

ARA-DAC Weekly Analysis Result: 2002 (GFA)

Technical Report

GPS Week: 2002 (GFA)

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

ARA-DAC details:

Contact person: J. Zurutuza

Contact mail: geodesia@aranzadi.eus

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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 2002 WEEK FINAL COMBINATION: PRECISE ORBITS					12-JUN-18 20:18
LOCAL GEODETIC DATUM: IGS14					EPOCH: 2018-05-23 12:00:00
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACOR 13434M001	4594489.56979	-678367.47152	4357066.27493	W
33	ALDA 19383M001	4687280.16788	-190876.58414	4308106.94564	A
42	ALSA 19419M001	4677250.84626	-176770.41627	4319079.86091	A
44	AMUR 19388M001	4661499.45534	-244591.27890	4332269.87011	A
77	BLAZ 10074M002	4634456.06213	-124344.99703	4365785.44605	A
78	BIDA 00000M000	4644177.83419	-145778.34347	4354832.47118	A
88	BRZR 19387M001	4662221.00222	-220769.92209	4333309.42894	A
9	CACE 13447M001	4899866.51068	-544567.05695	4033770.19133	W
10	CANT 13438M001	4625924.31978	-307096.25397	4365771.54195	W
112	CHER 00000M000	4645880.33052	-125721.94660	4353624.36135	A
15	CREU 13432M001	4715420.13911	273178.03827	4271946.82796	W
16	EBRE 13410M001	4833519.99892	41537.36839	4147461.70197	W
131	ELGE 19353S001	4657557.41438	-202241.49567	4338991.85889	A
133	EMAZ 17001M001	4645924.21676	-276949.88680	4347759.56660	A
153	GERN 19389M001	4642811.32054	-217222.95381	4353278.87197	A
173	IGEL 19352S001	4645951.43843	-165574.52455	4352550.40656	A
178	ISPS 19484M001	4640596.48830	-206963.79689	4356391.90130	A
182	KAST 19499M001	4646949.09072	-240747.29818	4348014.97974	A
185	LARE 19440M001	4632831.96042	-279026.15742	4360314.41543	A
186	LAZK 19354S001	4666098.35180	-178186.21251	4330463.66171	A
190	LEIT 19428M001	4663520.94839	-155858.73855	4334519.87085	A
242	ORND 19427M001	4659695.79889	-130864.75650	4338948.87681	A
249	PAS2 19351S001	4644909.06395	-156645.08791	4353623.06362	A
31	PASA 19351S001	4644909.06698	-156645.08887	4353623.06539	W
34	RID1 13448M002	4708446.83428	-199490.30387	4284089.72440	W
35	SALA 13469M001	4803054.48988	-462131.09082	4158379.06347	W
36	SCDA 10088M002	4639940.50762	-136224.96157	4359552.40362	W
298	SOPU 19386M001	4643997.92333	-255913.92753	4350063.13421	A
40	TERU 13487M001	4867391.33063	-95523.37425	4108341.66964	W
349	VITO 19385M001	4679397.70929	-218436.52635	4314898.35277	A
44	YEBE 13420M001	4848724.57604	-261631.95063	4123094.31733	W
45	ZARA 13462M001	4773803.17362	-73506.00426	4215454.08305	W

5.2 ETRF2000 (ETRS89) Coordinates

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

ETRF2000 FINAL COORD. wk 2002					12-JUN-18 20:18
LOCAL GEODETIC DATUM: ETRF2000					EPOCH: 2018-05-23 12:00:00
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACOR 13434M001	4594489.86785	-678367.98943	4357065.87111	W
33	ALDA 19383M001	4687280.51784	-190877.11035	4308106.54081	A
42	ALSA 19419M001	4677251.19855	-176770.94143	4319079.45698	A
44	AMUR 19388M001	4661499.80084	-244591.80266	4332269.46654	A
77	BLAZ 10074M002	4634456.42345	-124345.51773	4365785.04587	A
78	BIDA 00000M000	4644178.19236	-145778.86521	4354832.07003	A
88	BRZR 19387M001	4662221.35048	-220770.44586	4333309.02560	A
9	CACE 13447M001	4899866.80227	-544567.60515	4033769.76667	W
10	CANT 13438M001	4625924.66045	-307096.77431	4365771.14025	W
112	CHER 00000M000	4645880.69087	-125722.46845	4353623.96031	A
15	CREU 13432M001	4715420.53901	273177.51083	4271946.42640	W
16	EBRE 13410M001	4833520.36438	41536.82829	4147461.28908	W
131	ELGE 19353S001	4657557.76512	-202242.01892	4338991.45611	A
133	EMAZ 17001M001	4645924.55964	-276950.40909	4347759.16380	A
153	GERN 19389M001	4642811.67053	-217223.47561	4353278.47009	A
173	IGEL 19352S001	4645951.79421	-165575.04653	4352550.00505	A
178	ISPS 19484M001	4640596.84066	-206964.31844	4356391.49970	A
182	KAST 19499M001	4646949.43771	-240747.82047	4348014.57728	A
185	LARE 19440M001	4632832.30390	-279026.67838	4360314.01356	A
186	LAZK 19354S001	4666098.70468	-178186.73655	4330463.25858	A
190	LEIT 19428M001	4663521.30407	-155859.26227	4334519.46817	A
242	ORND 19427M001	4659696.15869	-130865.27976	4338948.47470	A
249	PAS2 19351S001	4644909.42081	-156645.60975	4353622.66229	A
31	PASA 19351S001	4644909.42384	-156645.61071	4353622.66406	W
34	RID1 13448M002	4708447.18166	-199490.83222	4284089.31791	W
35	SALA 13469M001	4803054.79815	-462131.62926	4158378.64693	W
36	SCDA 10088M002	4639940.86718	-136225.48285	4359552.00290	W
298	SOPU 19386M001	4643998.26874	-255914.44956	4350062.73179	A
40	TERU 13487M001	4867391.67800	-95523.91817	4108341.25268	W
349	VITO 19385M001	4679398.05659	-218437.05184	4314897.94820	A
44	YEBE 13420M001	4848724.90563	-261632.49316	4123093.89980	W
45	ZARA 13462M001	4773803.53064	-73506.53878	4215453.67323	W

5.3 ETRF2014 (ETRS89) Coordinates

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

ETRF2014 FINAL COORD. wk 2002		12-JUN-18 20:18			
LOCAL GEODETIC DATUM: ETRF2014		EPOCH: 2018-05-23 12:00:00			
NUM	STATION NAME	X (M)	Y (M)	Z (M)	FLAG
1	ACDR 13434M001	4594489.82504	-678368.02842	4357065.91907	W
33	ALDA 19383M001	4687280.47291	-190877.15062	4308106.58866	A
42	ALSA 19419M001	4677251.15367	-176770.98179	4319079.50486	A
44	AMUR 19388M001	4661499.75631	-244591.84285	4332269.51443	A
77	BIAZ 10074M002	4634456.37883	-124345.55842	4365785.09387	A
78	BIDA 00000M000	4644178.14771	-145778.90579	4354832.11801	A
88	BRZR 19387M001	4662221.30588	-220770.48613	4333309.07349	A
9	CACE 13447M001	4899866.75615	-544567.64344	4033769.81398	W
10	CANT 13438M001	4625924.61643	-307096.81442	4365771.18820	W
112	CHER 00000M000	4645880.64615	-125722.50909	4353624.00829	A
15	CREU 13432M001	4715420.49233	273177.46914	4271946.47447	W
16	EBRE 13410M001	4833520.31730	41536.78781	4147461.33674	W
131	ELGE 19353S001	4657557.72050	-202242.05927	4338991.50402	A
133	EMAZ 17001M001	4645924.51535	-276950.44923	4347759.21171	A
153	GERN 19389M001	4642811.62610	-217223.51596	4353278.51804	A
173	IGEL 19352S001	4645951.74960	-165575.08704	4352550.05301	A
178	ISPS 19484M001	4640596.79622	-206964.35884	4356391.54766	A
182	KAST 19499M001	4646949.39330	-240747.86072	4348014.62521	A
185	LARE 19440M001	4632832.25973	-279026.71856	4360314.06150	A
186	LAZK 19354S001	4666098.65992	-178186.77694	4330463.30649	A
190	LEIT 19428M001	4663521.25926	-155859.30275	4334519.51609	A
242	ORON 19427M001	4659696.11384	-130865.32033	4338948.52264	A
249	PAS2 19351S001	4644909.37618	-156645.65030	4353622.71026	A
31	PASA 19351S001	4644909.37921	-156645.65126	4353622.71203	W
34	RI01 13448M002	4708447.13655	-199490.87238	4284089.36571	W
35	SALA 13469M001	4803054.75282	-462131.66819	4158378.69444	W
36	SOA 10088M002	4639940.82254	-136225.52348	4359552.05088	W
298	SOPU 19386M001	4643998.22440	-255914.48977	4350062.77972	A
40	TERU 13487M001	4867391.63101	-95523.95808	4108341.30019	W
349	VITO 19385M001	4679398.01181	-218437.09205	4314897.99605	A
44	YEBE 13420M001	4848724.85931	-261632.53259	4123093.94728	W
45	ZARA 13462M001	4773803.48452	-73506.57911	4215453.72094	W

6 Quality Control

6.1 Mean and Daily Repeatabilities

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

ARA LAC 2002 WEEK FINAL COMBINATION: PRECISE ORBITS				12-JUN-18 20:18		
Station	#Days	Weekday 0123456	Repeatability (mm)			
			N	E	U	
ACOR 13434M001	7	XXXXXX	1.11	0.92	5.33	
ALDA 19383M001	7	XXXXXX	1.30	1.47	3.60	
ALSA 19419M001	6	XX XXXX	0.51	1.20	5.99	
AMUR 19388M001	7	XXXXXX	1.12	1.11	4.75	
BLAZ 10074M002	7	XXXXXX	0.75	1.44	2.31	
BIDA 00000M000	7	XXXXXX	1.32	1.68	2.13	
BRZR 19387M001	7	XXXXXX	1.80	1.03	3.80	
CACE 13447M001	6	XXXXXX	0.87	0.69	1.75	
CANT 13438M001	7	XXXXXX	0.61	0.81	5.59	
CHER 00000M000	7	XXXXXX	1.12	0.83	3.08	
CREU 13432M001	7	XXXXXX	0.57	0.70	3.23	
EBRE 13410M001	7	XXXXXX	1.03	1.23	3.40	
ELGE 19353S001	7	XXXXXX	1.23	1.08	4.34	
EMAZ 17001M001	7	XXXXXX	1.09	1.16	4.98	
GERN 19389M001	7	XXXXXX	1.06	0.93	6.27	
IGEL 19352S001	7	XXXXXX	0.86	0.94	3.36	
ISPS 19484M001	7	XXXXXX	1.02	1.50	4.07	
KAST 19499M001	7	XXXXXX	0.81	0.77	6.57	
LARE 19440M001	7	XXXXXX	1.36	1.13	5.37	
LAZK 19354S001	7	XXXXXX	0.70	0.86	5.17	
LEIT 19428M001	7	XXXXXX	1.23	1.38	3.96	
ORON 19427M001	7	XXXXXX	0.82	1.23	3.37	
PAS2 19351S001	3	XXX	1.31	1.95	3.40	
PASA 19351S001	7	XXXXXX	0.87	1.34	2.34	
RI01 13448M002	7	XXXXXX	0.45	1.25	2.92	
SALA 13469M001	7	XXXXXX	1.09	0.58	2.17	
SCDA 10088M002	7	XXXXXX	0.98	1.36	2.09	
SOPU 19386M001	7	XXXXXX	0.70	0.88	5.58	
TERU 13487M001	6	XXXXXX	0.98	0.47	2.15	
VITD 19385M001	7	XXXXXX	0.78	1.11	3.21	
YEBE 13420M001	7	XXXXXX	0.62	0.63	2.69	
ZARA 13462M001	6	XXXXXX	0.90	0.72	3.69	

Comparison of individual solutions:

ACOR 13434M001	N	1.11	-1.02	-0.72	0.58	1.88	0.33	0.60	-1.24
ACOR 13434M001	E	0.92	1.45	0.26	0.52	0.70	-0.84	-0.43	-1.13
ACOR 13434M001	U	5.33	-5.06	-8.19	0.53	5.12	3.65	6.09	-0.85
ALDA 19383M001	N	1.30	1.87	-2.32	0.06	0.89	-0.65	0.16	0.00
ALDA 19383M001	E	1.47	-1.98	0.79	-1.96	-0.77	1.66	-0.01	1.13
ALDA 19383M001	U	3.60	-4.14	5.21	-2.48	2.19	-2.67	2.20	3.26
ALSA 19419M001	N	0.51	0.50	0.03		-0.16	0.86	0.19	-0.48
ALSA 19419M001	E	1.20	-1.52	-0.08		-0.90	1.76	-0.87	0.42
ALSA 19419M001	U	5.99	-3.77	7.91		-1.44	-7.64	6.13	-2.13
AMUR 19388M001	N	1.12	-0.69	2.05	1.37	-0.13	-0.12	0.79	0.56
AMUR 19388M001	E	1.11	-1.40	-0.01	-0.34	-0.80	1.73	1.26	0.30
AMUR 19388M001	U	4.75	-2.87	-4.20	5.47	2.68	-6.06	-0.16	-5.96
BLAZ 10074M002	N	0.75	0.41	0.42	-0.81	-0.81	0.16	0.23	1.29
BLAZ 10074M002	E	1.44	-0.51	0.08	-0.24	-1.93	1.40	1.28	2.19
BLAZ 10074M002	U	2.31	-1.90	-3.20	-0.27	1.96	-1.97	-0.48	3.20
BIDA 00000M000	N	1.32	-1.32	1.30	-1.59	-0.14	0.65	-0.09	2.03
BIDA 00000M000	E	1.68	-0.84	-1.02	0.23	-0.36	3.20	1.66	-1.40
BIDA 00000M000	U	2.13	-2.74	-2.44	-0.78	-0.38	-0.22	1.15	3.39
BRZR 19387M001	N	1.80	0.26	3.13	-1.43	1.07	0.66	-2.17	-1.10
BRZR 19387M001	E	1.03	-0.45	0.33	1.70	0.58	1.29	-1.06	0.05
BRZR 19387M001	U	3.80	3.36	-4.99	1.08	1.39	-6.02	1.37	-3.00
CACE 13447M001	N	0.87	0.61	-0.77	-0.56	-0.55	-1.16	-0.91	
CACE 13447M001	E	0.69	0.19	-0.51	-0.43	0.77	-0.15	-1.14	
CACE 13447M001	U	1.75	-0.59	0.30	0.92	0.74	-3.66	0.05	
CANT 13438M001	N	0.61	0.23	-0.65	0.29	0.91	0.61	-0.67	0.04
CANT 13438M001	E	0.81	0.37	-0.33	-0.16	-1.61	0.46	0.03	0.90
CANT 13438M001	U	5.59	-1.22	-2.56	-3.57	10.14	-1.94	4.04	-6.62
CHER 00000M000	N	1.12	0.75	1.92	-1.03	-1.18	-0.20	-0.23	0.86
CHER 00000M000	E	0.83	0.44	-0.74	1.06	-0.47	1.35	0.42	-0.21
CHER 00000M000	U	3.08	-2.86	0.53	1.46	1.65	-5.95	-0.02	2.86
CREU 13432M001	N	0.57	0.86	-0.02	-0.34	-0.60	-0.17	-0.19	-0.82
CREU 13432M001	E	0.70	-0.68	0.22	0.67	-1.16	-0.60	0.15	0.46
CREU 13432M001	U	3.23	2.77	-1.03	1.11	5.90	-1.80	-3.39	-1.76
EBRE 13410M001	N	1.03	-2.17	0.77	0.59	0.32	-0.18	0.13	0.75
EBRE 13410M001	E	1.23	1.15	-2.41	0.53	-0.96	0.63	0.19	0.57
EBRE 13410M001	U	3.40	-0.94	-4.35	0.54	2.82	-3.60	4.97	1.93
ELGE 19353S001	N	1.23	-0.83	2.51	-1.02	-0.73	0.17	-0.40	0.54
ELGE 19353S001	E	1.08	-0.09	1.13	0.73	-1.02	2.01	-0.06	-0.36
ELGE 19353S001	U	4.34	0.77	3.19	-7.27	1.39	-5.58	3.29	-2.32
EMAZ 17001M001	N	1.09	2.39	-0.24	0.47	-0.55	-0.31	-0.48	-0.72
EMAZ 17001M001	E	1.16	1.88	0.26	-0.70	0.41	-0.34	0.79	-1.76
EMAZ 17001M001	U	4.98	-5.31	-2.98	1.56	-1.20	-2.06	9.52	3.62
GERN 19389M001	N	1.06	0.56	-0.25	-1.53	-0.80	1.69	-0.15	0.69
GERN 19389M001	E	0.93	0.09	1.00	1.12	-0.27	1.46	-0.41	-0.72
GERN 19389M001	U	6.27	1.83	-9.02	-0.29	6.15	-9.42	4.83	-1.13
IGEL 19352S001	N	0.86	0.15	1.32	-1.02	0.70	0.48	-0.90	0.38
IGEL 19352S001	E	0.94	-0.56	-0.08	-0.12	-0.54	1.70	1.35	-0.10
IGEL 19352S001	U	3.36	2.69	-1.89	-1.99	4.71	-4.81	0.20	-2.77
ISPS 19484M001	N	1.02	1.70	-0.45	-0.21	-1.07	0.40	0.25	-1.31
ISPS 19484M001	E	1.50	1.71	-0.36	-0.36	-0.79	3.02	-0.74	0.31
ISPS 19484M001	U	4.07	-2.65	-2.98	-5.99	-1.22	0.06	6.60	-1.64
KAST 19499M001	N	0.81	-0.36	1.24	1.24	0.37	0.02	0.75	0.10
KAST 19499M001	E	0.77	-0.43	0.04	0.38	-0.67	1.13	1.23	-0.09
KAST 19499M001	U	6.57	1.50	-9.89	-4.27	4.39	-6.46	8.35	-3.18
LARE 19440M001	N	1.36	2.56	0.78	0.09	-0.30	1.79	-0.82	-0.13
LARE 19440M001	E	1.13	0.25	0.86	1.06	-1.47	1.38	0.12	1.27
LARE 19440M001	U	5.37	-4.30	-4.87	-1.42	8.06	-7.31	3.20	-0.37
LAZK 19354S001	N	0.70	-0.70	0.82	-0.19	-0.55	0.81	-0.66	0.59
LAZK 19354S001	E	0.86	-0.31	0.34	0.58	-0.09	1.91	-0.01	-0.50

LAZK	19354S001	U	5.17	-3.26	8.71	-0.91	-0.51	-5.94	1.57	-5.93
LEIT	19428M001	N	1.23	2.34	-1.00	0.14	1.21	-1.06	-0.25	-0.04
LEIT	19428M001	E	1.38	-0.31	1.57	-1.70	-0.10	1.66	1.42	-1.07
LEIT	19428M001	U	3.96	-1.88	-4.03	5.69	-0.55	-5.54	0.79	3.25
ORDN	19427M001	N	0.82	0.84	-1.18	0.69	0.24	0.83	0.15	-0.82
ORDN	19427M001	E	1.23	-0.54	0.78	-0.88	-1.34	1.73	0.57	1.51
ORDN	19427M001	U	3.37	-4.31	3.38	-2.42	-0.08	-3.59	1.41	4.16
PAS2	19351S001	N	1.31					0.64	-1.00	1.41
PAS2	19351S001	E	1.95					1.11	2.25	-1.15
PAS2	19351S001	U	3.40					-1.67	2.27	-3.90
PASA	19351S001	N	0.87	0.54	0.94	-0.94	-0.40	0.12	-0.61	1.39
PASA	19351S001	E	1.34	-1.09	0.64	-0.88	-0.56	1.89	2.07	-0.51
PASA	19351S001	U	2.34	1.87	-0.99	0.18	1.89	-3.02	0.21	-3.94
RID1	13448M002	N	0.45	0.52	-0.25	-0.14	0.48	-0.01	0.59	0.51
RID1	13448M002	E	1.25	2.14	0.11	-0.56	-0.48	0.42	-1.97	-0.33
RID1	13448M002	U	2.92	-0.50	2.80	-4.09	2.35	-1.72	-3.66	2.08
SALA	13469M001	N	1.09	-0.14	1.36	1.10	-0.85	-0.10	1.41	-1.17
SALA	13469M001	E	0.58	1.25	-0.30	0.00	-0.13	-0.55	0.14	-0.07
SALA	13469M001	U	2.17	-1.95	3.15	1.55	1.14	3.14	-1.00	-0.28
SCDA	10088M002	N	0.98	-0.33	0.60	-1.48	-0.72	-0.25	0.68	1.42
SCDA	10088M002	E	1.36	0.64	-0.81	0.04	0.69	2.34	1.36	-1.51
SCDA	10088M002	U	2.09	1.46	-2.64	-0.49	2.92	-2.42	-1.57	0.13
SOPU	19386M001	N	0.70	0.31	0.30	1.03	0.27	0.55	-1.14	0.16
SOPU	19386M001	E	0.88	1.07	1.26	-0.25	-0.65	1.03	0.43	-0.40
SOPU	19386M001	U	5.58	-1.46	-3.45	-3.66	7.14	-7.71	5.48	-4.36
TERU	13487M001	N	0.98	0.82	1.39	1.08	-0.85	-0.33	-0.44	
TERU	13487M001	E	0.47	-0.59	0.51	-0.20	-0.46	-0.48	0.07	
TERU	13487M001	U	2.15	2.34	0.74	-3.61	0.59	1.47	1.28	
VITO	19385M001	N	0.78	-0.21	-0.51	0.62	1.02	1.34	0.35	-0.11
VITO	19385M001	E	1.11	-0.33	-1.99	0.63	-0.37	1.45	-0.75	0.28
VITO	19385M001	U	3.21	-1.84	4.22	0.51	2.38	-3.05	-3.57	-3.55
YEBE	13420M001	N	0.62	-0.88	-0.51	-0.36	-0.60	-0.34	-0.77	0.25
YEBE	13420M001	E	0.63	0.95	0.07	-0.17	0.07	-0.58	-0.54	-0.89
YEBE	13420M001	U	2.69	0.53	1.57	3.19	-3.36	-1.62	-2.72	-3.02
ZARA	13462M001	N	0.90	0.86	0.85	-0.89	0.57	0.80	-0.94	
ZARA	13462M001	E	0.72	-0.64	0.13	-0.83	-0.46	0.85	-0.74	
ZARA	13462M001	U	3.69	-7.98	-0.17	-0.20	-0.08	1.85	0.89	

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	-2.14	2.14	-2.37
2	ALAC 13433M001	I W	-0.05	0.48	-1.61
3	ALBA 13452M001	I W	-0.61	-0.53	-0.99
4	ALME 13437M001	I W	-1.99	0.85	3.96
5	BCLN 13412M001	I W	-0.31	-0.92	-1.52
6	BELL 13431M001	I W	1.23	1.72	-2.23
7	BORR 13480M001	I W	-0.29	-1.19	-2.88
8	BRST 10004M004	I W	-2.25	-0.28	-2.52
9	CACE 13447M001	I W	0.21	0.96	1.06
10	CANT 13438M001	I W	-0.44	-0.36	3.55
11	CARG 19412M001	I W	0.10	0.06	0.50
12	CASC 13909S001	I W	-0.33	-0.27	0.77
13	CEU1 13449M002	I W	-0.19	-1.00	0.64
14	COBA 13453M001	I W	0.61	0.41	-2.60
15	CREU 13432M001	I W	-0.88	1.15	3.01
16	EBRE 13410M001	I W	0.83	1.61	0.27
17	ESCO 13435M001	I W	0.35	-2.67	4.89
18	FUNC 13911S001	I W	2.09	0.23	-3.72
19	GAIA 13902M001	I W	-0.22	-0.40	2.33
21	HUEL 13451M001	I W	-0.28	0.94	1.23
22	IZAN 31309M002	I W	0.59	0.43	-3.01
24	LLIV 13436M001	I W	-0.75	0.96	3.39
25	LPAL 81701M001	I W	-1.38	1.87	-5.51
26	LRDC 10023M001	I W	0.29	-0.92	-0.58
27	MALA 13443M001	I W	-2.04	1.62	-1.17
28	MAS1 31303M002	I W	-0.00	1.41	1.08
30	MEL1 19379M001	I W	-0.59	-0.54	0.31
31	PASA 19351S001	I W	-0.89	-0.19	2.80
32	PDEL 31906M004	I W	0.84	-1.46	0.89
33	RABT 35001M002	I W	-0.65	-0.49	-3.57
34	RID1 13448M002	I W	-0.16	-1.30	-0.31
35	SALA 13469M001	I W	-0.48	0.61	2.40
36	SCDA 10088M002	I W	-3.59	-0.90	0.08
38	SONS 13446M001	I W	1.37	0.78	-3.11
39	TERC 31909M001	I W	9.40	-3.97	-4.05
40	TERU 13487M001	I W	2.35	0.14	-0.40
41	VALA 13463M002	I W	-0.53	-0.78	-1.60
42	VALE 13439M001	I W	-0.66	0.28	-1.75
43	VIGO 13450M001	I W	-0.01	-0.54	1.21
44	YEBE 13420M001	I W	0.81	-0.76	2.75
45	ZARA 13462M001	I W	-1.02	0.26	3.81
46	ZIMM 14001M004	I W	1.63	0.55	4.56
	RMS / COMPONENT		1.89	1.20	2.61
	MEAN		0.00	0.00	-0.00
	MIN		-3.59	-3.97	-5.51
	MAX		9.40	2.14	4.89

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 126
RMS OF TRANSFORMATION : 1.99 MM

BARYCENTER COORDINATES:

LATITUDE : 39 41 12.90
LONGITUDE : - 5 21 29.58
HEIGHT : -48.657 KM

PARAMETERS:

TRANSLATION IN N : 0.00 +- 0.31 MM
TRANSLATION IN E : 0.00 +- 0.31 MM
TRANSLATION IN U : 0.00 +- 0.31 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          17031765
NUMBER OF UNKNOWN               235238
NUMBER OF DEGREES OF FREEDOM    16796527
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  2.502373247634838

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
  1  0.00281     -0.0167 -0.0233  0.0235  0.0005 -0.0009 -0.0006  -0.00050
  2  0.00232     0.0037  0.0076  0.0005 -0.0001  0.0001  0.0002  -0.00044
  3  0.00229     0.0088  0.0022 -0.0094  0.0000  0.0004  0.0001  -0.00013
  4  0.00254     0.0026 -0.0100 -0.0014  0.0002  0.0001 -0.0002  -0.00021
  5  0.00277     0.0267  0.0276 -0.0242 -0.0004  0.0011  0.0009  -0.00065
  6  0.00246     0.0156 -0.0003 -0.0137  0.0001  0.0007  0.0001  -0.00060
  7  0.00230     0.0102  0.0144 -0.0110 -0.0002  0.0005  0.0004  -0.00007
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00158      2406900    2.51          2441623          3          1023      33703      0
  2  0.00147      2369321    2.16          2403269          3          1017      32934      0
  3  0.00153      2397870    2.35          2432158          3          1017      33274      0
  4  0.00160      2439600    2.55          2474487          3          1026      33864      0
  5  0.00156      2413713    2.43          2448957          3          1023      34224      0
  6  0.00154      2450636    2.38          2485311          3          1023      33655      0
  7  0.00176      2312430    3.09          2345960          3          981       32552      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 18:140:00000 18:146:86370 LEICA GRX1200PRO -----
ALDA  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
ALSA  A   1 P 18:140:00000 18:146:86370 LEICA GRX1200GGPRO -----
AMUR  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
BIAZ  A   1 P 18:140:00000 18:146:86370 TRI SP90M -----
BIDA  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
BRZR  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
CACE  A   1 P 18:140:00000 18:145:86370 TRIMBLE NETR9 -----
CANT  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
CHER  A   1 P 18:140:00000 18:146:86370 LEICA GRX1200+GNSS -----
CREU  A   1 P 18:140:00000 18:146:86370 LEICA GR50 -----
EBRE  A   1 P 18:140:00000 18:146:86370 LEICA GR50 -----
ELGE  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
EMAZ  A   1 P 18:140:00000 18:146:86370 LEICA GR30 -----
GERN  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
IGEL  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
ISPS  A   1 P 18:140:00000 18:146:86370 TRIMBLE NETR9 -----
KAST  A   1 P 18:140:00000 18:146:86370 LEICA GR30 -----
LARE  A   1 P 18:140:00000 18:146:86370 LEICA GRX1200GGPRO -----
LAZK  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
LEIT  A   1 P 18:140:00000 18:146:86370 LEICA GRX1200+GNSS -----
ORON  A   1 P 18:140:00000 18:146:86370 LEICA GRX1200GGPRO -----
PAS2  A   1 P 18:144:00000 18:146:86370 TPS NET-G3A -----
PASA  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
RIO1  A   1 P 18:140:00000 18:146:86370 LEICA GR25 -----
SALA  A   1 P 18:140:00000 18:146:86370 LEICA GRX1200+GNSS -----
SCOA  A   1 P 18:140:00000 18:146:86370 LEICA GR25 -----
SOPU  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
TERU  A   1 P 18:140:00000 18:145:86370 LEICA GRX1200GGPRO -----
VITO  A   1 P 18:140:00000 18:146:86370 LEICA GR10 -----
YEBE  A   1 P 18:140:00000 18:146:86370 TRIMBLE NETR9 -----
ZARA  A   1 P 18:140:00000 18:145:86370 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 18:140:00000 18:146:86370 LEIAT504      LEIS -----
ALDA  A   1 P 18:140:00000 18:146:86370 LEIAS10       NONE -----
ALSA  A   1 P 18:140:00000 18:146:86370 LEIAX1202GG  NONE -----
AMUR  A   1 P 18:140:00000 18:146:86370 LEIAS10       NONE -----
```

```

BIAZ A 1 P 18:140:00000 18:146:86370 LEIAR25 LEIT -----
BIDA A 1 P 18:140:00000 18:146:86370 LEIAS10 NONE -----
BRZR A 1 P 18:140:00000 18:146:86370 LEIAS10 NONE -----
CACE A 1 P 18:140:00000 18:145:86370 TRM29659.00 NONE -----
CANT A 1 P 18:140:00000 18:146:86370 LEIAR25_R4 LEIT 25066
CHER A 1 P 18:140:00000 18:146:86370 LEIAX1203+GNSS NONE -----
CREU A 1 P 18:140:00000 18:146:86370 LEIAR25_R4 NONE 26357
EBRE A 1 P 18:140:00000 18:146:86370 LEIAR25_R4 NONE 26359
ELGE A 1 P 18:140:00000 18:146:86370 LEIAR25_R4 LEIT -----
EMAZ A 1 P 18:140:00000 18:146:86370 LEIAS10 NONE -----
GERN A 1 P 18:140:00000 18:146:86370 LEIAS10 NONE -----
IGEL A 1 P 18:140:00000 18:146:86370 LEIAR20 LEIM -----
ISPS A 1 P 18:140:00000 18:146:86370 TRM59900.00 SCIS -----
KAST A 1 P 18:140:00000 18:146:86370 LEIAS10 NONE -----
LARE A 1 P 18:140:00000 18:146:86370 LEIAT504 NONE -----
LAZK A 1 P 18:140:00000 18:146:86370 LEIAR25_R4 LEIT -----
LEIT A 1 P 18:140:00000 18:146:86370 LEIAX1203+GNSS NONE -----
ORDN A 1 P 18:140:00000 18:146:86370 LEIAX1202GG NONE -----
PAS2 A 1 P 18:144:00000 18:146:86370 LEIAR20 LEIM 73034
PASA A 1 P 18:140:00000 18:146:86370 LEIAR20 LEIM 73034
RID1 A 1 P 18:140:00000 18:146:86370 LEIAR25_R4 LEIT 25138
SALA A 1 P 18:140:00000 18:146:86370 LEIAR25 NONE -----
SCDA A 1 P 18:140:00000 18:146:86370 TRM55971.00 NONE -----
SOPU A 1 P 18:140:00000 18:146:86370 LEIAS10 NONE -----
TERU A 1 P 18:140:00000 18:145:86370 LEIAT504GG LEIS -----
VITO A 1 P 18:140:00000 18:146:86370 LEIAS10 NONE -----
YEBE A 1 P 18:140:00000 18:146:86370 TRM29659.00 NONE -----
ZARA A 1 P 18:140:00000 18:145:86370 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 18:140:00000 18:146:86370 UNE 3.0460 0.0000 0.0000
ALDA A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
ALSA A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
AMUR A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
BIAZ A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
BIDA A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
BRZR A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
CACE A 1 P 18:140:00000 18:145:86370 UNE 0.0600 0.0000 0.0000
CANT A 1 P 18:140:00000 18:146:86370 UNE 3.0490 0.0000 0.0000
CHER A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
CREU A 1 P 18:140:00000 18:146:86370 UNE 0.0770 0.0000 0.0000
EBRE A 1 P 18:140:00000 18:146:86370 UNE 0.0770 0.0000 0.0000
ELGE A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
EMAZ A 1 P 18:140:00000 18:146:86370 UNE 0.0350 0.0000 0.0000
GERN A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
IGEL A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
ISPS A 1 P 18:140:00000 18:146:86370 UNE 0.0350 0.0000 0.0000
KAST A 1 P 18:140:00000 18:146:86370 UNE 0.0350 0.0000 0.0000
LARE A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
LAZK A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
LEIT A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
ORDN A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
PAS2 A 1 P 18:144:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
PASA A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
RID1 A 1 P 18:140:00000 18:146:86370 UNE 0.0606 0.0000 0.0000
SALA A 1 P 18:140:00000 18:146:86370 UNE 0.0600 0.0000 0.0000
SCDA A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
SOPU A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
TERU A 1 P 18:140:00000 18:145:86370 UNE 0.0600 0.0000 0.0000
VITO A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
YEBE A 1 P 18:140:00000 18:146:86370 UNE 0.0000 0.0000 0.0000
ZARA A 1 P 18:140:00000 18:145:86370 UNE 3.2590 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:

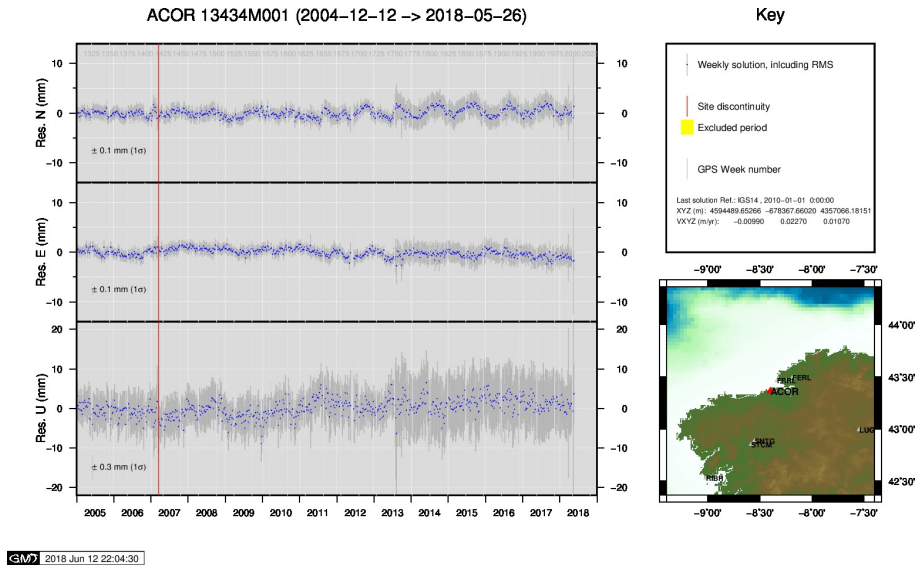
```

2018-06-10 06:11 UTC | PAS21430.180 | RECEIVER TYPE | NET-G3A -> TPS NET-G3A
2018-06-10 09:18 UTC | PAS21440.180 | RECEIVER TYPE | NET-G3A -> TPS NET-G3A
2018-06-10 12:50 UTC | PAS21450.180 | RECEIVER TYPE | NET-G3A -> TPS NET-G3A
2018-06-10 16:06 UTC | PAS21460.180 | RECEIVER TYPE | NET-G3A -> TPS NET-G3A

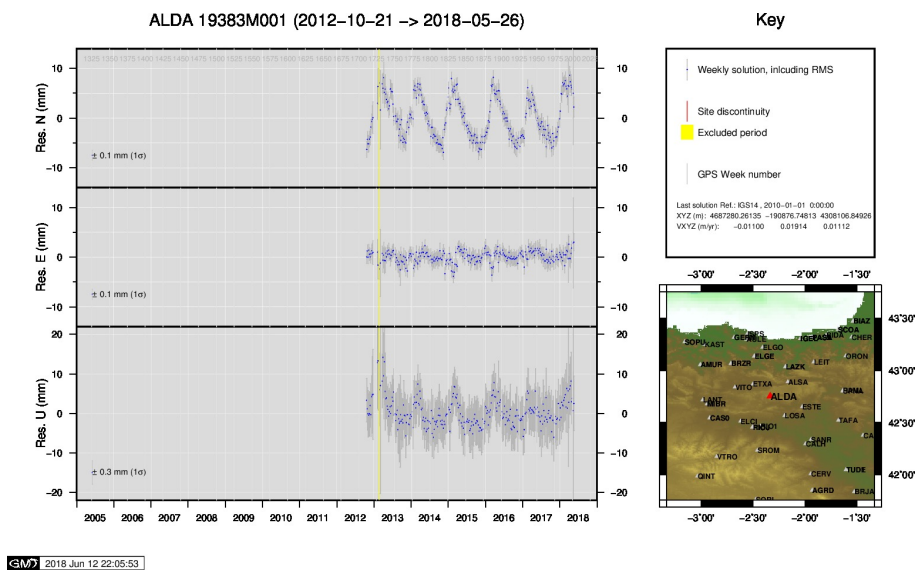
```

9 Cumulative Time Series

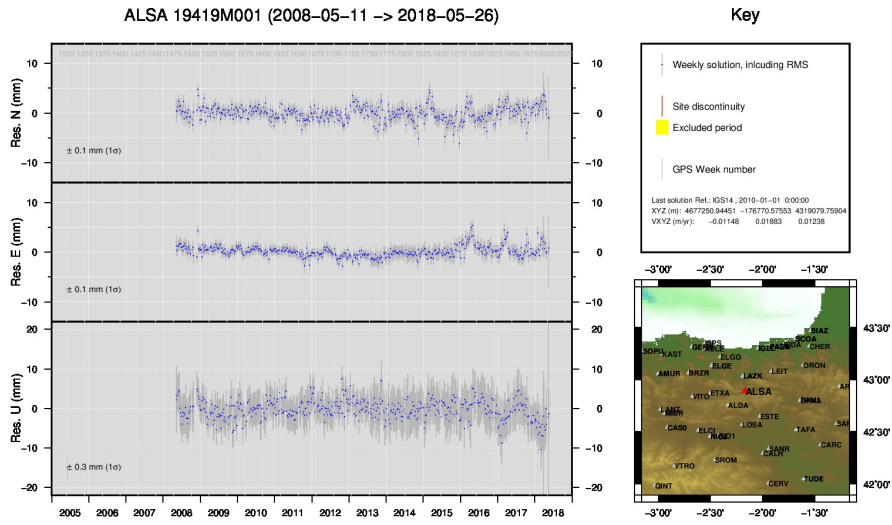
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



1) ACOR

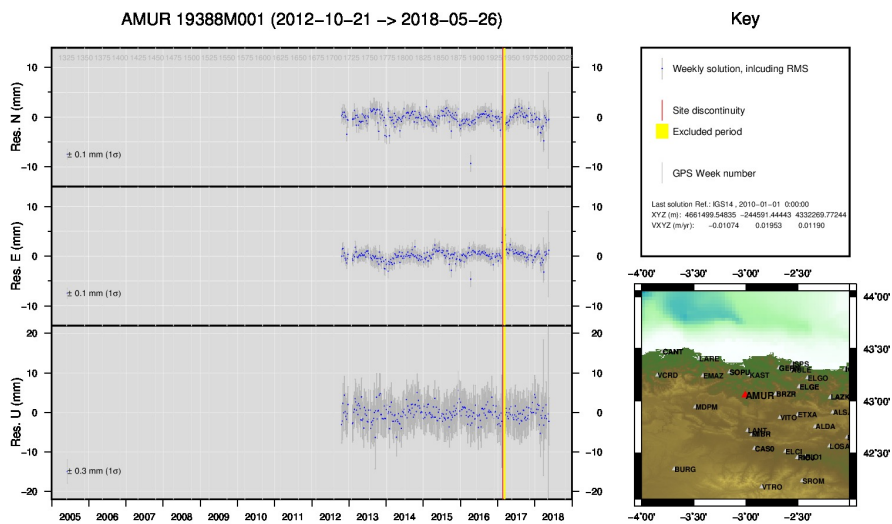


2) ALDA



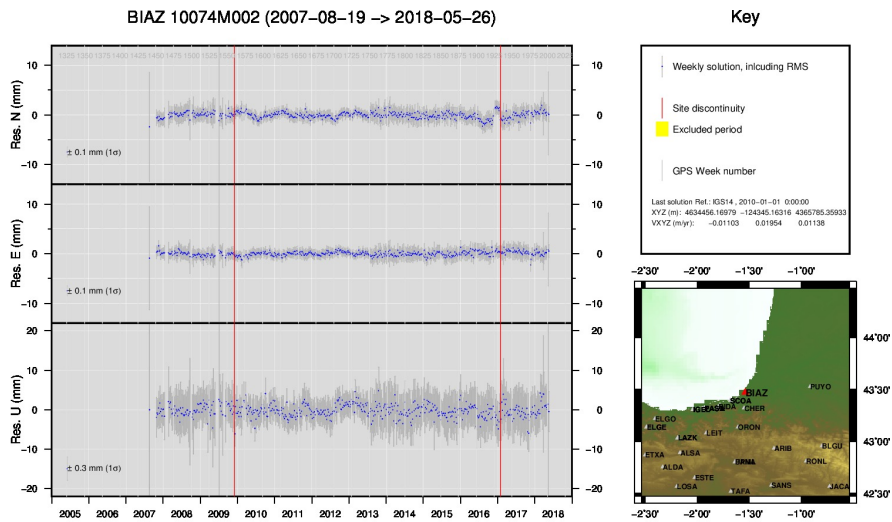
GMW 2018 Jun 12 22:06:51

3) ALSA



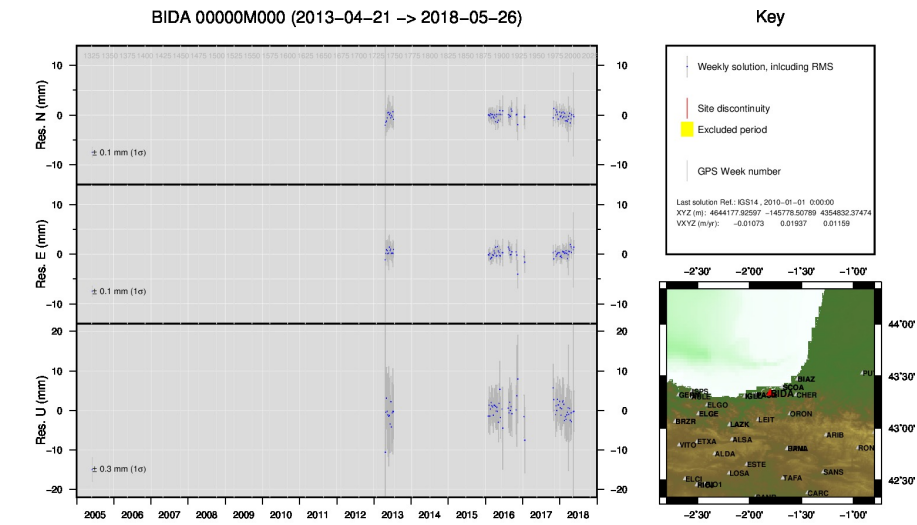
GMW 2018 Jun 12 22:07:04

4) AMUR



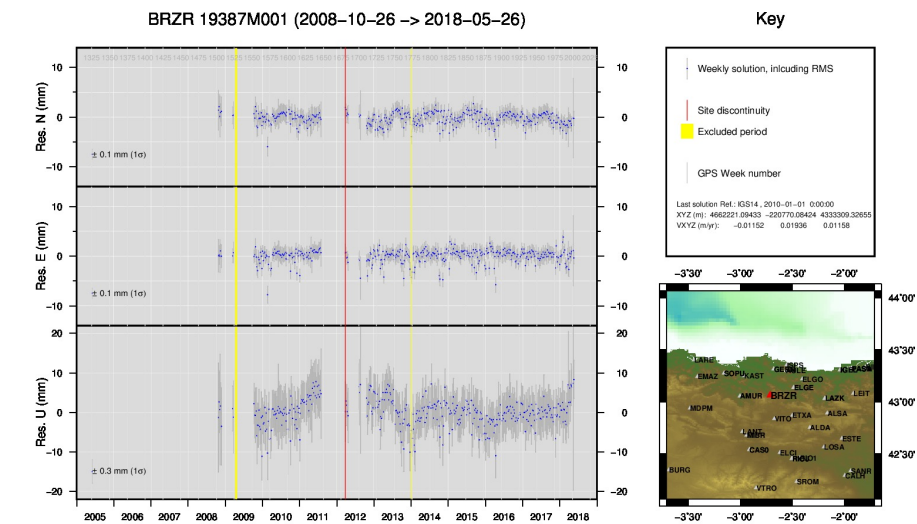
GMW 2018 Jun 12 22:10:23

5) BIAZ



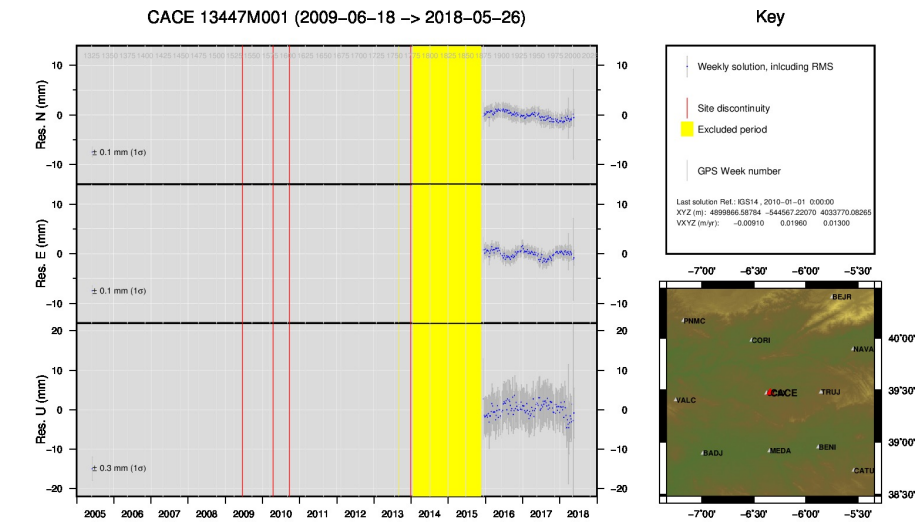
GMW 2018 Jun 12 22:10:30

6) BIDA



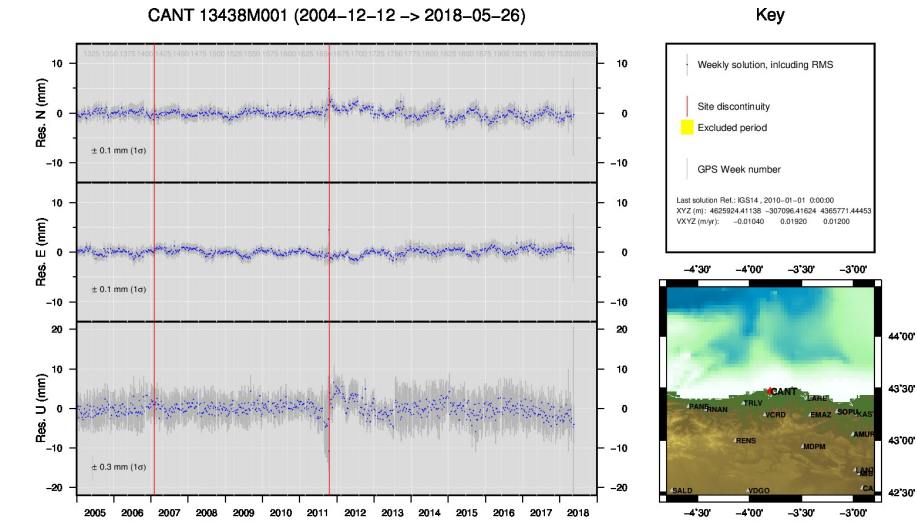
GMW 2018 Jun 12 22:11:40

7) BRZR

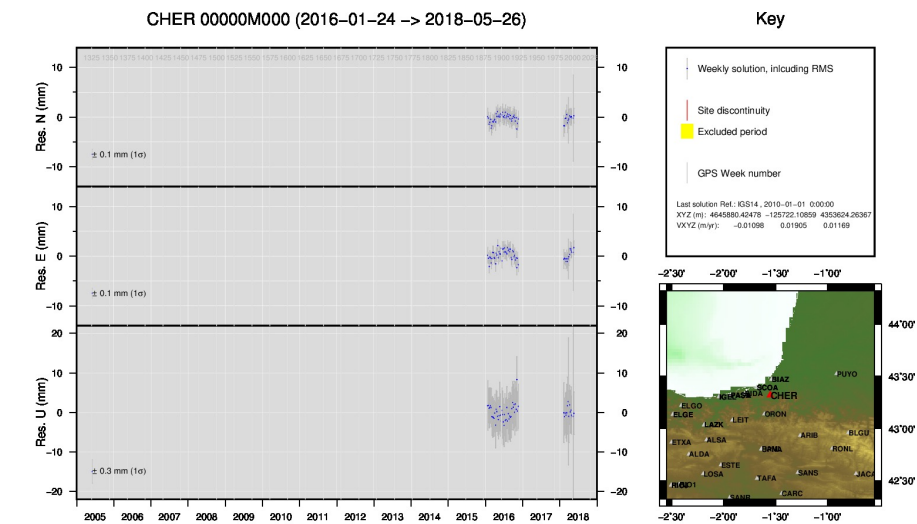


GMW 2018 Jun 12 22:12:16

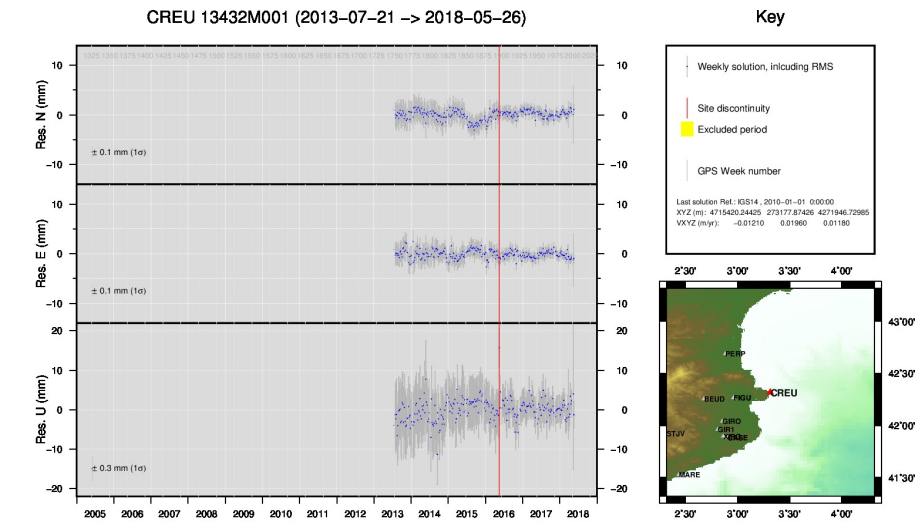
8) CACE



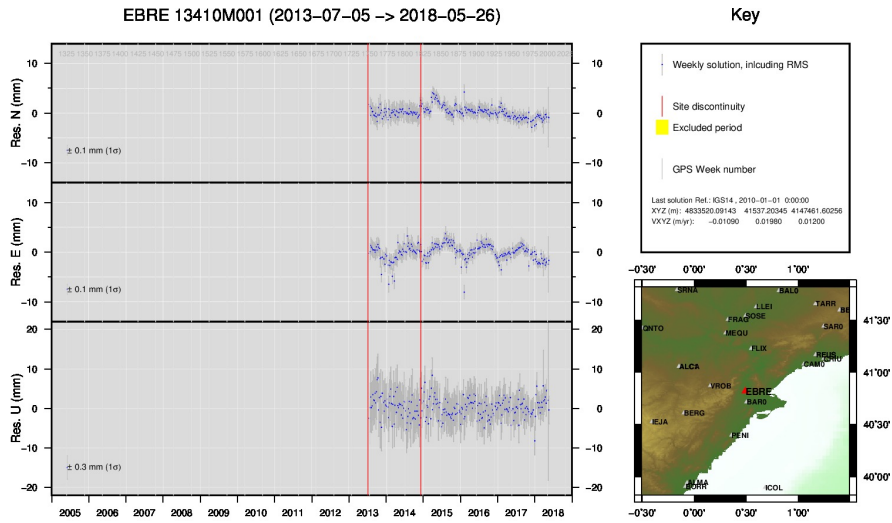
9) CANT



10) CHER

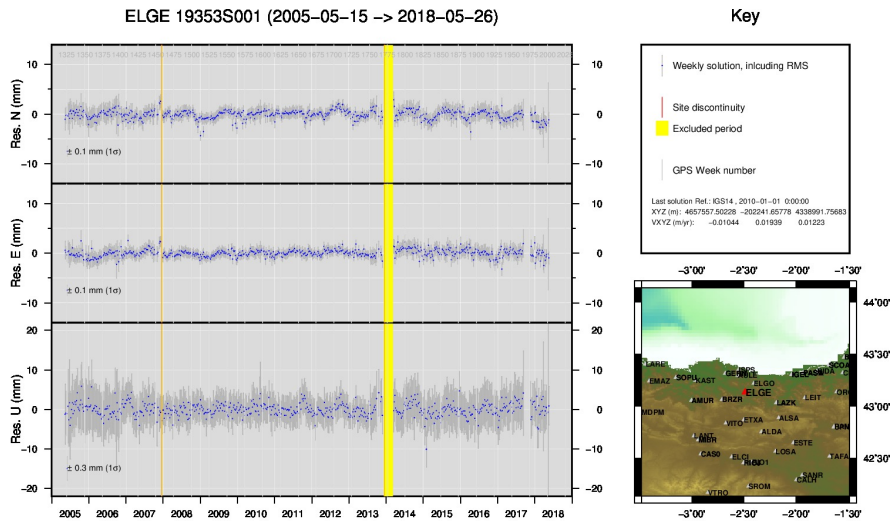


11) CREU



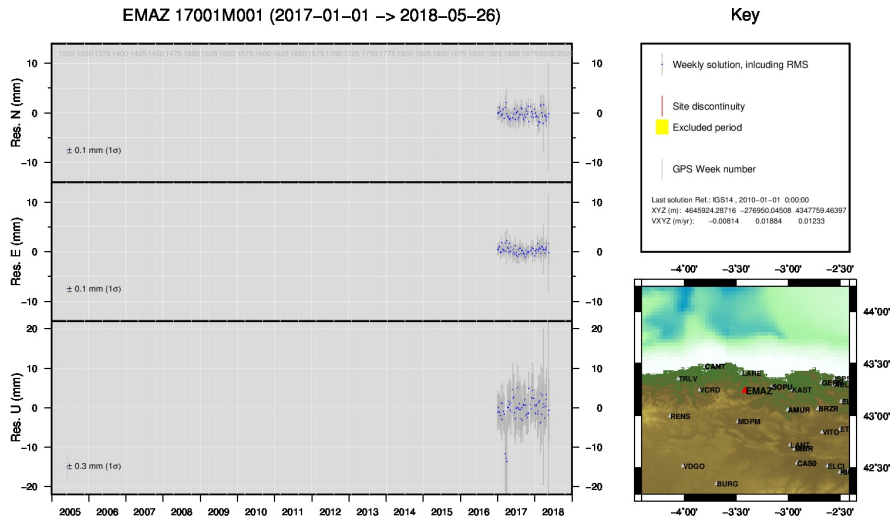
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12) EBRE



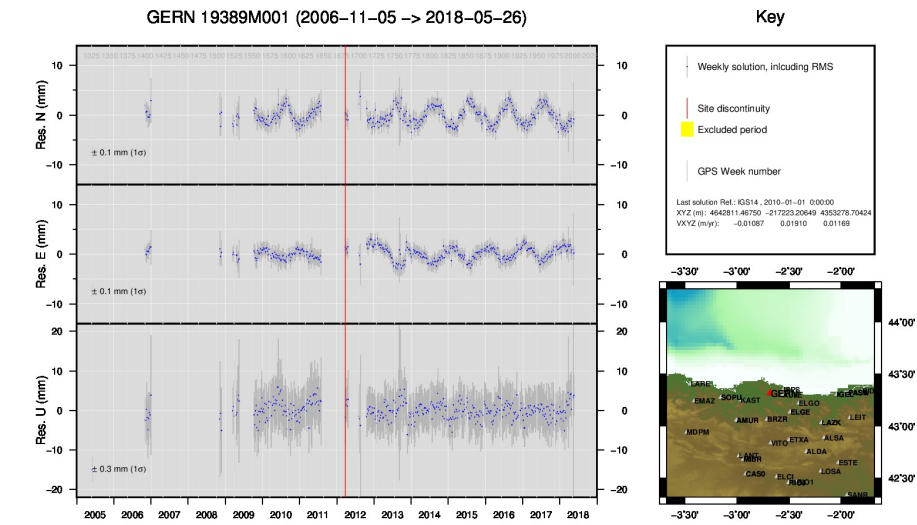
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13) ELGE



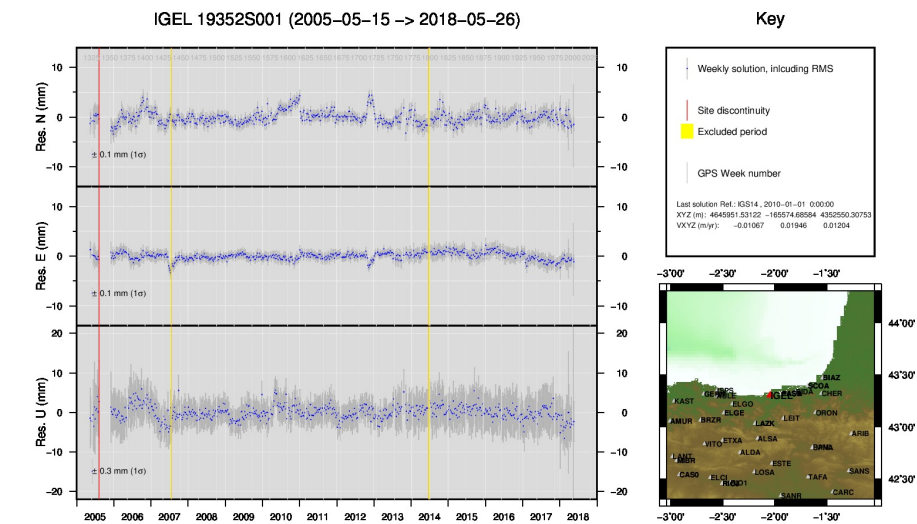
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14) EMAZ



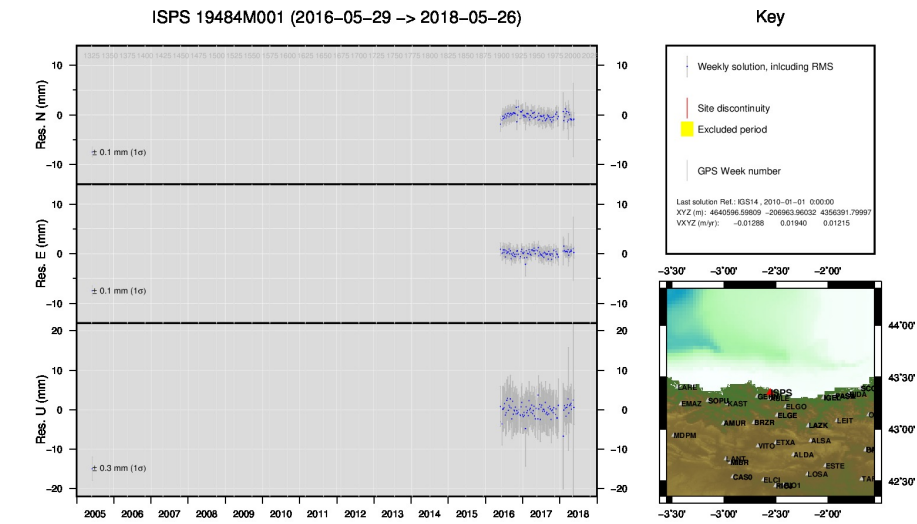
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15) GERN



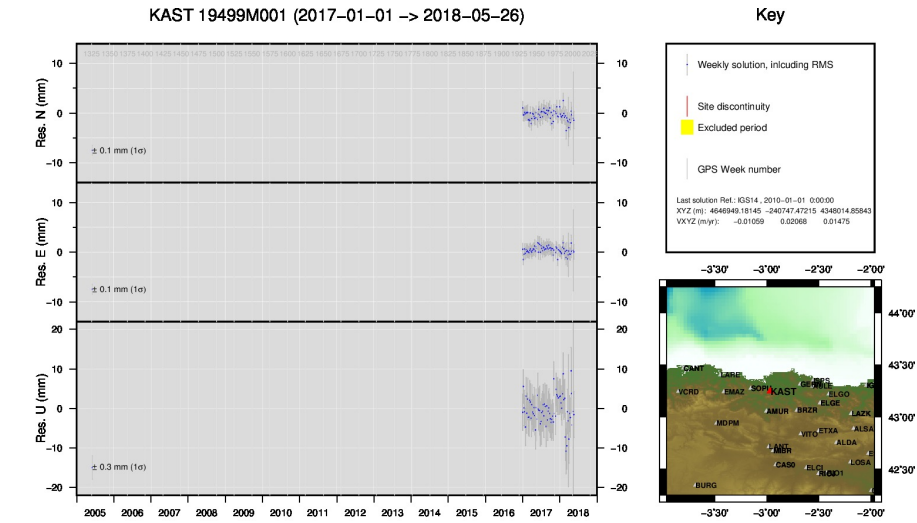
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16) IGEL



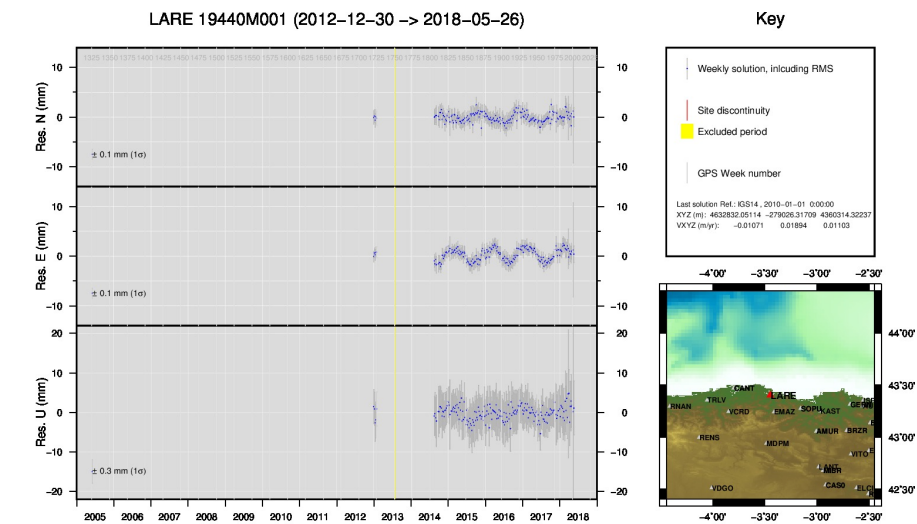
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17) ISPS



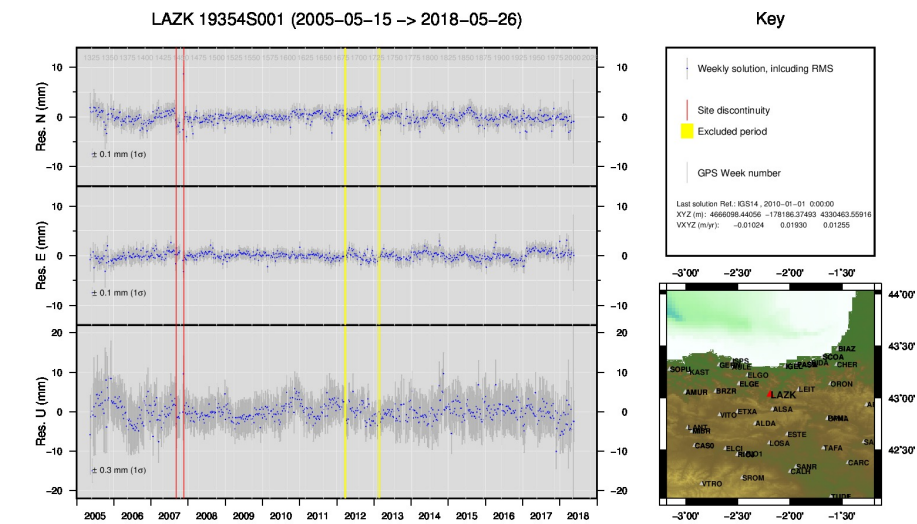
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18) KAST



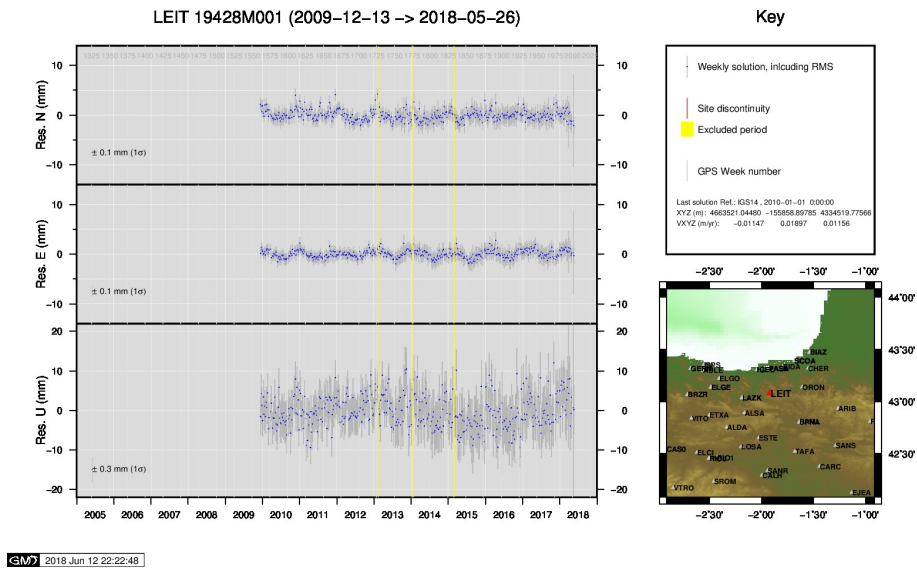
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19) LARE

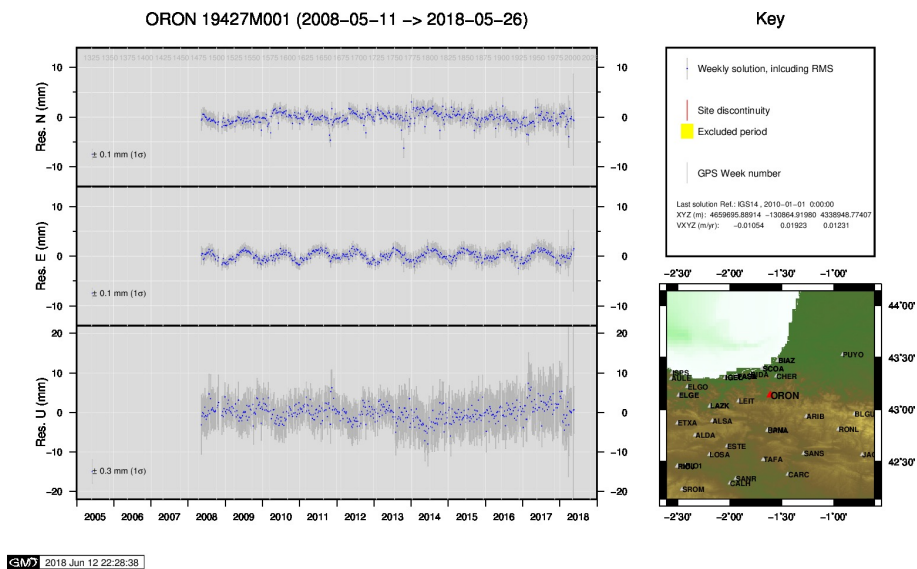


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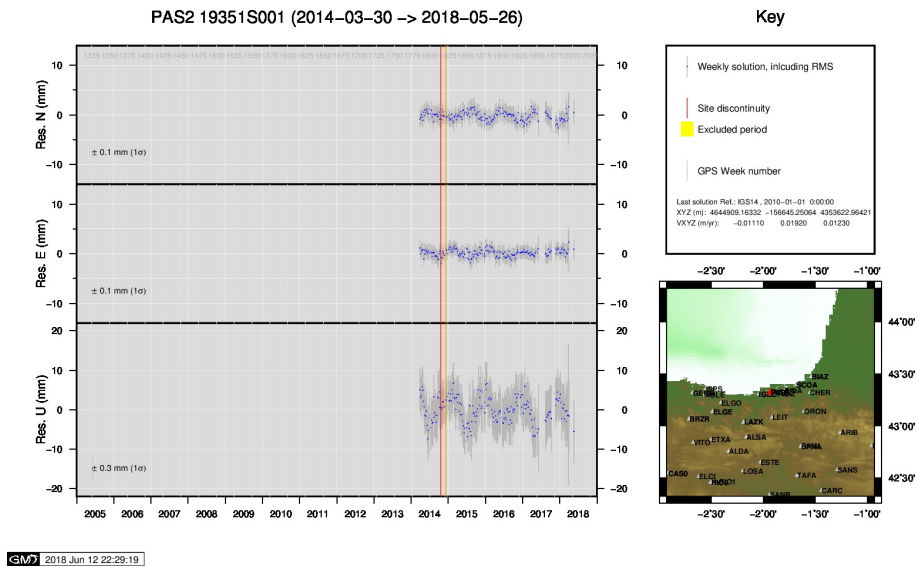
20) LAZK



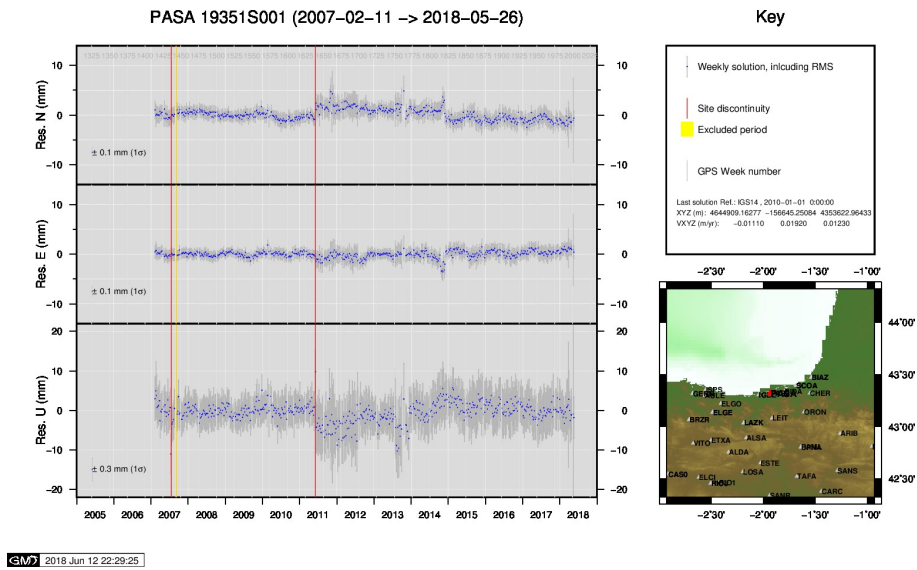
21) LEIT



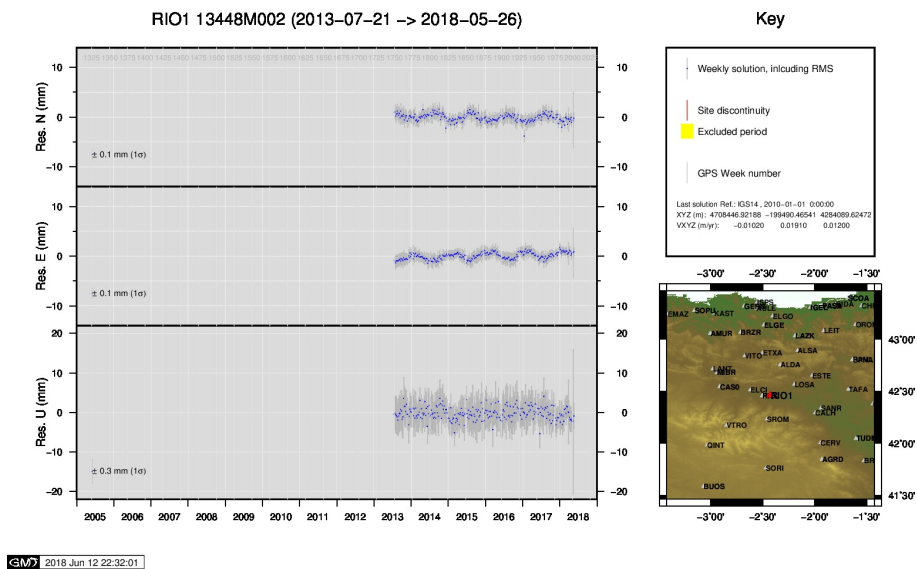
22) ORON



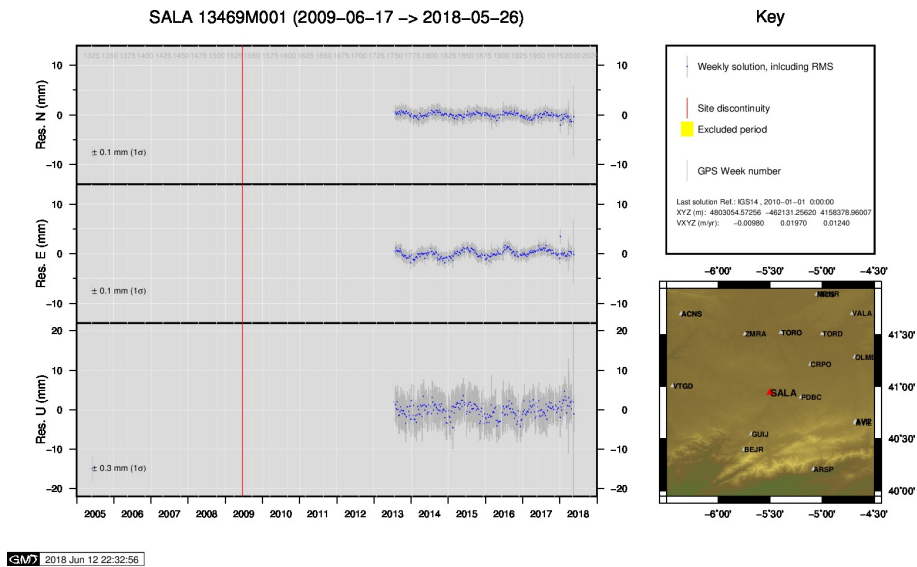
23) PAS2



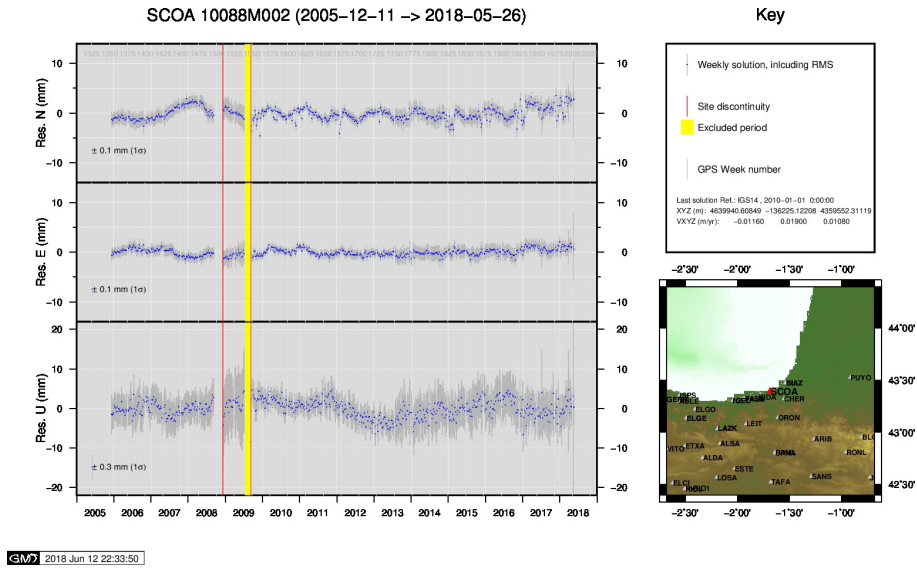
24) PASA



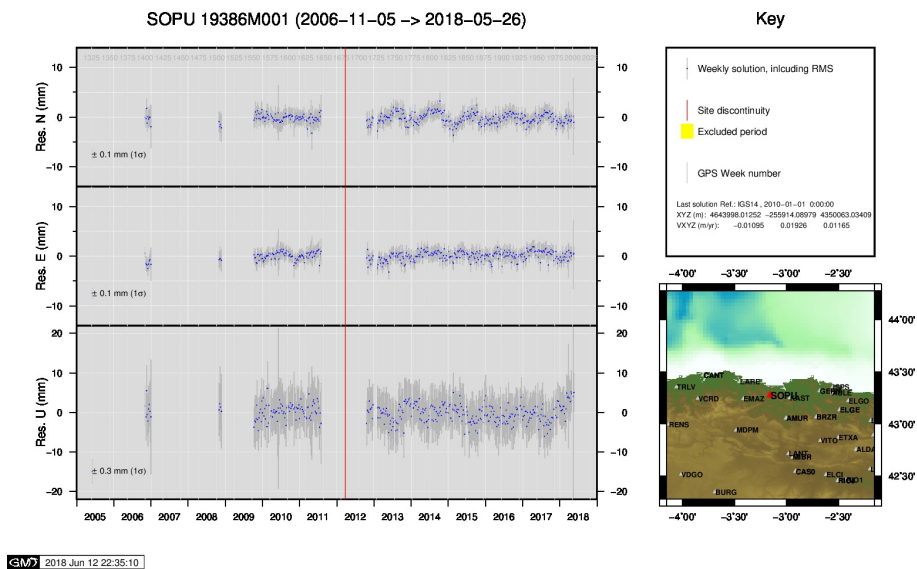
25) RIO1



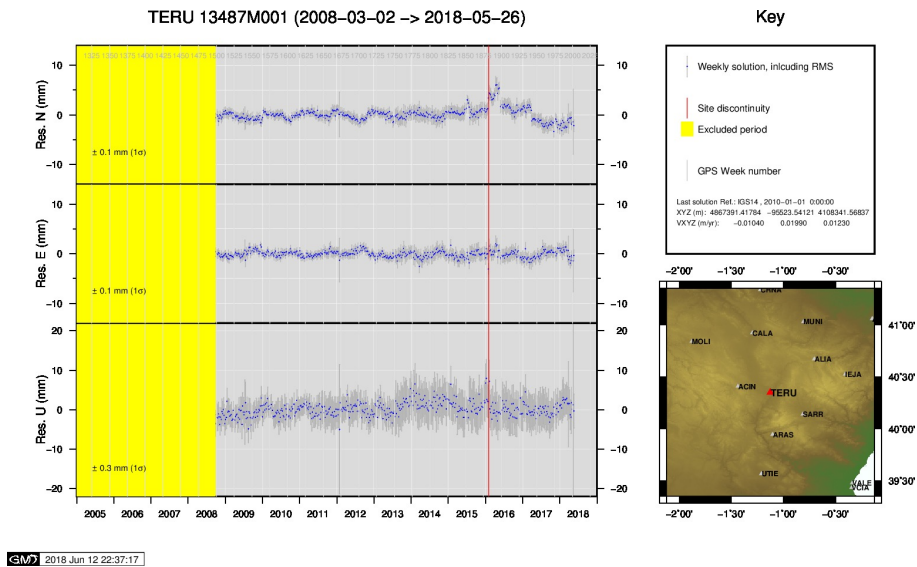
26) SALA



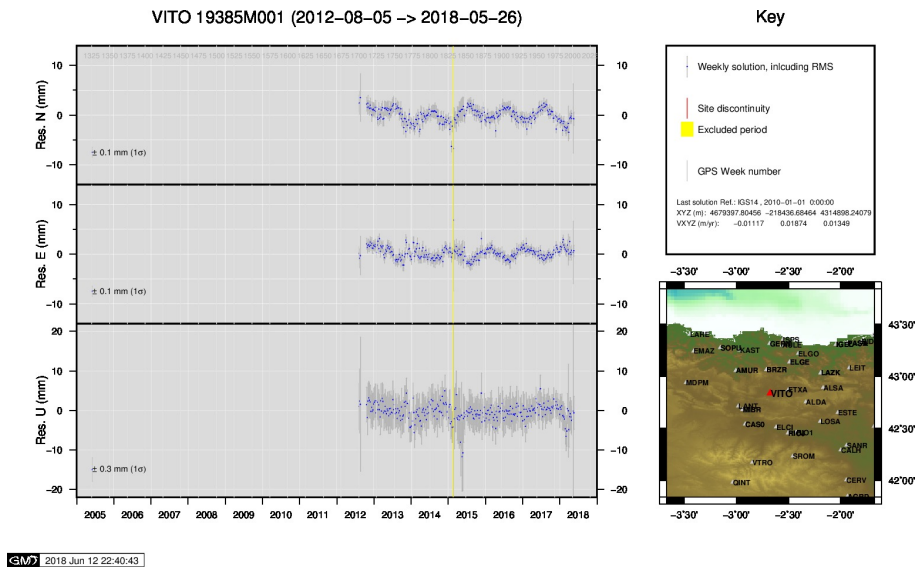
27) SCOA



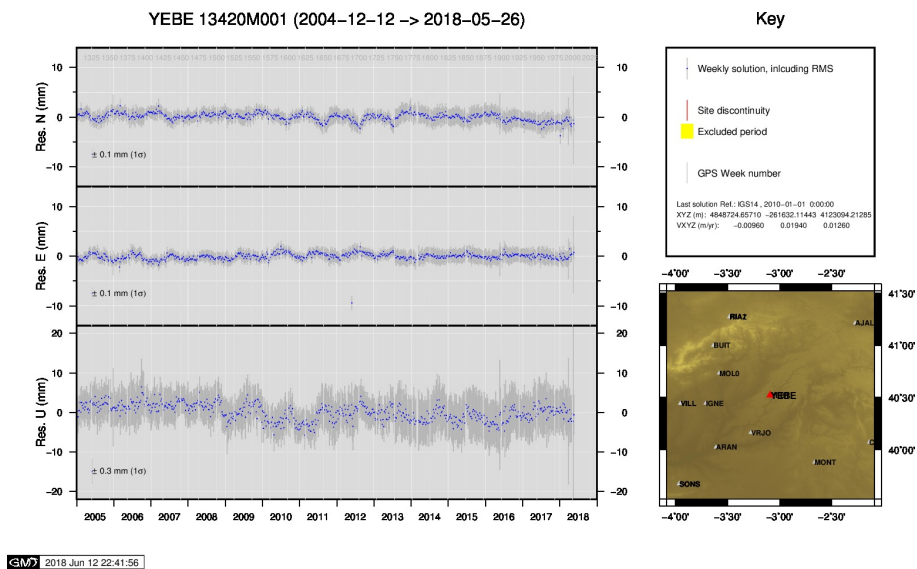
28) SOPU



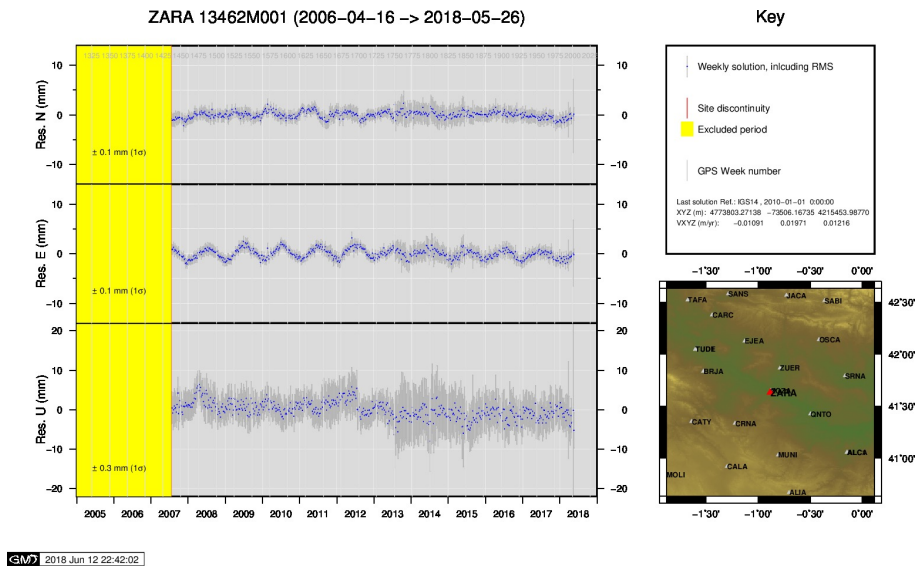
29) TERU



30) VITO



31) YEBE



32) ZARA

