ARA-DAC Weekly Analysis Result: 1916 (GFA)

Technical Report

GPS Week: 1916 (GFA)

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

ARA-DAC details:
Contact person: J. Zurutuza
Contact mail: geodesia@aranzadi.eus

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1 Introduction

In may 2015 ARA (EUREF's acronym of the ARANZADI's Department of Applied Geodesy), kicks off as a EUREF's Operational Center. In July 2015, the Densification solutions ARA computes routinely in a weekly basis start being submitted to the EUREF's EPN Densification Project.

2 Map of Computed Sites

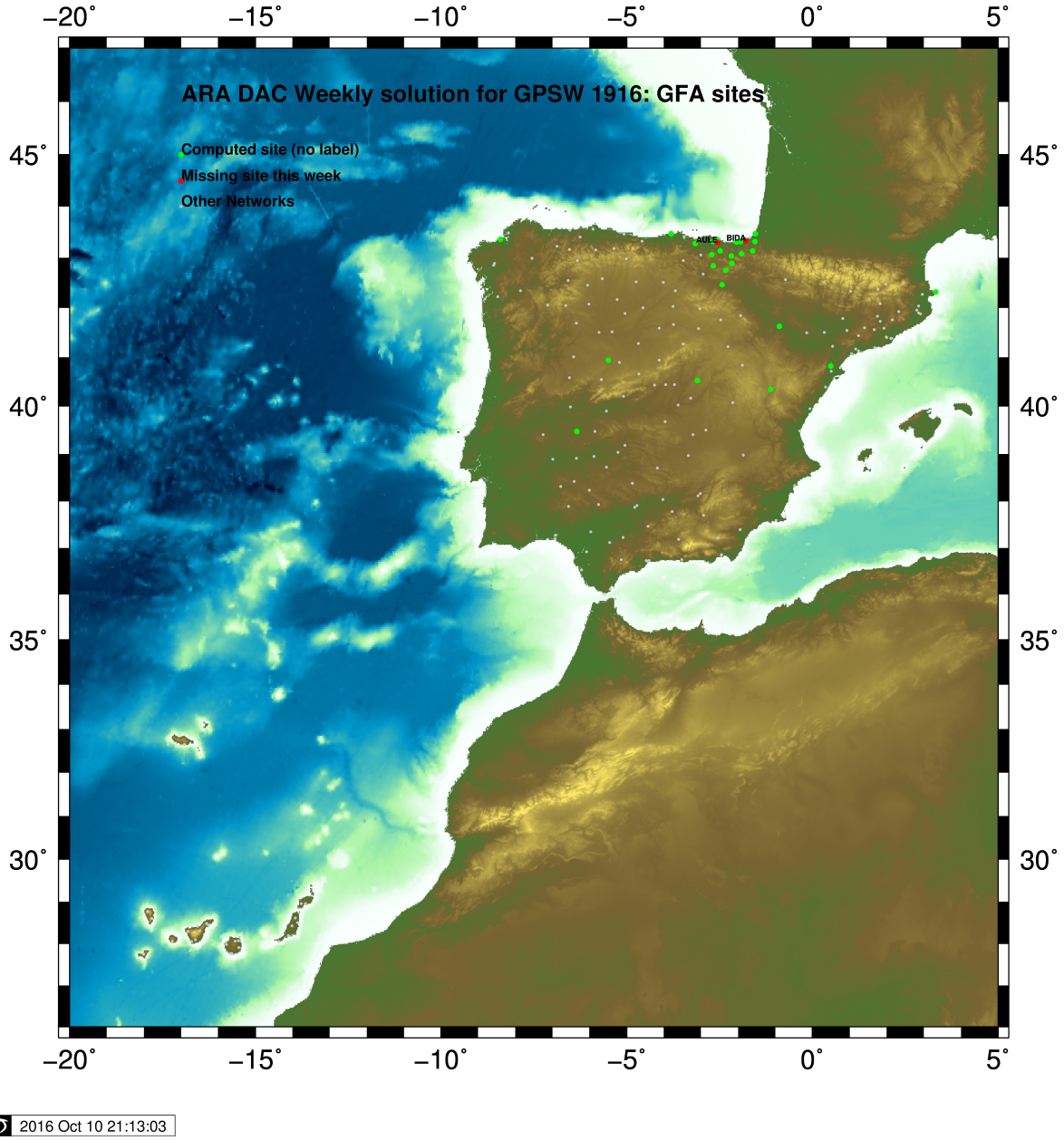


Fig.1: Computed Sites for GPS Week1916 (GFA)

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

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

5 Computed Coordinates

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

5.1 IGb08

The Reference Frame considered in this section is IGb08, release C1890.

ARA LAC 1916 WEEK COMBINATION: PRECISE ORBITS 10-OCT-16 19:44

LOCAL GEODETIC DATUM: IGb08 EPOCH: 2016-09-28 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACOR 13434M001	4594489.58685	-678367.50522	4357066.25582	W
22	ALDA 19383M001	4687280.19105	-190876.61768	4308106.92347	A
28	ALSA 19419M001	4677250.87107	-176770.44584	4319079.84634	A
51	BIAZ 10074M002	4634456.09746	-124345.03112	4365785.43671	A
54	BRZR 19387M001	4662221.02056	-220769.95136	4333309.40920	A
7	CACE 13447M001	4899866.53127	-544567.08686	4033770.17556	W
8	CANT 13438M001	4625924.34465	-307096.28489	4365771.52945	W
69	CHER 00000M000	4645880.35595	-125721.97736	4353624.34763	A
11	CREU 13432M001	4715420.16626	273178.00849	4271946.81293	A
12	EBRE 13410M001	4833520.01845	41537.33980	4147461.68492	W
77	ELGE 19353S001	4657557.43676	-202241.52545	4338991.84439	A
87	GERN 19389M001	4642811.34001	-217222.98476	4353278.85715	A
101	IGEL 19352S001	4645951.46309	-165574.55393	4352550.39522	A
105	ISPS 19484M001	4640596.51579	-206963.82812	4356391.88698	A
109	LAZK 19354S001	4666098.37650	-178186.24407	4330463.64911	A
112	LEIT 19428M001	4663520.96886	-155858.76894	4334519.85593	A
141	ORON 19427M001	4659695.82306	-130864.78831	4338948.86183	A
146	PAS2 19351S001	4644909.09152	-156645.11976	4353623.05078	A
147	PASA 19351S001	4644909.09282	-156645.12004	4353623.05142	A
27	RIO1 13448M002	4708446.85503	-199490.33535	4284089.70908	W
28	SALA 13469M001	4803054.50920	-462131.12105	4158379.04715	W
172	SOPU 19386M001	4643997.94076	-255913.95824	4350063.11651	A
31	TERU 13487M001	4867391.34884	-95523.40520	4108341.65397	W
204	VITO 19385M001	4679397.73222	-218436.55685	4314898.33609	A
35	YEBE 13420M001	4848724.59665	-261631.98117	4123094.30204	W
36	ZARA 13462M001	4773803.19961	-73506.03467	4215454.07010	W

5.2 ETRS89 Coordinates

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

ETRF2000 COORD. wk 1916 10-OCT-16 19:44

LOCAL GEODETIC DATUM: ETRF2000 EPOCH: 2016-09-28 12:00:00

NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACOR 13434M001	4594489.86774	-678367.99338	4357065.86864	W
22	ALDA 19383M001	4687280.52089	-190877.11389	4308106.53536	A
28	ALSA 19419M001	4677251.20311	-176770.94106	4319079.45907	A
51	BIAZ 10074M002	4634456.43805	-124345.52215	4365785.05296	A
54	BRZR 19387M001	4662221.34881	-220770.44525	4333309.02248	A
7	CACE 13447M001	4899866.80592	-544567.60367	4033769.76885	W
8	CANT 13438M001	4625924.66575	-307096.77550	4365771.14427	W
69	CHER 00000M000	4645880.69562	-125722.46948	4353623.96308	A
11	CREU 13432M001	4715420.54323	273177.51092	4271946.42792	A
12	EBRE 13410M001	4833520.36285	41536.83039	4147461.28927	W
77	ELGE 19353S001	4657557.76735	-202242.01886	4338991.45820	A
87	GERN 19389M001	4642811.66990	-217223.47679	4353278.47180	A
101	IGEL 19352S001	4645951.79845	-165575.04615	4352550.01023	A
105	ISPS 19484M001	4640596.84697	-206964.31992	4356391.50190	A
109	LAZK 19354S001	4666098.70911	-178186.73823	4330463.26259	A
112	LEIT 19428M001	4663521.30411	-155859.26281	4334519.46984	A
141	ORON 19427M001	4659696.16125	-130865.28175	4338948.47627	A
146	PAS2 19351S001	4644909.42789	-156645.61186	4353622.66596	A
147	PASA 19351S001	4644909.42919	-156645.61214	4353622.66660	A
27	RIO1 13448M002	4708447.18243	-199490.83357	4284089.31941	W
28	SALA 13469M001	4803054.80059	-462131.62869	4158378.64805	W
172	SOPU 19386M001	4643998.26632	-255914.45047	4350062.73065	A
31	TERU 13487M001	4867391.67616	-95523.91816	4108341.25449	W
204	VITO 19385M001	4679398.05955	-218437.05237	4314897.94822	A
35	YEBE 13420M001	4848724.90719	-261632.49275	4123093.90202	W
36	ZARA 13462M001	4773803.53608	-73506.53877	4215453.67732	W

5.3 Mean and Daily Repeatabilities

In this section, the mean and daily repeatabilities of the sites are shown. Repatabilities refer to the IGb08 solution and are given with respect the Local fram (North-East-Up).

ARA LAC 1916 WEEK COMBINATION: PRECISE ORBITS 10-OCT-16 19:44

Station	#Days	Weekday 0123456	Repeatability (mm) N	E	U
ACOR 13434M001	7	XXXXXXX	0.74	1.08	4.46

```
ALDA 19383M001     7  XXXXXXX     1.58   0.88   4.61
ALSA 19419M001     7  XXXXXXX     1.50   1.17   4.54
BIAZ 10074M002     6  XXXXXX      0.60   0.71   4.73
BRZR 19387M001     7  XXXXXXX     0.50   1.12   4.48
CACE 13447M001     7  XXXXXXX     0.88   0.71   1.75
CANT 13438M001     7  XXXXXXX     0.60   0.66   2.28
CHER 00000M000     7  XXXXXXX     1.11   1.56   4.38
CREU 13432M001     7  XXXXXXX     0.89   0.92   4.32
EBRE 13410M001     7  XXXXXXX     0.65   0.90   4.24
ELGE 19353S001     7  XXXXXXX     0.65   0.89   3.83
GERN 19389M001     7  XXXXXXX     0.98   0.95   4.95
IGEL 19352S001     7  XXXXXXX     1.09   0.83   3.74
ISPS 19484M001     7  XXXXXXX     0.70   0.89   4.44
LAZK 19354S001     7  XXXXXXX     0.75   0.91   4.48
LEIT 19428M001     7  XXXXXXX     1.48   0.73   4.87
ORON 19427M001     7  XXXXXXX     0.82   0.97   5.28
PAS2 19351S001     7  XXXXXXX     0.74   0.75   3.73
PASA 19351S001     7  XXXXXXX     0.67   0.97   3.71
RIO1 13448M002     7  XXXXXXX     0.67   0.98   3.80
SALA 13469M001     7  XXXXXXX     0.56   0.56   1.59
SOPU 19386M001     7  XXXXXXX     0.91   0.97   2.92
TERU 13487M001     7  XXXXXXX     0.38   0.40   3.61
VITO 19385M001     7  XXXXXXX     1.11   1.25   3.67
YEBE 13420M001     7  XXXXXXX     0.56   0.80   2.03
ZARA 13462M001     7  XXXXXXX     0.55   0.48   2.86

Comparison of individual solutions:
-----------------------------------
ACOR 13434M001   N    0.74      0.51    0.41   -0.58   -0.79    1.00    0.94   -0.07
ACOR 13434M001   E    1.08      0.24   -1.21   -0.32    0.71    0.32    2.06   -0.74
ACOR 13434M001   U    4.46      0.37    6.20    5.90   -2.37    0.16   -5.72    2.78
ALDA 19383M001   N    1.58     -0.17    2.01    1.90   -1.81   -0.73   -1.24   -1.38
ALDA 19383M001   E    0.88      0.32   -0.51   -0.60    0.28    0.69    1.21    1.37
ALDA 19383M001   U    4.61     -3.77   -6.37   -5.75   -2.16   -5.47    1.39    1.76
ALSA 19419M001   N    1.50     -2.36    1.19    0.00   -0.59    1.31   -1.77    1.13
ALSA 19419M001   E    1.17     -1.05   -0.14    0.55   -0.58    0.44    1.72    1.81
ALSA 19419M001   U    4.54     -2.64   -0.50   -3.70   -3.42   -9.50   -0.24   -1.03
BIAZ 10074M002   N    0.60      0.72   -0.39   -0.89   -0.22    0.29    0.44
BIAZ 10074M002   E    0.71      0.49    1.28    0.38    0.02   -0.40   -0.58
BIAZ 10074M002   U    4.73      2.55   -5.59   -6.46   -3.95   -2.19   -3.45
BRZR 19387M001   N    0.50      0.27    0.38    0.10   -0.79   -0.40   -0.72   -0.05
BRZR 19387M001   E    1.12     -0.53    0.94    1.35   -0.92   -0.73    1.61    0.76
BRZR 19387M001   U    4.48     -4.70   -5.01    0.14    2.55   -5.79   -5.55   -1.47
CACE 13447M001   N    0.88      0.24    0.18   -0.67    1.18   -0.26   -0.06   -1.62
CACE 13447M001   E    0.71      0.24    0.11   -0.78    1.12    0.31    0.22   -0.97
CACE 13447M001   U    1.75     -1.61   -1.42   -0.56    3.11   -0.73   -1.44    1.04
CANT 13438M001   N    0.60      0.53    0.05   -0.76    0.66    0.39    0.74   -0.42
CANT 13438M001   E    0.66     -0.00    0.12    1.39    0.00   -0.61   -0.29    0.43
CANT 13438M001   U    2.28      2.16   -1.97   -0.23   -0.92   -4.16   -1.41   -1.55
CHER 00000M000   N    1.11      0.78   -2.21   -0.32    0.51    0.49    0.99   -0.56
CHER 00000M000   E    1.56     -2.18    2.79   -0.17   -0.07    1.34    0.25    0.47
CHER 00000M000   U    4.38     -8.59   -4.72   -2.44   -2.88   -0.31    0.21   -2.21
CREU 13432M001   N    0.89     -0.20   -0.23   -0.61    0.38    1.16   -0.80    1.45
CREU 13432M001   E    0.92      0.38   -0.83   -0.16   -1.54   -1.34   -0.00   -0.24
CREU 13432M001   U    4.32      3.01   -2.23   -1.77   -0.25    9.42    2.29   -0.82
EBRE 13410M001   N    0.65     -0.35    0.60    1.15    0.31    0.16   -0.10    0.76
EBRE 13410M001   E    0.90     -1.03   -0.74    0.97   -1.27   -0.41    0.72    0.25
EBRE 13410M001   U    4.24      3.60    1.40    3.39    4.86    5.77   -4.89   -0.84
ELGE 19353S001   N    0.65     -0.38   -0.26   -0.54    0.14    0.90    0.12   -1.08
ELGE 19353S001   E    0.89      0.63    0.62    1.19   -0.32   -0.99    0.21    1.18
ELGE 19353S001   U    3.83     -6.51   -4.09   -4.09    0.70   -1.46   -1.85   -2.50
GERN 19389M001   N    0.98      0.95    0.04   -1.03   -1.80    0.68    0.27   -0.10
GERN 19389M001   E    0.95     -1.21    0.98   -0.19    0.15    0.37    1.09    1.27
GERN 19389M001   U    4.95    -11.13   -3.62   -0.18   -0.97   -2.89    0.11   -0.83
IGEL 19352S001   N    1.09     -0.62   -0.38   -1.41   -0.25    1.02    1.68   -0.84
IGEL 19352S001   E    0.83      0.51    1.14    0.65    0.09   -0.88   -0.12    1.16
IGEL 19352S001   U    3.74     -5.43   -4.97   -4.20    0.41   -2.23   -1.07   -2.42
ISPS 19484M001   N    0.70     -1.34    0.65    0.08    0.09   -0.75    0.33   -0.02
ISPS 19484M001   E    0.89     -0.28    0.32    1.41    0.01   -0.89    1.13    0.72
ISPS 19484M001   U    4.44     -8.33   -3.88   -1.63    1.71   -3.37    0.17   -4.12
LAZK 19354S001   N    0.75     -0.64   -0.36   -0.85    0.24    0.95   -0.82    0.69
LAZK 19354S001   E    0.91      0.41    1.22    0.37   -0.47   -0.57    0.11    1.61
LAZK 19354S001   U    4.48     -8.98   -2.08   -4.03   -0.30   -1.60    0.18   -4.02
LEIT 19428M001   N    1.48     -0.67    1.78    0.48   -1.65   -1.22    1.77   -1.41
LEIT 19428M001   E    0.73     -0.50   -0.15    1.04    0.28    0.97    0.82    0.40
LEIT 19428M001   U    4.87     -3.96   -4.51    3.64   -5.04   -7.73   -2.29   -1.68
ORON 19427M001   N    0.82     -0.29    0.43   -0.73   -0.13    0.35    1.01   -1.43
ORON 19427M001   E    0.97      1.01    1.31   -0.04    0.26   -1.12    0.02    1.27
ORON 19427M001   U    5.28     -6.31    0.67   -1.88   -4.72   -5.93    4.00   -7.05
PAS2 19351S001   N    0.74      1.38   -0.48   -0.02   -0.87    0.01   -0.34   -0.54
PAS2 19351S001   E    0.75      0.60    1.19    0.06    0.50    0.26   -0.79    0.80
PAS2 19351S001   U    3.73     -6.26   -3.12   -3.22   -1.72   -3.17    0.70   -3.24
PASA 19351S001   N    0.67      0.58   -0.06   -0.17   -0.01    0.46   -0.36   -1.41
PASA 19351S001   E    0.97      1.29    1.00    0.05   -0.39   -0.55   -0.54    1.49
PASA 19351S001   U    3.71     -5.94   -2.63   -3.90   -2.06   -3.92    0.80   -2.16
RIO1 13448M002   N    0.67     -0.77   -0.03   -0.83   -0.47    0.33    0.81   -0.63
RIO1 13448M002   E    0.98     -0.05    1.43    1.18   -0.91   -0.31    0.12    1.15
RIO1 13448M002   U    3.80     -6.22   -1.96    0.21   -2.04   -5.16   -1.86   -3.16
SALA 13469M001   N    0.56      1.24   -0.33   -0.01   -0.25   -0.14    0.32   -0.18
SALA 13469M001   E    0.56     -0.56   -0.56    0.32   -0.49    0.06   -0.09    0.96
SALA 13469M001   U    1.59     -0.17    1.85   -0.55   -2.40    0.68    2.16   -0.72
SOPU 19386M001   N    0.91      0.68    0.22    0.70   -1.35   -0.69    0.50   -1.19
SOPU 19386M001   E    0.97     -0.89    1.47   -0.03   -0.83    1.24    0.30    0.56
SOPU 19386M001   U    2.92     -2.09   -5.08   -1.23   -1.96   -3.55   -1.19    1.31
TERU 13487M001   N    0.38     -0.36    0.05   -0.04    0.52   -0.25    0.42    0.47
TERU 13487M001   E    0.40     -0.17   -0.62    0.06   -0.18   -0.34   -0.65    0.03
TERU 13487M001   U    3.61      5.82   -1.35    1.44    1.68    5.91   -1.24    1.16
VITO 19385M001   N    1.11      0.85    0.26   -1.76   -0.69    1.45   -0.36   -0.86
VITO 19385M001   E    1.25     -0.72    0.26    1.87    0.61   -1.27    0.69    1.71
VITO 19385M001   U    3.67     -3.04   -3.25    0.83   -4.13   -5.48   -0.27   -3.60
YEBE 13420M001   N    0.56      0.16   -0.13    0.57    0.09   -0.36   -0.98    0.64
YEBE 13420M001   E    0.80     -1.01    0.56   -0.59    0.09    0.53    1.11   -0.80
YEBE 13420M001   U    2.03     -2.46    4.03   -0.87    0.45   -0.36   -0.35    1.07
ZARA 13462M001   N    0.55     -0.11   -0.65   -0.43    0.08   -0.22    0.57    0.90
ZARA 13462M001   E    0.48     -0.19    0.66   -0.75   -0.20   -0.26   -0.14   -0.46
ZARA 13462M001   U    2.86      3.16    2.01   -1.30    0.89    5.24    2.10    0.85
```

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	-0.36	0.59	2.10
2	ALAC 13433M001	I W	0.65	2.00	3.71
3	ALBA 13452M001	I W	-0.58	1.32	-1.77
4	ALME 13437M001	I W	-0.27	0.58	2.63
6	BRST 10004M004	I W	0.78	-0.00	3.71
7	CACE 13447M001	I W	1.16	-0.04	-2.35
8	CANT 13438M001	I W	-0.80	-0.56	-3.28
9	CEU1 13449M002	I W	0.63	3.13	8.34
10	COBA 13453M001	I W	1.19	-0.60	-2.63
12	EBRE 13410M001	I W	2.00	-0.46	2.64
14	FUNC 13911S001	I W	-0.23	-2.30	5.52
16	HUEL 13451M001	I W	-0.40	0.16	-1.31
17	IZAN 31309M002	I W	-3.77	-0.40	2.61
18	LLIV 13436M001	I W	4.79	-1.37	-3.94
19	LPAL 81701M001	I W	-3.92	-1.15	0.91
20	LROC 10023M001	I W	1.77	-1.51	-0.62
21	MALA 13443M001	I W	-3.91	1.31	-1.27
22	MALL 13444M001	I W	0.64	0.12	0.11
24	MELI 19379M001	I W	-1.55	-0.44	-3.58
25	PDEL 31906M004	I W	-3.04	-3.03	1.98
26	RABT 35001M002	I W	0.34	0.69	-1.69
27	RIO1 13448M002	I W	-0.50	1.28	-3.02
28	SALA 13469M001	I W	-0.10	-0.11	0.54
29	SCOA 10088M002	I W	-0.33	-0.10	-5.62
30	SONS 13446M001	I W	-0.83	-1.40	-2.94
31	TERU 13487M001	I W	3.81	0.97	0.53
32	VALE 13439M001	I W	-0.37	1.71	-0.45
33	VIGO 13450M001	I W	-0.30	0.30	3.15
34	VILL 13406M001	I W	0.89	0.02	-0.64
35	YEBE 13420M001	I W	1.15	0.02	-0.57
36	ZARA 13462M001	I W	0.43	-0.80	-2.14
37	ZIMM 14001M004	I W	1.05	0.06	-0.66
	RMS / COMPONENT		1.90	1.24	3.03
	MEAN		-0.00	-0.00	-0.00
	MIN		-3.92	-3.03	-5.62
	MAX		4.79	3.13	8.34

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 96
RMS OF TRANSFORMATION : 2.19 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                        8917410
 NUMBER OF UNKNOWNS                             135048
 NUMBER OF DEGREES OF FREEDOM                  8782362
 PHASE MEASUREMENTS SIGMA                      0.00100
 SAMPLING INTERVAL (SECONDS)                       180
 VARIANCE FACTOR                    2.162054844530400
```

Helmert Transformation Parameters With Respect to Combined Solution:

		Translation (m)			Rotation (")			
Sol	Rms (m)	X	Y	Z	X	Y	Z	Scale (ppm)
1	0.00278	-0.0144	-0.0324	0.0167	0.0006	-0.0007	-0.0009	-0.00004
2	0.00198	0.0084	0.0107	-0.0135	-0.0001	0.0005	0.0004	0.00047
3	0.00191	-0.0105	0.0009	0.0079	-0.0000	-0.0004	0.0000	0.00063
4	0.00186	-0.0237	-0.0134	0.0208	0.0002	-0.0010	-0.0004	0.00087
5	0.00276	-0.0172	-0.0352	0.0270	0.0005	-0.0010	-0.0011	-0.00071
6	0.00177	0.0047	-0.0077	-0.0011	0.0002	0.0001	-0.0002	-0.00066
7	0.00185	-0.0074	-0.0227	0.0104	0.0004	-0.0004	-0.0006	-0.00049

Statistics of individual solutions:

File	RMS (m)	DOF	Chi**2/DOF	#Observations authentic	/ pseudo	#Parameters explicit	/ implicit	/ singular
1	0.00152	1209770	2.31	1229687	3	588	19332	0
2	0.00151	1252410	2.27	1272417	3	588	19422	0
3	0.00145	1291168	2.11	1310944	3	591	19188	0
4	0.00147	1275107	2.17	1295549	3	591	19854	0
5	0.00142	1248321	2.02	1267570	3	582	18670	0
6	0.00147	1253431	2.16	1272913	3	585	18900	0
7	0.00143	1248660	2.05	1268330	3	582	19091	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 16:269:00000 16:275:86370 LEICA GRX1200PRO     ----- -----------
 ALDA  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 ALSA  A    1 P 16:269:00000 16:275:86370 LEICA GRX1200GGPRO   ----- -----------
 BIAZ  A    1 P 16:269:00000 16:274:57570 LEICA GRX1200GGPRO   ----- -----------
 BRZR  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 CACE  A    1 P 16:269:00000 16:275:86370 TRIMBLE NETR9        ----- -----------
 CANT  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 CHER  A    1 P 16:269:00000 16:275:86370 LEICA GRX1200+GNSS   ----- -----------
 CREU  A    1 P 16:269:00000 16:275:86370 LEICA GR25           ----- -----------
 EBRE  A    1 P 16:269:00000 16:275:86370 TRIMBLE NETR9        ----- -----------
 ELGE  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 GERN  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 IGEL  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 ISPS  A    1 P 16:269:00000 16:275:86370 TRIMBLE NETR9        ----- -----------
 LAZK  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 LEIT  A    1 P 16:269:00000 16:275:86370 LEICA GRX1200+GNSS   ----- -----------
 ORON  A    1 P 16:269:00000 16:275:86370 LEICA GRX1200GGPRO   ----- -----------
 PAS2  A    1 P 16:269:00000 16:275:86370 TPS NET-G3A          ----- -----------
 PASA  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 RIO1  A    1 P 16:269:00000 16:275:86370 LEICA GR25           ----- -----------
 SALA  A    1 P 16:269:00000 16:275:86370 LEICA GRX1200+GNSS   ----- -----------
 SOPU  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 TERU  A    1 P 16:269:00000 16:275:86370 LEICA GRX1200GGPRO   ----- -----------
 VITO  A    1 P 16:269:00000 16:275:86370 LEICA GR10           ----- -----------
 YEBE  A    1 P 16:269:00000 16:275:86370 TRIMBLE NETRS        ----- -----------
 ZARA  A    1 P 16:269:00000 16:275:86370 TRIMBLE NETR9        ----- -----------
```

6.2 Antennas

Serial number ONLY provided in case individual calibrations are vailable.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_________ S/N__
 ACOR  A    1 P 16:269:00000 16:275:86370 LEIAT504        LEIS -----
 ALDA  A    1 P 16:269:00000 16:275:86370 LEIAS10         NONE -----
 ALSA  A    1 P 16:269:00000 16:275:86370 LEIAX1202GG     NONE -----
 BIAZ  A    1 P 16:269:00000 16:274:57570 LEIAR25         LEIT -----
 BRZR  A    1 P 16:269:00000 16:275:86370 LEIAS10         NONE -----
 CACE  A    1 P 16:269:00000 16:275:86370 TRM29659.00     NONE -----
 CANT  A    1 P 16:269:00000 16:275:86370 LEIAR25.R4      LEIT 25066
 CHER  A    1 P 16:269:00000 16:275:86370 LEIAX1203+GNSS  NONE -----
 CREU  A    1 P 16:269:00000 16:275:86370 LEIAR25.R4      NONE 26357
 EBRE  A    1 P 16:269:00000 16:275:86370 TRM57971.00     NONE 25503
```

```
 ELGE  A    1 P 16:269:00000 16:275:86370 LEIAR25.R4      LEIT -----
 GERN  A    1 P 16:269:00000 16:275:86370 LEIAS10         NONE -----
 IGEL  A    1 P 16:269:00000 16:275:86370 LEIAR20         LEIM -----
 ISPS  A    1 P 16:269:00000 16:275:86370 TRM59900.00     SCIS -----
 LAZK  A    1 P 16:269:00000 16:275:86370 LEIAR25.R4      LEIT -----
 LEIT  A    1 P 16:269:00000 16:275:86370 LEIAX1203+GNSS  NONE -----
 ORON  A    1 P 16:269:00000 16:275:86370 LEIAX1202GG     NONE -----
 PAS2  A    1 P 16:269:00000 16:275:86370 LEIAR20         LEIM 73034
 PASA  A    1 P 16:269:00000 16:275:86370 LEIAR20         LEIM 73034
 RIO1  A    1 P 16:269:00000 16:275:86370 LEIAR25.R4      LEIT 25138
 SALA  A    1 P 16:269:00000 16:275:86370 LEIAR25         NONE -----
 SOPU  A    1 P 16:269:00000 16:275:86370 LEIAS10         NONE -----
 TERU  A    1 P 16:269:00000 16:275:86370 LEIAT504GG      LEIS -----
 VITO  A    1 P 16:269:00000 16:275:86370 LEIAS10         NONE -----
 YEBE  A    1 P 16:269:00000 16:275:86370 TRM29659.00     NONE -----
 ZARA  A    1 P 16:269:00000 16:275:86370 TRM29659.00     NONE -----
```

6.3 Eccentrities

```
*                                          UP______ NORTH___ EAST____
*SITE PT SOLN T DATA_START__ DATA_END____ AXE ARP->BENCHMARK(M)_________
 ACOR  A    1 P 16:269:00000 16:275:86370 UNE   3.0460   0.0000   0.0000
 ALDA  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 ALSA  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 BIAZ  A    1 P 16:269:00000 16:274:57570 UNE   0.0000   0.0000   0.0000
 BRZR  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 CACE  A    1 P 16:269:00000 16:275:86370 UNE   0.0600   0.0000   0.0000
 CANT  A    1 P 16:269:00000 16:275:86370 UNE   3.0490   0.0000   0.0000
 CHER  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 CREU  A    1 P 16:269:00000 16:275:86370 UNE   0.0770   0.0000   0.0000
 EBRE  A    1 P 16:269:00000 16:275:86370 UNE   0.0770   0.0000   0.0000
 ELGE  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 GERN  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 IGEL  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 ISPS  A    1 P 16:269:00000 16:275:86370 UNE   0.0350   0.0000   0.0000
 LAZK  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 LEIT  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 ORON  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 PAS2  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 PASA  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 RIO1  A    1 P 16:269:00000 16:275:86370 UNE   0.0606   0.0000   0.0000
 SALA  A    1 P 16:269:00000 16:275:86370 UNE   0.0600   0.0000   0.0000
 SOPU  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 TERU  A    1 P 16:269:00000 16:275:86370 UNE   0.0600   0.0000   0.0000
 VITO  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 YEBE  A    1 P 16:269:00000 16:275:86370 UNE   0.0000   0.0000   0.0000
 ZARA  A    1 P 16:269:00000 16:275:86370 UNE   3.2590   0.0000   0.0000
```

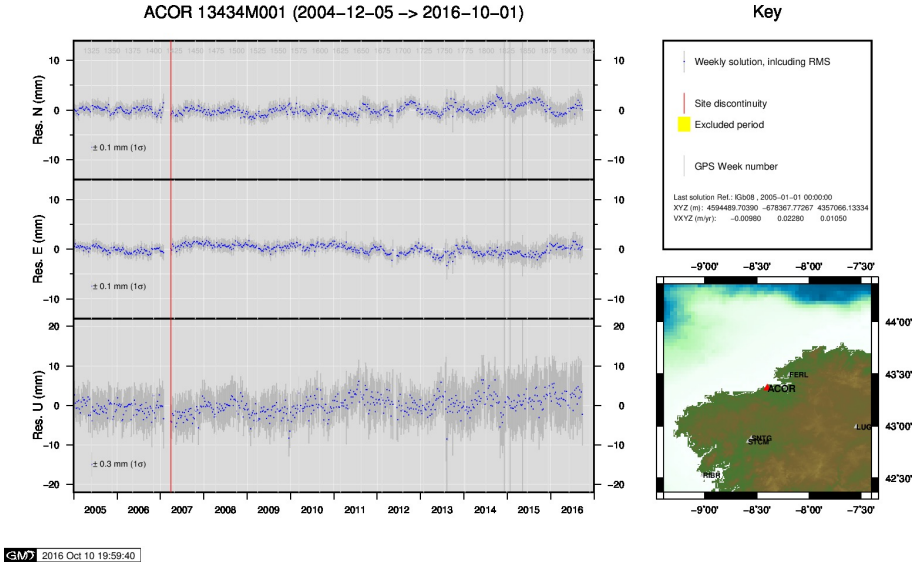
7 Inconsistencies (logsheet-RINEX metadata)

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

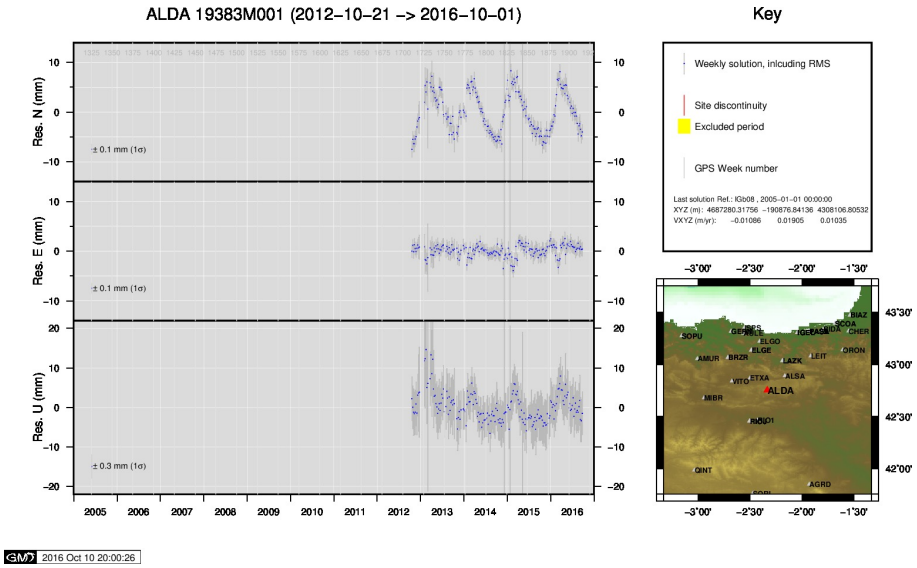
```
2016-10-10 09:50 UTC | ISPS2690.16O | RECEIVER FIRM. VERS. |  5.14 -> NP 5.10 / SP 5.10
2016-10-10 11:06 UTC | ISPS2700.16O | RECEIVER FIRM. VERS. |  5.14 -> NP 5.10 / SP 5.10
2016-10-10 12:35 UTC | ISPS2710.16O | RECEIVER FIRM. VERS. |  5.14 -> NP 5.10 / SP 5.10
2016-10-10 15:05 UTC | ISPS2730.16O | RECEIVER FIRM. VERS. |  5.14 -> NP 5.10 / SP 5.10
2016-10-10 16:41 UTC | ISPS2740.16O | RECEIVER FIRM. VERS. |  5.14 -> NP 5.10 / SP 5.10
2016-10-10 17:59 UTC | ISPS2750.16O | RECEIVER FIRM. VERS. |  5.14 -> NP 5.10 / SP 5.10
```

8 Cumulative Time Series

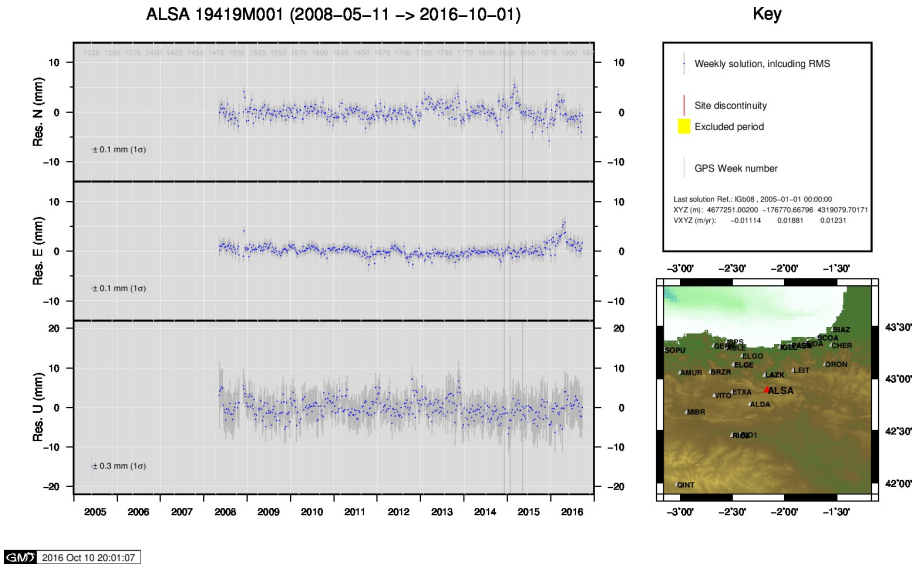
Time series of stations. Latest plots at: http://geolabpasaia.org/gnss/ARA-net/TSeries/, or click on the caption of each image.



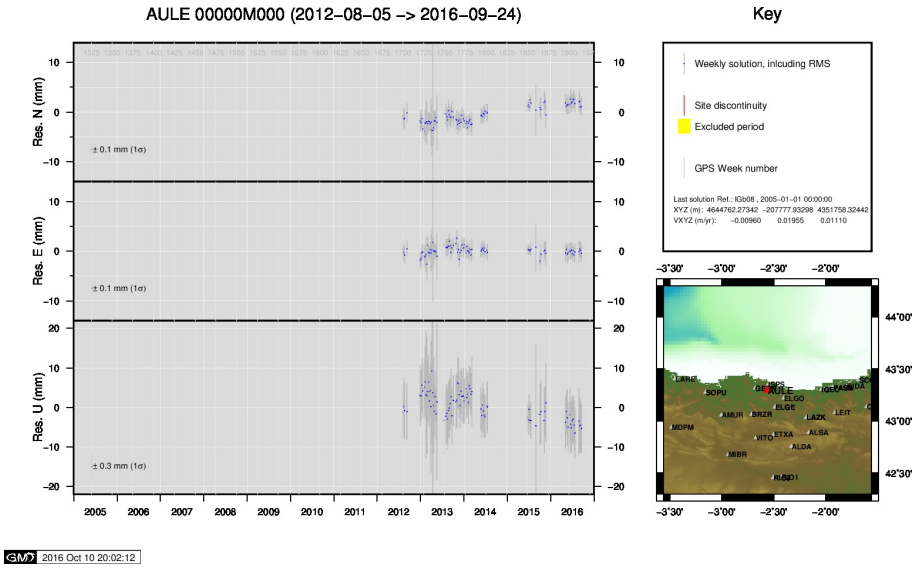
1) ACOR



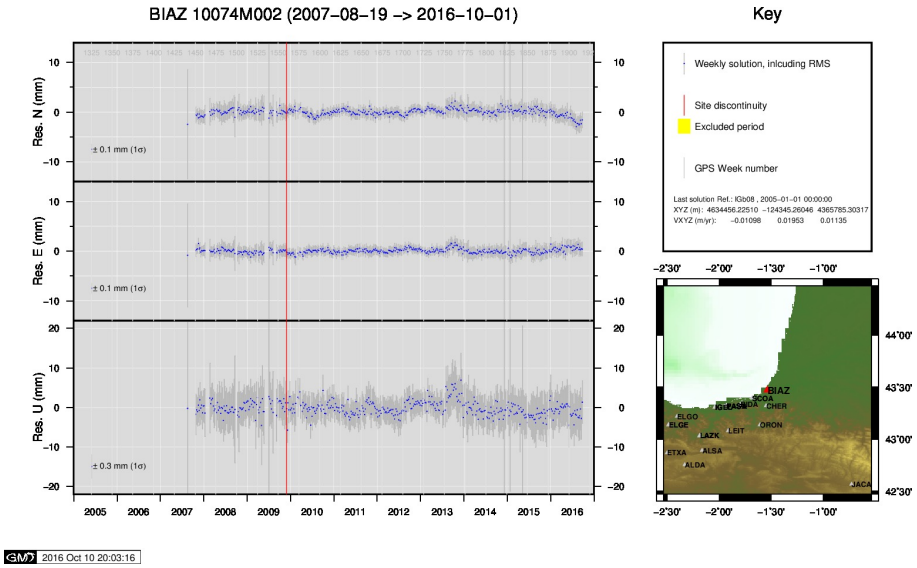
2) ALDA



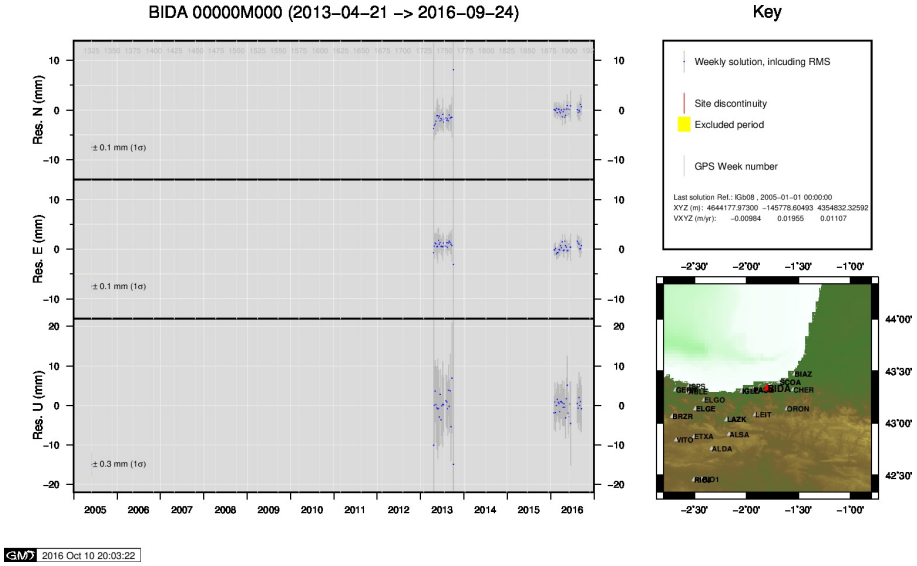
3) ALSA



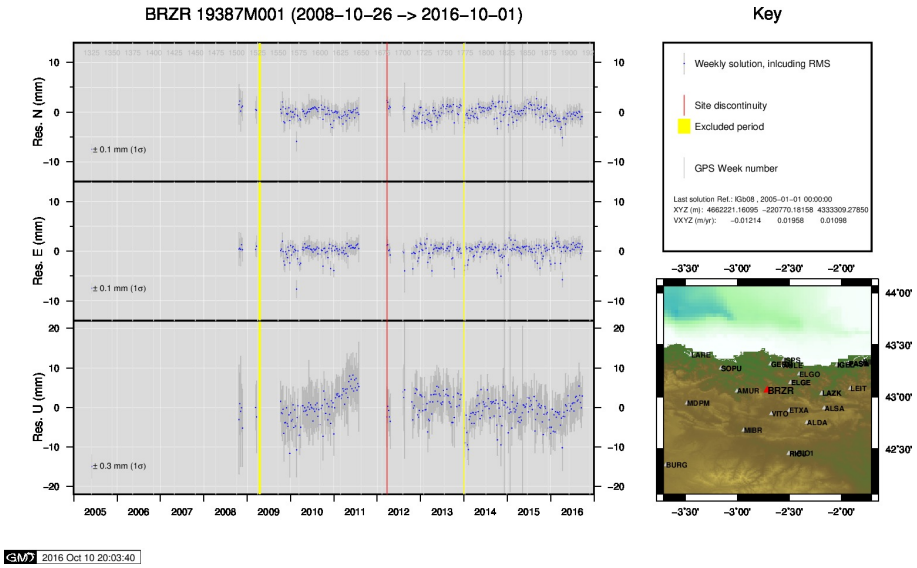
4) AULE



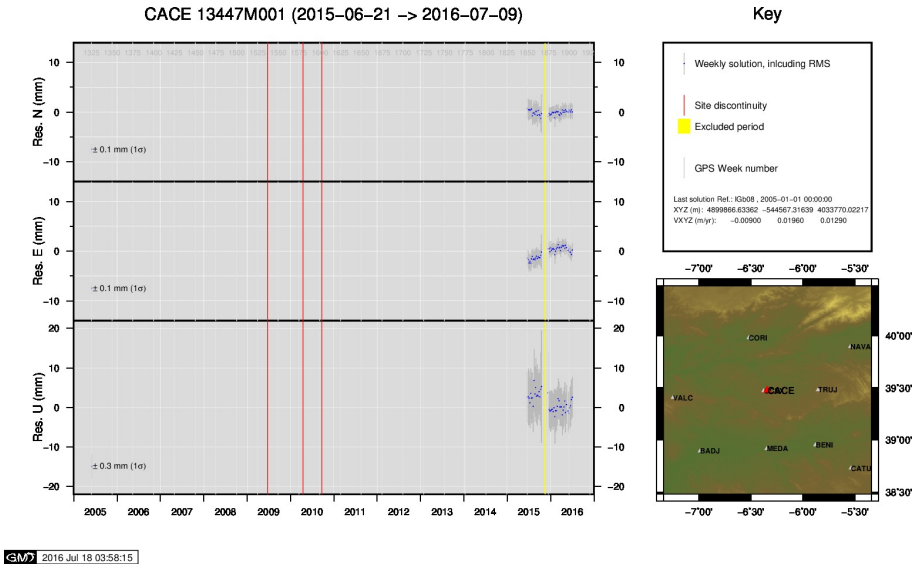
5) BIAZ



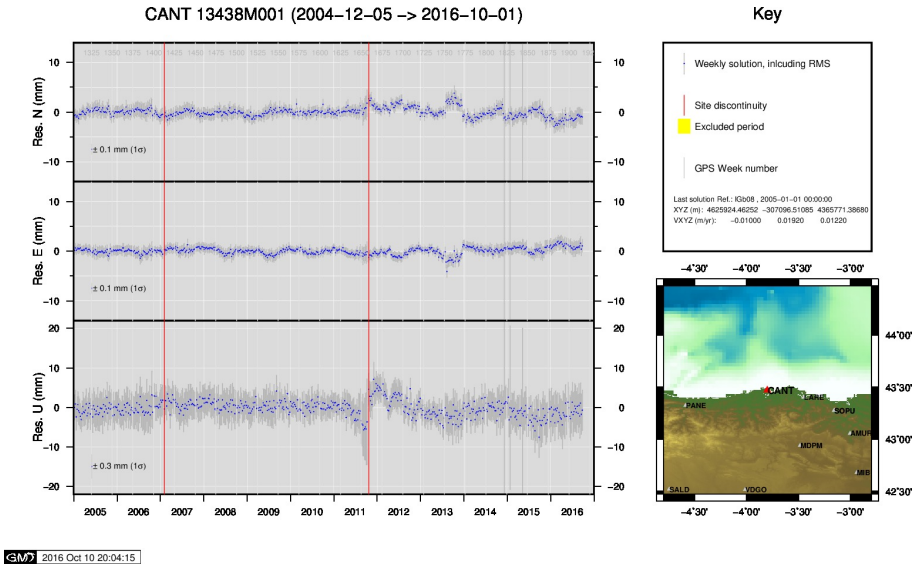
6) BIDA



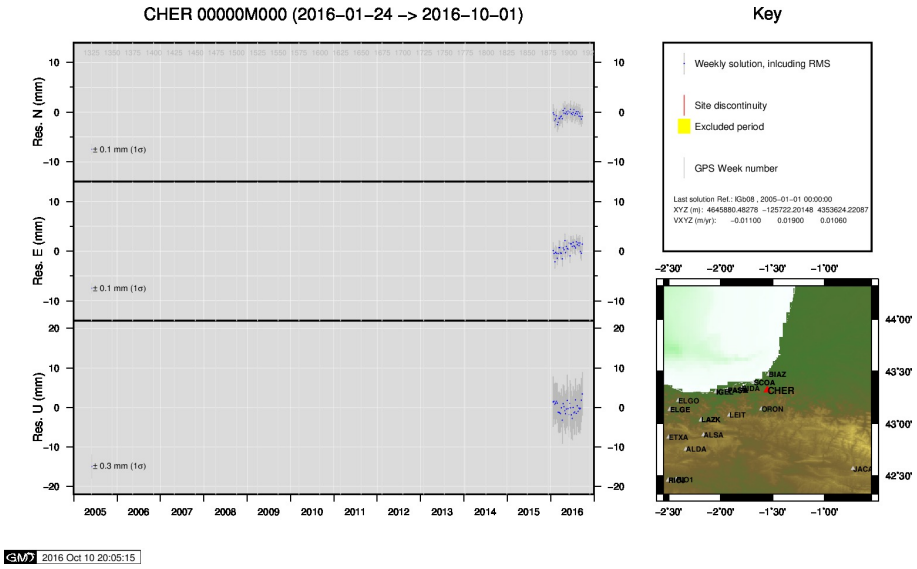
7) BRZR



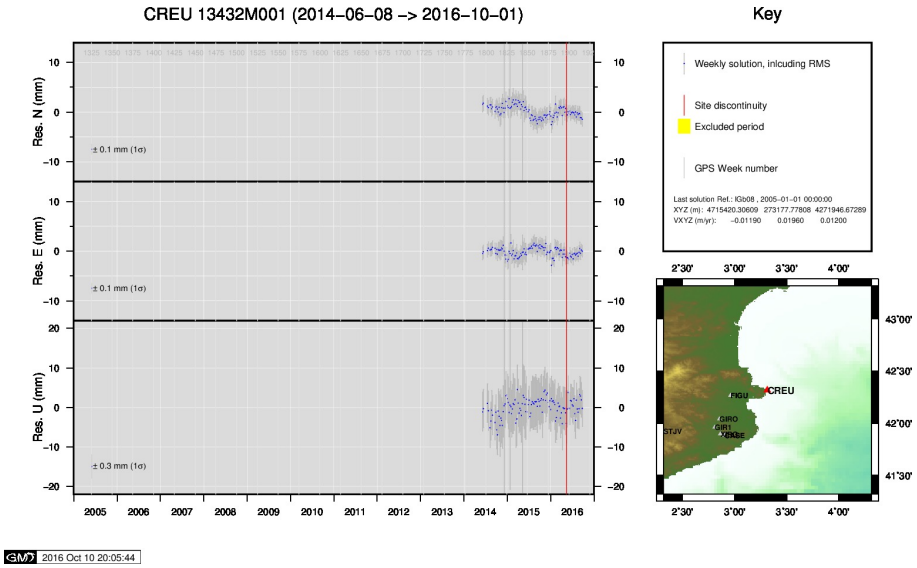
8) CACE



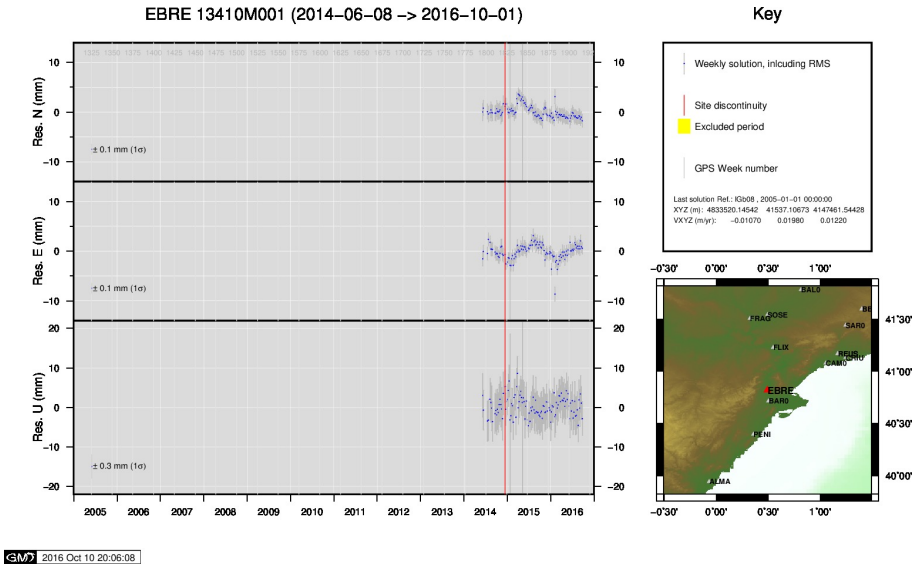
9) CANT



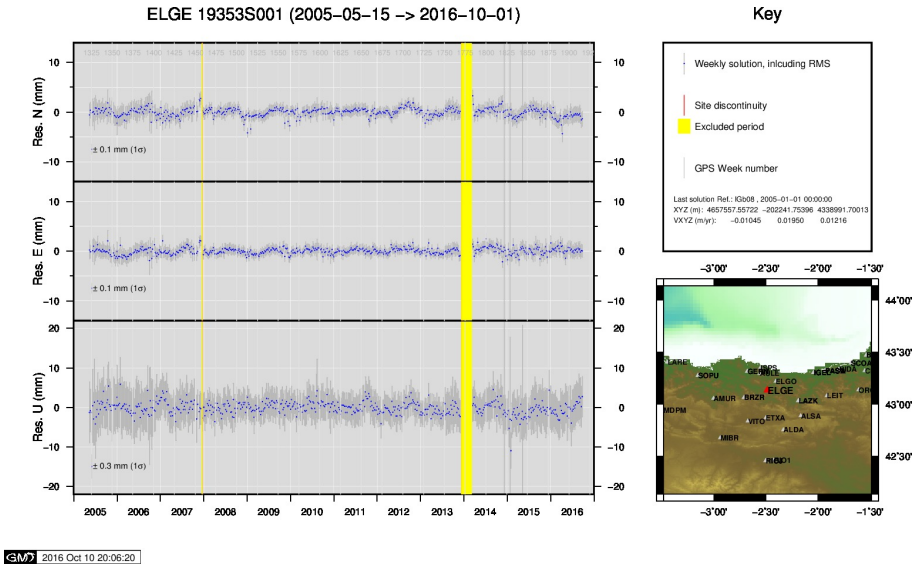
10) CHER



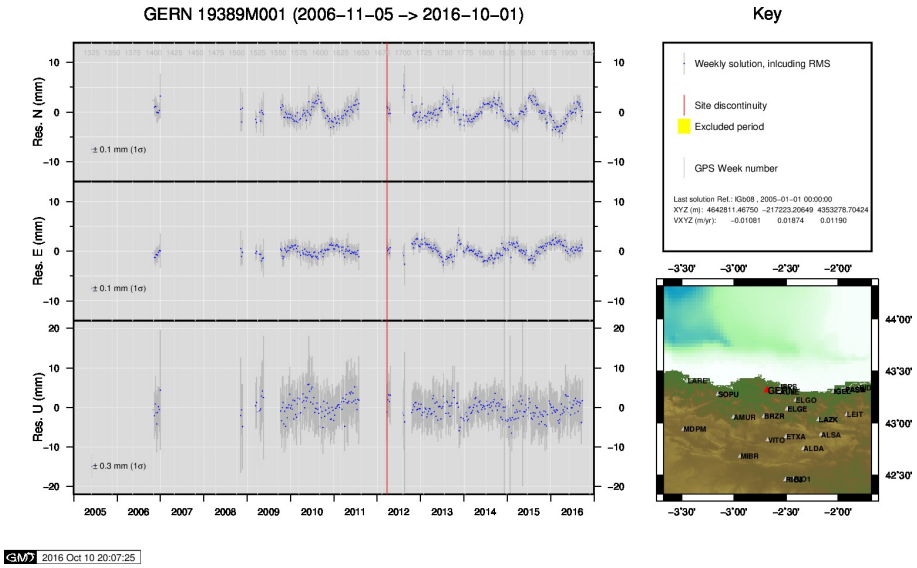
11) CREU



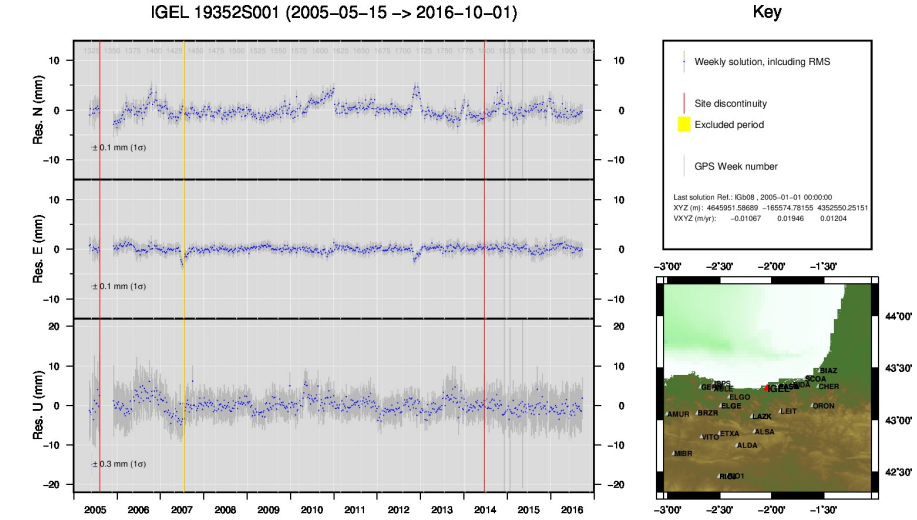
12) EBRE



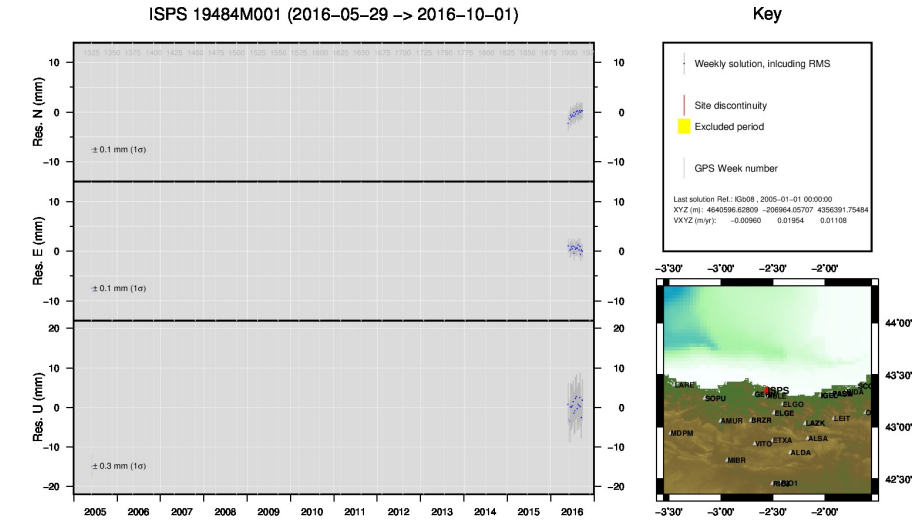
13) ELGE



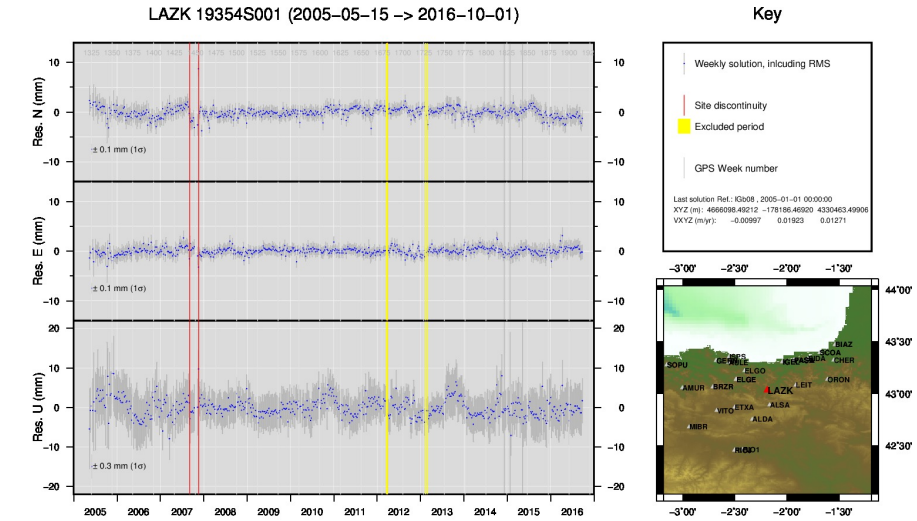
14) GERN



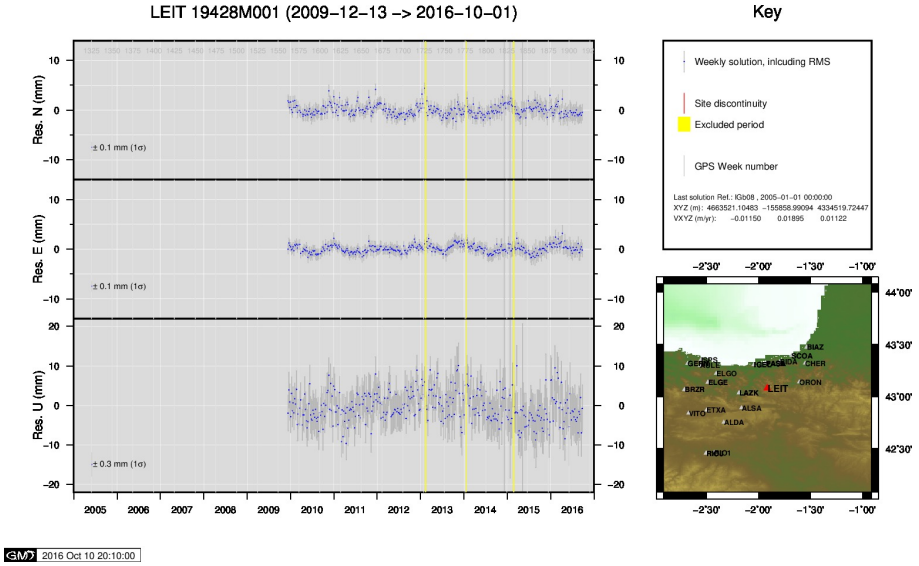
15) IGEL



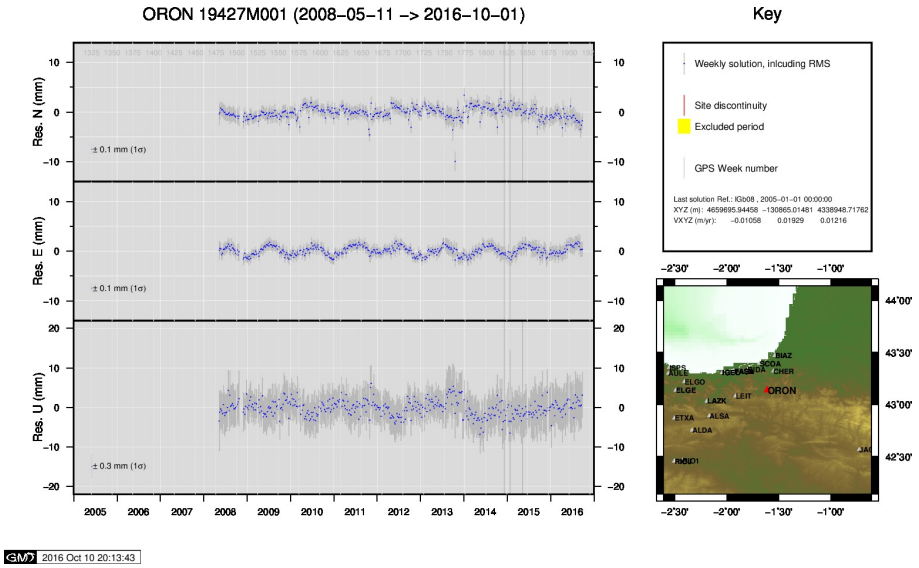
16) ISPS



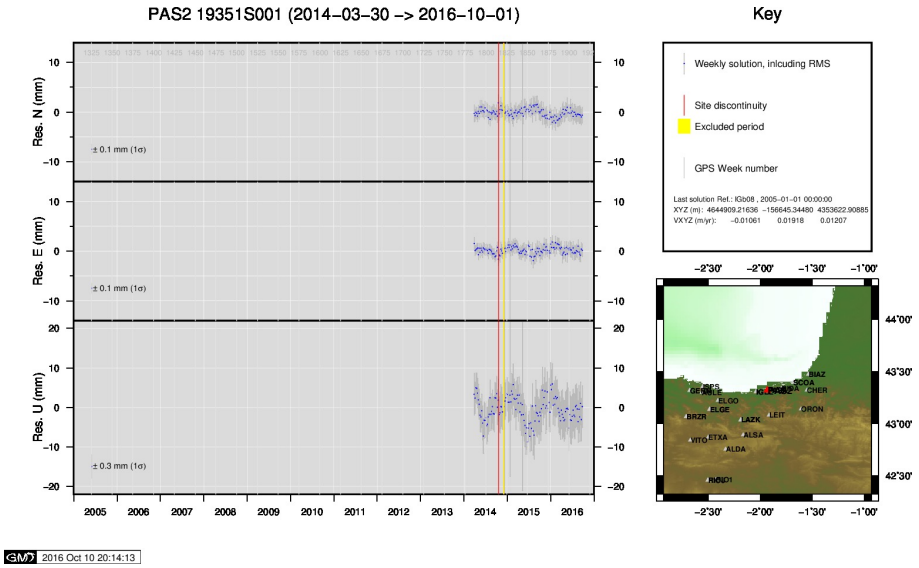
17) LAZK



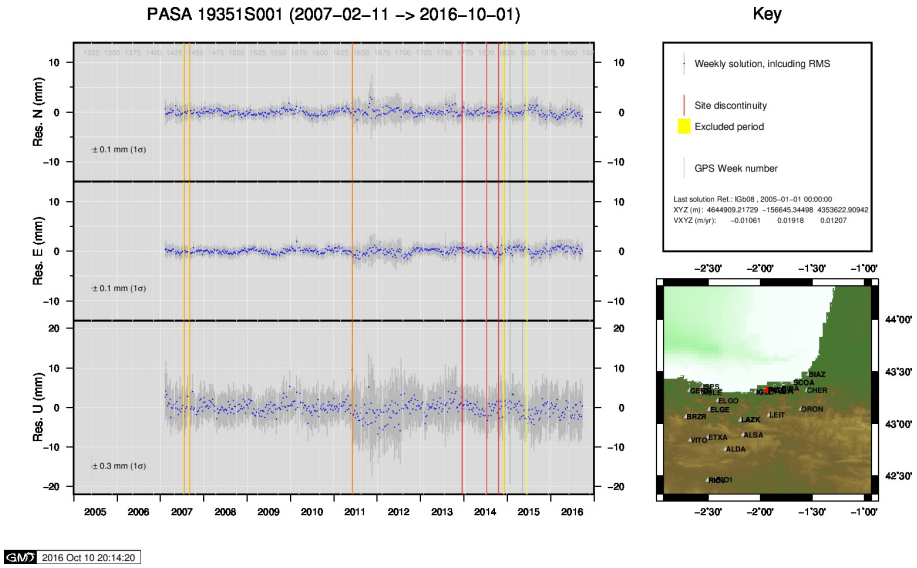
18) LEIT



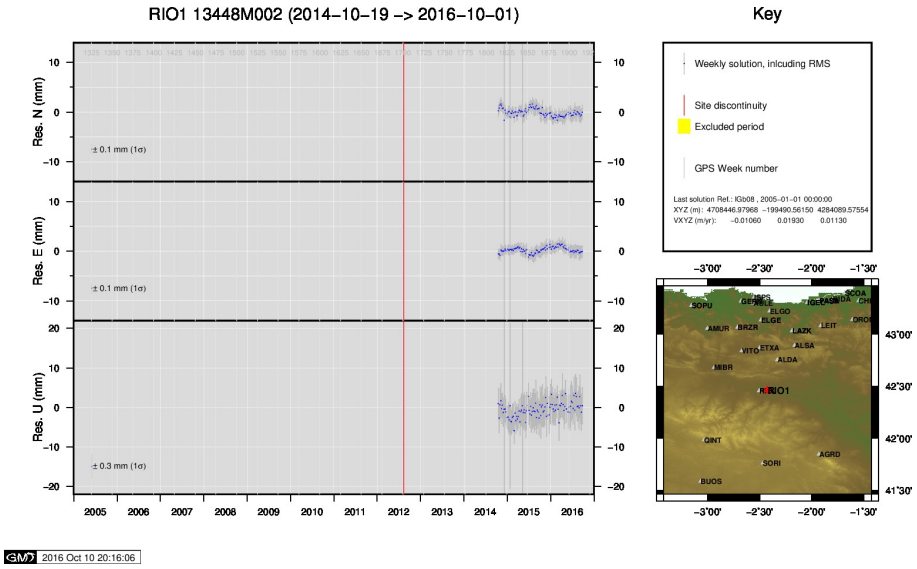
19) ORON



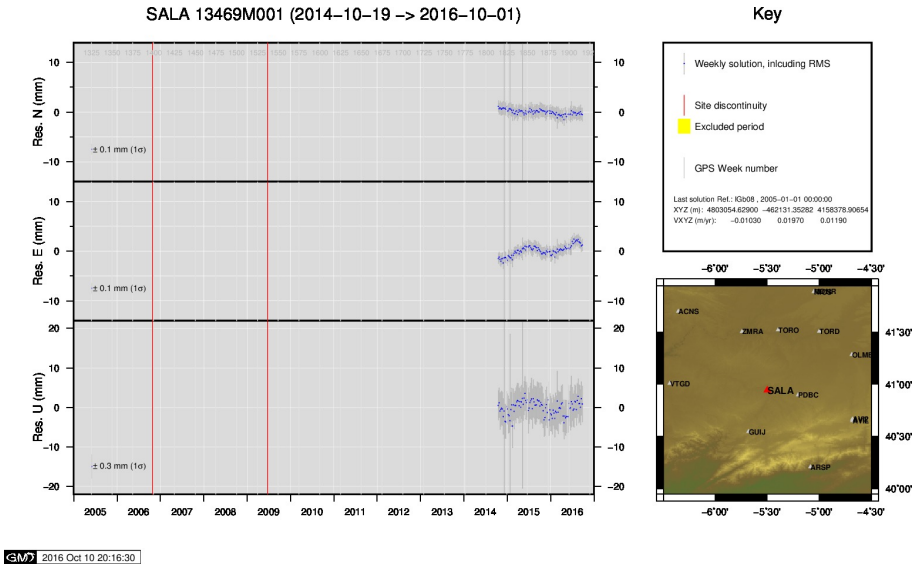
20) PAS2



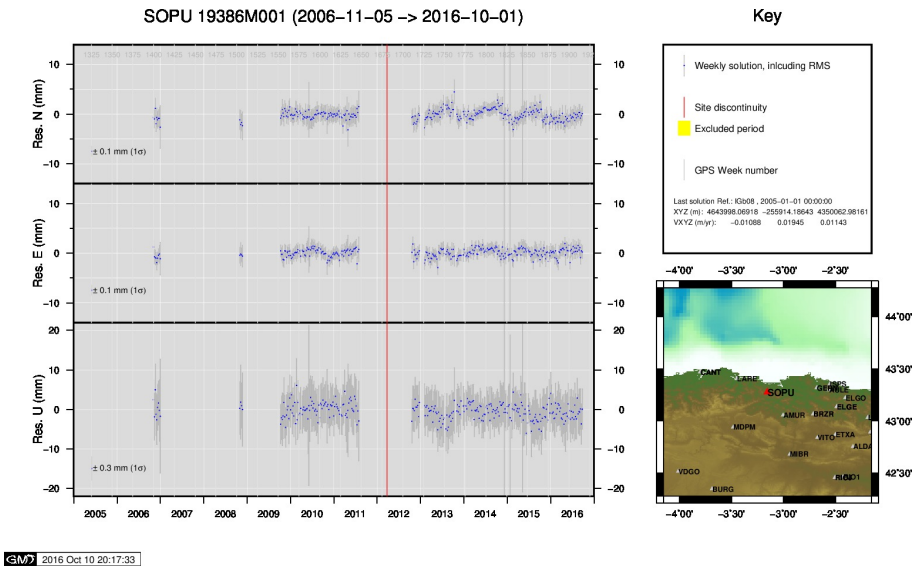
21) PASA



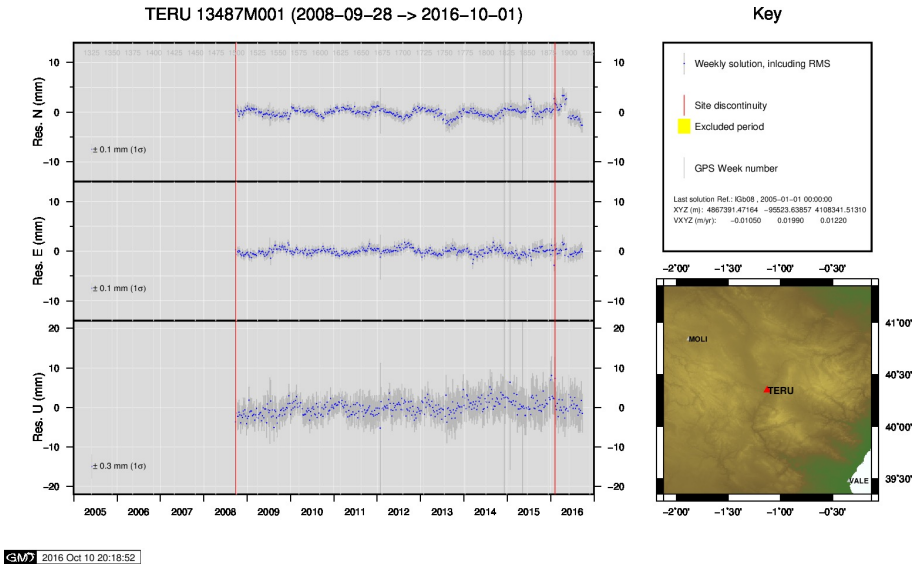
22) RIO1



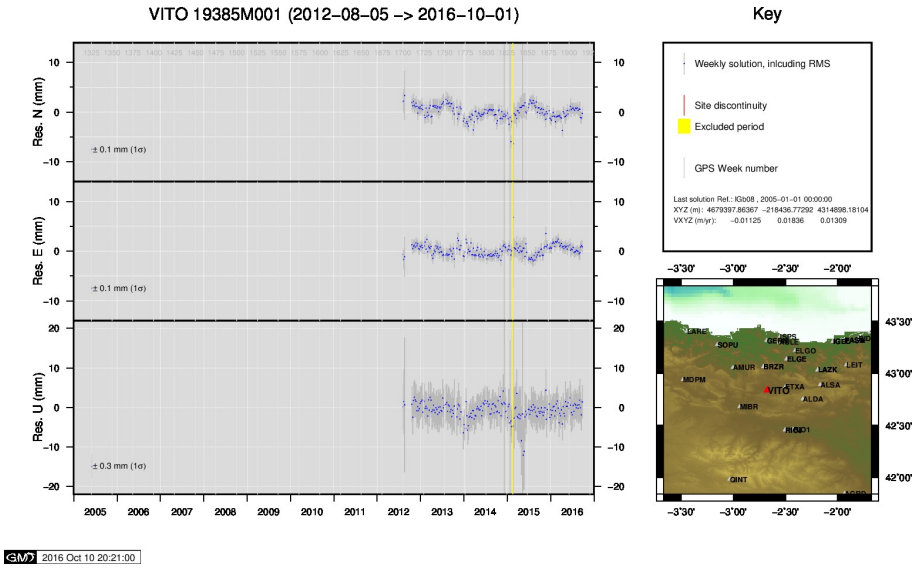
23) SALA



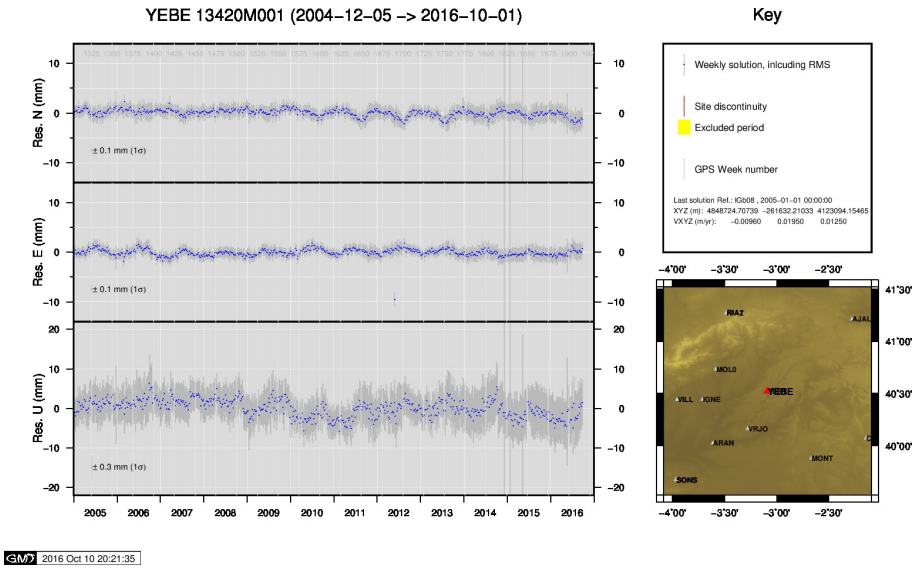
24) SOPU



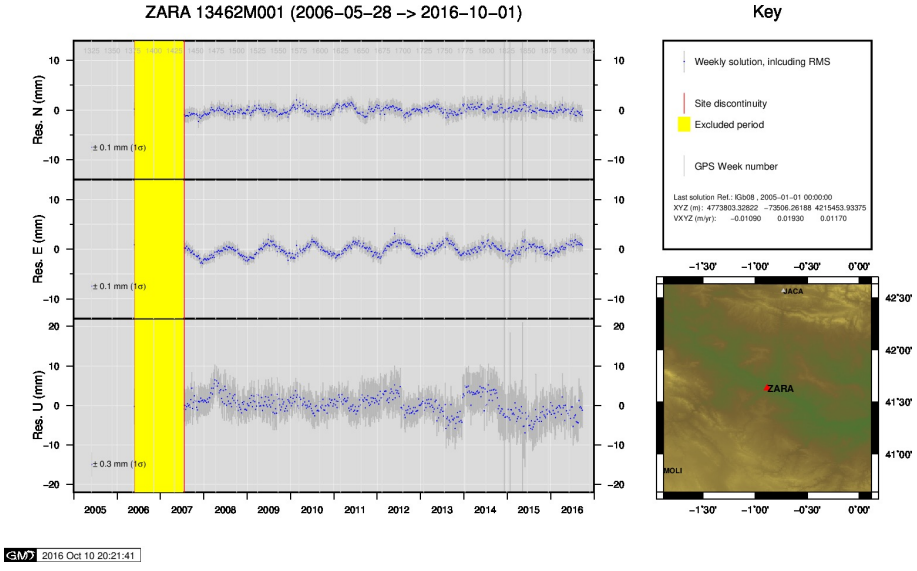
25) TERU



26) VITO



27) YEBE



28) ZARA