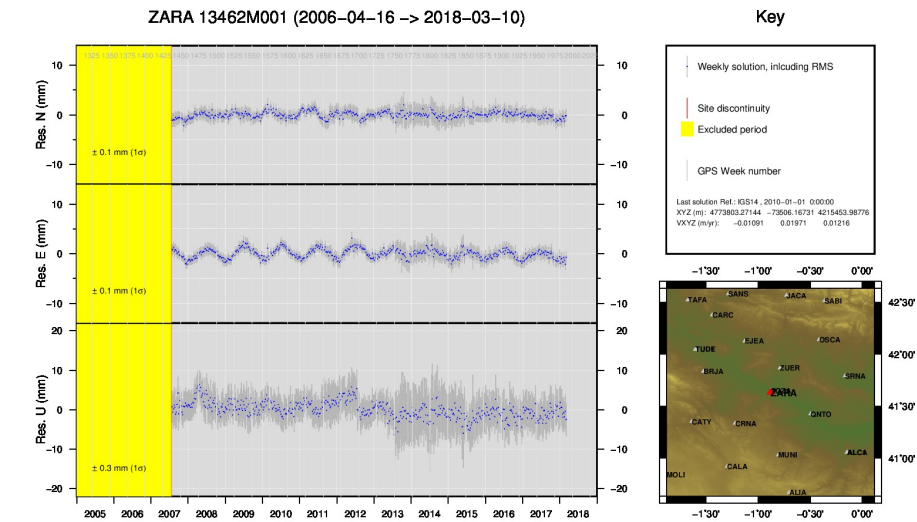
GMW 2018 Mar 27 12:44:15

30 ) VITO



GMW 2018 Mar 27 12:45:22

31 ) YEBE



GMW 2018 Mar 27 12:45:28

32 ) ZARA



