

# ARA-DAC Weekly Analysis Result: 1914 (GFA)

## Technical Report

**GPS Week: 1914 (GFA)**

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

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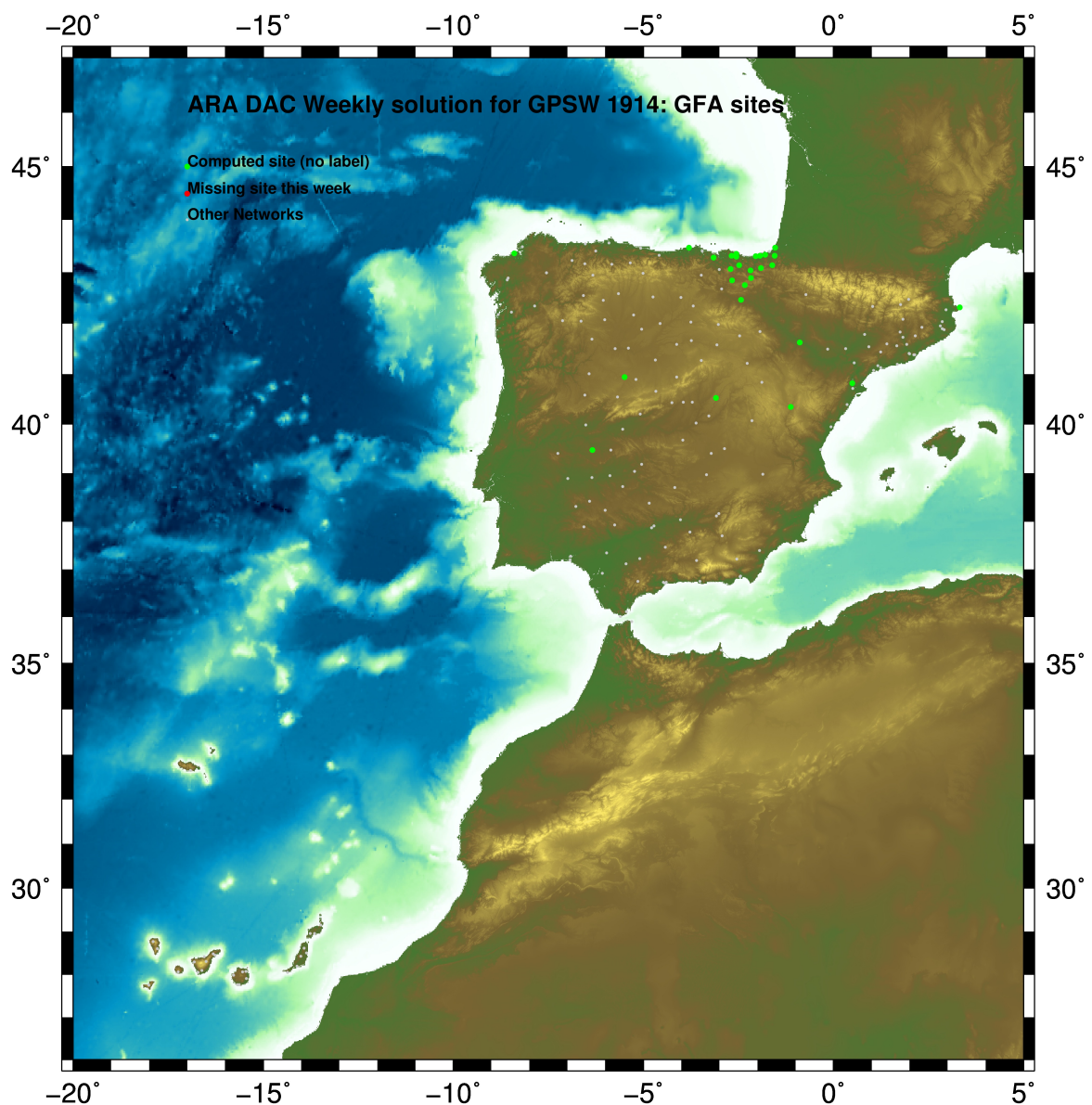
Report generated on 2016/09/25 at 13:18:38



## 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 2016 Sep 25 13:18:30

Fig.1: Computed Sites for GPS Week1914 (GFA)

### 3 Main Computation Parameters

The main parameters considered in the ARA analysis follow strictly the EPN recommendations.

- Reprocessing: 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
- Modelled observable: Double differences of carrier phase in QIF or  $L_3$  combinations (respectively for ambiguity resolution in baseline mode, and final network solution). In the final network solution the double differenced data are sampled at 180 sec. intervals.
- Ground antenna phase center calibrations: Group APCV used from the PCV\_COD.I08 file and individual calibrations from EPNC\_08.ATX. EPN\_A class sites (CRD + VEL) IGB08 used to define the reference frame. If individual calibrations, other from these, are available, they are also included in the analysis.
- Troposphere:
  - 3 deg elev. cutoff; elevation dependent weighting
  - VMF1\_DRY mapping function. ZPD parameters are estimated using WET 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:  $3\sigma$  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 IGB08

The Reference Frame considered in this section is IGB08, release C1890.

ARA LAC 1914 WEEK COMBINATION: PRECISE ORBITS 25-SEP-16 12:09

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LOCAL GEODETIC DATUM: IGB08 EPOCH: 2016-09-14 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACDR 13434M001	4594489.58997	-678367.50747	4357066.26866	W
22	ALDA 19383M001	4687280.18954	-190876.61783	4308106.92227	A
28	ALSA 19419M001	4677250.87027	-176770.44797	4319079.84337	A
40	AULE 00000M000	4644762.15592	-207777.70422	4351758.45254	A
51	BIAZ 10074M002	4634456.09617	-124345.03183	4365785.43503	A
55	BIDA 00000M000	4644177.85646	-145778.37628	4354832.45752	A
54	BRZR 19387M001	4662221.01973	-220769.95333	4333309.40724	A
7	CACE 13447M001	4899866.52849	-544567.08768	4033770.17268	W
8	CANT 13438M001	4625924.34600	-307096.28521	4365771.53022	W
69	CHER 00000M000	4645880.35325	-125721.97937	4353624.34459	A
11	CREU 13432M001	4715420.16811	273178.00785	4271946.81469	A
12	EBRE 13410M001	4833520.02272	41537.34085	4147461.68838	W
77	ELGE 19353S001	4657557.43611	-202241.52633	4338991.84400	A
87	GERN 19389M001	4642811.33901	-217222.98595	4353278.85673	A
101	IGEL 19352S001	4645951.46075	-165574.55462	4352550.39254	A
105	ISPS 19484M001	4640596.51474	-206963.82945	4356391.88515	A
109	LAZK 19354S001	4666098.37460	-178186.24486	4330463.64605	A
112	LEIT 19428M001	4663520.97091	-155859.76951	4334519.85716	A
141	ORON 19427M001	4659695.82211	-130864.78899	4338948.85815	A
146	PAS2 19351S001	4644909.09201	-156645.12142	4353623.05079	A
147	PASA 19351S001	4644909.09387	-156645.12133	4353623.05132	A
27	RIO1 13448M002	4708446.85549	-199490.33612	4284089.70794	W
28	SALA 13469M001	4803054.50828	-462131.12134	4158379.04634	W
172	SOPU 19386M001	4643997.94136	-255913.96013	4350063.11541	A
31	TERU 13487M001	4867391.34881	-95523.40549	4108341.65401	W
204	VITO 19385M001	4679397.73167	-218436.55754	4314898.33389	A
35	YEBE 13420M001	4848724.59667	-261631.98245	4123094.30050	W
36	ZARA 13462M001	4773803.20002	-73506.03496	4215454.07011	W

### 5.2 ETRS89 Coordinates

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

ETRF2000 COORD. wk 1914 25-SEP-16 12:09

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LOCAL GEODETIC DATUM: ETRF2000 EPOCH: 2016-09-14 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACDR 13434M001	4594489.87054	-678367.99489	4357065.87197	W
22	ALDA 19383M001	4687280.51900	-190877.11329	4308106.53464	A
28	ALSA 19419M001	4677251.20192	-176770.94244	4319079.45659	A
40	AULE 00000M000	4644762.48634	-207778.19567	4351758.06765	A
51	BIAZ 10074M002	4634456.43636	-124345.52212	4365785.05176	A
55	BIDA 00000M000	4644178.19368	-145778.86754	4354832.07335	A
54	BRZR 19387M001	4662221.34760	-220770.44647	4333309.02101	A
7	CACE 13447M001	4899866.80284	-544567.60371	4033769.76648	W
8	CANT 13438M001	4625924.66673	-307096.77508	4365771.14552	W
69	CHER 00000M000	4645880.69253	-125722.47074	4353623.96052	A
11	CREU 13432M001	4715420.54463	273177.51104	4271946.43016	A
12	EBRE 13410M001	4833520.36672	41536.83221	4147461.29323	W
77	ELGE 19353S001	4657557.76631	-202242.01899	4338991.45829	A
87	GERN 19389M001	4642811.66852	-217223.47724	4353278.47186	A
101	IGEL 19352S001	4645951.79571	-165575.04609	4352550.00803	A
105	ISPS 19484M001	4640596.84554	-206964.32051	4356391.50055	A
109	LAZK 19354S001	4666098.70682	-178186.73827	4330463.26002	A
112	LEIT 19428M001	4663521.30577	-155859.26263	4334519.47155	A
141	ORON 19427M001	4659696.15991	-130865.28169	4338948.47307	A
146	PAS2 19351S001	4644909.42799	-156645.61277	4353622.66645	A
147	PASA 19351S001	4644909.42985	-156645.61268	4353622.66698	A
27	RIO1 13448M002	4708447.18251	-199490.83359	4284089.31876	W
28	SALA 13469M001	4803054.79934	-462131.62821	4158378.64774	W
172	SOPU 19386M001	4643998.26655	-255914.45161	4350062.73004	A
31	TERU 13487M001	4867391.67575	-95523.91768	4108341.25503	W
204	VITO 19385M001	4679398.05862	-218437.05230	4314897.94650	A
35	YEBE 13420M001	4848724.90686	-261632.49326	4123093.90098	W
36	ZARA 13462M001	4773803.53610	-73506.53830	4215453.67782	W

### 5.3 Mean and Daily Repeatabilities

In this section, the mean and daily repeatabilities of the sites are shown. Repeatabilities refer to the IGB08 solution and are given with respect the Local fram (North-East-Up).

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACDR 13434M001	7	XXXXXXX	1.36	1.30	2.35
ALDA 19383M001	6	XXXXXXX	2.28	0.60	6.15
ALSA 19419M001	7	XXXXXXX	2.76	1.40	5.24
AULE 00000M000	7	XXXXXXX	1.07	0.90	0.95
BIAZ 10074M002	7	XXXXXXX	1.99	1.14	4.37
BIDA 00000M000	7	XXXXXXX	2.49	1.75	5.33
BRZR 19387M001	7	XXXXXXX	1.71	1.86	3.65
CACE 13447M001	7	XXXXXXX	0.29	0.36	4.41
CANT 13438M001	7	XXXXXXX	0.93	0.79	4.95
CHER 00000M000	7	XXXXXXX	1.11	1.83	4.92
CREU 13432M001	7	XXXXXXX	0.77	0.96	5.64
EBRE 13410M001	7	XXXXXXX	1.01	1.82	5.08
ELGE 19353S001	7	XXXXXXX	1.75	1.77	3.92
GERN 19389M001	7	XXXXXXX	1.34	1.93	0.82
IGEL 19352S001	7	XXXXXXX	1.98	0.86	4.84
ISPS 19484M001	7	XXXXXXX	0.70	1.37	4.28
LAZK 19354S001	7	XXXXXXX	1.23	1.35	3.47
LEIT 19428M001	7	XXXXXXX	2.67	1.11	6.96
ORDN 19427M001	7	XXXXXXX	2.28	0.94	8.02
PAS2 19351S001	7	XXXXXXX	1.94	1.95	4.26
PASA 19351S001	7	XXXXXXX	1.80	1.38	4.06
RID1 13448M002	7	XXXXXXX	1.21	0.61	2.37
SALA 13469M001	7	XXXXXXX	0.36	0.54	2.82
SOPU 19386M001	7	XXXXXXX	2.29	1.77	3.92
TERU 13487M001	7	XXXXXXX	0.62	0.46	5.95
VITO 19385M001	7	XXXXXXX	1.79	2.86	4.14
YEBE 13420M001	7	XXXXXXX	0.86	0.82	3.87
ZARA 13462M001	7	XXXXXXX	0.90	0.44	1.92

Comparison of individual solutions:

ACDR 13434M001	N	1.36	1.05	2.43	-0.65	-0.55	-1.78	-0.30	-0.44
ACDR 13434M001	E	1.30	-1.56	-0.36	0.78	1.35	1.49	0.48	1.64
ACDR 13434M001	U	2.35	1.43	0.95	-0.75	-2.87	3.88	-0.11	-2.52
ALDA 19383M001	N	2.28	0.50	-0.89	4.29	0.77	-0.84	-2.31	
ALDA 19383M001	E	0.60	0.17	0.05	0.09	-0.73	0.96	0.56	
ALDA 19383M001	U	6.15	2.64	7.53	-9.60	1.90	1.14	-5.36	
ALSA 19419M001	N	2.76	0.24	-5.61	2.92	0.70	-0.97	1.81	0.93
ALSA 19419M001	E	1.40	1.24	2.26	-0.41	0.26	0.66	-1.74	-1.16
ALSA 19419M001	U	5.24	-4.39	8.97	-7.24	1.13	0.02	-1.96	2.68
AULE 00000M000	N	1.07	1.67	-0.70	-1.56	0.56	0.66	-0.50	-0.38
AULE 00000M000	E	0.90	0.37	1.03	-0.30	-0.98	1.49	-0.66	0.06
AULE 00000M000	U	0.95	-1.12	0.63	-0.58	-0.74	1.04	1.32	-0.33
BIAZ 10074M002	N	1.99	-0.04	1.15	2.69	0.19	0.18	-1.49	-3.59
BIAZ 10074M002	E	1.14	0.80	-0.40	-1.62	-0.50	1.07	1.67	-0.49
BIAZ 10074M002	U	4.37	-3.30	4.85	-3.86	3.87	-0.04	1.47	-6.93
BIDA 00000M000	N	2.49	-2.01	5.37	0.88	0.13	-0.32	-1.49	1.09
BIDA 00000M000	E	1.75	1.05	-2.05	-0.90	-1.80	2.05	2.17	0.10
BIDA 00000M000	U	5.33	-6.61	5.34	-8.02	0.72	-0.03	5.26	2.47
BRZR 19387M001	N	1.71	2.14	1.20	0.39	1.32	-2.68	-1.41	-0.71
BRZR 19387M001	E	1.86	1.99	-1.56	-2.30	1.16	-1.15	2.44	0.73
BRZR 19387M001	U	3.65	-0.43	2.38	0.94	4.76	-1.12	-6.70	2.13
CACE 13447M001	N	0.29	-0.42	-0.01	-0.21	0.46	-0.03	0.16	-0.19
CACE 13447M001	E	0.36	-0.49	0.54	0.18	-0.17	0.00	0.21	0.36
CACE 13447M001	U	4.41	4.45	-1.69	-8.56	2.23	2.74	1.94	2.16
CANT 13438M001	N	0.93	0.62	1.83	0.10	-0.15	-1.07	0.05	-0.54
CANT 13438M001	E	0.79	-0.74	-0.19	-1.00	-0.87	0.40	1.11	0.18
CANT 13438M001	U	4.95	4.54	-7.30	-1.74	7.08	3.57	-1.90	1.93
CHER 00000M000	N	1.11	0.96	-0.82	1.11	0.49	0.43	-0.40	-2.01
CHER 00000M000	E	1.83	2.89	0.75	-3.00	0.20	0.26	0.31	-1.38
CHER 00000M000	U	4.92	-3.02	4.86	-9.31	4.28	0.34	-0.55	2.64
CREU 13432M001	N	0.77	-0.20	-0.68	0.10	-1.12	-0.14	-0.47	1.25
CREU 13432M001	E	0.96	-0.90	0.21	1.40	1.31	-0.38	0.20	-0.87
CREU 13432M001	U	5.64	4.04	-0.19	8.31	3.78	-9.01	-1.55	-2.76
EBRE 13410M001	N	1.01	-0.10	0.41	0.47	-0.60	-1.29	-0.22	1.92
EBRE 13410M001	E	1.82	-1.74	1.49	0.89	1.47	-0.62	0.07	-3.37
EBRE 13410M001	U	5.05	-1.38	1.50	-2.21	-3.95	4.75	-4.94	9.11
ELGE 19353S001	N	1.75	0.83	2.91	-0.03	0.23	0.37	-1.86	-2.36
ELGE 19353S001	E	1.77	0.98	-2.92	-1.28	-0.13	2.05	1.86	0.33
ELGE 19353S001	U	3.92	-6.41	4.28	4.39	2.03	1.27	-1.83	-2.11
GERN 19389M001	N	1.34	0.66	-0.78	-0.56	1.92	0.95	0.10	-2.21
GERN 19389M001	E	1.93	0.68	-0.32	-3.77	-0.53	1.01	1.52	2.00
GERN 19389M001	U	0.82	-0.53	-0.05	-0.66	0.83	-0.95	0.37	1.24
IGEL 19352S001	N	1.98	-0.86	1.82	1.08	1.00	2.17	-2.22	-2.77
IGEL 19352S001	E	0.86	0.65	-0.23	0.39	-1.39	0.39	1.31	0.10
IGEL 19352S001	U	4.84	-1.36	8.04	-7.82	-1.79	2.46	1.23	-1.46
ISPS 19484M001	N	0.70	-0.21	0.62	1.17	0.17	-0.13	-0.84	-0.59
ISPS 19484M001	E	1.37	2.01	-1.88	-1.48	0.19	0.64	0.97	0.13
ISPS 19484M001	U	4.28	3.33	0.94	3.98	2.16	-8.70	0.41	-1.30
LAZK 19354S001	N	1.23	0.64	-1.35	-2.20	1.18	0.55	0.34	0.52
LAZK 19354S001	E	1.35	1.40	0.07	-0.34	-0.02	1.68	0.70	-2.37
LAZK 19354S001	U	3.47	-2.33	3.92	-1.20	1.07	4.69	-1.90	-4.83
LEIT 19428M001	N	2.67	1.08	-1.35	5.39	0.88	-2.04	-1.83	-1.59
LEIT 19428M001	E	1.11	0.76	-0.31	0.89	-1.99	0.45	0.07	1.34
LEIT 19428M001	U	6.96	-4.51	-7.05	-0.96	-2.08	-4.33	8.79	10.92
ORDN 19427M001	N	2.28	1.97	-1.11	-4.21	2.86	0.30	-0.26	-0.26
ORDN 19427M001	E	0.94	1.35	-1.30	-0.79	0.70	0.02	0.73	0.42
ORDN 19427M001	U	8.02	-0.22	8.15	-16.72	-0.48	2.67	-2.74	4.95
PAS2 19351S001	N	1.94	0.17	0.88	2.74	0.63	0.47	-1.17	-3.51
PAS2 19351S001	E	1.95	1.34	2.02	-2.67	-2.28	1.09	1.86	-0.11
PAS2 19351S001	U	4.26	-2.05	8.85	-0.20	-2.12	-2.87	1.53	-3.38
PASA 19351S001	N	1.80	0.96	1.50	1.43	0.86	0.67	-1.41	-3.34
PASA 19351S001	E	1.38	0.81	0.91	-1.04	-2.20	0.91	1.76	0.18
PASA 19351S001	U	4.06	-3.11	7.44	2.83	-2.06	-2.48	1.00	-3.81
RID1 13448M002	N	1.21	0.17	-0.40	2.12	1.02	0.43	-1.25	-1.13
RID1 13448M002	E	0.61	0.39	-0.10	-0.81	0.29	1.07	0.30	0.29
RID1 13448M002	U	2.37	0.82	2.47	-0.18	-2.67	-1.32	-3.08	2.90
SALA 13469M001	N	0.36	0.16	-0.32	-0.17	-0.43	0.61	-0.29	0.06
SALA 13469M001	E	0.54	0.29	-1.16	0.02	-0.29	-0.05	-0.33	0.32
SALA 13469M001	U	2.82	-4.11	1.24	-4.55	0.70	1.67	0.76	2.16
SOPU 19386M001	N	2.29	1.74	3.56	0.92	0.38	-0.88	-2.40	-2.88
SOPU 19386M001	E	1.77	2.51	0.83	-1.07	1.19	-0.71	-2.95	-0.18
SOPU 19386M001	U	3.92	2.05	1.95	-4.24	3.67	2.10	2.70	-6.39
TERU 13487M001	N	0.62	0.33	0.90	0.07	-0.99	0.23	-0.39	-0.43
TERU 13487M001	E	0.46	0.49	0.20	0.57	-0.20	-0.56	-0.54	0.02
TERU 13487M001	U	5.95	3.21	-1.93	11.96	-4.29	1.43	-0.15	-5.89
VITO 19385M001	N	1.79	2.28	0.77	-3.02	1.23	-0.73	0.99	-1.14
VITO 19385M001	E	2.86	-0.82	-2.08	-3.85	0.23	0.77	4.94	2.02
VITO 19385M001	U	4.14	0.27	0.84	-6.76	4.26	-3.88	1.42	4.60
YEBE 13420M001	N	0.86	0.06	-0.74	-0.98	-1.12	1.01	-0.10	0.83

YEBE 13420M001	E	0.82	-0.02	0.56	1.60	0.35	-0.27	-0.80	-0.54
YEBE 13420M001	U	3.87	-0.78	-6.31	5.80	0.52	0.59	-3.80	-0.82
ZARA 13462M001	N	0.90	0.01	-0.45	-0.93	-0.38	-0.92	1.49	0.74
ZARA 13462M001	E	0.44	0.21	0.63	0.22	-0.49	-0.25	-0.58	-0.06
ZARA 13462M001	U	1.92	3.56	1.91	-1.19	-1.86	-0.36	0.78	-0.28

## 5.4 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: Igb08  
RESIDUALS IN LOCAL SYSTEM (NORTH, EAST, UP)

NUM	NAME	FLG	RESIDUALS IN MILLIMETERS		
1	ACOR 13434M001	I W	-1.04	1.71	-2.17
2	ALAC 13433M001	I W	0.41	0.50	-0.03
3	ALBA 13452M001	I W	-0.08	1.34	-0.81
4	ALME 13437M001	I W	-0.62	1.26	8.27
6	BRST 10004M004	I W	-0.78	-0.32	-3.48
7	CACE 13447M001	I W	1.02	0.31	1.57
8	CANT 13438M001	I W	-1.17	-1.06	-4.79
9	CEU1 13449M002	I W	0.94	3.30	13.53
10	COBA 13453M001	I W	1.05	-0.38	-5.14
12	EBRE 13410M001	I W	1.32	-2.60	-2.70
14	FUNC 13911S001	I W	1.86	0.99	-3.80
16	HUEL 13451M001	I W	-0.15	-0.24	2.23
17	IZAN 31309M002	I W	-2.31	0.28	3.37
18	LLIV 13436M001	I W	3.96	-2.18	-4.24
19	LPAL 81701M001	I W	-1.74	-1.00	0.89
20	LROC 10023M001	I W	1.33	-1.34	-1.83
21	MALA 13443M001	I W	-3.28	1.21	2.83
22	MALL 13444M001	I W	-0.09	-0.82	1.97
24	MELI 19379M001	I W	-0.02	-0.95	1.27
25	PDEL 31906M004	I W	-2.72	-3.37	4.42
26	RABT 35001M002	I W	-0.15	1.43	1.36
27	RID1 13448M002	I W	0.08	1.31	-2.61
28	SALA 13469M001	I W	-0.68	-0.45	1.81
29	SCOA 10088M002	I W	-0.27	-0.19	-3.73
30	SONS 13446M001	I W	-1.20	-1.62	-0.31
31	TERU 13487M001	I W	3.11	0.54	0.57
32	VALE 13439M001	I W	-0.58	0.30	-1.85
33	VIGO 13450M001	I W	-0.89	1.62	-0.21
34	VILL 13406M001	I W	0.75	1.94	-2.66
35	YEBE 13420M001	I W	1.78	0.58	0.34
36	ZARA 13462M001	I W	0.05	-1.25	-2.40
37	ZIMM 14001M004	I W	0.11	-0.85	-1.66
	RMS / COMPONENT		1.53	1.45	3.85
	MEAN		0.00	0.00	-0.00
	MIN		-3.28	-3.37	-5.14
	MAX		3.96	3.30	13.53

NUMBER OF PARAMETERS : 3  
NUMBER OF COORDINATES : 96  
RMS OF TRANSFORMATION : 2.53 MM

## 5.5 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                8735859
NUMBER OF UNKNOWN                    135700
NUMBER OF DEGREES OF FREEDOM          8600159
PHASE MEASUREMENTS SIGMA              0.00100
SAMPLING INTERVAL (SECONDS)           180
VARIANCE FACTOR                       2.383356009576376

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
  1  0.00240    -0.0108 -0.0176  0.0159  0.0004 -0.0006 -0.0004  -0.00035
  2  0.00250     0.0092  0.0042 -0.0119 -0.0001  0.0005  0.0001   0.00000
  3  0.00333     0.0146 -0.0290 -0.0074  0.0006  0.0005 -0.0007  -0.00104
  4  0.00278    -0.0124  0.0128  0.0122 -0.0004 -0.0006  0.0002   0.00025
  5  0.00230    -0.0040 -0.0074  0.0050  0.0000 -0.0002 -0.0003  -0.00013
  6  0.00198     0.0110  0.0180 -0.0168 -0.0003  0.0006  0.0005   0.00049
  7  0.00218    -0.0181 -0.0067  0.0213  0.0000 -0.0009 -0.0002  -0.00002
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00143    1299814    2.04          1319652      3          597   19244    0
  2  0.00153    1179429    2.34          1198743      3          543   18774    0
  3  0.00186    1127481    3.46          1148057      3          540   20039    0
  4  0.00154    1227390    2.39          1247060      3          597   19076    0
  5  0.00150    1281596    2.25          1301917      3          597   19727    0
  6  0.00144    1260703    2.09          1281095      3          591   19804    0
  7  0.00147    1220317    2.16          1239335      3          585   18436    0
```

## 6 Equipment

### 6.1 Receiver List

Serial numbers not shown.

```
*SITE PT SOLN T DATA_START_ DATA_END_ DESCRIPTION_ S/N_ FIRMWARE_
ACOR A 1 P 16:255:00000 16:261:86370 LEICA GRX1200PRO -----
ALDA A 1 P 16:255:00000 16:260:86370 LEICA GR10 -----
ALSA A 1 P 16:255:00000 16:261:86370 LEICA GRX1200GGPRO -----
AULE A 1 P 16:255:00000 16:261:86370 LEICA GRX1200+GNSS -----
BIAZ A 1 P 16:255:00000 16:261:51390 LEICA GRX1200GGPRO -----
BIDA A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
BRZR A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
CACE A 1 P 16:255:00000 16:261:86370 TRIMBLE NETR9 -----
CANT A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
CHER A 1 P 16:255:00000 16:261:86370 LEICA GRX1200+GNSS -----
CREU A 1 P 16:255:00030 16:261:86370 LEICA GR25 -----
EBRE A 1 P 16:255:00000 16:261:86370 TRIMBLE NETR9 -----
ELGE A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
GERN A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
IGEL A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
ISPS A 1 P 16:255:00000 16:261:86370 TRIMBLE NETR9 -----
LAZK A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
LEIT A 1 P 16:255:00000 16:261:86370 LEICA GRX1200+GNSS -----
ORON A 1 P 16:255:00000 16:261:86370 LEICA GRX1200GGPRO -----
PAS2 A 1 P 16:255:00000 16:261:86370 TPS NET-G3A -----
PASA A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
RIO1 A 1 P 16:255:00000 16:261:86370 LEICA GR25 -----
SALA A 1 P 16:255:00000 16:261:86370 LEICA GRX1200+GNSS -----
SOPU A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
TERU A 1 P 16:255:00000 16:261:86370 LEICA GRX1200GGPRO -----
VITO A 1 P 16:255:00000 16:261:86370 LEICA GR10 -----
YEBE A 1 P 16:255:00000 16:261:86370 TRIMBLE NETR9 -----
ZARA A 1 P 16:255:00000 16:261:86370 TRIMBLE NETR9 -----
```

### 6.2 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 16:255:00000 16:261:86370 LEIAT504 LEIS -----
ALDA A 1 P 16:255:00000 16:260:86370 LEIAS10 NONE -----
ALSA A 1 P 16:255:00000 16:261:86370 LEIAX1202GG NONE -----
AULE A 1 P 16:255:00000 16:261:86370 LEIAS10 NONE -----
BIAZ A 1 P 16:255:00000 16:261:51390 LEIAR25 LEIT -----
BIDA A 1 P 16:255:00000 16:261:86370 LEIAS10 NONE -----
BRZR A 1 P 16:255:00000 16:261:86370 LEIAS10 NONE -----
CACE A 1 P 16:255:00000 16:261:86370 TRM29659.00 NONE -----
```

CANT	A	1	P	16:255:00000	16:261:86370	LEIAR25_R4	LEIT	25066
CHER	A	1	P	16:255:00000	16:261:86370	LEIAX1203+GNSS	NONE	----
CREU	A	1	P	16:255:00030	16:261:86370	LEIAR25_R4	NONE	26357
EBRE	A	1	P	16:255:00000	16:261:86370	TRM57971.00	NONE	25503
ELGE	A	1	P	16:255:00000	16:261:86370	LEIAR25_R4	LEIT	----
GERN	A	1	P	16:255:00000	16:261:86370	LEIAS10	NONE	----
IGEL	A	1	P	16:255:00000	16:261:86370	LEIAR20	LEIM	----
ISPS	A	1	P	16:255:00000	16:261:86370	TRM59900.00	SCIS	----
LAZK	A	1	P	16:255:00000	16:261:86370	LEIAR25_R4	LEIT	----
LEIT	A	1	P	16:255:00000	16:261:86370	LEIAX1203+GNSS	NONE	----
ORON	A	1	P	16:255:00000	16:261:86370	LEIAX1202GG	NONE	----
PAS2	A	1	P	16:255:00000	16:261:86370	LEIAR20	LEIM	73034
PASA	A	1	P	16:255:00000	16:261:86370	LEIAR20	LEIM	73034
RID1	A	1	P	16:255:00000	16:261:86370	LEIAR25_R4	LEIT	25138
SALA	A	1	P	16:255:00000	16:261:86370	LEIAR25	NONE	----
SOPU	A	1	P	16:255:00000	16:261:86370	LEIAS10	NONE	----
TERU	A	1	P	16:255:00000	16:261:86370	LEIAT504GG	LEIS	----
VITO	A	1	P	16:255:00000	16:261:86370	LEIAS10	NONE	----
YEBE	A	1	P	16:255:00000	16:261:86370	TRM29659.00	NONE	----
ZARA	A	1	P	16:255:00000	16:261:86370	TRM29659.00	NONE	----

### 6.3 Eccentricities

*SITE	PT	SOLN	T	DATA_START_	DATA_END_	AXE	ARP->BENCHMARK(M)	UP_	NORTH_	EAST_
ACOR	A	1	P	16:255:00000	16:261:86370	UNE	3.0460	0.0000	0.0000	0.0000
ALDA	A	1	P	16:255:00000	16:260:86370	UNE	0.0000	0.0000	0.0000	0.0000
ALSA	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
AULE	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
BLAZ	A	1	P	16:255:00000	16:261:51390	UNE	0.0000	0.0000	0.0000	0.0000
BIDA	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
BRZR	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
CACE	A	1	P	16:255:00000	16:261:86370	UNE	0.0600	0.0000	0.0000	0.0000
CANT	A	1	P	16:255:00000	16:261:86370	UNE	3.0490	0.0000	0.0000	0.0000
CHER	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
CREU	A	1	P	16:255:00030	16:261:86370	UNE	0.0770	0.0000	0.0000	0.0000
EBRE	A	1	P	16:255:00000	16:261:86370	UNE	0.0770	0.0000	0.0000	0.0000
ELGE	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
GERN	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
IGEL	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
ISPS	A	1	P	16:255:00000	16:261:86370	UNE	0.0350	0.0000	0.0000	0.0000
LAZK	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
LEIT	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
ORON	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
PAS2	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
PASA	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
RID1	A	1	P	16:255:00000	16:261:86370	UNE	0.0606	0.0000	0.0000	0.0000
SALA	A	1	P	16:255:00000	16:261:86370	UNE	0.0600	0.0000	0.0000	0.0000
SOPU	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
TERU	A	1	P	16:255:00000	16:261:86370	UNE	0.0600	0.0000	0.0000	0.0000
VITO	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
YEBE	A	1	P	16:255:00000	16:261:86370	UNE	0.0000	0.0000	0.0000	0.0000
ZARA	A	1	P	16:255:00000	16:261:86370	UNE	3.2590	0.0000	0.0000	0.0000

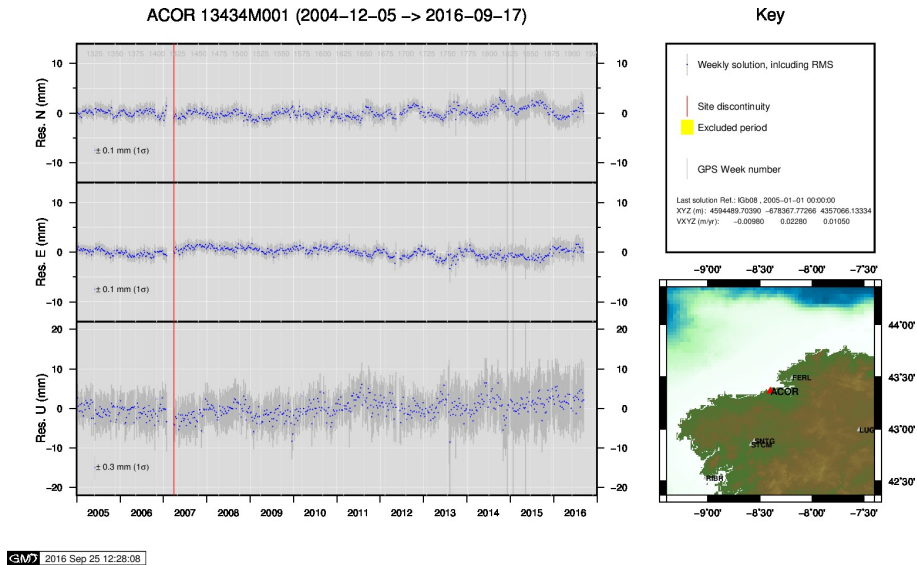
## 7 Inconsistencies (logsheet-RINEX metadata)

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

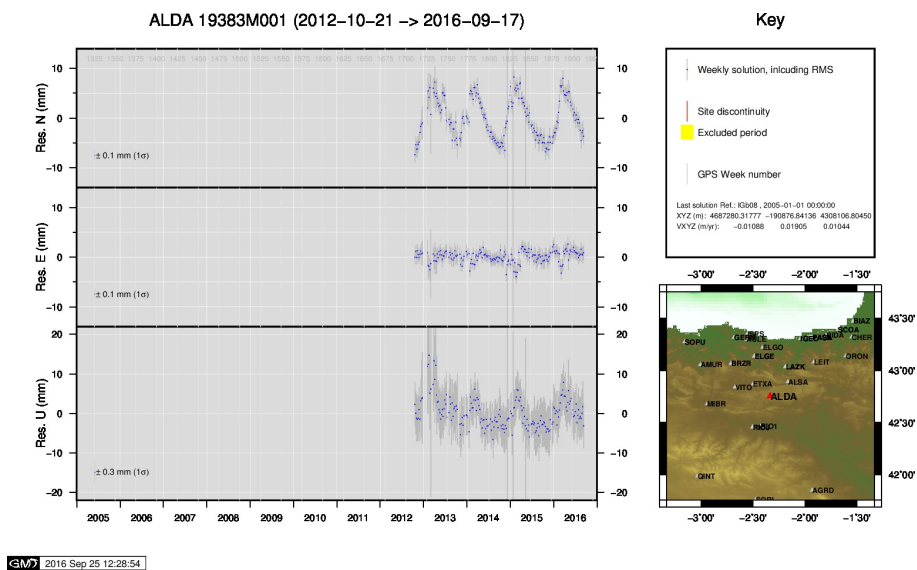
2016-09-25 04:37 UTC		ISP2560.160		RECEIVER FIRM. VERS.		5.14 -> NP 5.10 / SP 5.10
2016-09-25 05:47 UTC		ISP2560.160		RECEIVER FIRM. VERS.		5.14 -> NP 5.10 / SP 5.10
2016-09-25 06:57 UTC		ISP2570.160		RECEIVER FIRM. VERS.		5.14 -> NP 5.10 / SP 5.10
2016-09-25 08:12 UTC		ISP2580.160		RECEIVER FIRM. VERS.		5.14 -> NP 5.10 / SP 5.10
2016-09-25 09:35 UTC		ISP2590.160		RECEIVER FIRM. VERS.		5.14 -> NP 5.10 / SP 5.10
2016-09-25 10:52 UTC		ISP2600.160		RECEIVER FIRM. VERS.		5.14 -> NP 5.10 / SP 5.10
2016-09-25 12:08 UTC		ISP2610.160		RECEIVER FIRM. VERS.		5.14 -> NP 5.10 / SP 5.10

## 8 Cumulative Time Series

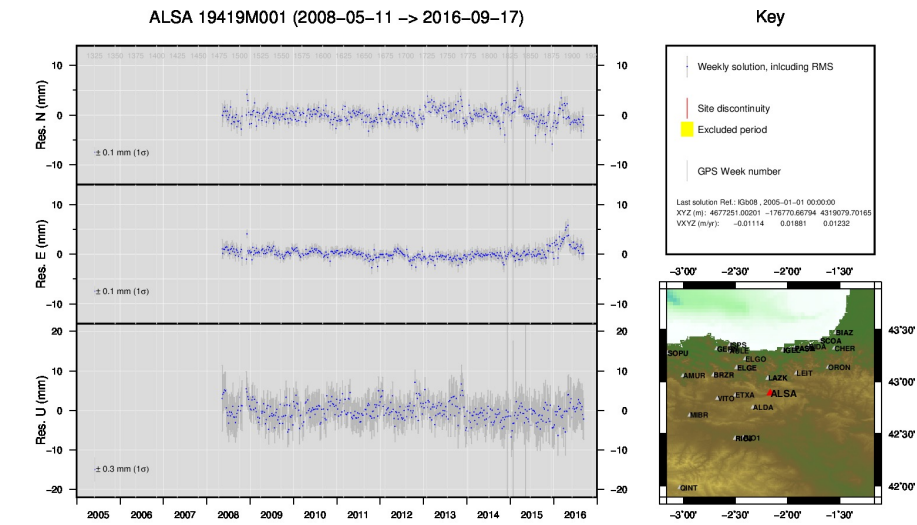
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



1 ) ACOR

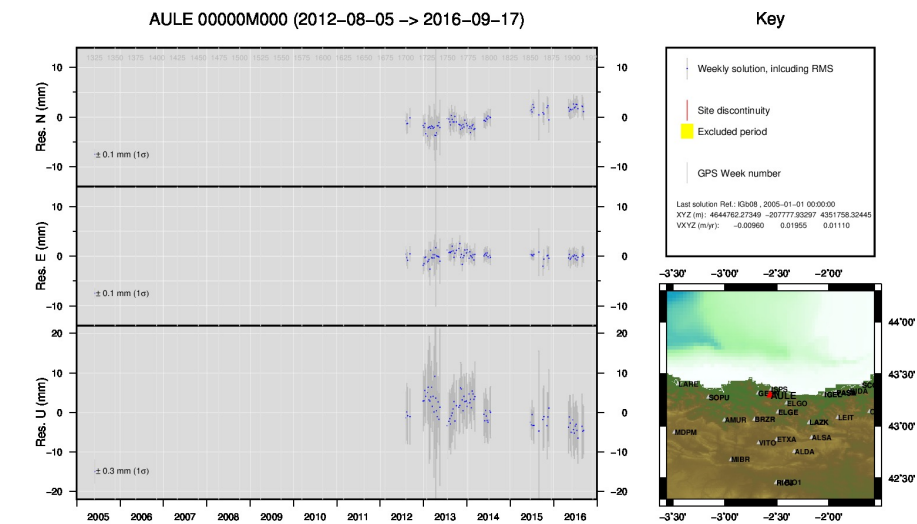


2 ) ALDA



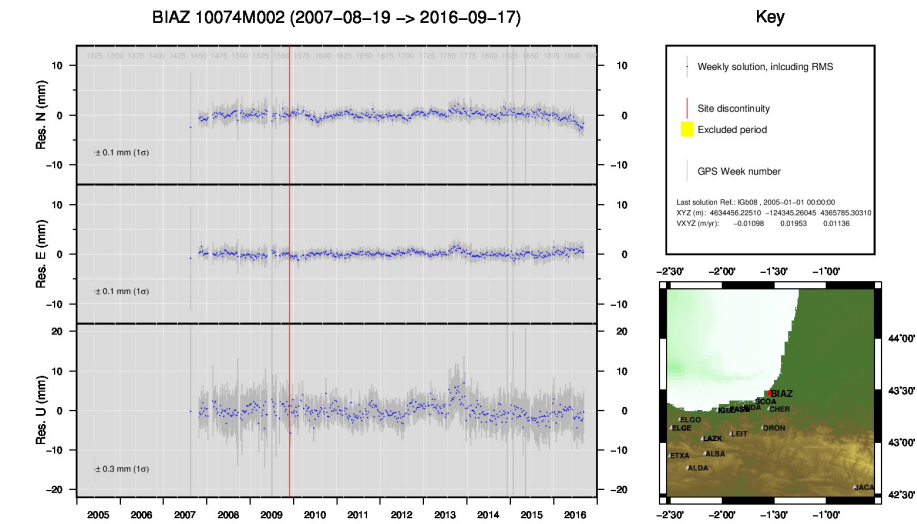
GMW 2016 Sep 25 12:29:34

3 ) ALSA



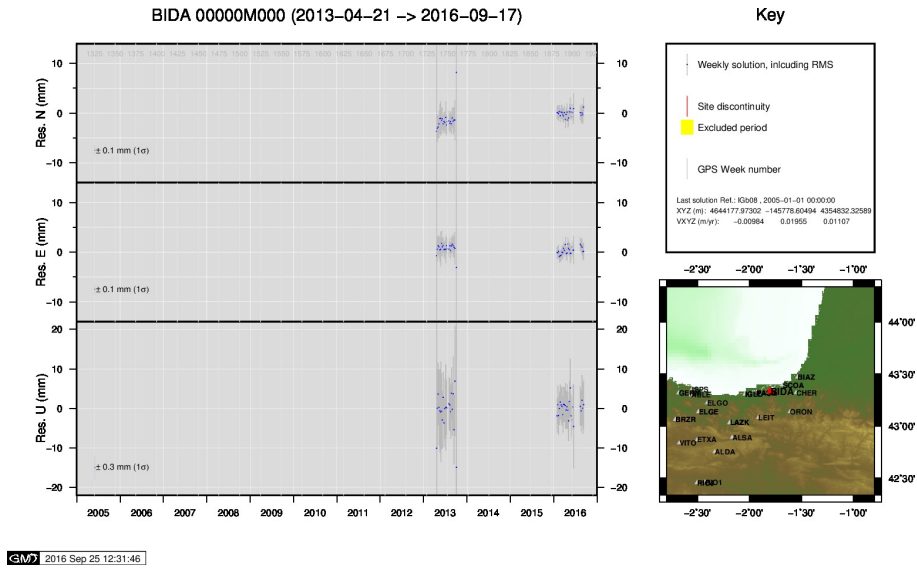
GMW 2016 Sep 25 12:30:38

4 ) AULE

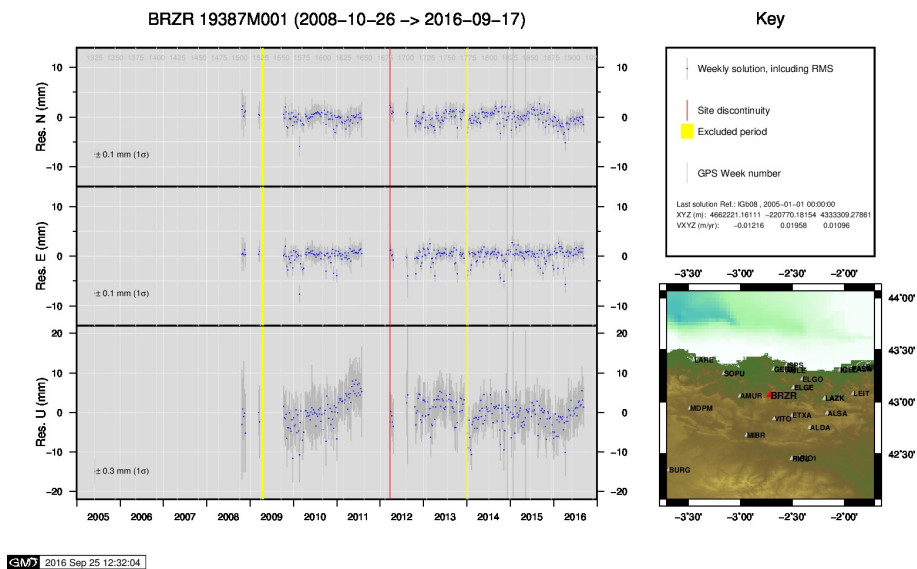


GMW 2016 Sep 25 12:31:40

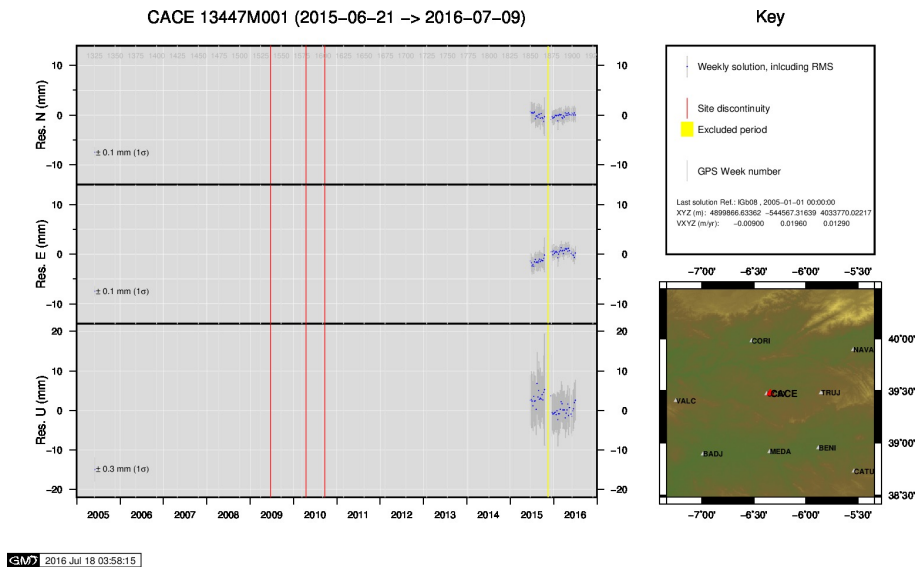
5 ) BIAZ



6 ) BIDA

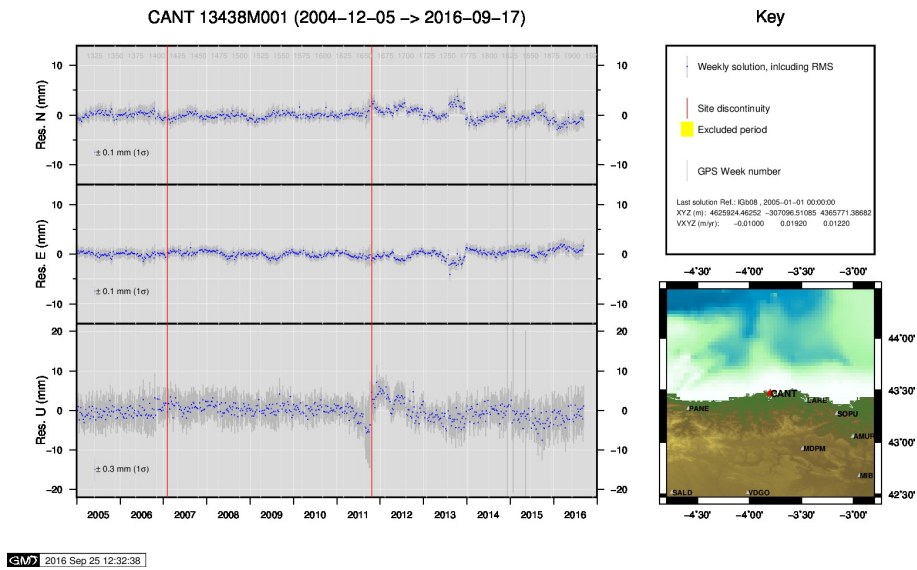


7 ) BRZR

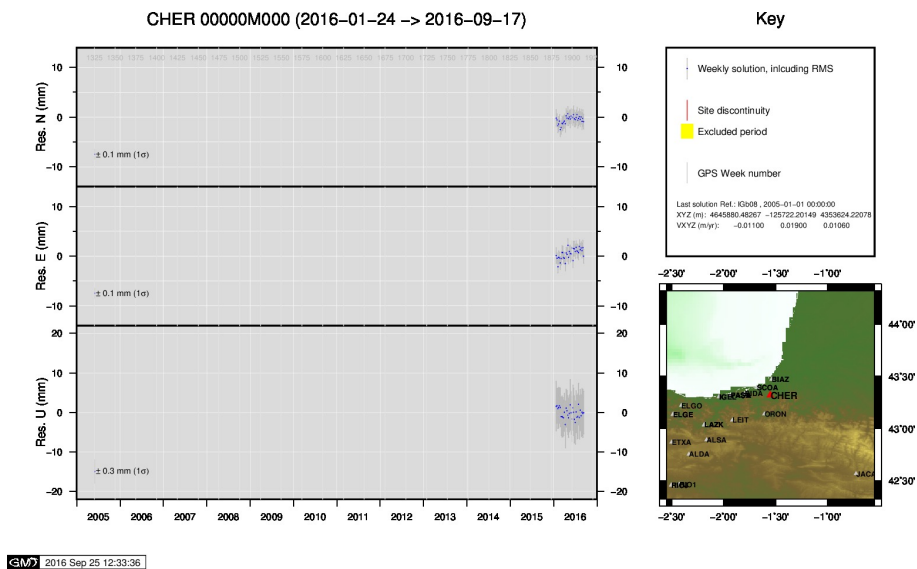


8 ) CACE

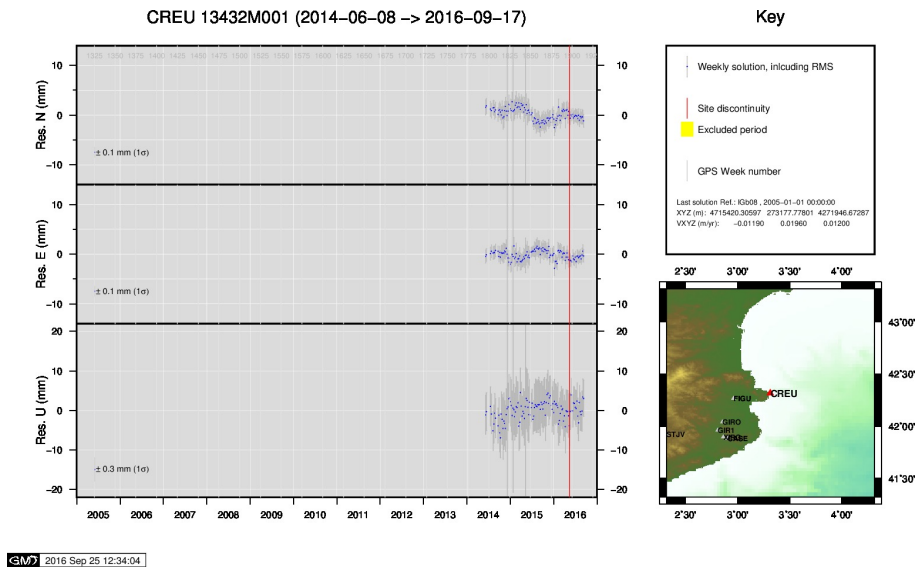




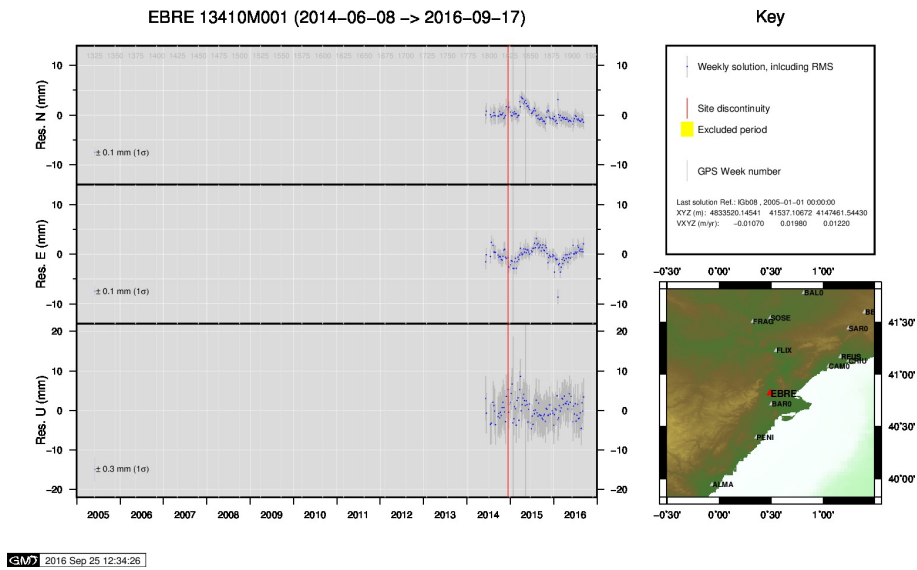
9 ) CANT



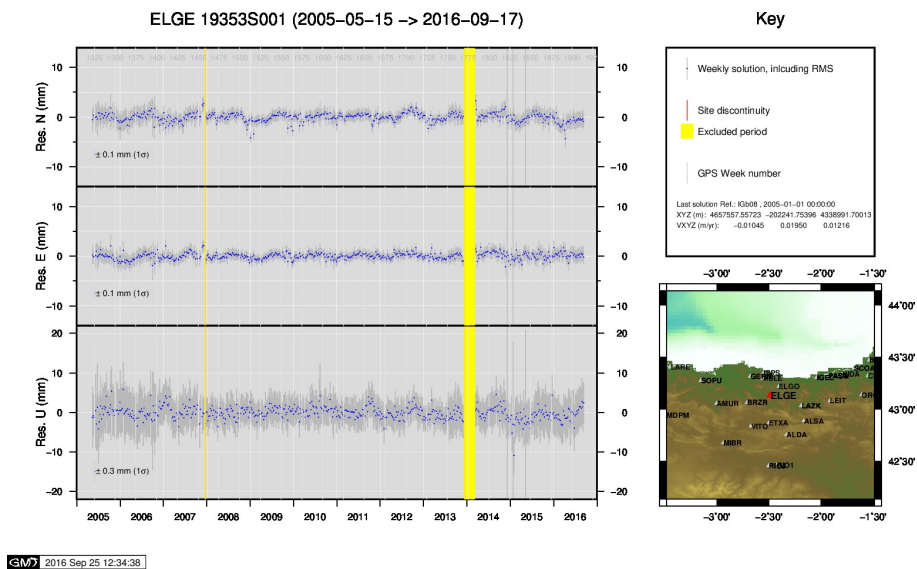
10 ) CHER



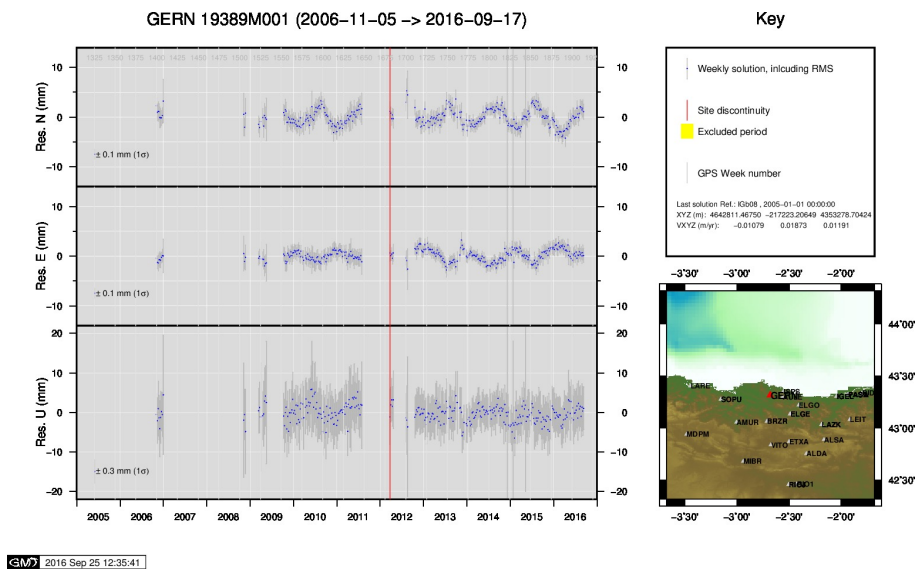
11 ) CREU



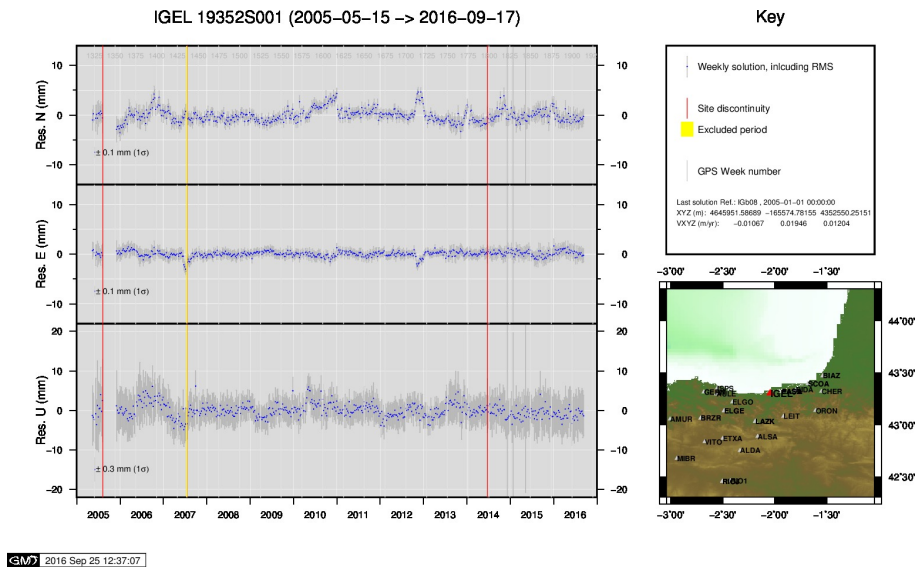
12 ) EBRE



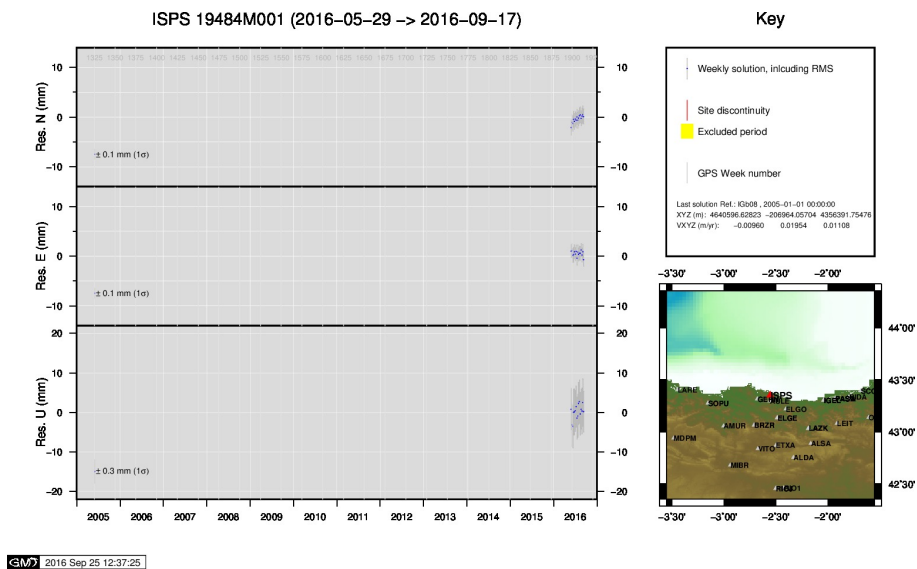
13 ) ELGE



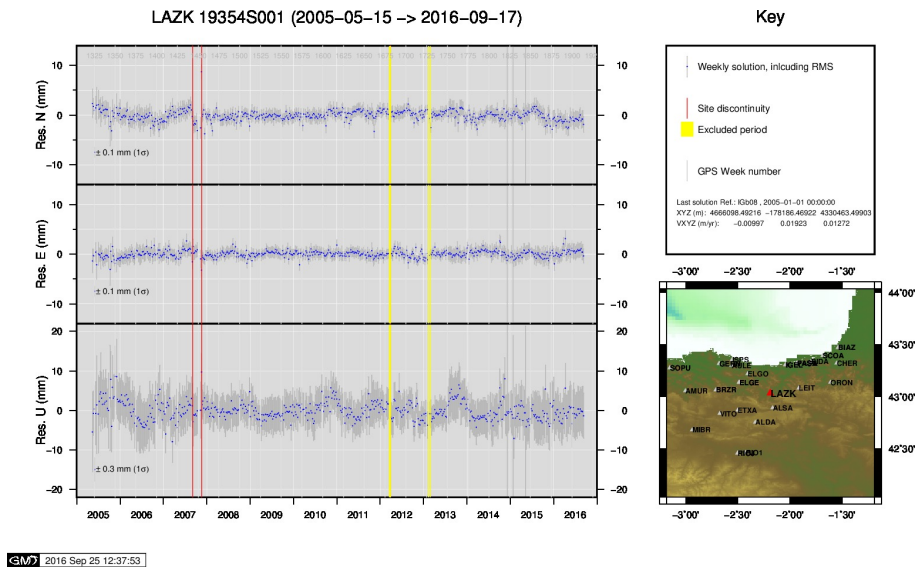
14 ) GERN



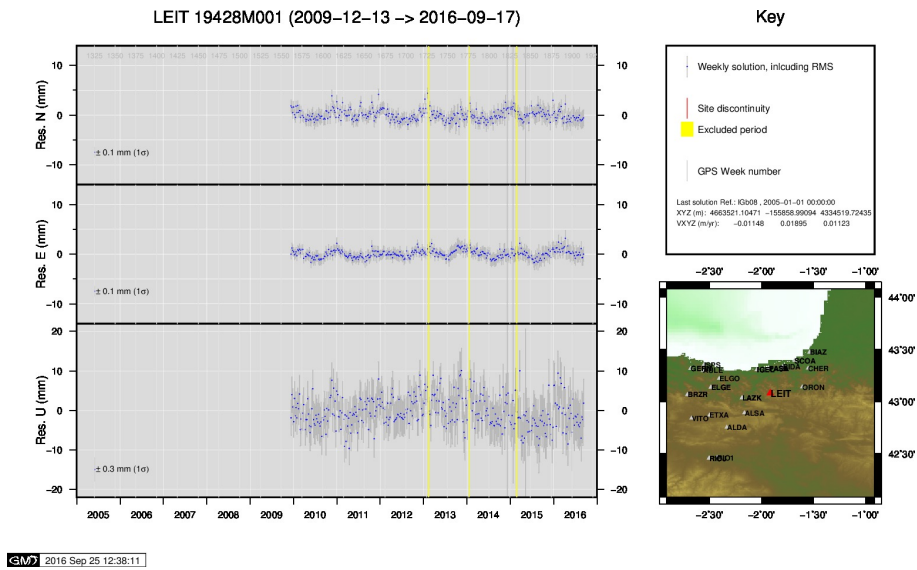
15 ) IGEL



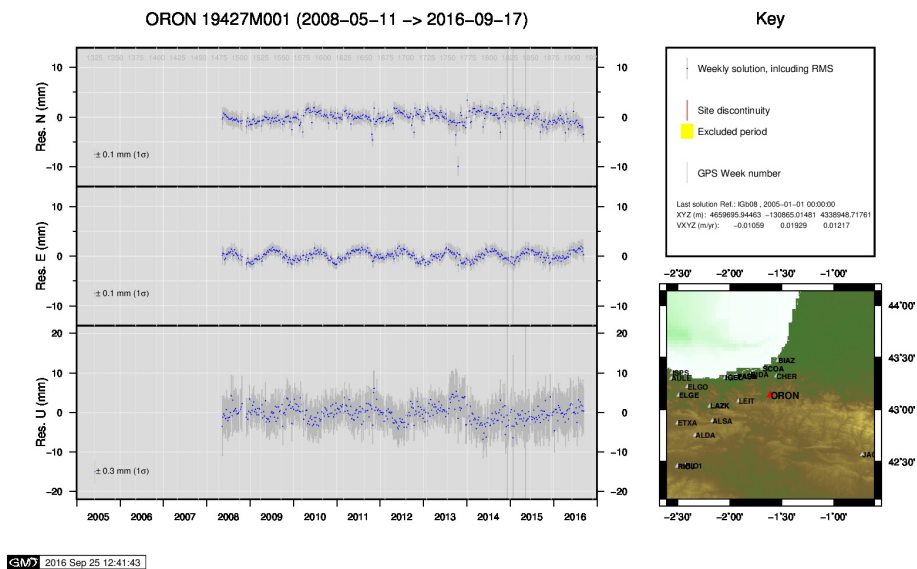
16 ) ISPS



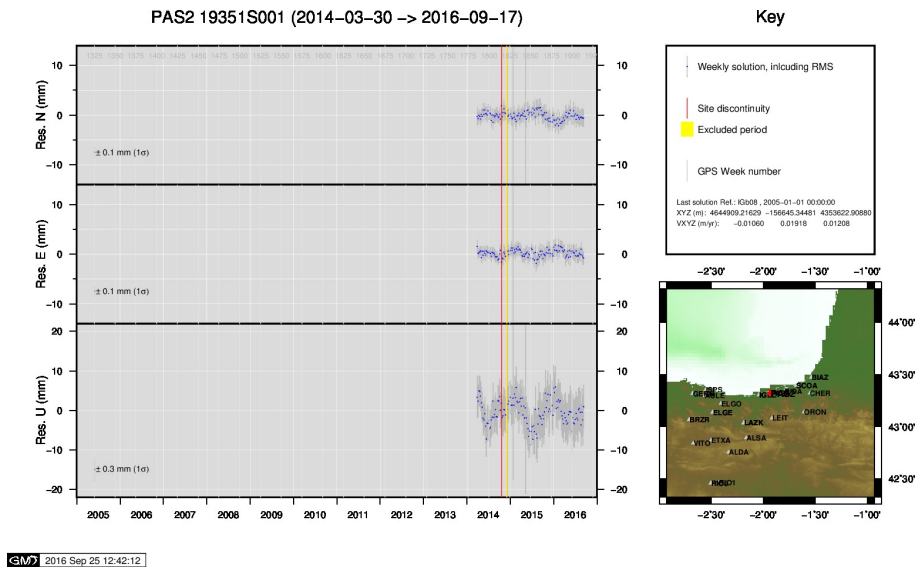
17 ) LAZK



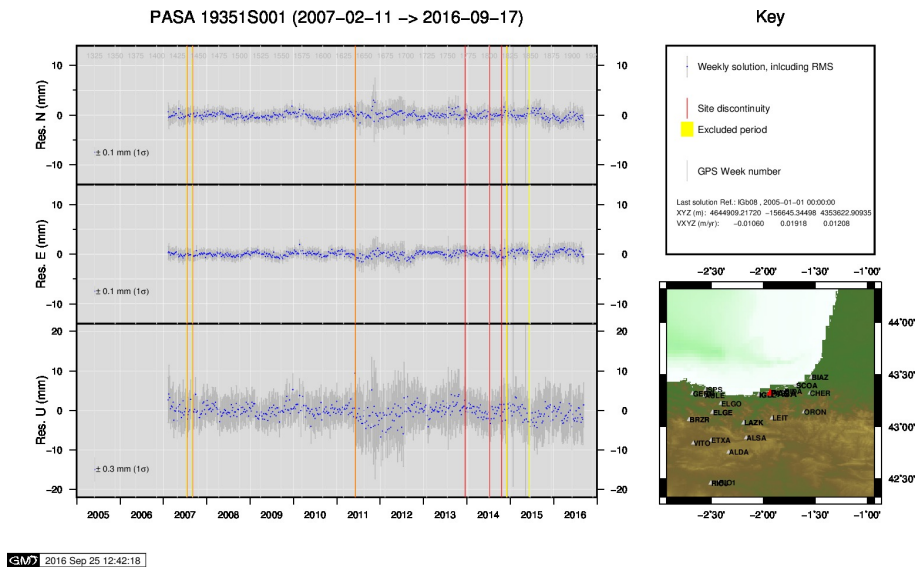
18 ) LEIT



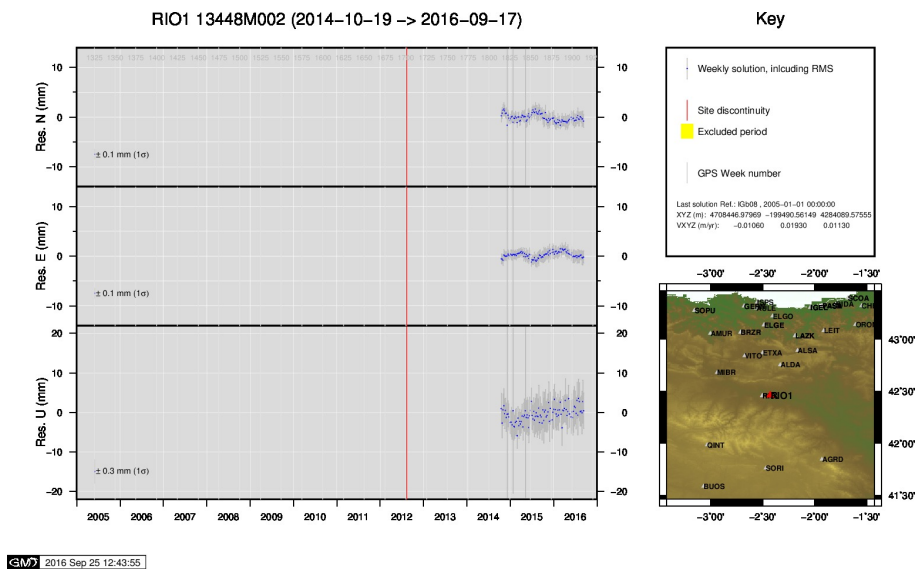
19 ) ORON



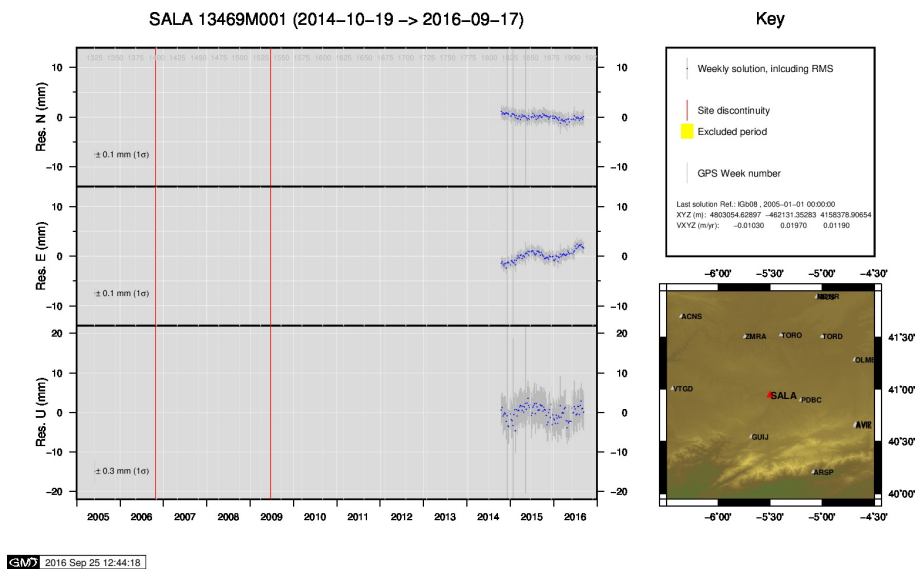
20 ) PAS2



21 ) PASA

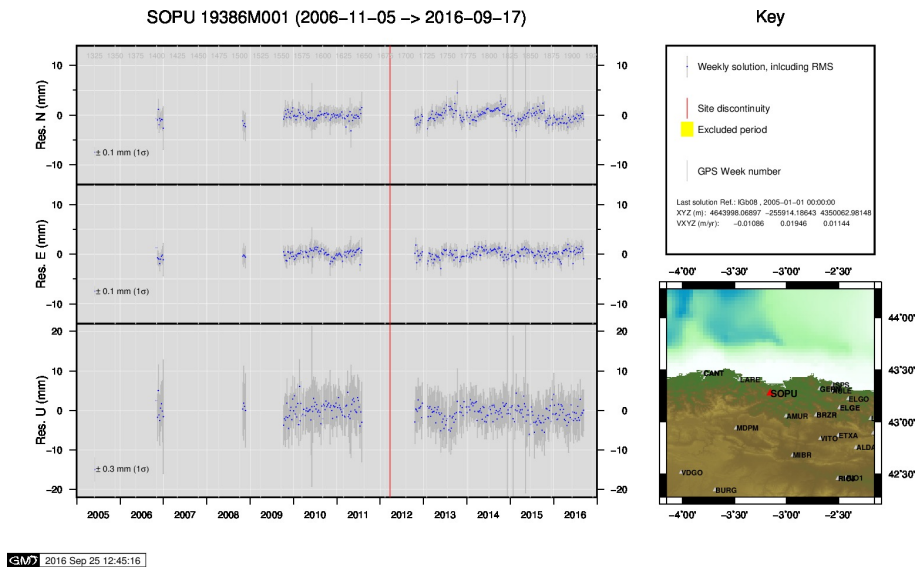


22 ) RIO1

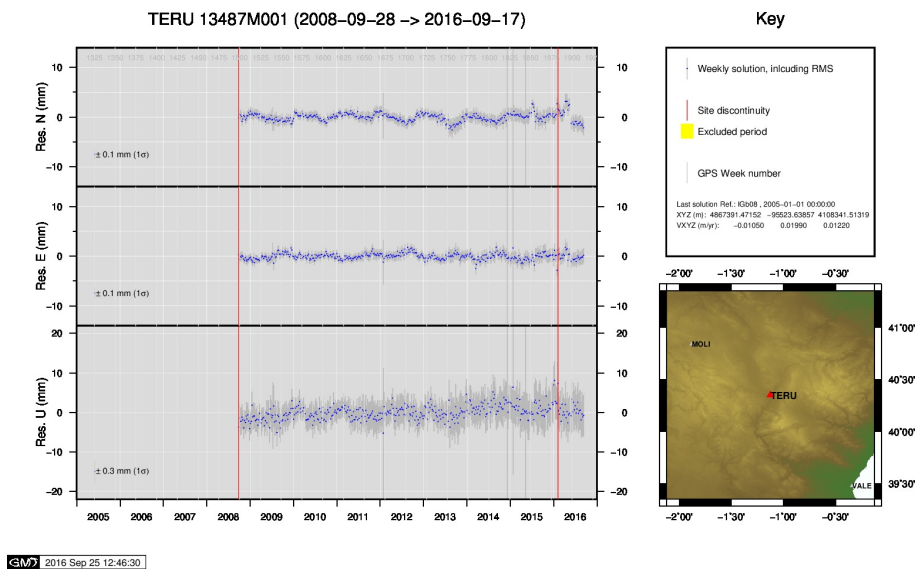


23 ) SALA

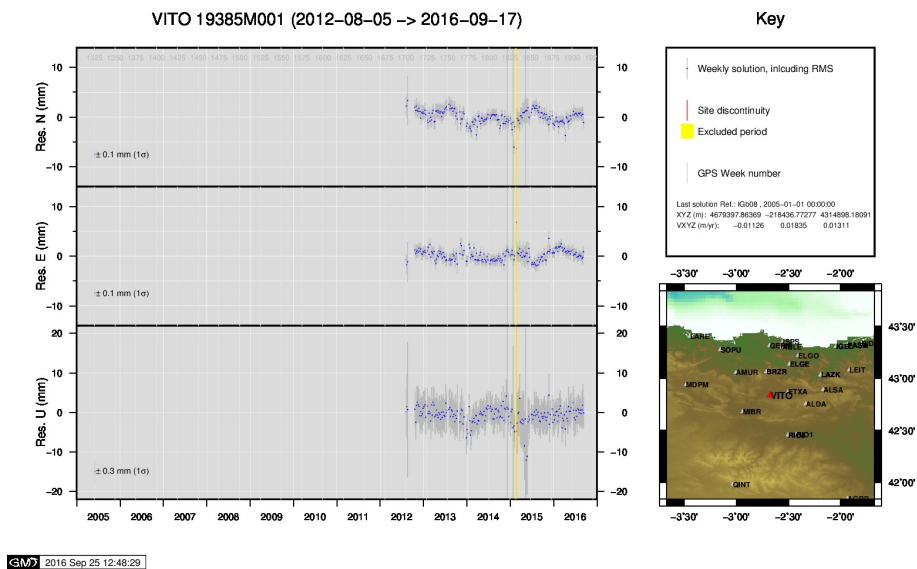




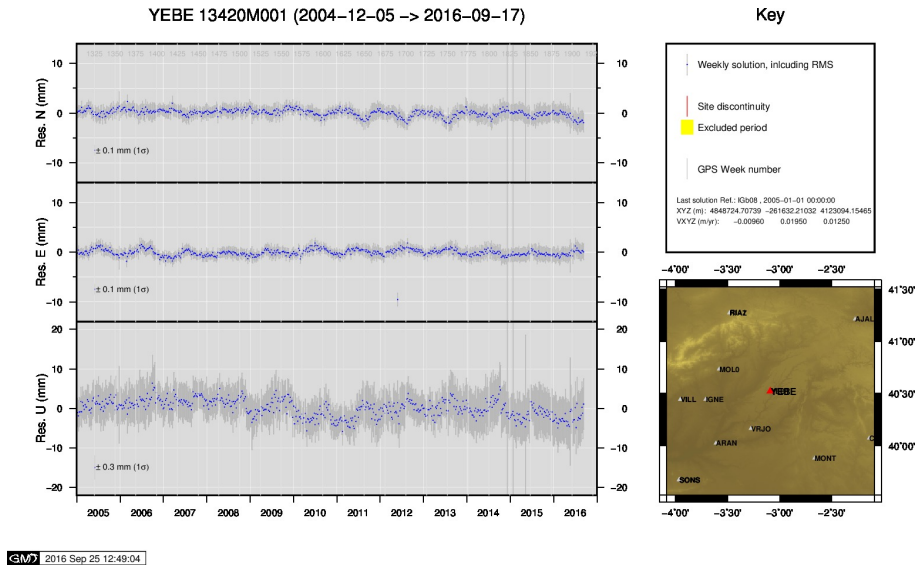
24 ) SOPU



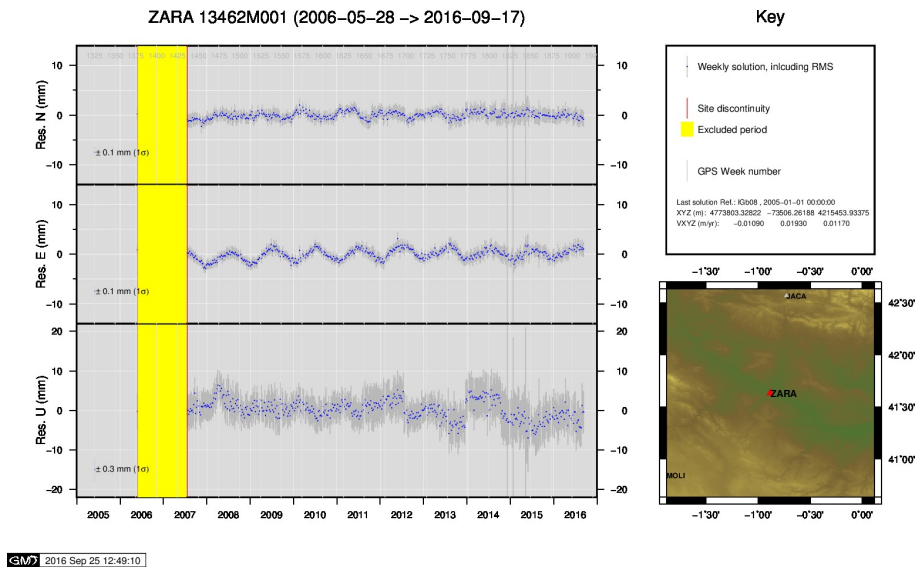
25 ) TERU



26 ) VITO



27 ) YEBE



28 ) ZARA