

# ARA-DAC Weekly Analysis Result: 1992 (GFA)

## Technical Report

**GPS Week: 1992 (GFA)**

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

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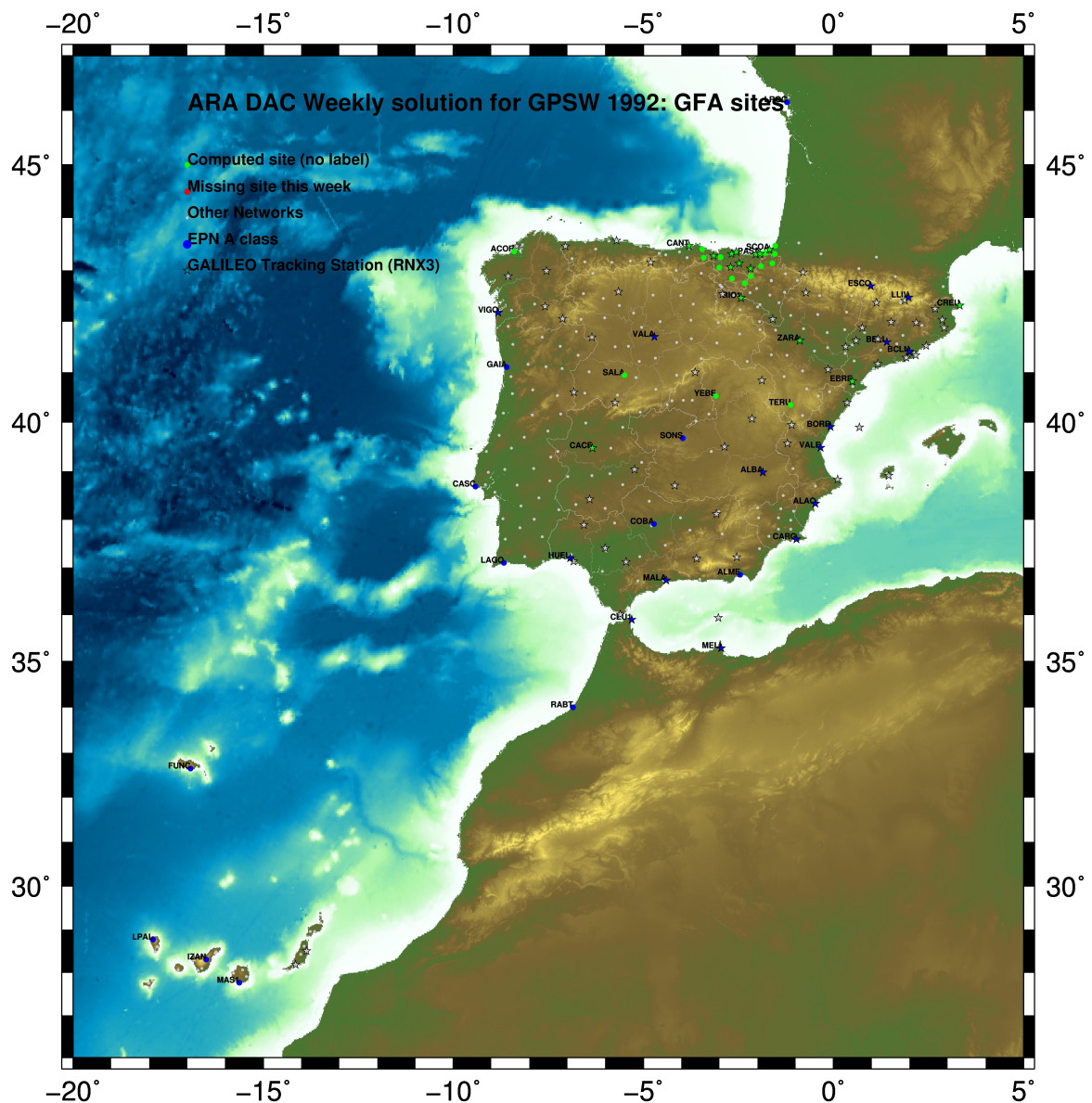
Report generated on 2018/04/02 at 00:18:45



# 1 Introduction

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

# 2 Map of Computed Sites



GM 2018 Apr 02 00:18:31

Fig.1: Computed Sites for GPS Week1992 (GFA)

### 3 Main Computation Parameters

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

- Preprocessing: Independent baselines are defined by the criterion of maximum common observations. Cycle slips are fixed with the MAUPRP program, analysing triple phase differences for each independent baseline. If MAUPRP does not fix all slips for one station, that station is edited out.
- Basic Observable : Carrier phase,  $L_1$  and  $L_2$ ; a priori sigma of single differences:0.002 m.
  - sampling (for ambiguity resolution) : 30 s
  - sampling (for final processing) : 180 s
  - Systems: GPS+GLONASS observations are used (GALILEO also used if available from GPSW 1986 on)
- Modelled observable: Double differences of carrier phase using different combinations based on the distance.
- Ground antenna phase center calibrations: Group APCV used from the PCV\_COD.I14 file and individual calibrations from EPNC\_14.ATX. EPN\_A class sites (CRD + VEL) IGS14 used to define the reference frame (from GPSW 1934). If individual calibrations, other from these, are available, they are also included in the analysis.
- Troposphere:
  - 3 deg elev. cutoff; elevation dependent weighting
  - VMF1 mapping function. ZPD parameters are estimated using the VMF1 mapping function.
  - CHENHER gradient estimation model.
- Ionosphere: no a priori model, ionospheric effect almost removed by iono free combination.
- Ocean Loading: FES2004 (Scherneck).
- Atmosph. Loading: computed from a global grid using the GRDS1S2 program of Bernese 5.2.

### 4 Estimated Parameters

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

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

## 5 Computed Coordinates

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

### 5.1 IGS14

The Reference Frame considered in this section is IGS14, release C1980.

```
ARA LAC 1992 WEEK FINAL COMBINATION: PRECISE ORBITS 01-APR-18 18:34
-----
LOCAL GEODETIC DATUM: IGS14 EPOCH: 2018-03-14 12:00:00
NUM STATION NAME X (M) Y (M) Z (M) FLAG
1 ACRD 13434M001 4594489.57145 -678367.47570 4357066.26983 W
33 ALDA 19383M001 4687280.17133 -190876.58974 4308106.94970 A
42 ALSA 19419M001 4677250.84336 -176770.41809 4319079.85820 A
44 AMUR 19388M001 4661499.46043 -244591.28464 4332269.86829 A
77 BIAZ 10074M002 4634456.06700 -124345.00185 4365785.44893 A
78 BIDA 00000M000 4644177.83741 -145778.34872 4354832.46882 A
88 BRZR 19387M001 4662221.00041 -220769.92757 4333309.42108 A
9 CACE 13447M001 4899866.51058 -544567.05983 4033770.18602 W
10 CANT 13438M001 4625924.32506 -307096.25760 4365771.54320 W
112 CHER 00000M000 4645880.33375 -125721.95279 4353624.36044 A
15 CREU 13432M001 4715420.14207 273178.03439 4271946.82435 W
16 EBRE 13410M001 4833520.00262 41537.36506 4147461.70081 W
131 ELGE 19353S001 4657557.41904 -202241.49876 4338991.85860 A
133 EMAZ 17001M001 4645924.21908 -276949.88944 4347759.56482 A
153 GERN 19389M001 4642811.32359 -217222.95743 4353278.86919 A
173 IGEL 19352S001 4645951.44064 -165574.52853 4352550.40665 A
178 ISPS 19484M001 4640596.49211 -206963.80066 4356391.90124 A
182 KAST 19499M001 4646949.08817 -240747.30189 4348014.57298 A
185 LARE 19440M001 4632831.96512 -279026.16067 4360314.41703 A
186 LAZK 19354S001 4666098.35847 -178186.21352 4330463.66454 A
190 LEIT 19428M001 4663520.95307 -155858.74157 4334519.87198 A
242 ORDN 19427M001 4659695.80263 -130864.76188 4338948.87396 A
249 PAS2 19351S001 4644909.07138 -156645.09289 4353623.06575 A
31 PASA 19351S001 4644909.07252 -156645.09278 4353623.06559 W
34 RID1 13448M002 4708446.83916 -199490.30769 4284089.72445 W
35 SALA 13469M001 4803054.49192 -462131.09520 4158379.06153 W
36 SCDA 10088M002 4639940.51091 -136224.96554 4359552.40316 W
298 SOPU 19386M001 4643997.92581 -255913.93119 4350063.13409 A
40 TERU 13487M001 4867391.33533 -95523.37697 4108341.66910 W
349 VITO 19385M001 4679397.71058 -218436.53032 4314898.34663 A
44 YEBE 13420M001 4848724.57785 -261631.95569 4123094.31628 W
45 ZARA 13462M001 4773803.18094 -73506.00898 4215454.08368 W
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### 5.2 ETRF2000 (ETRS89) Coordinates

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

```
ETRF2000 FINAL COORD. wk 1992 01-APR-18 18:34
-----
LOCAL GEODETIC DATUM: ETRF2000 EPOCH: 2018-03-14 12:00:00
NUM STATION NAME X (M) Y (M) Z (M) FLAG
1 ACRD 13434M001 4594489.86790 -678367.98991 4357065.86842 W
33 ALDA 19383M001 4687280.51934 -190877.11219 4308106.54728 A
42 ALSA 19419M001 4677251.19368 -176770.93950 4319079.45668 A
44 AMUR 19388M001 4661499.80401 -244591.80466 4332269.46713 A
77 BIAZ 10074M002 4634456.42630 -124345.51882 4365785.05113 A
78 BIDA 00000M000 4644178.19358 -145778.86673 4354832.07006 A
88 BRZR 19387M001 4662221.34674 -220770.44760 4333309.02014 A
9 CACE 13447M001 4899866.80060 -544567.60413 4033769.76390 W
10 CANT 13438M001 4625924.66384 -307096.77422 4365771.14390 W
112 CHER 00000M000 4645880.69209 -125722.47091 4353623.96179 A
15 CREU 13432M001 4715420.53970 273177.51072 4271946.42518 W
16 EBRE 13410M001 4833520.36603 41536.82881 4147461.29039 W
131 ELGE 19353S001 4657557.76782 -202242.01827 4338991.45822 A
133 EMAZ 17001M001 4645924.56006 -276950.40799 4347759.16442 A
153 GERN 19389M001 4642811.67164 -217223.47550 4353278.46970 A
173 IGEL 19352S001 4645951.79444 -165575.04678 4352550.00754 A
178 ISPS 19484M001 4640596.84152 -206964.31849 4356391.50204 A
182 KAST 19499M001 4646949.43323 -240747.82044 4348014.57292 A
185 LARE 19440M001 4632832.30669 -279026.67791 4360314.01755 A
186 LAZK 19354S001 4666098.70939 -178186.73381 4330463.26381 A
190 LEIT 19428M001 4663521.30676 -155859.26155 4334519.47170 A
242 ORDN 19427M001 4659696.15942 -130865.28140 4338948.47425 A
249 PAS2 19351S001 4644909.42625 -156645.61100 4353622.66681 A
31 PASA 19351S001 4644909.42739 -156645.61089 4353622.66665 W
34 RID1 13448M002 4708447.18461 -199490.83227 4284089.32039 W
35 SALA 13469M001 4803054.79951 -462131.62981 4158378.64748 W
36 SCDA 10088M002 4639940.86846 -136225.48310 4359552.00482 W
298 SOPU 19386M001 4643998.26930 -255914.44948 4350062.73407 A
40 TERU 13487M001 4867391.68077 -95523.91702 4108341.25463 W
349 VITO 19385M001 4679398.05595 -218437.05206 4314897.94447 A
44 YEBE 13420M001 4848724.90562 -261632.49436 4123093.90125 W
45 ZARA 13462M001 4773803.53597 -73506.53969 4215453.67630 W
```

### 5.3 ETRF2014 (ETRS89) Coordinates

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

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ETRF2014 FINAL COORD. wk 1992                                01-APR-18 18:34
-----
LOCAL GEODETIC DATUM: ETRF2014          EPOCH: 2018-03-14 12:00:00
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
1  ACRD 13434M001        4594489.82504      -678368.02896   4357065.91629   W
33 ALDA 19383M001        4687280.47438      -190877.15253   4308106.59505   A
42 ALSA 19419M001        4677251.14877      -176770.97992   4319079.50447   A
44 AMUR 19388M001        4661499.75944      -244591.84491   4332269.51493   A
77 BIAZ 10074M002        4634456.38163      -124345.55958   4365785.09905   A
78 BIDA 00000M000        4644178.14888      -145778.90737   4354832.11795   A
88 BRZR 19387M001        4662221.30209      -220770.48793   4333309.06795   A
9  CACE 13447M001        4899866.75445      -544567.64249   4033769.81113   W
10 CANT 13438M001        4625924.61977      -307096.81440   4365771.19176   W
112 CHER 00000M000        4645880.64732      -125722.51161   4353624.00968   A
15 CREU 13432M001        4715420.49298      273177.46897   4271946.47317   W
16 EBRE 13410M001        4833520.31892      41536.78826   4147461.33796   W
131 ELGE 19353S001        4657557.72317      -202242.05868   4338991.50605   A
133 EMAZ 17001M001        4645924.51572      -276950.44820   4347759.21224   A
153 GERN 19389M001        4642811.62716      -217223.51592   4353278.51756   A
173 IGEL 19352S001        4645951.74978      -165575.08735   4352550.05541   A
178 ISPS 19484M001        4640596.79703      -206964.35894   4356391.54990   A
182 KAST 19499M001        4646949.38878      -240747.86076   4348014.62076   A
185 LARE 19440M001        4632832.26248      -279026.71815   4360314.06541   A
186 LAZK 19354S001        4666098.66458      -178186.77427   4330463.31163   A
190 LEIT 19428M001        4663521.26192      -155859.30209   4334519.51953   A
242 ORDN 19427M001        4659696.11454      -130865.32203   4338948.52210   A
249 PAS2 19351S001        4644909.38158      -156645.65161   4353622.71469   A
31 PASA 19351S001        4644909.38272      -156645.65150   4353622.71453   W
34 RIO1 13448M002        4708447.13946      -199490.87250   4284089.36810   W
35 SALA 13469M001        4803054.75414      -462131.66881   4158378.69491   W
36 SOA 10088M002        4639940.82378      -136225.52379   4359552.05272   W
298 SODU 19386M001        4643998.22492      -255914.48977   4350062.78191   A
40 TERU 13487M001        4867391.63375      -95523.95699   4108341.30206   W
349 VITO 19385M001        4679398.01113      -218437.09233   4314897.99224   A
44 YEBE 13420M001        4848724.85927      -261632.53385   4123093.94864   W
45 ZARA 13462M001        4773803.48981      -73506.58009   4215453.72394   W

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## 6 Quality Control

### 6.1 Mean and Daily Repeatabilities

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

ARA LAC 1992 WEEK FINAL COMBINATION: PRECISE ORBITS 01-APR-18 18:34

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	0.82	1.24	2.53
ALDA 19383M001	7	XXXXXX	1.22	0.94	3.12
ALSA 19419M001	7	XXXXXX	1.69	1.49	1.76
AMUR 19388M001	7	XXXXXX	4.80	4.49	4.55
BLAZ 10074M002	7	XXXXXX	0.64	0.69	3.55
BIDA 00000M000	7	XXXXXX	1.13	0.73	3.11
BRZR 19387M001	6	XXXX XX	2.26	3.96	6.51
CACE 13447M001	7	XXXXXX	0.84	0.82	2.86
CANT 13438M001	7	XXXXXX	2.05	0.63	4.72
CHER 00000M000	7	XXXXXX	0.54	1.37	1.91
CREU 13432M001	7	XXXXXX	1.88	1.84	5.58
EBRE 13410M001	7	XXXXXX	0.82	1.41	3.47
ELGE 19353S001	7	XXXXXX	1.50	2.04	1.97
EMAZ 17001M001	7	XXXXXX	1.97	1.82	4.58
GERN 19389M001	7	XXXXXX	1.21	1.51	1.69
IGEL 19352S001	7	XXXXXX	2.21	1.34	4.27
ISPS 19484M001	7	XXXXXX	2.69	1.59	4.15
KAST 19499M001	7	XXXXXX	1.18	0.71	4.84
LARE 19440M001	7	XXXXXX	1.09	0.87	3.42
LAZK 19354S001	7	XXXXXX	1.14	2.29	5.10
LEIT 19428M001	7	XXXXXX	2.04	0.80	3.40
ORON 19427M001	7	XXXXXX	2.77	1.85	2.47
PAS2 19351S001	6	XXXXXX	1.12	1.20	3.75
PASA 19351S001	7	XXXXXX	1.42	1.28	3.03
RI01 13448M002	7	XXXXXX	0.76	1.42	3.95
SALA 13469M001	7	XXXXXX	0.34	0.55	2.16
SCDA 10088M002	7	XXXXXX	0.54	0.75	1.75
SOPU 19386M001	7	XXXXXX	0.55	0.60	2.80
TERU 13487M001	7	XXXXXX	0.98	0.51	4.36
VITD 19385M001	7	XXXXXX	1.52	1.57	4.90
YEBE 13420M001	7	XXXXXX	1.10	1.02	2.60
ZARA 13462M001	7	XXXXXX	0.58	0.55	1.98

Comparison of individual solutions:

ACOR 13434M001	N	0.82	0.77	0.34	0.99	0.31	-0.77	-0.95	0.85
ACOR 13434M001	E	1.24	-0.06	0.79	-1.51	0.51	-0.59	1.72	1.68
ACOR 13434M001	U	2.53	2.80	0.48	3.22	1.32	-2.33	1.30	3.33
ALDA 19383M001	N	1.22	1.96	0.78	0.05	0.09	1.61	1.23	-0.63
ALDA 19383M001	E	0.94	0.03	-0.36	-0.79	-0.61	1.01	-0.91	1.52
ALDA 19383M001	U	3.12	4.02	-0.42	-5.10	-1.33	2.32	-2.83	0.98
ALSA 19419M001	N	1.69	2.74	0.41	-0.27	-2.74	-1.31	-0.33	-0.32
ALSA 19419M001	E	1.49	-1.97	0.51	1.65	-1.72	-0.68	0.35	1.72
ALSA 19419M001	U	1.76	0.83	2.26	-1.05	1.67	-1.92	-2.27	0.11
AMUR 19388M001	N	4.80	-9.56	2.81	1.64	2.98	-2.03	3.52	3.27
AMUR 19388M001	E	4.49	-9.11	0.25	0.52	3.68	-1.80	4.19	1.83
AMUR 19388M001	U	4.55	-8.35	-1.33	1.94	-0.92	-2.51	2.00	6.15
BLAZ 10074M002	N	0.64	0.30	-0.64	-0.41	0.98	0.62	0.27	-0.61
BLAZ 10074M002	E	0.69	-0.11	1.45	-0.12	-0.23	-0.58	0.55	0.07
BLAZ 10074M002	U	3.55	5.39	-0.01	0.36	-0.53	3.22	-4.16	-4.33
BIDA 00000M000	N	1.13	-0.89	1.02	1.59	-1.58	0.90	-0.09	0.25
BIDA 00000M000	E	0.73	0.10	0.76	0.76	0.10	-0.23	0.68	-1.21
BIDA 00000M000	U	3.11	1.08	-0.91	-1.40	-5.45	2.94	3.34	2.11
BRZR 19387M001	N	2.26	-1.89	3.25	1.43	-2.98		0.53	0.25
BRZR 19387M001	E	3.96	-7.26	3.08	3.83	-0.18		0.41	1.20
BRZR 19387M001	U	6.51	-6.45	-1.52	4.31	3.56		-11.01	3.92
CACE 13447M001	N	0.84	0.77	-1.10	-0.45	0.57	0.02	-1.31	0.44
CACE 13447M001	E	0.82	0.66	-0.22	0.46	1.51	-0.15	-1.02	0.14
CACE 13447M001	U	2.86	1.84	3.49	3.89	-2.49	0.70	0.88	-3.29
CANT 13438M001	N	2.05	1.83	-0.60	-4.56	0.70	0.09	-0.40	-0.39
CANT 13438M001	E	0.63	-0.58	0.03	-0.24	-0.79	-0.86	0.49	0.64
CANT 13438M001	U	4.72	-1.13	-0.80	-10.83	2.78	0.76	2.37	0.77
CHER 00000M000	N	0.54	-0.19	0.86	0.17	0.54	0.31	0.58	-0.47
CHER 00000M000	E	1.37	-1.99	0.55	1.44	0.53	-0.32	2.11	-0.16
CHER 00000M000	U	1.91	-1.72	0.83	3.23	-1.50	-1.04	0.43	2.09
CREU 13432M001	N	1.88	-3.91	0.83	1.05	-0.52	-1.28	1.23	0.81
CREU 13432M001	E	1.84	-3.44	1.85	0.47	0.01	-1.73	0.75	1.14
CREU 13432M001	U	5.58	-8.55	7.29	2.23	-1.32	-5.48	3.26	3.62
EBRE 13410M001	N	0.82	0.29	0.88	-0.12	-0.74	0.03	-1.10	-1.18
EBRE 13410M001	E	1.41	0.22	-2.75	0.67	0.07	1.87	0.35	-0.57
EBRE 13410M001	U	3.47	-3.10	-1.97	-0.13	0.68	-0.58	7.47	1.49
ELGE 19353S001	N	1.50	-2.47	0.89	0.06	0.65	-1.19	1.65	1.46
ELGE 19353S001	E	2.04	-1.72	1.52	0.27	-2.42	-0.91	3.41	1.12
ELGE 19353S001	U	1.97	-2.99	-2.09	-0.38	0.57	2.41	-0.75	-1.80
EMAZ 17001M001	N	1.97	4.31	-1.14	0.83	-0.56	1.18	-0.82	-0.61
EMAZ 17001M001	E	1.82	2.93	2.01	0.10	-1.55	-0.01	-2.12	0.44
EMAZ 17001M001	U	4.58	2.01	4.06	-1.17	-8.54	2.29	-0.64	-5.03
GERN 19389M001	N	1.21	-2.25	1.16	0.36	0.54	-0.12	1.38	0.16
GERN 19389M001	E	1.51	-0.23	-0.61	0.93	2.06	-2.09	1.78	-0.73
GERN 19389M001	U	1.69	1.02	0.90	-1.02	-0.31	-0.14	-1.57	-3.42
IGEL 19352S001	N	2.21	-0.10	-1.24	0.06	4.25	1.90	-2.26	-0.95
IGEL 19352S001	E	1.34	-0.93	1.76	0.42	1.33	-2.20	0.17	0.17
IGEL 19352S001	U	4.27	4.89	1.18	0.09	-4.44	6.28	-4.97	-0.55
ISPS 19484M001	N	2.69	4.56	-2.68	-0.71	2.21	1.03	0.40	-3.01
ISPS 19484M001	E	1.59	3.13	1.24	0.01	0.44	-1.14	-0.11	-1.50
ISPS 19484M001	U	4.15	1.04	4.44	-0.34	-4.42	2.39	-6.43	-3.96
KAST 19499M001	N	1.18	1.96	-0.11	-0.22	-0.40	1.96	-0.45	0.53
KAST 19499M001	E	0.71	0.63	-0.42	-0.91	0.95	-0.77	-0.09	0.34
KAST 19499M001	U	4.84	-4.11	2.54	4.61	-9.61	-0.20	0.36	1.93
LARE 19440M001	N	1.09	0.14	-0.72	1.77	1.71	-0.53	-0.08	0.46
LARE 19440M001	E	0.87	-0.20	-0.04	-0.53	1.73	-0.20	0.24	1.06
LARE 19440M001	U	3.42	2.94	-1.62	-0.99	5.45	3.81	-3.49	-1.27
LAZK 19354S001	N	1.14	2.33	-0.04	0.05	-1.11	-0.11	-1.05	0.22
LAZK 19354S001	E	2.29	4.44	-0.02	-1.87	1.08	-0.49	-2.29	-1.25

LAZK	19354S001	U	5.10	-0.17	-2.93	-1.77	-4.04	9.86	-1.34	-5.40
LEIT	19428M001	N	2.04	2.39	1.58	-0.95	0.64	2.12	-3.23	-0.65
LEIT	19428M001	E	0.80	0.88	1.06	-0.38	0.38	0.59	-1.02	-0.55
LEIT	19428M001	U	3.40	4.03	-4.98	-1.68	-0.67	4.94	-0.59	0.71
ORDN	19427M001	N	2.77	-5.22	0.62	2.36	-1.61	2.48	1.82	0.85
ORDN	19427M001	E	1.85	-1.63	3.37	0.46	-1.96	0.85	0.75	-1.12
ORDN	19427M001	U	2.47	1.69	-0.23	-1.47	-3.86	3.59	1.13	1.62
PAS2	19351S001	N	1.12		0.74	-1.06	1.51	1.42	0.10	-0.54
PAS2	19351S001	E	1.20		-0.66	1.47	1.96	-0.66	-0.55	0.26
PAS2	19351S001	U	3.75		-2.05	1.84	-5.93	2.68	-0.54	4.49
PASA	19351S001	N	1.42	-2.40	1.10	1.08	1.40	1.34	-0.17	-0.26
PASA	19351S001	E	1.28	-2.06	-0.28	0.01	2.34	0.05	0.13	0.07
PASA	19351S001	U	3.03	0.19	1.54	-0.63	-4.78	4.82	-1.74	1.80
RID1	13448M002	N	0.76	1.07	0.32	-0.36	1.06	-0.57	-0.79	-0.03
RID1	13448M002	E	1.42	0.63	-1.65	-0.84	1.47	2.47	-0.18	0.26
RID1	13448M002	U	3.95	5.80	-4.48	-2.98	3.11	-4.39	0.03	-1.42
SALA	13469M001	N	0.34	0.20	0.00	0.43	-0.19	0.18	-0.05	0.63
SALA	13469M001	E	0.55	-0.39	0.32	-0.52	0.35	-0.79	0.06	0.72
SALA	13469M001	U	2.16	3.40	-0.95	1.58	-0.37	-3.19	0.72	1.49
SCDA	10088M002	N	0.54	0.22	0.16	-0.41	-0.34	0.78	0.89	-0.12
SCDA	10088M002	E	0.75	0.02	-0.22	0.50	0.65	-1.08	1.20	-0.20
SCDA	10088M002	U	1.75	2.56	-1.37	0.83	-2.44	-0.64	1.48	0.83
SOPU	19386M001	N	0.55	0.89	0.59	-0.26	0.01	0.62	-0.31	0.36
SOPU	19386M001	E	0.60	0.39	-1.07	0.03	0.76	0.52	0.16	0.09
SOPU	19386M001	U	2.80	-1.43	-0.51	0.31	3.16	2.80	-2.63	-4.45
TERU	13487M001	N	0.98	-0.35	1.18	-0.21	-1.21	1.58	-0.21	-0.42
TERU	13487M001	E	0.51	0.62	-0.37	-0.43	0.79	0.46	0.11	0.06
TERU	13487M001	U	4.36	2.28	2.64	-0.33	-1.82	9.90	0.40	-0.56
VITO	19385M001	N	1.52	-1.50	1.74	1.79	-1.40	0.77	1.66	0.02
VITO	19385M001	E	1.57	-3.04	1.68	-0.15	-0.05	-0.41	1.03	1.22
VITO	19385M001	U	4.90	-0.24	7.15	-3.35	-2.91	-8.05	-0.51	2.84
YEBE	13420M001	N	1.10	-1.05	-0.70	-0.11	-1.22	0.35	-0.11	2.02
YEBE	13420M001	E	1.02	-0.44	-2.06	0.78	-0.03	-0.42	0.71	0.72
YEBE	13420M001	U	2.60	-4.09	-2.57	-1.98	0.11	-2.56	0.93	-2.43
ZARA	13462M001	N	0.58	0.43	0.54	0.72	-0.06	0.63	-0.50	-0.63
ZARA	13462M001	E	0.55	-0.19	0.61	0.39	-0.96	0.57	-0.01	0.06
ZARA	13462M001	U	1.98	-3.14	1.51	-2.64	-0.89	1.39	1.12	0.58



## 6.2 Datum verification

In this section, the datum verification is shown. A 3 parameter Helmert 3D (3 translations) is computed to the minimally constrained sites.

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

NUM	NAME	FLG	RESIDUALS IN MILLIMETERS		
1	ACOR 13434M001	I W	0.05	2.00	-0.23
2	ALAC 13433M001	I W	1.05	-0.68	-0.09
3	ALBA 13452M001	I W	0.40	-1.82	-0.65
4	ALME 13437M001	I W	-0.52	0.53	3.78
5	BCLN 13412M001	I W	-0.06	1.52	4.20
6	BELL 13431M001	I W	2.99	0.65	0.03
7	BORR 13480M001	I W	-1.02	-4.35	-1.48
8	BRST 10004M004	I W	-1.57	-0.24	-0.57
9	CACE 13447M001	I W	1.16	0.27	4.34
10	CANT 13438M001	I W	-1.08	-0.71	-1.23
11	CARG 19412M001	I W	0.87	-0.84	5.09
12	CASC 13909S001	I W	-0.30	-0.92	1.12
13	CEUI 13449M002	I W	0.29	2.89	3.63
14	COBA 13453M001	I W	1.08	0.72	-1.90
15	CREU 13432M001	I W	0.58	1.22	3.37
16	EBRE 13410M001	I W	0.95	1.00	-1.66
17	ESCO 13435M001	I W	0.50	-2.38	5.14
18	FUNC 13911S001	I W	3.28	2.74	0.76
19	GAIA 13902M001	I W	-0.54	-2.06	-1.61
21	HUEL 13451M001	I W	-0.19	3.42	3.63
22	IZAN 31309M002	I W	1.55	-0.43	2.10
23	LAGO 13903M001	I W	-11.86	-8.00	-0.25
24	LLIV 13436M001	I W	-0.86	-0.83	0.23
25	LPAL 81701M001	I W	-0.71	1.41	-1.59
26	LROC 10023M001	I W	-0.65	0.06	-0.18
27	MALA 13443M001	I W	-0.25	0.58	2.18
28	MAS1 31303M002	I W	1.78	1.06	0.34
30	MELI 19379M001	I W	0.03	1.29	2.03
31	PASA 19351S001	I W	-0.67	-0.27	-1.46
32	PDEL 31906M004	I W	-0.76	1.98	-10.54
33	RABT 35001M002	I W	0.63	-0.07	-2.20
34	RIO1 13448M002	I W	-0.10	-1.41	-4.06
35	SALA 13469M001	I W	-0.03	1.11	1.19
36	SCOA 10088M002	I W	-4.13	-0.67	-1.78
38	SONS 13446M001	I W	2.04	1.88	-1.80
39	TERC 31909M001	I W	3.91	-1.07	-7.35
40	TERU 13487M001	I W	2.61	-1.20	-3.55
41	VALA 13463M002	I W	-0.17	0.80	-1.42
42	VALE 13439M001	I W	0.49	0.09	-0.53
43	VIGO 13450M001	I W	-0.33	0.22	3.65
44	YEBE 13420M001	I W	-0.17	0.59	1.80
45	ZARA 13462M001	I W	0.13	0.77	-2.10
46	ZIMM 14001M004	I W	-0.39	-0.82	-0.35
	RMS / COMPONENT		2.31	1.94	3.10
	MEAN		0.00	0.00	0.00
	MIN		-11.86	-8.00	-10.54
	MAX		3.91	3.42	5.14

NUMBER OF PARAMETERS : 3  
NUMBER OF COORDINATES : 129  
RMS OF TRANSFORMATION : 2.50 MM

BARYCENTER COORDINATES:

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

PARAMETERS:

TRANSLATION IN N : -0.00 +- 0.38 MM  
TRANSLATION IN E : -0.00 +- 0.38 MM  
TRANSLATION IN U : 0.00 +- 0.38 MM

### 6.3 Adjustment Statistics

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

```
* STATISTICAL PARAMETER-----VALUE(S)-----
NUMBER OF OBSERVATIONS          17103393
NUMBER OF UNKNOWN               235626
NUMBER OF DEGREES OF FREEDOM    16867767
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)     180
VARIANCE FACTOR                  2.407049988007905
```

Helmert Transformation Parameters With Respect to Combined Solution:

Sol	Rms (m)	Translation (m)			Rotation (")			Scale (ppm)
		X	Y	Z	X	Y	Z	
1	0.00254	0.0234	-0.0078	-0.0301	0.0002	0.0012	-0.0002	-0.00009
2	0.00243	0.0093	0.0056	-0.0153	-0.0001	0.0006	0.0002	0.00052
3	0.00248	-0.0030	0.0040	-0.0065	-0.0001	0.0001	0.0001	0.00088
4	0.00232	0.0099	0.0016	-0.0060	0.0001	0.0003	0.0001	-0.00053
5	0.00242	0.0008	-0.0119	-0.0081	0.0002	0.0002	-0.0004	0.00056
6	0.00238	0.0118	0.0032	-0.0114	-0.0000	0.0005	0.0001	-0.00002
7	0.00225	0.0153	-0.0013	-0.0060	0.0001	0.0005	0.0001	-0.00127

Statistics of individual solutions:

File	RMS (m)	DOF	Chi**2/DOF	#Observations authentic / pseudo	#Parameters explicit / implicit / singular
1	0.00149	2438411	2.21	2473534	3 1017 34109 0
2	0.00158	2434127	2.49	2468160	3 1020 33016 0
3	0.00146	2397932	2.15	2431496	3 1026 32541 0
4	0.00144	2494541	2.06	2529974	3 1029 34407 0
5	0.00162	2246219	2.63	2281077	3 1014 33847 0
6	0.00183	2390392	3.33	2424147	3 1023 32735 0
7	0.00139	2460049	1.93	2495005	3 1023 33936 0

## 7 Equipment

### 7.1 Receiver List

Serial numbers not shown.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_____ S/N__ FIRMWARE____
ACOR A 1 P 18:07:00000 18:07:86370 LEICA GRX1200PRO -----
ALDA A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
ALSA A 1 P 18:07:00000 18:07:86370 LEICA GRX1200GGPRO -----
AMUR A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
BIAZ A 1 P 18:07:00000 18:07:86370 TRI SP90M -----
BIDA A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
BRZR A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
CACE A 1 P 18:07:00000 18:07:86370 TRIMBLE NETR9 -----
CANT A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
CHER A 1 P 18:07:00000 18:07:86370 LEICA GRX1200+GNSS -----
CREU A 1 P 18:07:00000 18:07:86370 LEICA GR50 -----
EBRE A 1 P 18:07:00000 18:07:86370 LEICA GR50 -----
ELGE A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
EMAZ A 1 P 18:07:00000 18:07:86370 LEICA GR30 -----
GERN A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
IGEL A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
ISPS A 1 P 18:07:00000 18:07:86370 TRIMBLE NETR9 -----
KAST A 1 P 18:07:00000 18:07:86370 LEICA GR30 -----
LARE A 1 P 18:07:00000 18:07:86370 LEICA GRX1200GGPRO -----
LAZK A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
LEIT A 1 P 18:07:00000 18:07:86370 LEICA GRX1200+GNSS -----
ORON A 1 P 18:07:00000 18:07:86370 LEICA GRX1200GGPRO -----
PAS2 A 1 P 18:07:00000 18:07:86370 TPS NET-G3A -----
PASA A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
RIO1 A 1 P 18:07:00000 18:07:86370 LEICA GR25 -----
SALA A 1 P 18:07:00000 18:07:86370 LEICA GRX1200+GNSS -----
SCOA A 1 P 18:07:00000 18:07:86370 LEICA GR25 -----
SOPU A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
TERU A 1 P 18:07:00000 18:07:86370 LEICA GRX1200GGPRO -----
VITO A 1 P 18:07:00000 18:07:86370 LEICA GR10 -----
YEBE A 1 P 18:07:00000 18:07:86370 TRIMBLE NETR9 -----
ZARA A 1 P 18:07:00000 18:07:86370 TRIMBLE NETR9 -----
```

### 7.2 Antennas

Serial number ONLY provided in case individual calibrations are available.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_____ S/N__
ACOR A 1 P 18:07:00000 18:07:86370 LEIAS04 LEIS -----
ALDA A 1 P 18:07:00000 18:07:86370 LEIAS10 NONE -----
ALSA A 1 P 18:07:00000 18:07:86370 LEIAX1202GG NONE -----
AMUR A 1 P 18:07:00000 18:07:86370 LEIAS10 NONE -----
```

BLAZ	A	1	P	18:07:00000	18:07:86370	LEIAR25	LEIT	----
BIDA	A	1	P	18:07:00000	18:07:86370	LEIAS10	NONE	----
BRZR	A	1	P	18:07:00000	18:07:86370	LEIAS10	NONE	----
CACE	A	1	P	18:07:00000	18:07:86370	TRM29659.00	NONE	----
CANT	A	1	P	18:07:00000	18:07:86370	LEIAR25.R4	LEIT	25066
CHER	A	1	P	18:07:00000	18:07:86370	LEIAX1203+GNSS	NONE	----
CREU	A	1	P	18:07:00000	18:07:86370	LEIAR25.R4	NONE	26357
EBRE	A	1	P	18:07:00000	18:07:86370	LEIAR25.R4	NONE	26359
ELGE	A	1	P	18:07:00000	18:07:86370	LEIAR25.R4	LEIT	----
EMAZ	A	1	P	18:07:00000	18:07:86370	LEIAS10	NONE	----
GERN	A	1	P	18:07:00000	18:07:86370	LEIAS10	NONE	----
IGEL	A	1	P	18:07:00000	18:07:86370	LEIAR20	LEIM	----
ISPS	A	1	P	18:07:00000	18:07:86370	TRM59900.00	SCIS	----
KAST	A	1	P	18:07:00000	18:07:86370	LEIAS10	NONE	----
LARE	A	1	P	18:07:00000	18:07:86370	LEIAT504	NONE	----
LAZK	A	1	P	18:07:00000	18:07:86370	LEIAR25.R4	LEIT	----
LEIT	A	1	P	18:07:00000	18:07:86370	LEIAX1203+GNSS	NONE	----
ORDN	A	1	P	18:07:00000	18:07:86370	LEIAX1202GG	NONE	----
PAS2	A	1	P	18:07:00000	18:07:86370	LEIAR20	LEIM	73034
PASA	A	1	P	18:07:00000	18:07:86370	LEIAR20	LEIM	73034
RID1	A	1	P	18:07:00000	18:07:86370	LEIAR25.R4	LEIT	25138
SALA	A	1	P	18:07:00000	18:07:86370	LEIAR25	NONE	----
SCDA	A	1	P	18:07:00000	18:07:86370	TRM59971.00	NONE	----
SOPU	A	1	P	18:07:00000	18:07:86370	LEIAS10	NONE	----
TERU	A	1	P	18:07:00000	18:07:86370	LEIAT504GG	LEIS	----
VITO	A	1	P	18:07:00000	18:07:86370	LEIAS10	NONE	----
YEBE	A	1	P	18:07:00000	18:07:86370	TRM29659.00	NONE	----
ZARA	A	1	P	18:07:00000	18:07:86370	TRM29659.00	NONE	----

### 7.3 Eccentricities

* SITE	PT	SOLN	T	DATA_START_	DATA_END_	AXE	ARP->BENCHMARK(M)	UP	NORTH	EAST
ACOR	A	1	P	18:07:00000	18:07:86370	UNE	3.0460	0.0000	0.0000	0.0000
ALDA	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
ALSA	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
AMUR	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
BLAZ	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
BIDA	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
BRZR	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
CACE	A	1	P	18:07:00000	18:07:86370	UNE	0.0600	0.0000	0.0000	0.0000
CANT	A	1	P	18:07:00000	18:07:86370	UNE	3.0490	0.0000	0.0000	0.0000
CHER	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
CREU	A	1	P	18:07:00000	18:07:86370	UNE	0.0770	0.0000	0.0000	0.0000
EBRE	A	1	P	18:07:00000	18:07:86370	UNE	0.0770	0.0000	0.0000	0.0000
ELGE	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
EMAZ	A	1	P	18:07:00000	18:07:86370	UNE	0.0350	0.0000	0.0000	0.0000
GERN	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
IGEL	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
ISPS	A	1	P	18:07:00000	18:07:86370	UNE	0.0350	0.0000	0.0000	0.0000
KAST	A	1	P	18:07:00000	18:07:86370	UNE	0.0350	0.0000	0.0000	0.0000
LARE	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
LAZK	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
LEIT	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
ORDN	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
PAS2	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
PASA	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
RID1	A	1	P	18:07:00000	18:07:86370	UNE	0.0606	0.0000	0.0000	0.0000
SALA	A	1	P	18:07:00000	18:07:86370	UNE	0.0600	0.0000	0.0000	0.0000
SCDA	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
SOPU	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
TERU	A	1	P	18:07:00000	18:07:86370	UNE	0.0600	0.0000	0.0000	0.0000
VITO	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
YEBE	A	1	P	18:07:00000	18:07:86370	UNE	0.0000	0.0000	0.0000	0.0000
ZARA	A	1	P	18:07:00000	18:07:86370	UNE	3.2590	0.0000	0.0000	0.0000

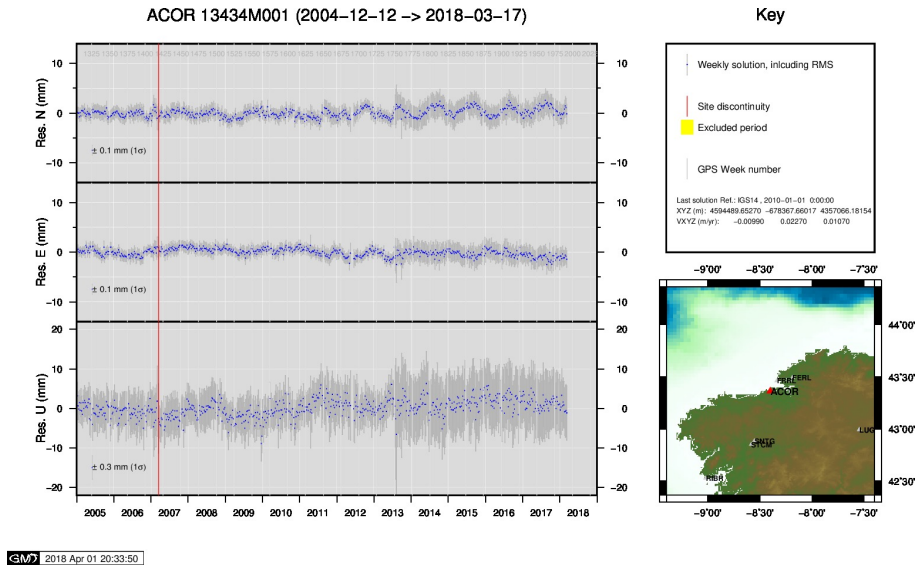
## 8 Inconsistencies (logsheet-RINEX metadata)

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

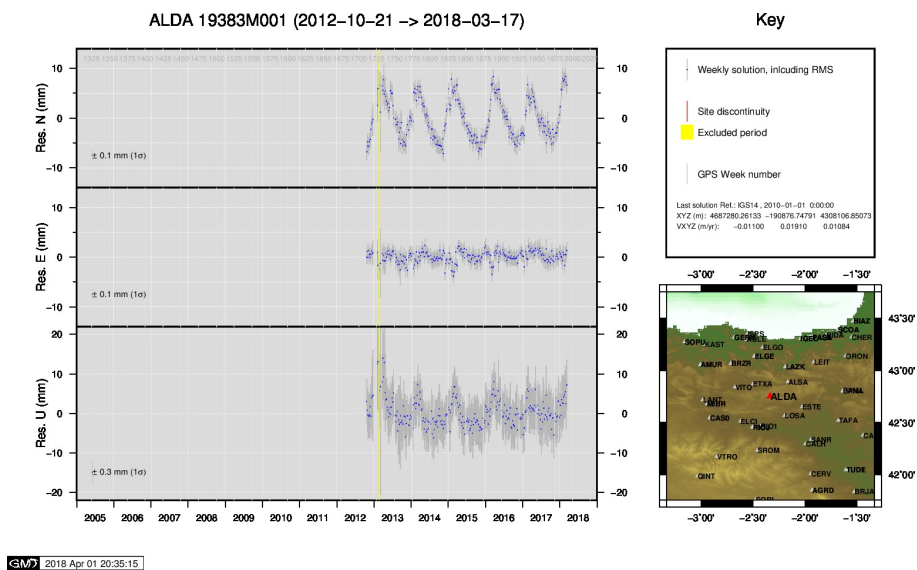
2018-03-31	21:14	UTC		BRZR0700.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-03-31	21:14	UTC		GERN0700.180		RECEIVER FIRM. VERS.		4.10	->	4.10/6.523
2018-03-31	21:15	UTC		SOPU0700.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	00:31	UTC		BRZR0710.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	00:32	UTC		GERN0710.180		RECEIVER FIRM. VERS.		4.10	->	4.10/6.523
2018-04-01	00:32	UTC		SOPU0710.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	03:42	UTC		BRZR0720.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	03:43	UTC		ELGE0720.180		RECEIVER FIRM. VERS.		4.11/6.523	->	4.20/6.524
2018-04-01	03:43	UTC		GERN0720.180		RECEIVER FIRM. VERS.		4.10	->	4.10/6.523
2018-04-01	03:43	UTC		LAZK0720.180		RECEIVER FIRM. VERS.		4.11/6.523	->	4.20/6.524
2018-04-01	03:43	UTC		SOPU0720.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	07:00	UTC		BRZR0730.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	07:00	UTC		GERN0730.180		RECEIVER FIRM. VERS.		4.10	->	4.10/6.523
2018-04-01	07:01	UTC		SOPU0730.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	10:00	UTC		GERN0740.180		RECEIVER FIRM. VERS.		4.10	->	4.10/6.523
2018-04-01	10:00	UTC		SOPU0740.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	14:09	UTC		BRZR0750.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	14:10	UTC		GERN0750.180		RECEIVER FIRM. VERS.		4.10	->	4.10/6.523
2018-04-01	14:10	UTC		SOPU0750.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	18:20	UTC		BRZR0760.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522
2018-04-01	18:20	UTC		GERN0760.180		RECEIVER FIRM. VERS.		4.10	->	4.10/6.523
2018-04-01	18:21	UTC		SOPU0760.180		RECEIVER FIRM. VERS.		4.02	->	4.02/6.522

## 9 Cumulative Time Series

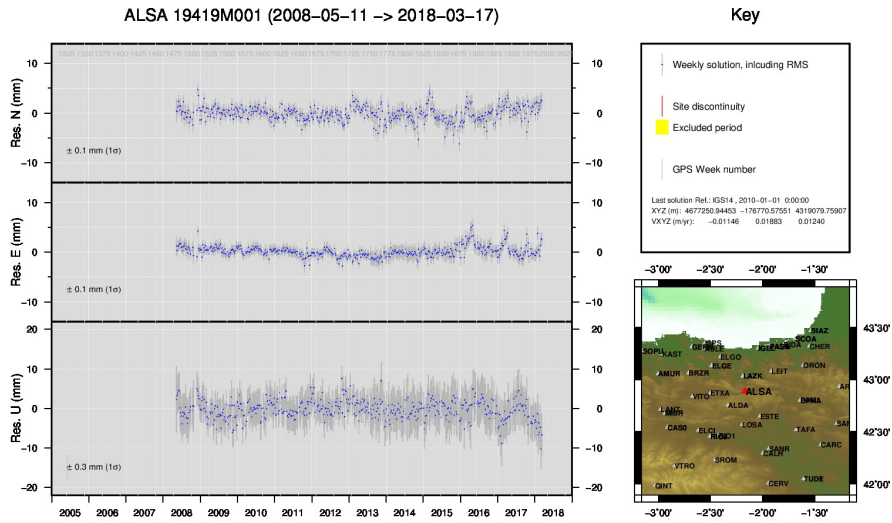
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



1 ) ACOR

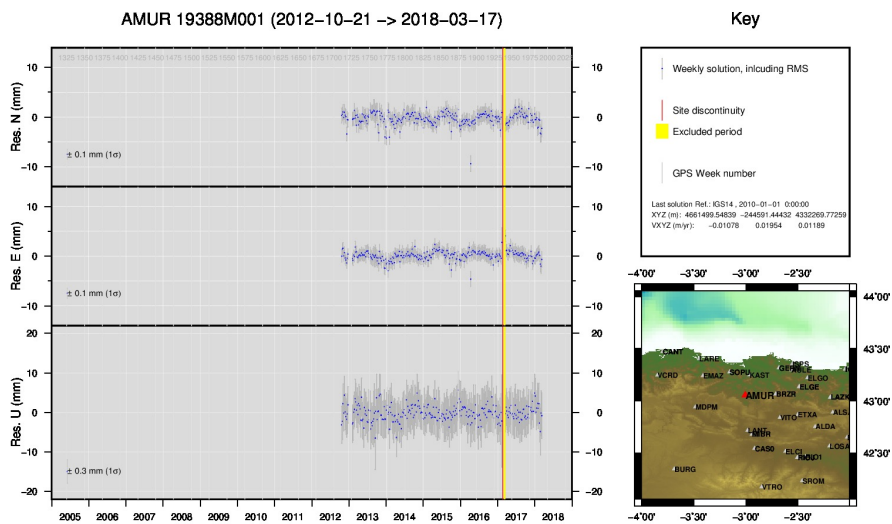


2 ) ALDA



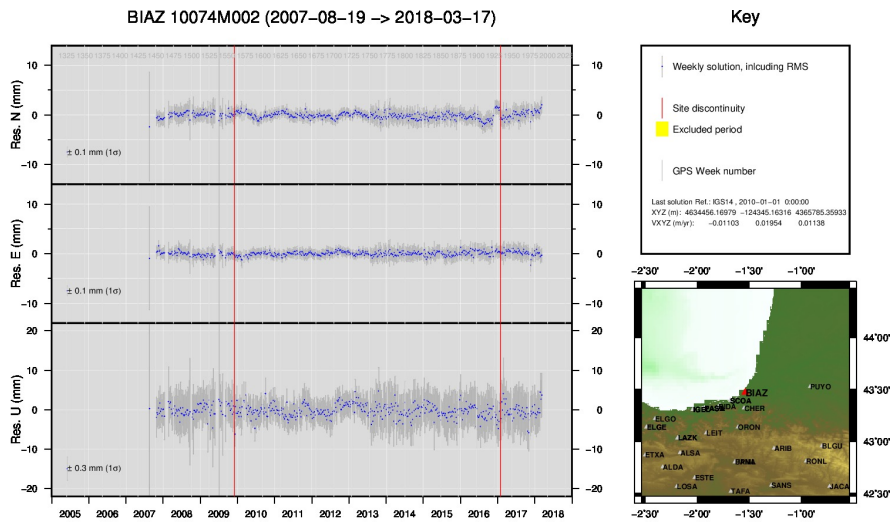
GMW 2018 Apr 01 20:36:15

3 ) ALSA



GMW 2018 Apr 01 20:36:29

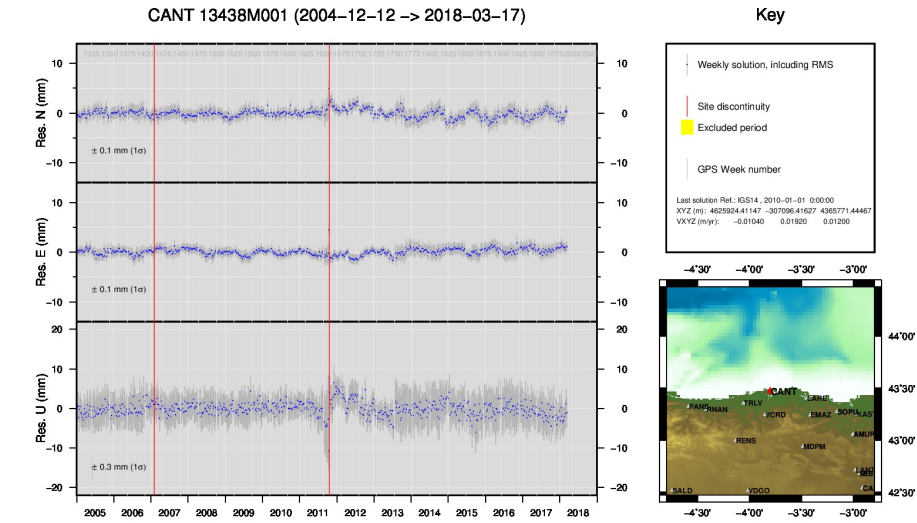
4 ) AMUR



GMW 2018 Apr 01 20:39:44

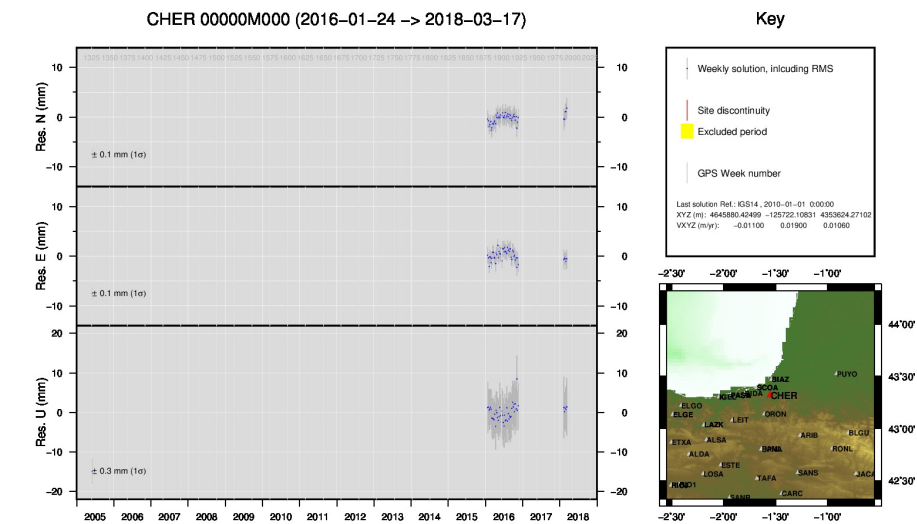
5 ) BIAZ





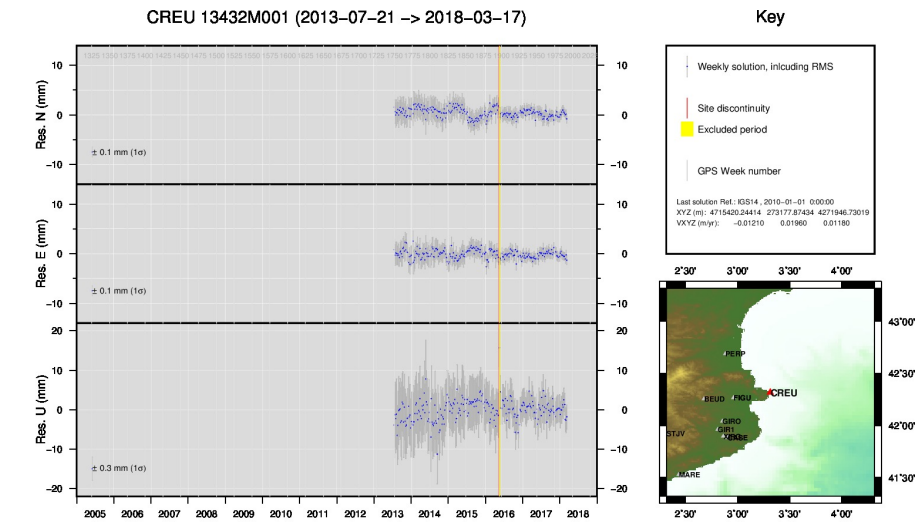
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9 ) CANT



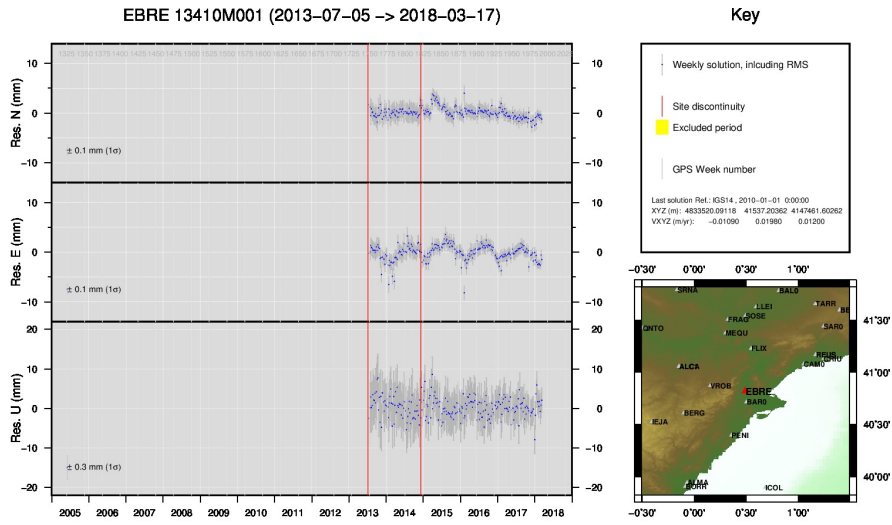
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10 ) CHER



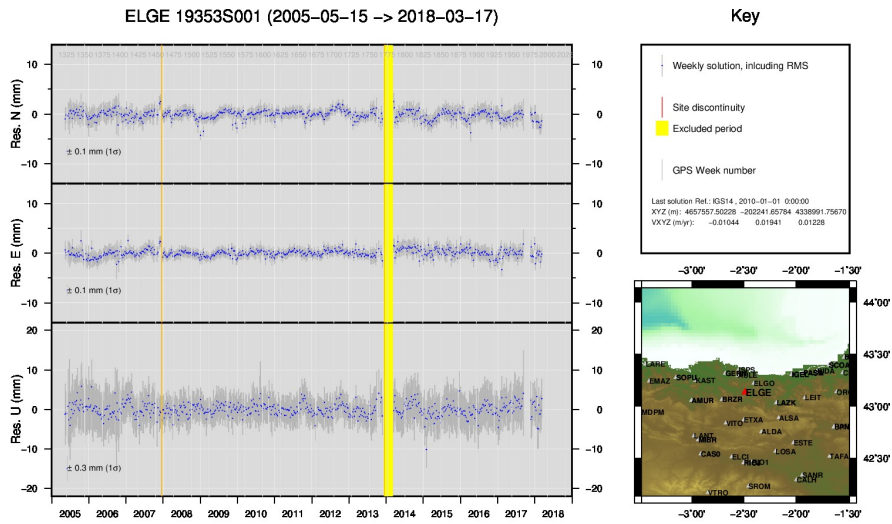
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11 ) CREU



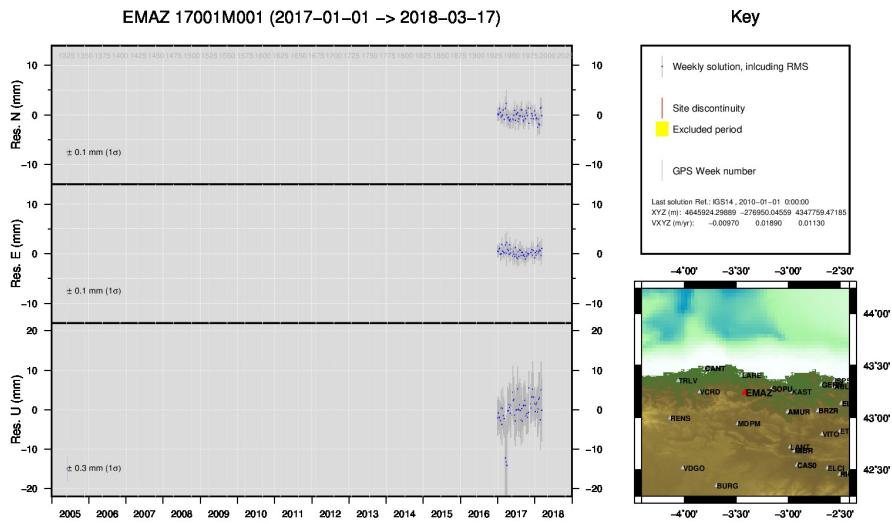
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12 ) EBRE



GMW 2018 Apr 01 20:45:55

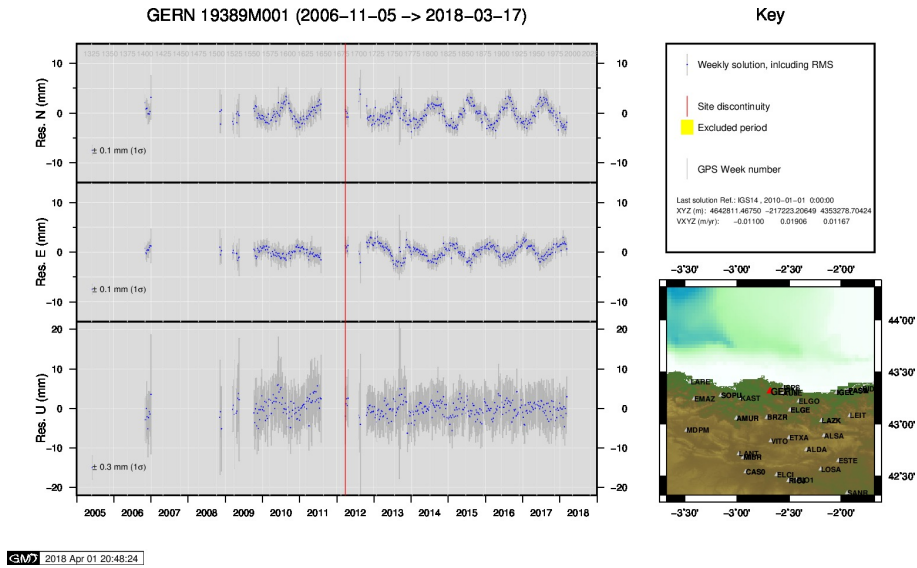
13 ) ELGE



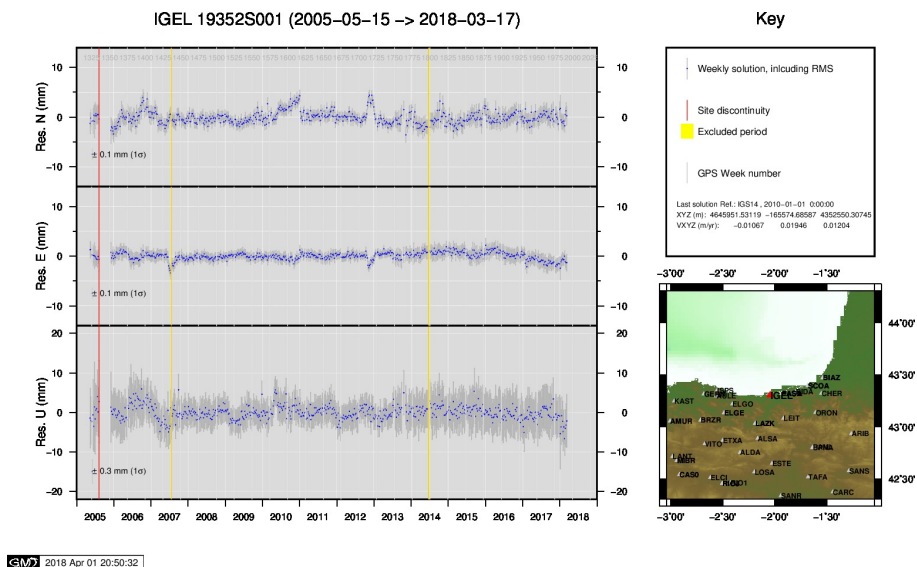
GMW 2018 Apr 01 20:46:08

14 ) EMAZ

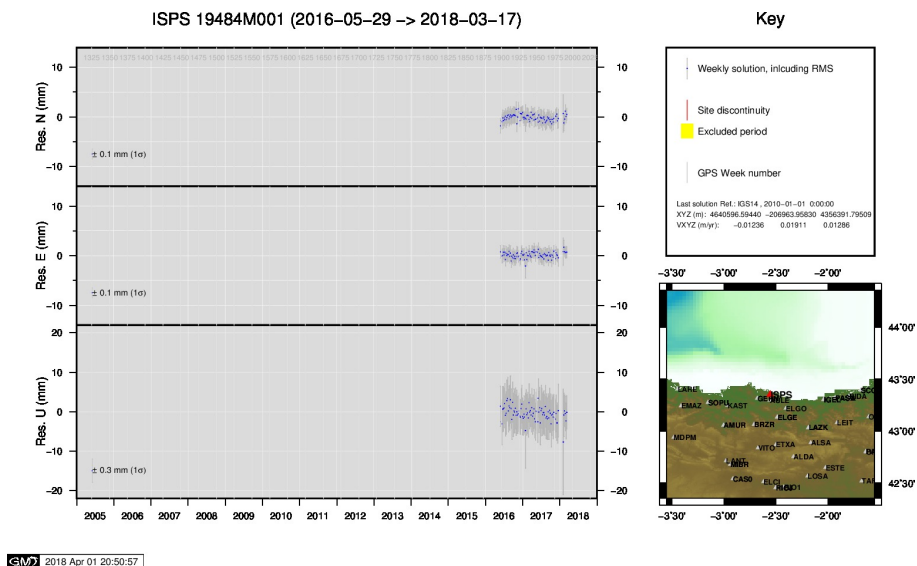




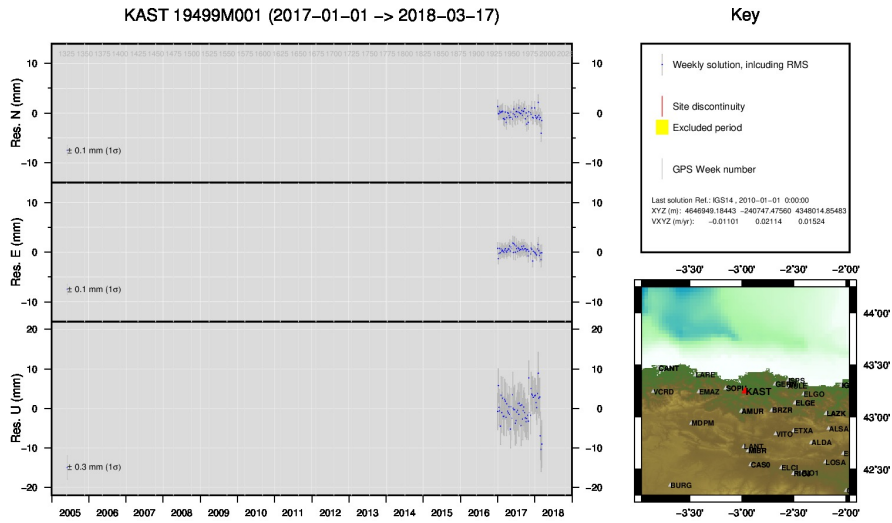
15 ) GERN



16 ) IGEL

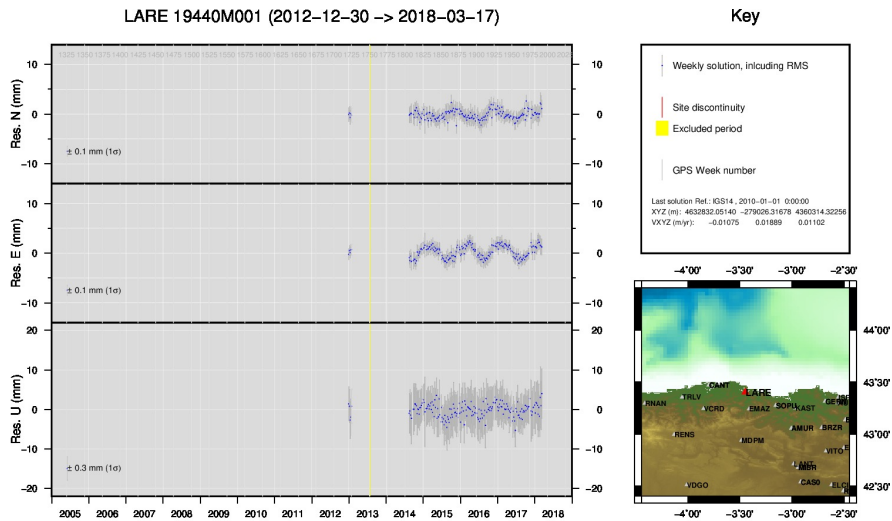


17 ) ISPS



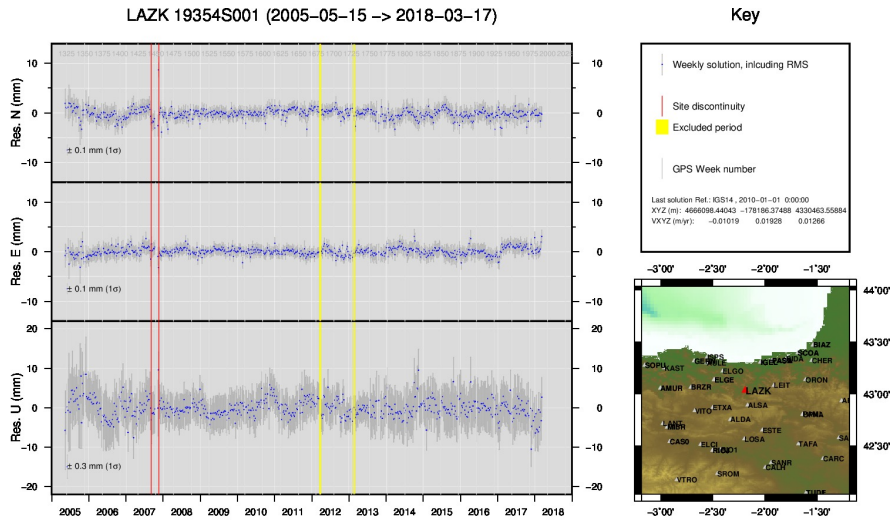
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18 ) KAST



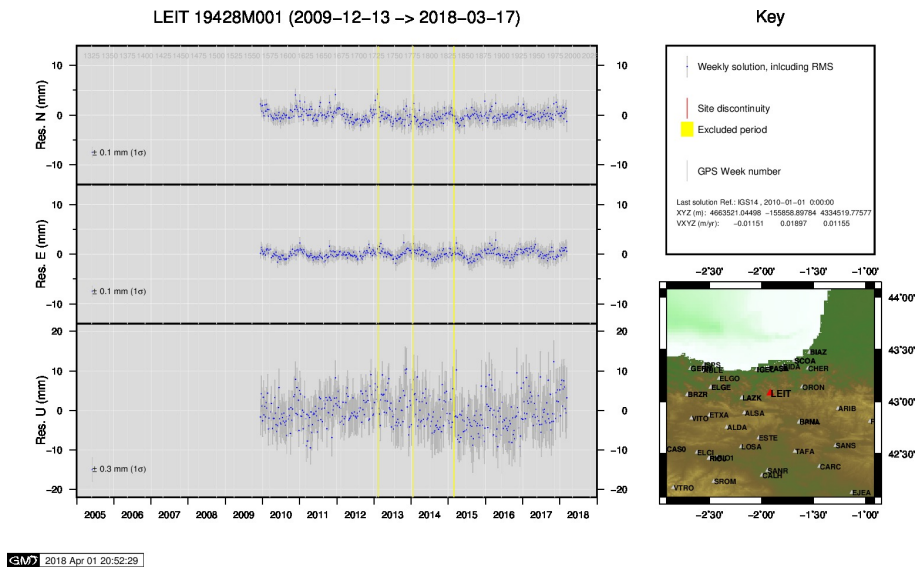
GMW 2018 Apr 01 20:51:57

19 ) LARE

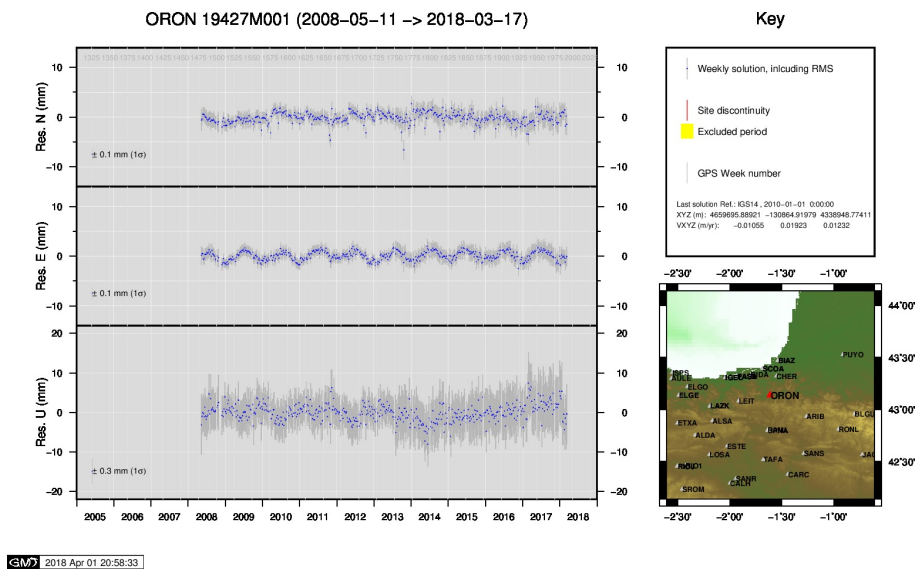


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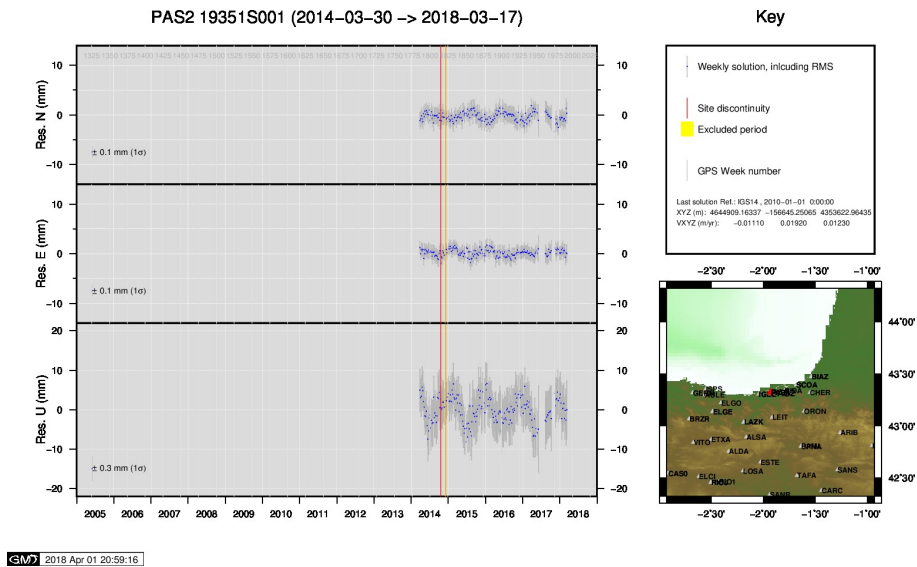
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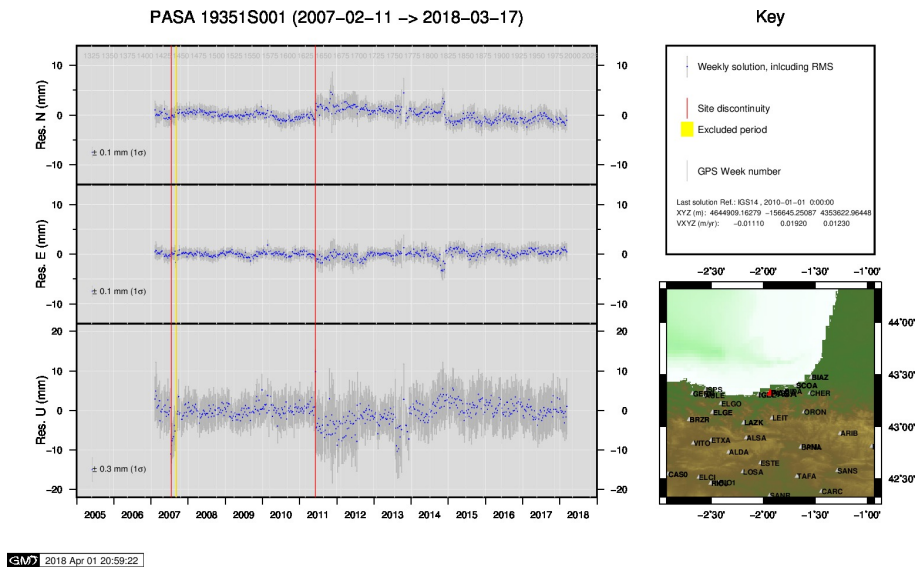
21 ) LEIT



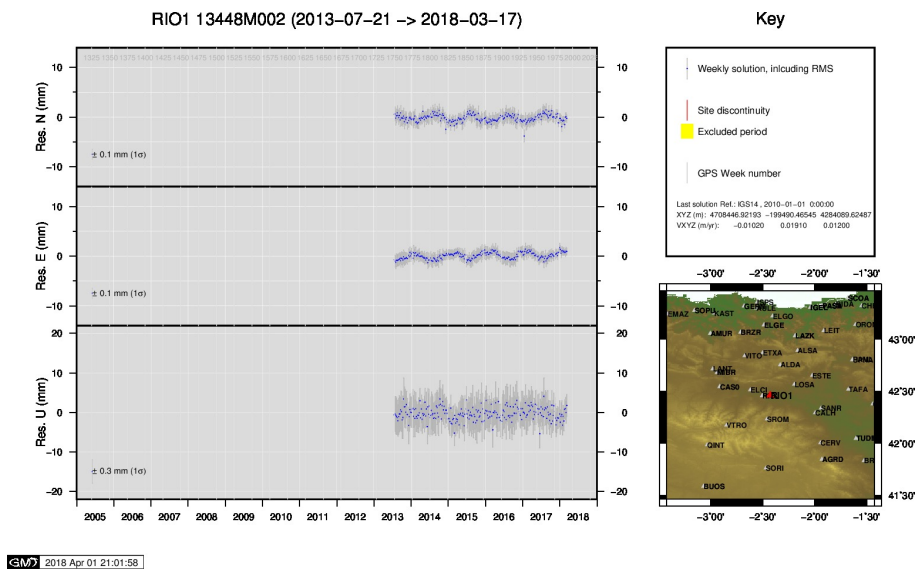
22 ) ORON



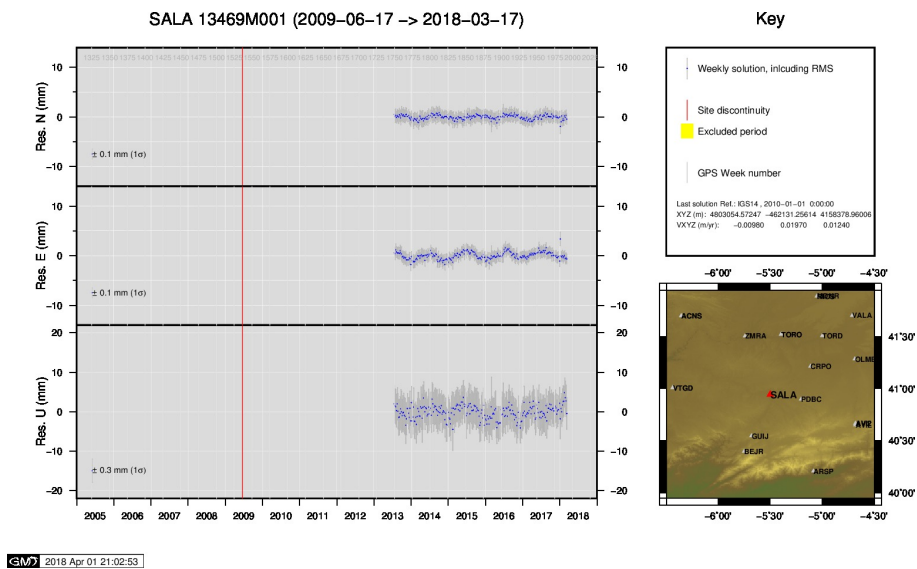
23 ) PAS2



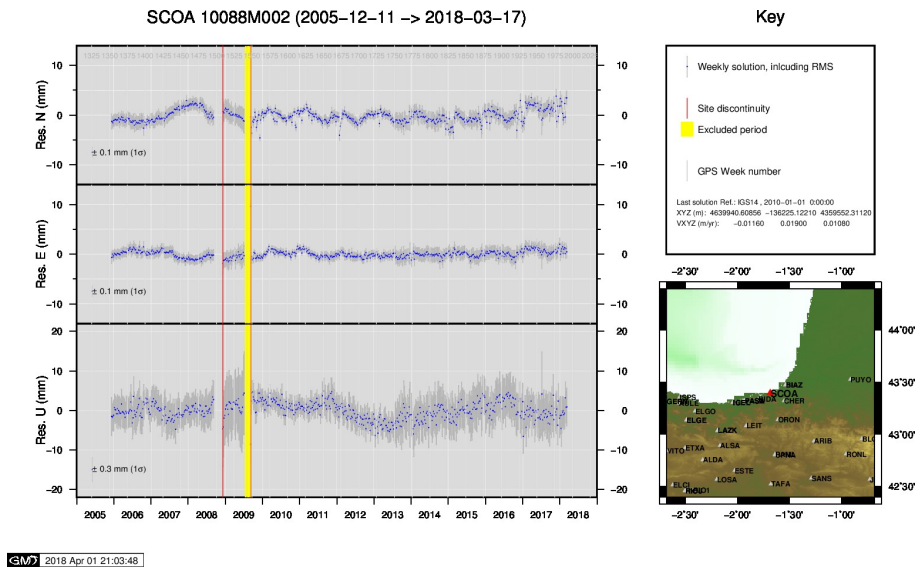
24 ) PASA



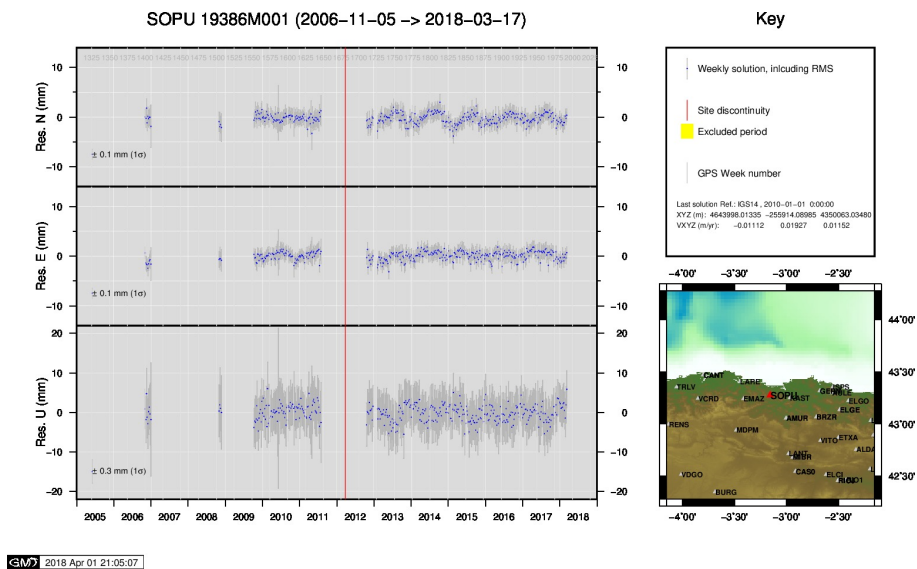
25 ) RIO1



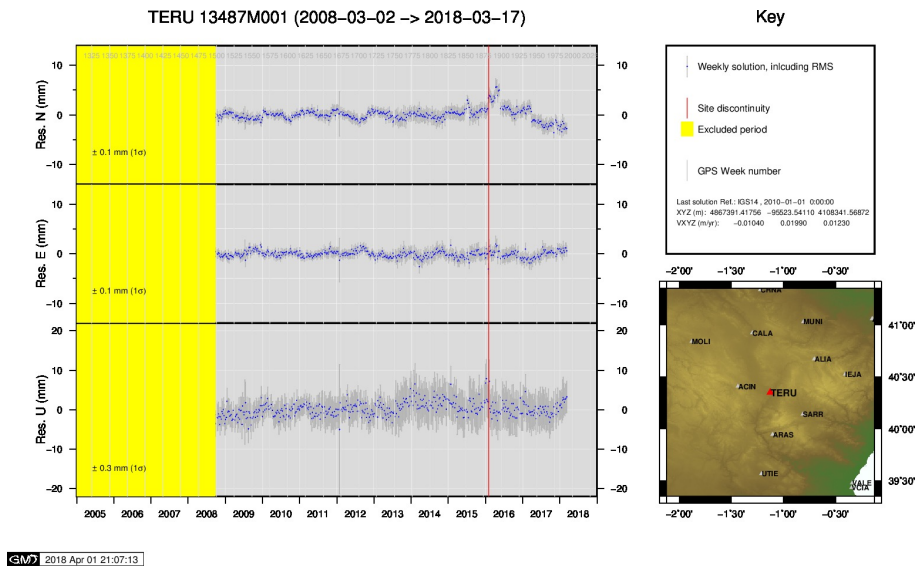
26 ) SALA



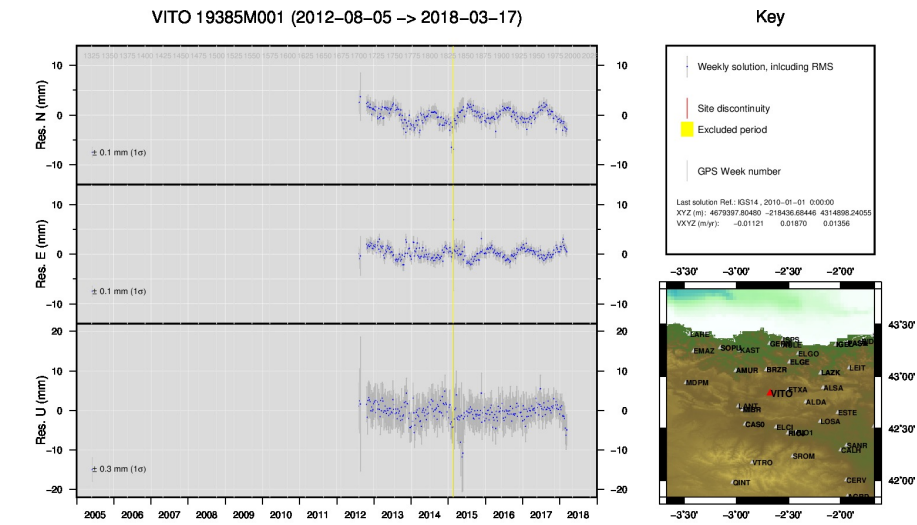
27 ) SCOA



28 ) SOPU

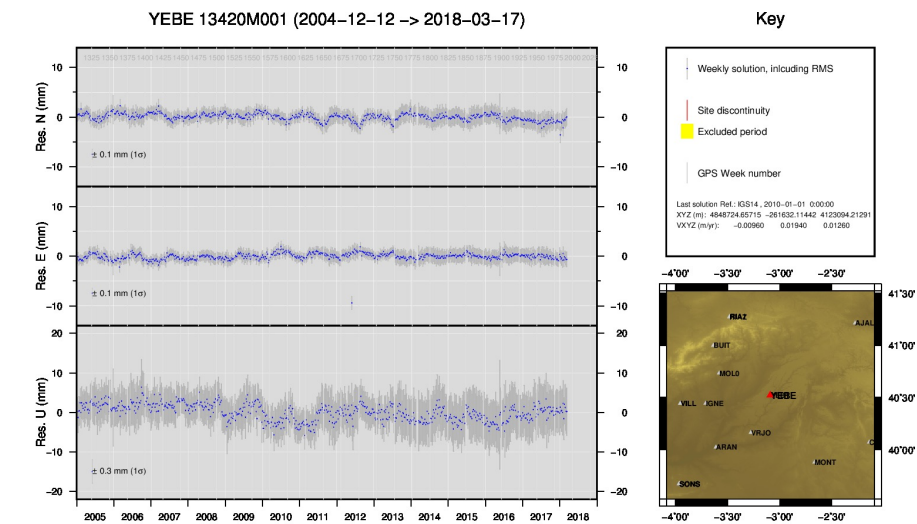


29 ) TERU



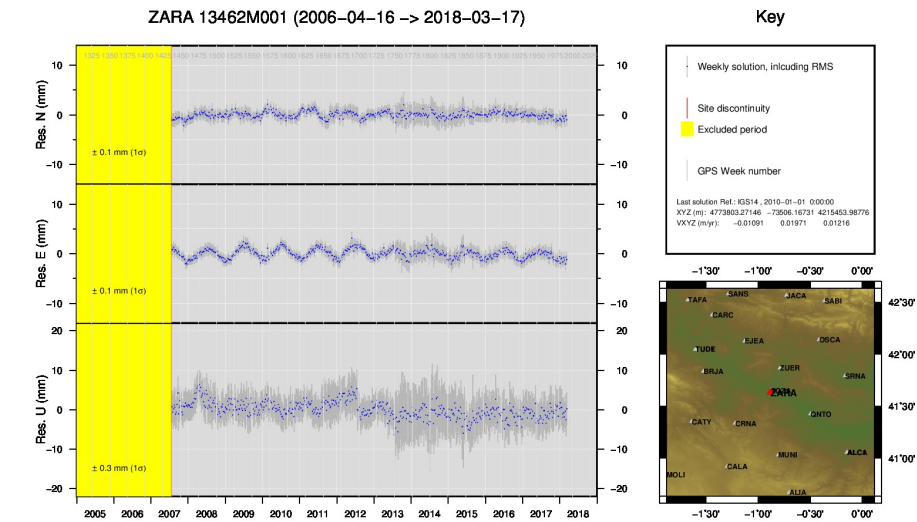
GMW 2018 Apr 01 21:10:39

30 ) VITO



GMW 2018 Apr 01 21:11:46

31 ) YEBE



GMW 2018 Apr 01 21:11:53

32 ) ZARA



