

# ARA-DAC Weekly Analysis Result: 1920 (GFA)

## Technical Report

**GPS Week: 1920 (GFA)**

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

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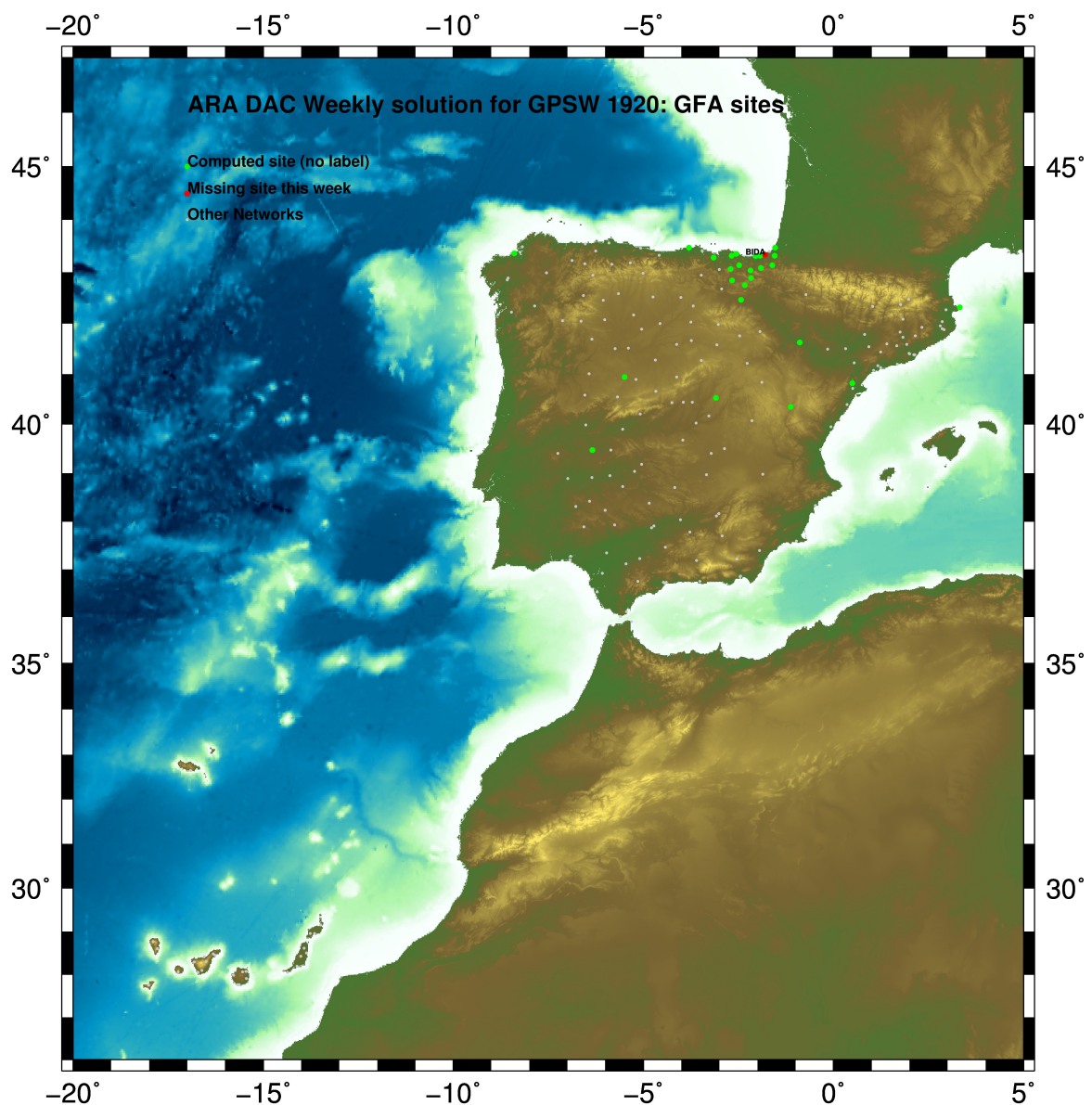
Report generated on 2016/11/06 at 17:27:33



## 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 Nov 06 17:27:25

Fig.1: Computed Sites for GPS Week1920 (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 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 IGB08

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

```

ARA LAC 1920 WEEK COMBINATION: PRECISE ORBITS                                06-NOV-16 16:07
-----
LOCAL GEODETIC DATUM: IGB08                EPOCH: 2016-10-26 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
 1 ACDR 13434M001         4594489.59032      -678367.50401    4357066.26087    W
 22 ALDA 19383M001         4687280.19397      -190876.61641    4308106.92402    A
 28 ALSA 19419M001         4677250.87024      -176770.44379    4319079.84675    A
 51 BIAZ 10074M002         4634456.09744      -124345.03029    4365785.43671    A
 54 BRZR 19387M001         4662221.01842      -220769.95157    4333309.40762    A
 7 CACE 13447M001         4899866.52895      -544567.08477    4033770.17501    W
 8 CANT 13438M001         4625924.34566      -307096.28400    4365771.52993    W
 69 CHER 00000M000         4645880.35645      -125721.97793    4353624.34801    A
 11 CREU 13432M001         4715420.16179      273178.00972    4271946.81078    A
 12 EBRE 13410M001         4833520.01803      41537.34132    4147461.68558    W
 77 ELGE 19353S001         4657557.43654      -202241.52545    4338991.84424    A
 87 GERN 19389M001         4642811.34031      -217222.98334    4353278.85502    A
 101 IGEL 19352S001         4645951.46241      -165574.55298    4352550.39539    A
 105 ISPS 19484M001         4640596.51490      -206963.82686    4356391.88715    A
 109 LAZK 19354S001         4666098.37633      -178186.24275    4330463.64751    A
 112 LEIT 19428M001         4663520.96907      -155858.76647    4334519.85745    A
 141 ORDN 19427M001         4659695.82434      -130864.78798    4338948.86078    A
 146 PAS2 19351S001         4644909.09566      -156645.11910    4353623.05382    A
 147 PASA 19351S001         4644909.09482      -156645.11916    4353623.05337    A
 27 RID1 13448M002         4708446.85854      -199490.33434    4284089.71111    W
 28 SALA 13469M001         4803054.50841      -462131.12032    4158379.04734    W
 172 SOPU 19386M001         4643997.94178      -255913.95703    4350063.11666    A
 31 TERU 13487M001         4867391.34871      -95523.40326    4108341.65483    W
 204 VITO 19385M001         4679397.73246      -218436.55603    4314898.33532    A
 35 YEBE 13420M001         4848724.59679      -261631.98015    4123094.30254    W
 36 ZARA 13462M001         4773803.19780      -73506.03313    4215454.07002    W
    
```

### 5.2 ETRS89 Coordinates

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

```

ETRF2000 COORD. wk 1920                                                    06-NOV-16 16:07
-----
LOCAL GEODETIC DATUM: ETRF2000                EPOCH: 2016-10-26 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
 1 ACDR 13434M001         4594489.87184      -678367.99365    4357065.87273    W
 22 ALDA 19383M001         4687280.52458      -190877.11412    4308106.53494    A
 28 ALSA 19419M001         4677251.20305      -176770.94051    4319079.45851    A
 51 BIAZ 10074M002         4634456.43882      -124345.52281    4365785.05200    A
 54 BRZR 19387M001         4662221.34743      -220770.44696    4333309.01993    A
 7 CACE 13447M001         4899866.80421      -544567.60314    4033769.76728    W
 8 CANT 13438M001         4625924.66750      -307096.77610    4365771.14379    W
 69 CHER 00000M000         4645880.69691      -125722.47154    4353623.96250    A
 11 CREU 13432M001         4715420.53965      273177.51065    4271946.42481    A
 12 EBRE 13410M001         4833520.36324      41536.83037    4147461.28894    W
 77 ELGE 19353S001         4657557.76789      -202242.02035    4338991.45708    A
 87 GERN 19389M001         4642811.67097      -217223.47686    4353278.46871    A
 101 IGEL 19352S001         4645951.79855      -165575.04669    4352550.00943    A
 105 ISPS 19484M001         4640596.84685      -206964.32015    4356391.50111    A
 109 LAZK 19354S001         4666098.70971      -178186.73841    4330463.26003    A
 112 LEIT 19428M001         4663521.30510      -155859.26184    4334519.47039    A
 141 ORDN 19427M001         4659696.16332      -130865.28292    4338948.47426    A
 146 PAS2 19351S001         4644909.43282      -156645.61269    4353622.66803    A
 147 PASA 19351S001         4644909.43198      -156645.61275    4353622.66758    A
 27 RID1 13448M002         4708447.18670      -199490.83407    4284089.32047    W
 28 SALA 13469M001         4803054.80045      -462131.62949    4158378.64724    W
 172 SOPU 19386M001         4643998.26810      -255914.45075    4350062.72984    A
 31 TERU 13487M001         4867391.67678      -95523.91777    4108341.25435    W
 204 VITO 19385M001         4679398.06055      -218437.05305    4314897.94648    A
 35 YEBE 13420M001         4848724.90704      -261632.49327    4123093.90152    W
 36 ZARA 13462M001         4773803.53505      -73506.53876    4215453.67625    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).

```

ARA LAC 1920 WEEK COMBINATION: PRECISE ORBITS                                06-NOV-16 16:07
-----
Station      #Days      Weekday      Repeatability (mm)
-----
ACDR 13434M001      7      XXXXXXX      0.84      0.59      3.77
    
```

ALDA 19383M001	7	XXXXXX	1.32	1.14	2.22
ALSA 19419M001	7	XXXXXX	1.50	1.95	3.89
BLAZ 10074M002	7	XXXXXX	1.33	0.89	3.62
BRZR 19387M001	7	XXXXXX	1.34	2.76	5.06
CACE 13447M001	7	XXXXXX	1.40	0.78	2.68
CANT 13438M001	7	XXXXXX	0.86	0.66	1.62
CHER 00000M000	7	XXXXXX	1.62	2.77	5.91
CREU 13432M001	7	XXXXXX	0.59	1.28	3.65
EBRE 13410M001	7	XXXXXX	0.51	0.86	2.66
ELGE 19353S001	7	XXXXXX	1.42	0.64	2.66
GERN 19389M001	7	XXXXXX	0.82	0.89	2.74
IGEL 19352S001	7	XXXXXX	2.07	0.86	1.99
ISPS 19484M001	7	XXXXXX	2.08	0.91	2.02
LAZK 19354S001	7	XXXXXX	2.17	0.86	5.82
LEIT 19428M001	7	XXXXXX	2.10	1.04	2.50
ORDN 19427M001	7	XXXXXX	4.29	1.93	4.93
PAS2 19351S001	7	XXXXXX	1.26	0.97	2.52
PASA 19351S001	7	XXXXXX	1.46	0.98	2.05
RIO1 13448M002	7	XXXXXX	0.99	0.77	3.45
SALA 13469M001	7	XXXXXX	0.55	0.26	2.21
SOPU 19386M001	7	XXXXXX	1.21	0.93	4.17
TERU 13487M001	7	XXXXXX	0.31	0.66	2.84
VITO 19385M001	7	XXXXXX	2.04	1.05	2.14
YEBE 13420M001	7	XXXXXX	0.49	0.64	2.02
ZARA 13462M001	7	XXXXXX	0.45	0.65	2.37

Comparison of individual solutions:

ACDR 13434M001	N	0.84	0.08	-0.32	1.53	-0.14	-0.98	0.05	-0.90
ACDR 13434M001	E	0.59	-0.59	0.29	-1.19	0.16	-0.09	0.32	0.29
ACDR 13434M001	U	3.77	7.48	0.88	0.99	-3.89	2.96	1.53	-1.04
ALDA 19383M001	N	1.32	0.77	-1.89	-2.19	-0.44	-0.19	0.41	1.01
ALDA 19383M001	E	1.14	1.40	1.45	1.72	-0.83	0.06	0.22	-0.21
ALDA 19383M001	U	2.22	-2.63	1.98	-2.04	0.84	-1.83	-3.21	0.51
ALSA 19419M001	N	1.50	1.82	-1.04	-2.73	0.14	0.68	-1.05	-0.07
ALSA 19419M001	E	1.95	0.49	1.85	3.99	0.11	-1.03	-0.02	-1.45
ALSA 19419M001	U	3.89	-4.36	6.46	1.04	-0.36	-4.12	-2.41	-2.47
BLAZ 10074M002	N	1.33	2.33	0.07	-0.31	-0.83	-1.55	-1.43	-0.04
BLAZ 10074M002	E	0.89	-0.63	-0.23	0.17	0.82	0.87	1.20	1.20
BLAZ 10074M002	U	3.62	-1.77	4.93	-3.85	-1.64	-5.63	0.00	1.45
BRZR 19387M001	N	1.34	-0.02	-2.99	-0.95	0.28	0.33	0.76	0.43
BRZR 19387M001	E	2.76	-5.25	0.21	-0.16	1.95	2.36	2.38	1.75
BRZR 19387M001	U	5.06	-9.41	-5.05	-2.03	4.10	3.25	0.96	2.66
CACE 13447M001	N	1.40	2.98	-0.43	-1.20	0.20	0.95	-0.07	-0.59
CACE 13447M001	E	0.78	1.29	-0.96	-0.67	-0.69	0.11	-0.39	0.18
CACE 13447M001	U	2.68	-5.19	-0.90	-0.24	2.16	1.54	2.81	0.49
CANT 13438M001	N	0.86	-0.36	1.46	0.28	-0.06	-1.41	0.29	0.08
CANT 13438M001	E	0.66	0.56	0.30	0.74	0.68	-0.27	1.05	-0.12
CANT 13438M001	U	1.62	0.71	-3.09	-0.39	-0.82	-1.37	-1.73	0.22
CHER 00000M000	N	1.62	3.35	-1.02	0.25	-1.26	-1.06	-0.79	0.17
CHER 00000M000	E	2.77	-5.52	1.90	-0.68	1.90	1.34	1.75	1.75
CHER 00000M000	U	5.91	-11.92	7.18	0.38	0.68	-3.35	-2.02	0.57
CREU 13432M001	N	0.59	0.53	0.14	-0.65	-0.12	1.11	-0.29	-0.21
CREU 13432M001	E	1.28	1.86	-1.61	0.03	-0.13	0.35	-1.23	-1.46
CREU 13432M001	U	3.65	-0.20	-1.53	-3.80	-1.61	4.20	4.77	4.51
EBRE 13410M001	N	0.51	-0.33	0.03	0.18	0.08	0.79	0.83	-0.30
EBRE 13410M001	E	0.86	0.84	-1.04	-0.20	-0.68	1.03	-0.77	-0.66
EBRE 13410M001	U	2.66	-2.70	0.75	-2.62	2.70	0.32	2.79	3.56
ELGE 19353S001	N	1.42	-1.91	0.33	1.82	-0.27	-2.21	-0.40	0.02
ELGE 19353S001	E	0.64	-0.44	0.72	0.39	0.54	0.58	0.73	0.64
ELGE 19353S001	U	2.66	3.18	-4.37	-1.70	-0.66	-2.96	-0.05	1.16
GERN 19389M001	N	0.82	-1.00	-0.54	0.60	-0.68	-1.18	-0.16	0.70
GERN 19389M001	E	0.89	-0.98	0.49	0.06	0.81	0.87	0.83	1.21
GERN 19389M001	U	2.74	1.47	2.46	1.78	-0.66	-3.48	-3.01	-3.50
IGEL 19352S001	N	2.07	3.87	1.20	-0.45	-1.69	-1.84	-1.38	-0.93
IGEL 19352S001	E	0.86	-0.50	-0.20	0.51	0.52	1.34	1.22	0.61
IGEL 19352S001	U	1.99	-3.73	1.40	-1.24	0.77	-1.70	-1.68	-0.06
ISPS 19484M001	N	2.08	3.79	-2.89	0.18	-1.16	-1.12	-0.80	0.06
ISPS 19484M001	E	0.91	0.09	-0.93	0.67	0.25	1.11	1.14	1.02
ISPS 19484M001	U	2.02	-3.19	0.87	0.66	0.14	0.66	-3.45	-0.73
LAZK 19354S001	N	2.17	-4.85	-0.67	0.82	0.54	-0.37	0.50	1.73
LAZK 19354S001	E	0.86	-0.09	1.03	-0.19	0.85	1.25	1.01	-0.17
LAZK 19354S001	U	5.82	1.37	1.04	10.04	-0.80	-6.95	-6.66	-2.53
LEIT 19428M001	N	2.10	3.15	1.36	1.02	-2.38	-2.09	-1.75	-0.74
LEIT 19428M001	E	1.04	0.95	0.34	1.93	-0.99	0.31	0.64	0.52
LEIT 19428M001	U	2.50	-5.21	2.07	-1.70	0.22	-0.43	-1.62	-0.42
ORON 19427M001	N	4.29	-8.79	-0.87	5.50	0.15	-0.03	0.49	1.47
ORON 19427M001	E	1.93	-3.12	1.14	-0.51	1.04	0.74	2.51	1.74
ORON 19427M001	U	4.93	-8.08	1.35	7.89	-1.80	-0.46	-3.23	-1.62
PAS2 19351S001	N	1.26	2.48	-0.29	-0.11	-1.17	-0.68	-1.02	-0.60
PAS2 19351S001	E	0.97	-0.68	-0.55	0.73	0.68	1.18	1.46	0.66
PAS2 19351S001	U	2.52	0.22	-0.73	0.03	0.90	-4.82	-3.33	1.61
PASA 19351S001	N	1.46	2.98	-0.73	-0.10	-1.25	-0.97	-0.90	-0.37
PASA 19351S001	E	0.98	-0.53	-0.83	0.86	0.88	1.18	1.25	0.60
PASA 19351S001	U	2.05	-0.90	0.40	-0.09	0.82	-4.01	-2.70	0.51
RIO1 13448M002	N	0.99	-1.07	-0.73	1.21	-1.14	-0.73	-0.56	0.76
RIO1 13448M002	E	0.77	-0.54	0.32	1.16	0.91	0.72	0.65	0.21
RIO1 13448M002	U	3.45	3.20	3.93	-0.64	-0.92	-5.04	-2.32	-3.69
SALA 13469M001	N	0.55	-0.79	1.00	0.17	-0.02	-0.36	-0.09	0.12
SALA 13469M001	E	0.26	-0.02	0.33	-0.21	-0.04	0.13	-0.38	0.27
SALA 13469M001	U	2.21	-0.47	-1.61	-0.76	-0.28	2.38	3.56	-2.75
SOPU 19386M001	N	1.21	1.53	-1.23	0.05	-0.16	-1.86	-1.10	0.40
SOPU 19386M001	E	0.93	-0.93	0.35	-0.02	0.93	0.87	1.57	0.36
SOPU 19386M001	U	4.17	-6.96	1.42	5.52	-1.35	-4.18	-0.02	2.06
TERU 13487M001	N	0.31	0.04	-0.06	-0.12	0.20	0.63	0.03	-0.35
TERU 13487M001	E	0.66	0.84	-0.58	0.53	-0.56	-0.49	-0.72	-0.46
TERU 13487M001	U	2.84	4.04	3.44	2.36	-1.48	-2.36	-1.96	1.77
VITO 19385M001	N	2.04	-4.54	-0.65	1.61	0.69	-0.01	-0.37	0.91
VITO 19385M001	E	1.05	-0.44	0.06	1.73	0.29	0.37	1.74	0.44
VITO 19385M001	U	2.14	-3.98	0.01	2.06	0.64	-1.40	-1.64	-1.51
YEBE 13420M001	N	0.49	-0.58	0.24	0.53	0.55	0.56	-0.11	-0.34
YEBE 13420M001	E	0.64	0.90	-0.36	-1.15	-0.04	-0.14	-0.01	0.43
YEBE 13420M001	U	2.02	2.48	-1.03	-1.37	-2.95	2.30	-0.29	-1.12
ZARA 13462M001	N	0.45	0.22	0.26	-0.29	0.68	0.08	0.07	-0.73
ZARA 13462M001	E	0.65	0.64	-1.05	-0.28	0.39	-0.23	-0.64	-0.58
ZARA 13462M001	U	2.37	5.73	0.60	0.20	0.04	0.40	-0.49	0.34

## 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	-0.90	0.75	-3.89
2	ALAC 13433M001	I W	1.36	0.47	-0.38
3	ALBA 13452M001	I W	0.06	1.76	-0.55
4	ALME 13437M001	I W	-0.36	0.63	0.51
6	BRST 10004M004	I W	0.51	-0.88	3.63
7	CACE 13447M001	I W	1.28	-0.48	-0.07
8	CANT 13438M001	I W	0.73	-0.13	-4.39
9	CEU1 13449M002	I W	0.87	3.37	8.95
10	COBA 13453M001	I W	0.81	0.18	-7.51
12	EBRE 13410M001	I W	2.45	-0.50	2.52
14	FUNC 13911S001	I W	-1.91	-0.77	6.42
15	HERT 13212M010	I W	3.30	-1.96	-1.88
16	HUEL 13451M001	I W	-0.66	2.12	2.06
17	IZAN 31309M002	I W	-5.97	-0.24	6.09
18	LLIV 13436M001	I W	5.16	-3.28	-7.92
19	LPAL 81701M001	I W	-5.74	-1.55	7.91
20	LROC 10023M001	I W	0.83	-2.15	-0.93
21	MALA 13443M001	I W	-4.27	2.22	-3.79
22	MALL 13444M001	I W	0.82	-0.37	2.53
24	MELI 19379M001	I W	-1.07	0.58	0.06
25	PDEL 31906M004	I W	-9.44	-7.61	13.46
26	RABT 35001M002	I W	-0.41	1.88	-1.22
27	RIO1 13448M002	I W	1.41	1.38	-7.10
28	SALA 13469M001	I W	0.50	0.67	0.95
29	SCOA 10088M002	I W	0.07	0.98	-6.24
30	SONS 13446M001	I W	0.21	-0.09	-4.88
31	TERU 13487M001	I W	4.27	0.50	0.11
32	VALE 13439M001	I W	0.46	0.96	-0.57
33	VIGO 13450M001	I W	-0.14	-0.13	-1.34
34	VILL 13406M001	I W	0.95	2.12	-2.64
35	YEBE 13420M001	I W	1.45	0.50	-0.21
36	ZARA 13462M001	I W	0.57	-0.77	-0.76
37	ZIMM 14001M004	I W	2.82	-0.16	1.09
	RMS / COMPONENT		2.88	1.94	4.78
	MEAN		0.00	-0.00	0.00
	MIN		-9.44	-7.61	-7.92
	MAX		5.16	3.37	13.46

NUMBER OF PARAMETERS : 3  
 NUMBER OF COORDINATES : 99  
 RMS OF TRANSFORMATION : 3.41 NM

## 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          8005072
NUMBER OF UNKNOWN(S)            115683
NUMBER OF DEGREES OF FREEDOM    7889389
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  1.975974133047199

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
  1  0.00269    -0.0032 -0.0202  0.0212  0.0002 -0.0006 -0.0007  -0.00193
  2  0.00189    0.0020 -0.0314 -0.0038  0.0005  0.0002 -0.0009  -0.00026
  3  0.00164    0.0082 -0.0203 -0.0014  0.0004  0.0002 -0.0005  -0.00114
  4  0.00125   -0.0016 -0.0114 -0.0030  0.0002  0.0000 -0.0003   0.00037
  5  0.00179   -0.0097  0.0001  0.0052 -0.0000 -0.0003 -0.0000   0.00072
  6  0.00153   -0.0057  0.0360 -0.0023 -0.0006 -0.0001  0.0010   0.00134
  7  0.00190   -0.0149  0.0176  0.0126 -0.0003 -0.0006  0.0005   0.00094
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00165    1076154    2.71          1094166      3          471  17544    0
  2  0.00144    1120947    2.06          1138642      3          477  17221    0
  3  0.00142    1192727    2.00          1211544      3          531  18289    0
  4  0.00132    1123905    1.75          1139841      3          474  15465    0
  5  0.00134    1121175    1.79          1137273      3          474  15627    0
  6  0.00132    1124796    1.74          1140643      3          471  15379    0
  7  0.00132    1126868    1.75          1142963      3          474  15624    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 16:297:00000 16:303:86370 LEICA GRX1200PRO  -----
ALDA  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
ALSA  A   1 P 16:297:00000 16:303:86370 LEICA GRX1200GGPRO -----
BIAZ  A   1 P 16:297:00000 16:303:86370 LEICA GRX1200GGPRO -----
BRZR  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
CACE  A   1 P 16:297:00000 16:303:86370 TRIMBLE NETR9  -----
CANT  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
CHER  A   1 P 16:297:00000 16:303:86370 LEICA GRX1200+GNSS -----
CREU  A   1 P 16:297:00000 16:303:86370 LEICA GR25      -----
EBRE  A   1 P 16:297:00000 16:303:86370 TRIMBLE NETR9  -----
ELGE  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
GERN  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
IGEL  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
ISPS  A   1 P 16:297:00000 16:303:86370 TRIMBLE NETR9  -----
LAZK  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
LEIT  A   1 P 16:297:00000 16:303:86370 LEICA GRX1200+GNSS -----
ORON  A   1 P 16:297:00000 16:303:86370 LEICA GRX1200GGPRO -----
PAS2  A   1 P 16:297:00000 16:303:86370 TPS NET-G3A    -----
PASA  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
RIO1  A   1 P 16:297:00000 16:303:86370 LEICA GR25      -----
SALA  A   1 P 16:297:00000 16:303:86370 LEICA GRX1200+GNSS -----
SOPU  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
TERU  A   1 P 16:297:00000 16:303:86370 LEICA GRX1200GGPRO -----
VITO  A   1 P 16:297:00000 16:303:86370 LEICA GR10      -----
YEBA  A   1 P 16:297:00000 16:303:86370 TRIMBLE NETR9  -----
ZARA  A   1 P 16:297:00000 16:303:86370 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 16:297:00000 16:303:86370 LEIAT504      LEIS  -----
ALDA  A   1 P 16:297:00000 16:303:86370 LEIAS10      NONE  -----
ALSA  A   1 P 16:297:00000 16:303:86370 LEIAX1202GG  NONE  -----
BIAZ  A   1 P 16:297:00000 16:303:86370 LEIAR25     LEIT  -----
BRZR  A   1 P 16:297:00000 16:303:86370 LEIAS10      NONE  -----
CACE  A   1 P 16:297:00000 16:303:86370 TRM29659.00 NONE  -----
CANT  A   1 P 16:297:00000 16:303:86370 LEIAR25.R4   LEIT  25066
CHER  A   1 P 16:297:00000 16:303:86370 LEIAX1203+GNSS NONE  -----
CREU  A   1 P 16:297:00000 16:303:86370 LEIAR25.R4   NONE  26357
EBRE  A   1 P 16:297:00000 16:303:86370 TRM57971.00 NONE  25503
```



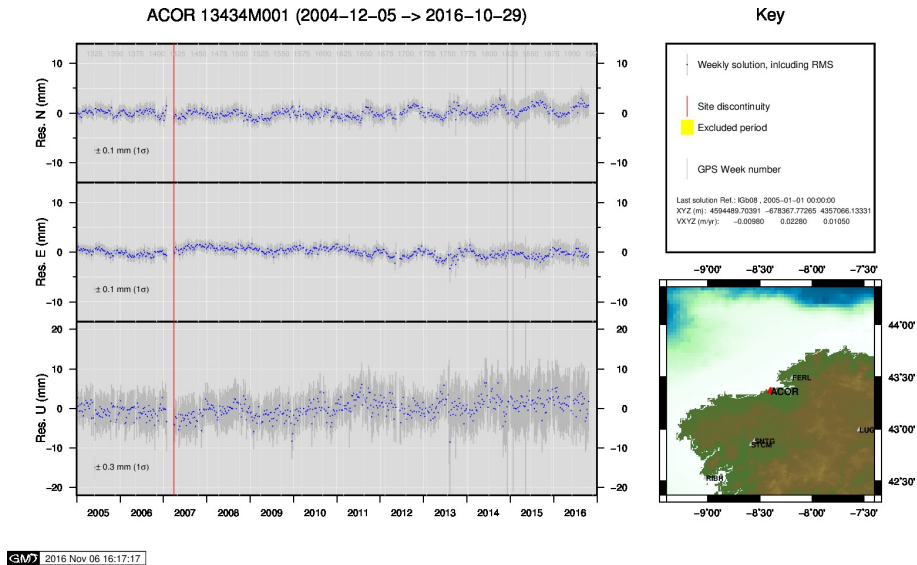
ELGE	A	1	P	16:297:00000	16:303:86370	LEIAR25_R4	LEIT	----
GERN	A	1	P	16:297:00000	16:303:86370	LEIAS10	NONE	----
IGEL	A	1	P	16:297:00000	16:303:86370	LEIAR20	LEIM	----
ISPS	A	1	P	16:297:00000	16:303:86370	TRM59900.00	SCIS	----
LAZK	A	1	P	16:297:00000	16:303:86370	LEIAR25_R4	LEIT	----
LEIT	A	1	P	16:297:00000	16:303:86370	LEIAX1203+GNSS	NONE	----
ORON	A	1	P	16:297:00000	16:303:86370	LEIAX1202GG	NONE	----
PAS2	A	1	P	16:297:00000	16:303:86370	LEIAR20	LEIM	73034
PASA	A	1	P	16:297:00000	16:303:86370	LEIAR20	LEIM	73034
RI01	A	1	P	16:297:00000	16:303:86370	LEIAR25_R4	LEIT	25138
SALA	A	1	P	16:297:00000	16:303:86370	LEIAR25	NONE	----
SOPU	A	1	P	16:297:00000	16:303:86370	LEIAS10	NONE	----
TERU	A	1	P	16:297:00000	16:303:86370	LEIAT504GG	LEIS	----
VITO	A	1	P	16:297:00000	16:303:86370	LEIAS10	NONE	----
YEBE	A	1	P	16:297:00000	16:303:86370	TRM29659.00	NONE	----
ZARA	A	1	P	16:297:00000	16:303:86370	TRM29659.00	NONE	----

### 6.3 Eccentricities

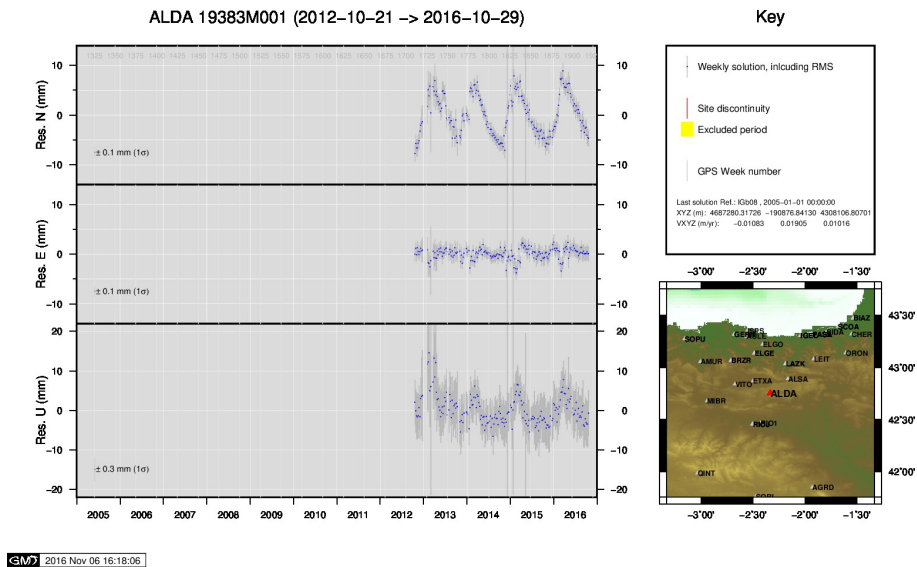
				UP----- NORTH--- EAST----				
*SITE	PT	SOLN	T	DATA_START_	DATA_END_	AXE	ARP->BENCHMARK(M)	-----
ACOR	A	1	P	16:297:00000	16:303:86370	UNE	3.0460	0.0000 0.0000
ALDA	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
ALSA	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
BIAZ	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
BRZR	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
CACE	A	1	P	16:297:00000	16:303:86370	UNE	0.0600	0.0000 0.0000
CANT	A	1	P	16:297:00000	16:303:86370	UNE	3.0490	0.0000 0.0000
CHER	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
CREU	A	1	P	16:297:00000	16:303:86370	UNE	0.0770	0.0000 0.0000
EBRE	A	1	P	16:297:00000	16:303:86370	UNE	0.0770	0.0000 0.0000
ELGE	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
GERN	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
IGEL	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
ISPS	A	1	P	16:297:00000	16:303:86370	UNE	0.0350	0.0000 0.0000
LAZK	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
LEIT	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
ORON	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
PAS2	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
PASA	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
RI01	A	1	P	16:297:00000	16:303:86370	UNE	0.0606	0.0000 0.0000
SALA	A	1	P	16:297:00000	16:303:86370	UNE	0.0600	0.0000 0.0000
SOPU	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
TERU	A	1	P	16:297:00000	16:303:86370	UNE	0.0600	0.0000 0.0000
VITO	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
YEBE	A	1	P	16:297:00000	16:303:86370	UNE	0.0000	0.0000 0.0000
ZARA	A	1	P	16:297:00000	16:303:86370	UNE	3.2590	0.0000 0.0000

## 7 Cumulative Time Series

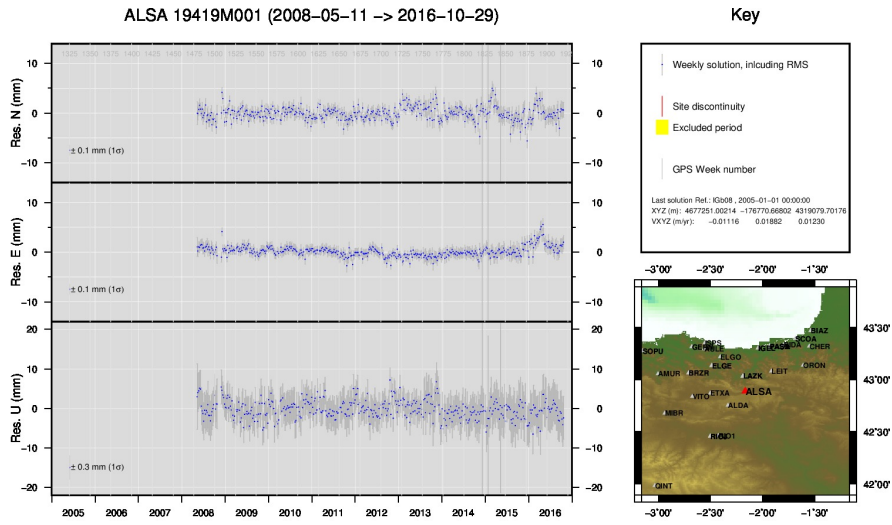
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



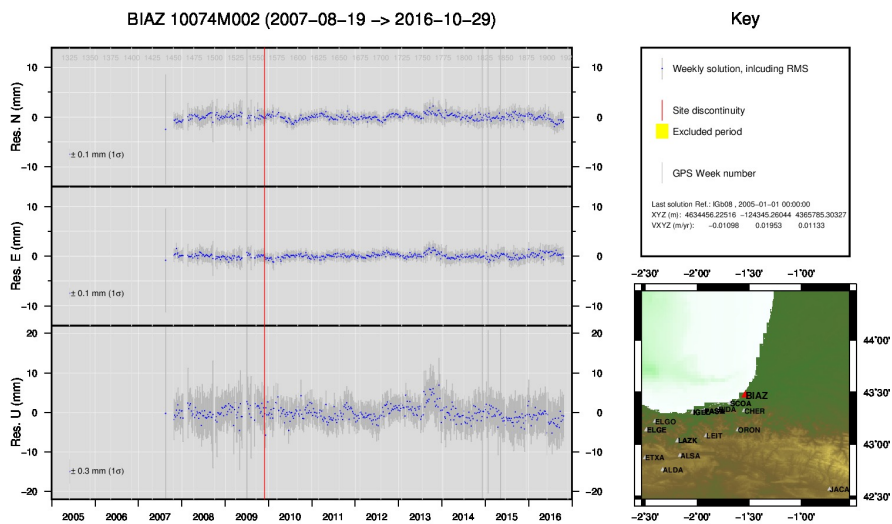
1 ) ACOR



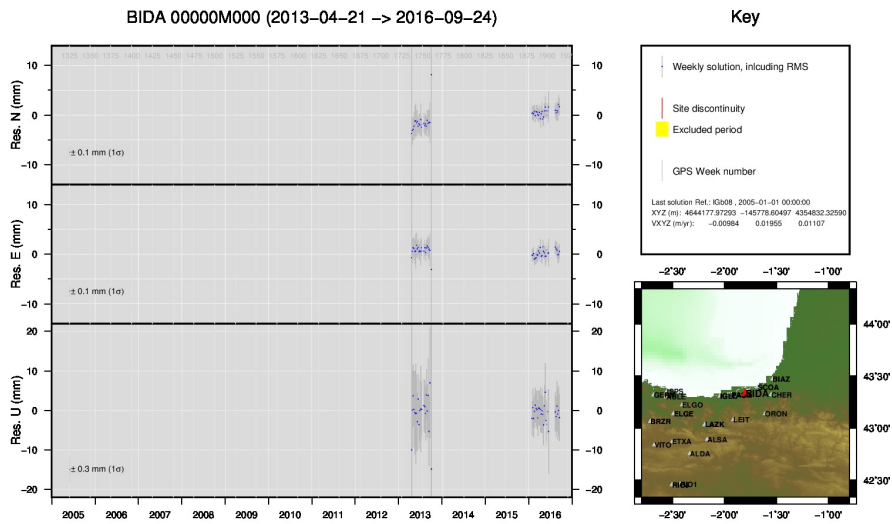
2 ) ALDA



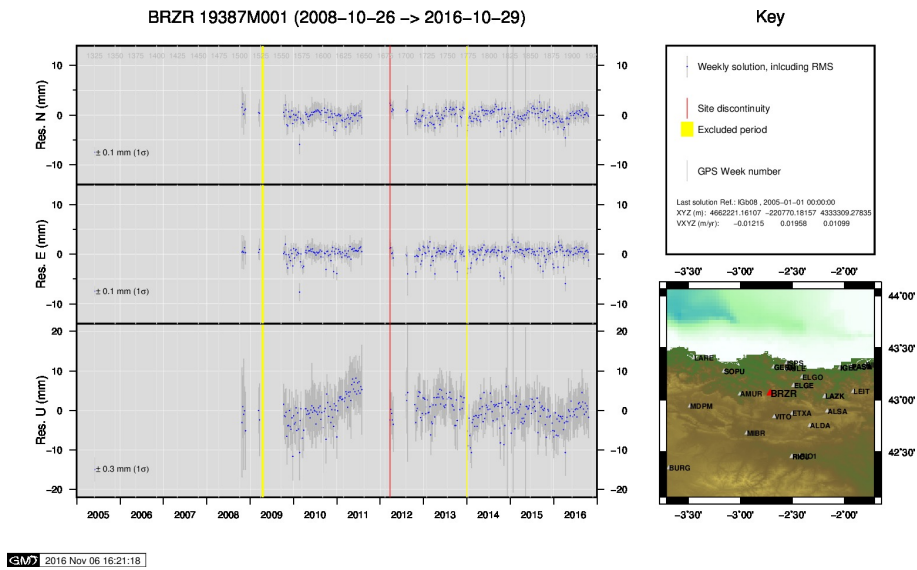
3 ) ALSA



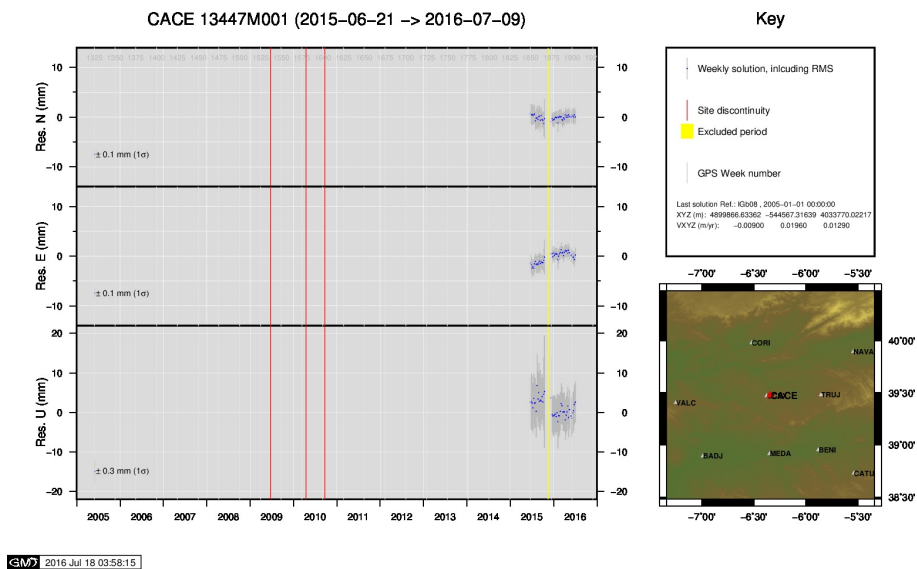
4 ) BLAZ



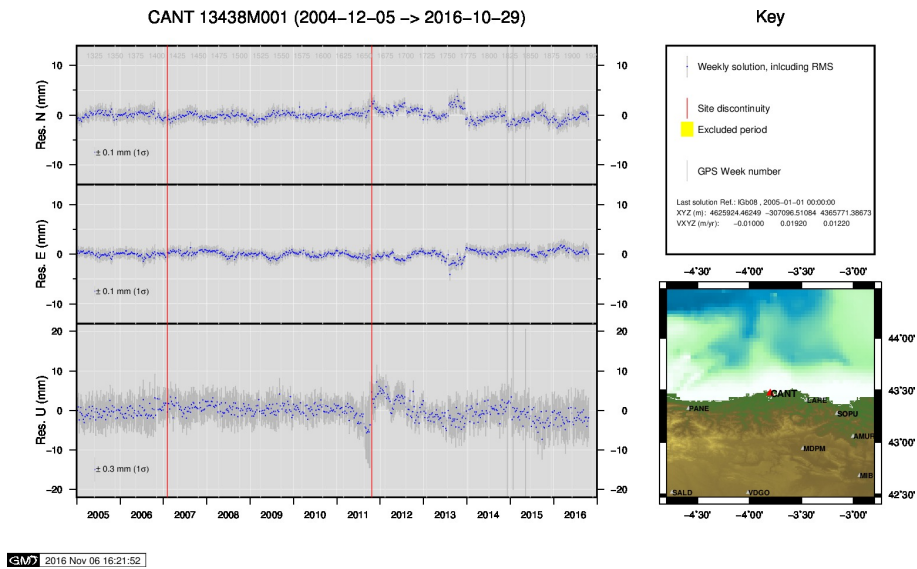
5 ) BIDA



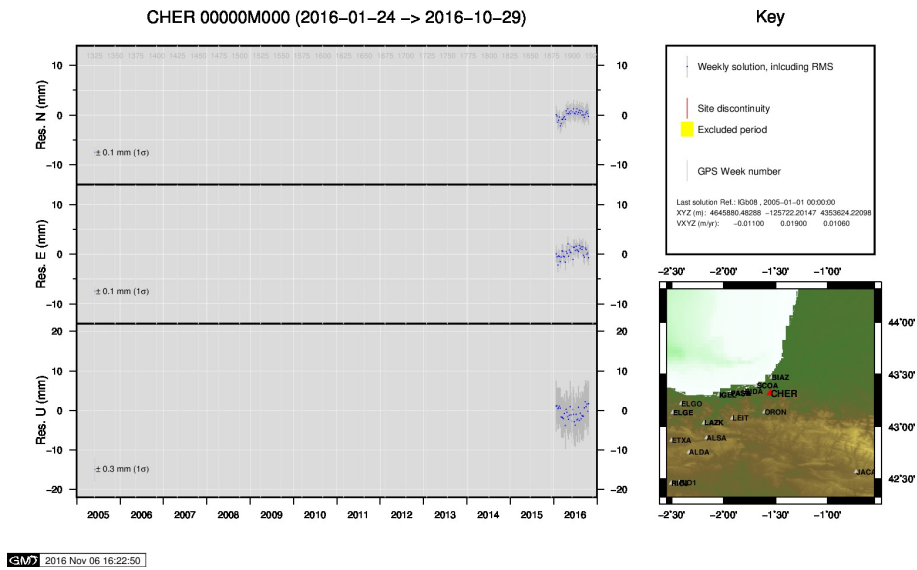
6 ) BRZR



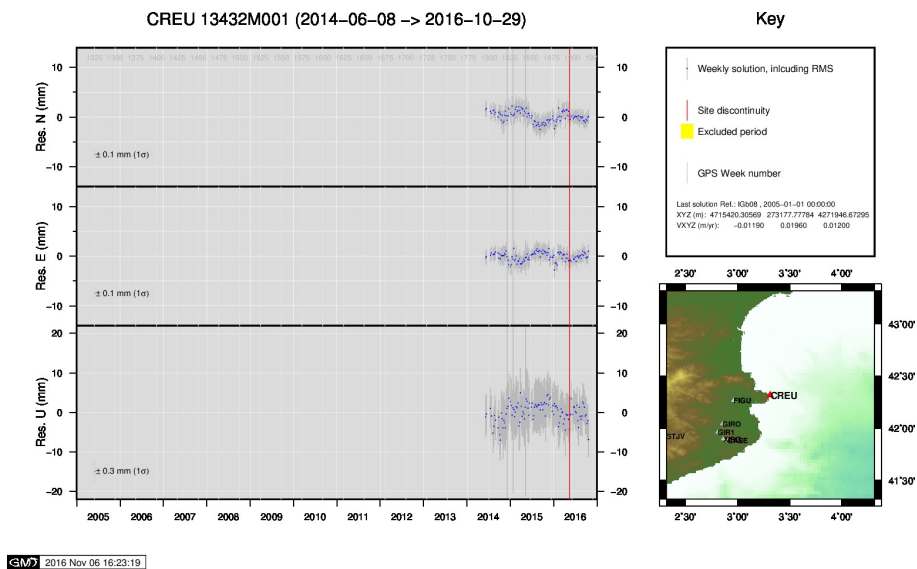
7 ) CACE



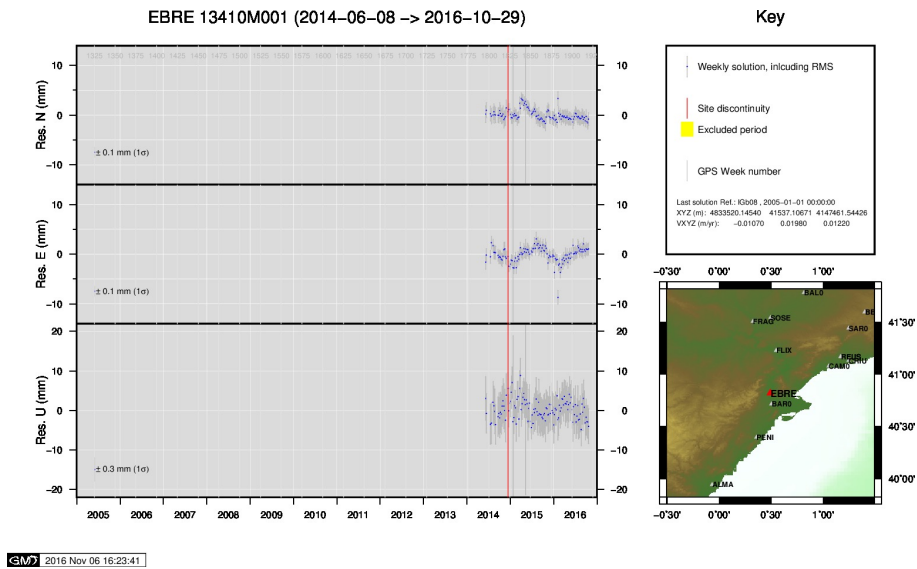
8 ) CANT



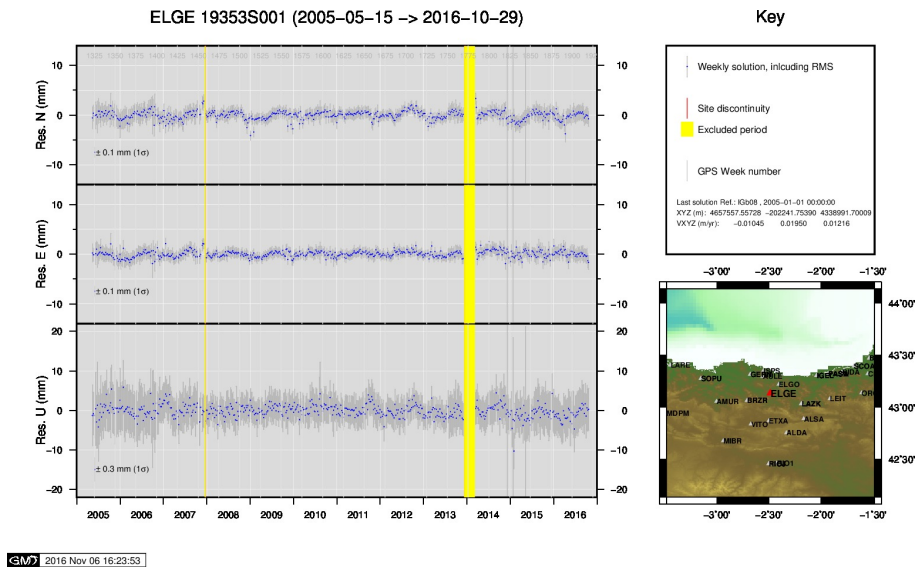
9 ) CHER



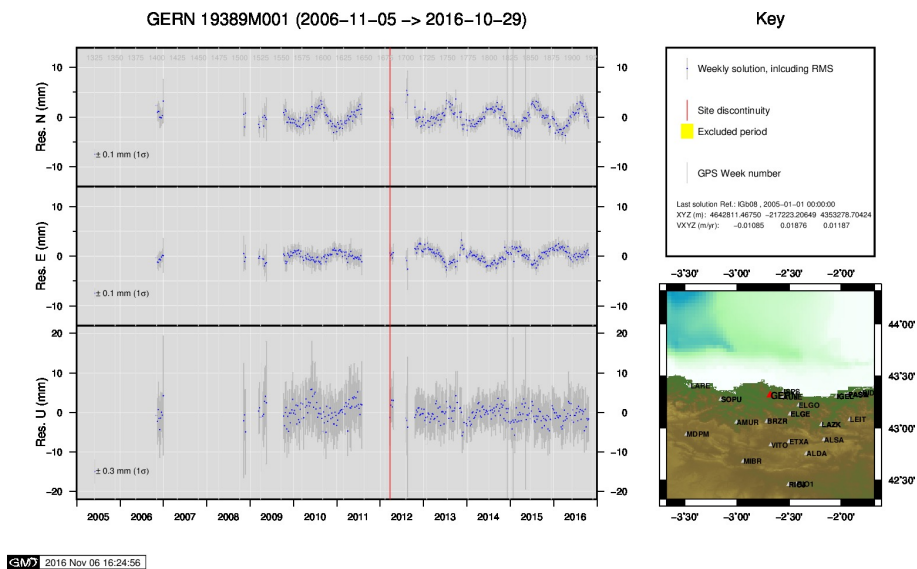
10 ) CREU



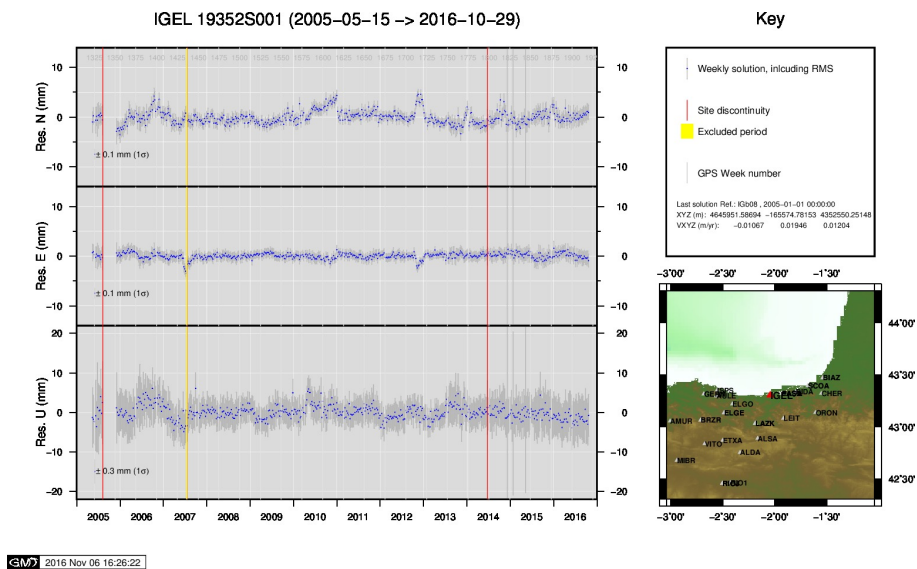
11 ) EBRE



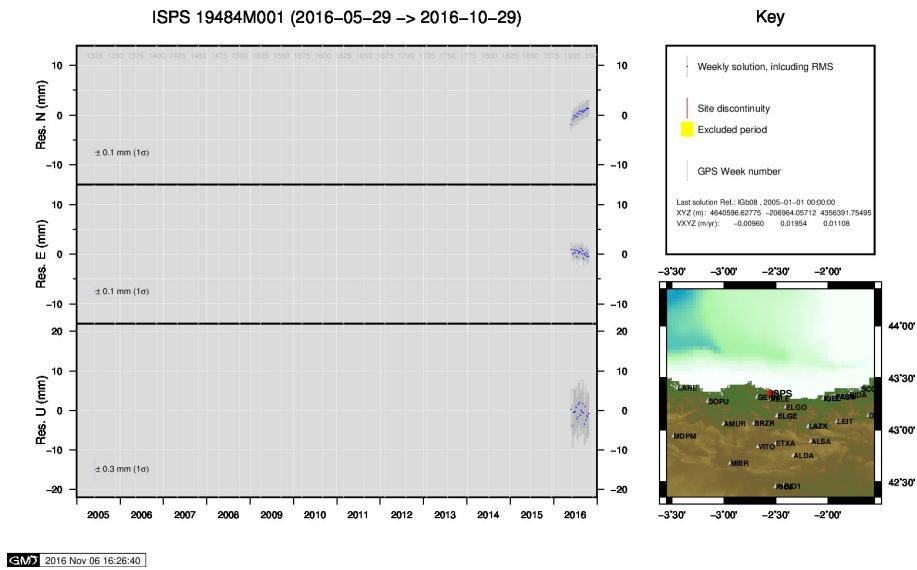
12 ) ELGE



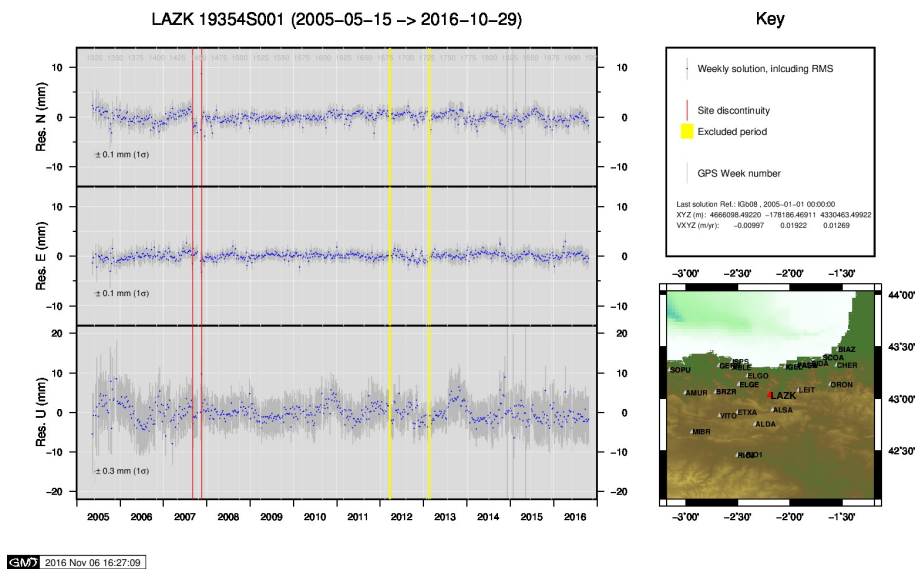
13 ) GERN



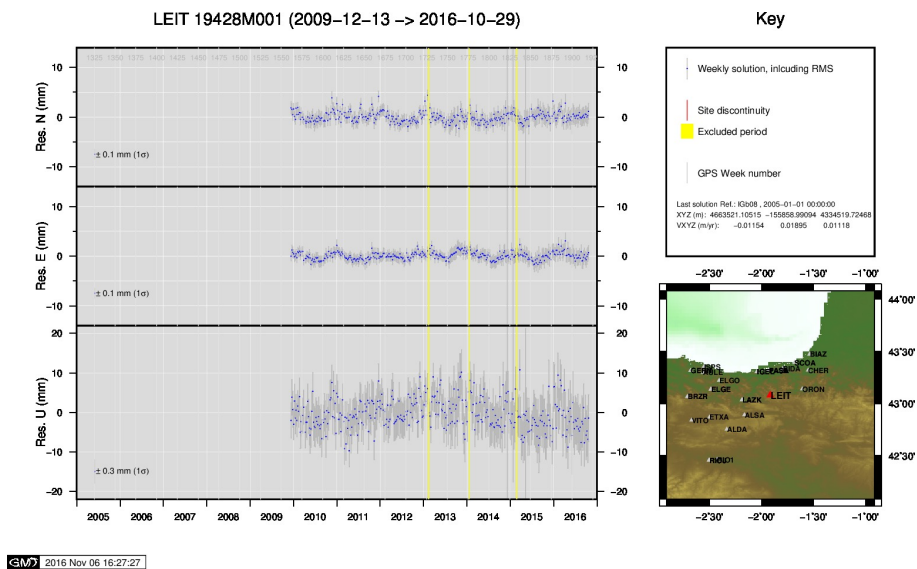
14 ) IGEL



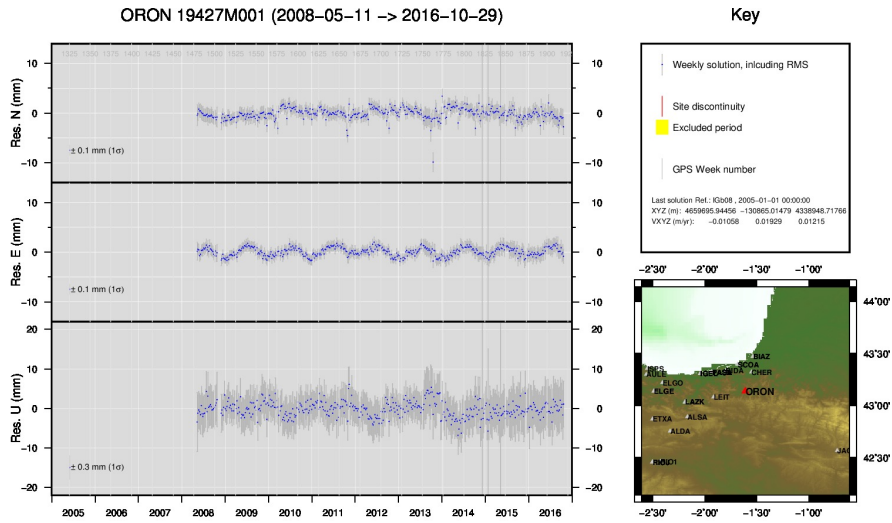
15 ) ISPS



16 ) LAZK

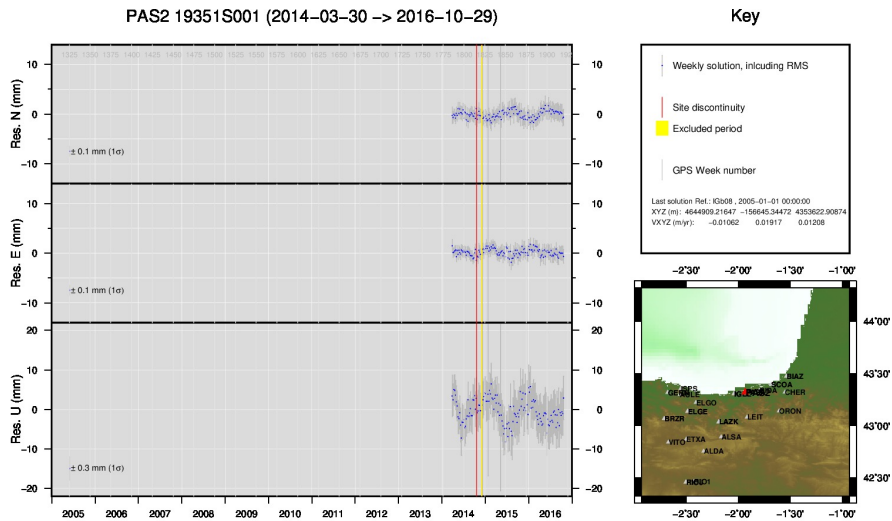


17 ) LEIT



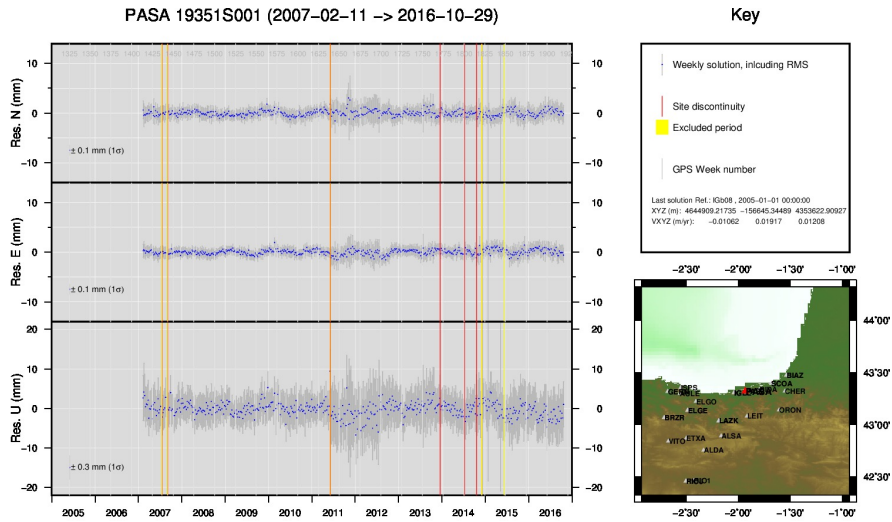
GMW 2016 Nov 06 16:31:00

18 ) ORON



GMW 2016 Nov 06 16:31:29

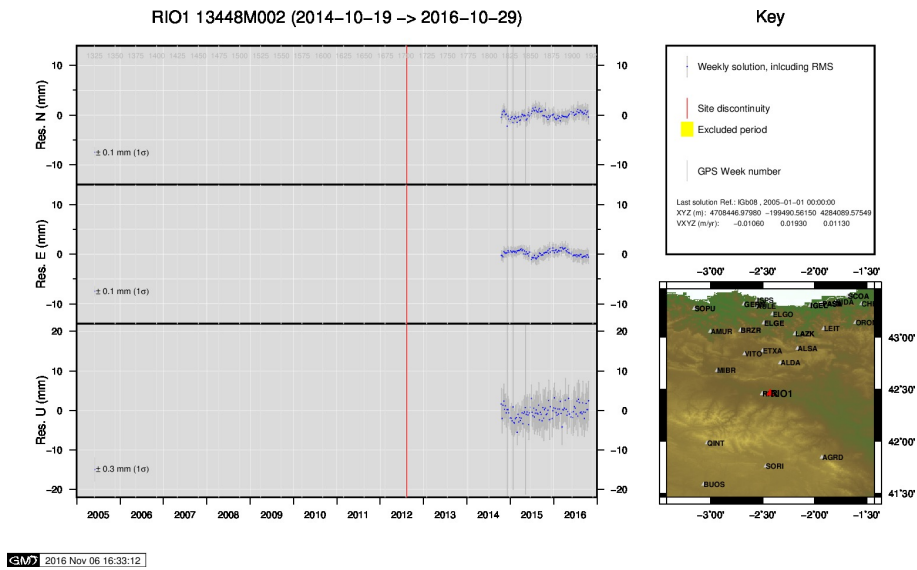
19 ) PAS2



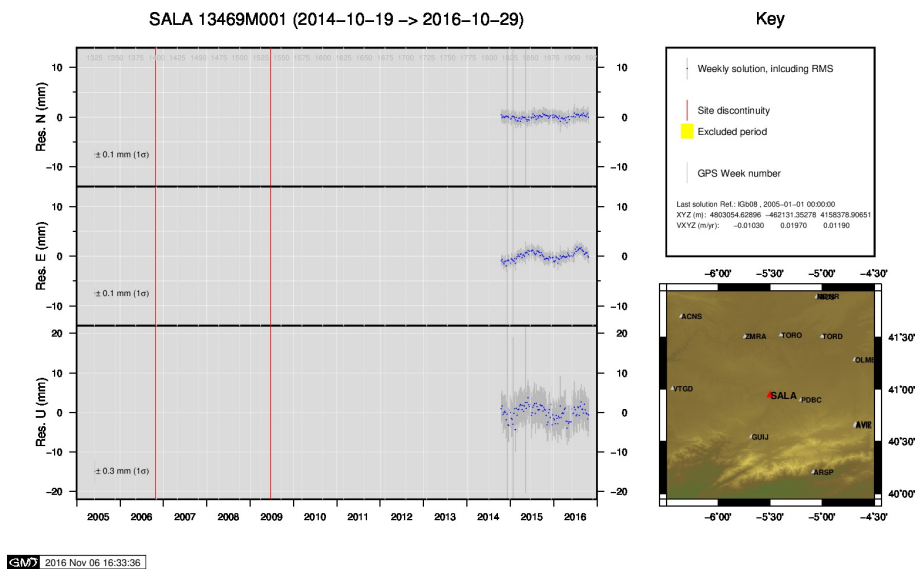
GMW 2016 Nov 06 16:31:35

20 ) PASA

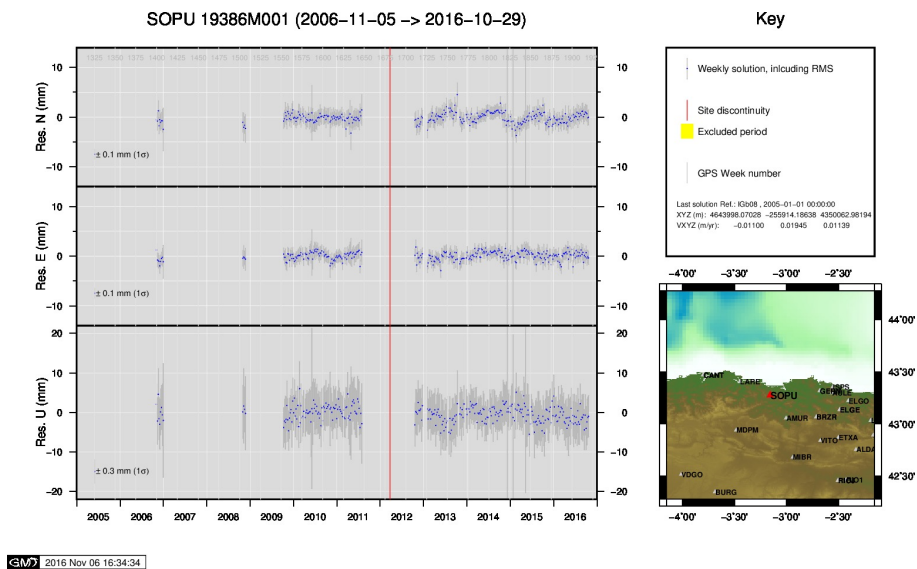




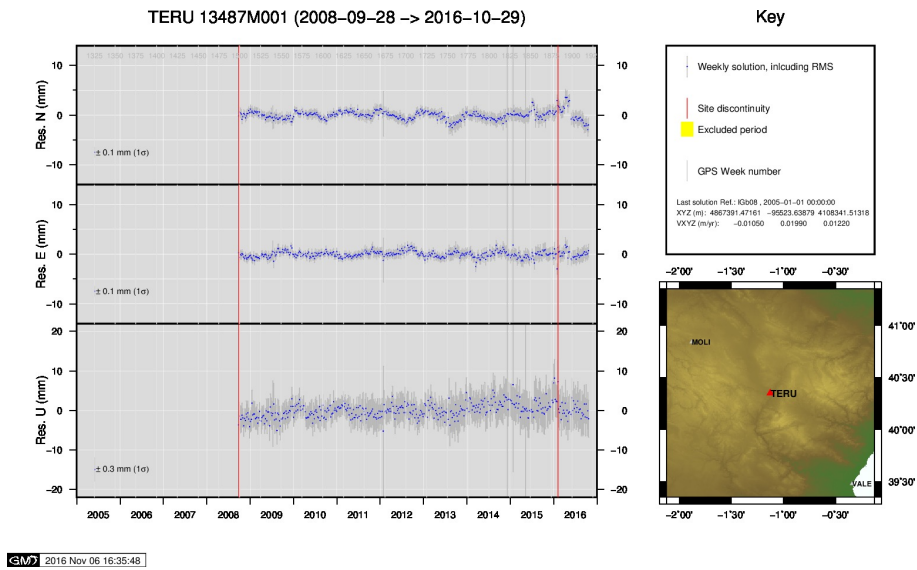
21 ) RIO1



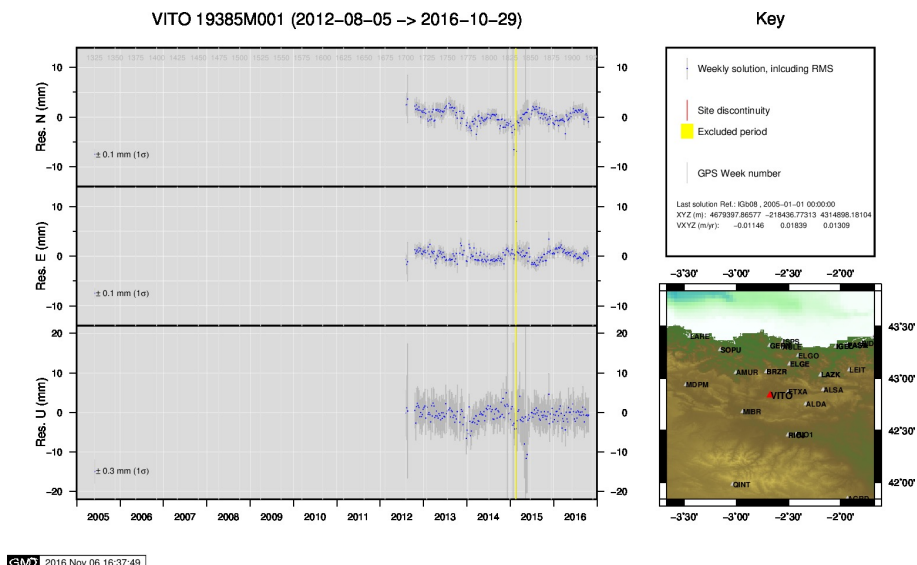
22 ) SALA



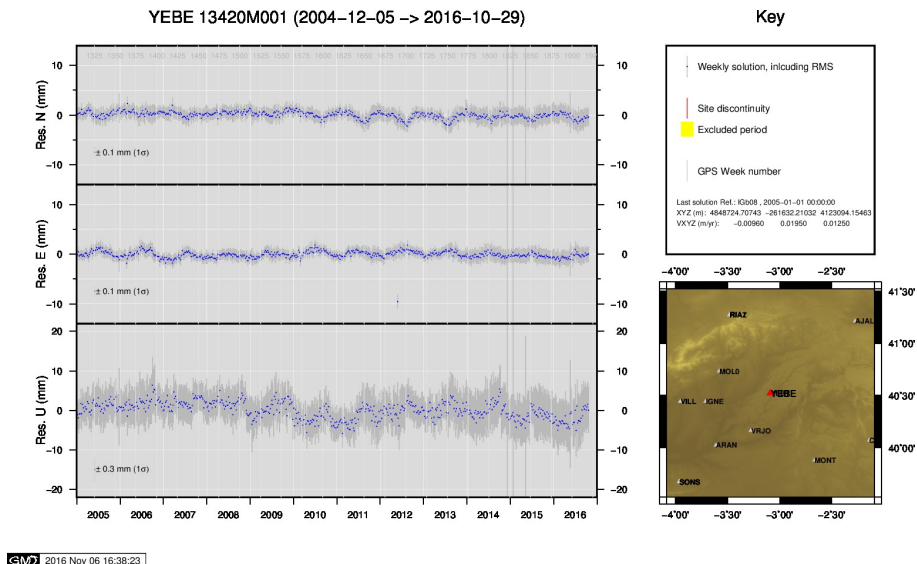
23 ) SOPU



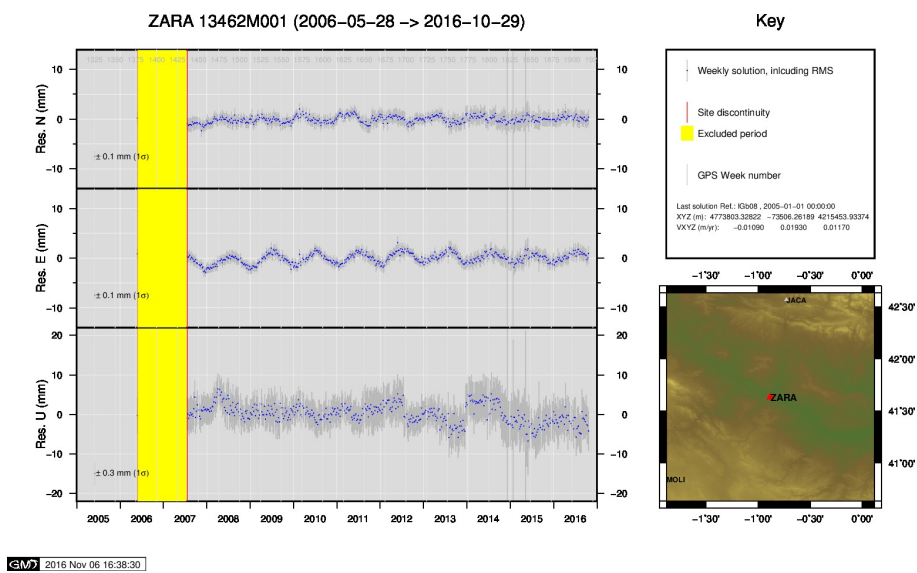
24 ) TERU



25 ) VITO



26 ) YEBE



27 ) ZARA