

ARA-DAC Weekly Analysis Result: 1993 (GFA)

Technical Report

GPS Week: 1993 (GFA)

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

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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 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 IGS14

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

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ARA LAC 1993 WEEK FINAL COMBINATION: PRECISE ORBITS                08-APR-18 18:41
-----
LOCAL GEODETIC DATUM: IGS14                EPOCH: 2018-03-21 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
 1 ACRD 13434M001        4594489.57177       -678367.47400      4357066.27141      W
33 ALDA 19383M001        4687280.16867       -190876.58965      4308106.94535      A
42 ALSA 19419M001        4677250.84661       -176770.41993      4319079.85910      A
44 AMUR 19388M001        4661499.46173       -244591.28524      4332269.86929      A
77 BIAZ 10074M002        4634456.06633       -124345.00185      4365785.44610      A
78 BIDA 00000M000        4644177.83812       -145778.34960      4354832.46937      A
88 BRZR 19387M001        4662221.00158       -220769.92500      4333309.42212      A
 9 CACE 13447M001        4899866.51061       -544567.05896      4033770.18788      W
10 CANT 13438M001        4625924.32503       -307096.25752      4365771.54228      W
112 CHER 00000M000        4645880.33636       -125721.95324      4353624.36073      A
15 CREU 13432M001        4715420.14495        273178.03601      4271946.82828      W
16 EBRE 13410M001        4833520.00319        41537.36387      4147461.70086      W
131 ELGE 19353S001        4657557.41784       -202241.49796      4338991.85578      A
133 EMAZ 17001M001        4645924.22270       -276949.88953      4347759.56738      A
153 GERN 19389M001        4642811.32310       -217222.95691      4353278.86819      A
173 IGEL 19352S001        4645951.44200       -165574.52833      4352550.40482      A
178 ISPS 19484M001        4640596.49393       -206963.80060      4356391.90019      A
182 KAST 19499M001        4646949.09448       -240747.30350      4348014.57851      A
185 LARE 19440M001        4632831.96182       -279026.15929      4360314.41290      A
186 LAZK 19354S001        4666098.35434       -178186.21624      4330463.65996      A
190 LEIT 19428M001        4663520.95347       -155858.74162      4334519.87636      A
242 ORDN 19427M001        4659695.80366       -130864.76222      4338948.87653      A
249 PAS2 19351S001        4644909.07163       -156645.09291      4353623.06409      A
 31 PASA 19351S001        4644909.07361       -156645.09252      4353623.06509      W
 34 RID1 13448M002        4708446.83985       -199490.30811      4284089.72378      W
 35 SALA 13469M001        4803054.49236       -462131.09434      4158379.06278      W
 36 SCDA 10088M002        4639940.51353       -136224.96550      4359552.40306      W
298 SOPU 19386M001        4643997.92583       -255913.93273      4350063.13194      A
 40 TERU 13487M001        4867391.33406       -95523.37821      4108341.67040      W
349 VITO 19385M001        4679397.71447       -218436.52892      4314898.35073      A
 44 YEBE 13420M001        4848724.57841       -261631.95555      4123094.31679      W
 45 ZARA 13462M001        4773803.18084       -73506.00972      4215454.08410      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).

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ETRF2000 FINAL COORD. wk 1993                08-APR-18 18:41
-----
LOCAL GEODETIC DATUM: ETRF2000            EPOCH: 2018-03-21 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
 1 ACRD 13434M001        4594489.86838       -678367.98858      4357065.86976      W
33 ALDA 19383M001        4687280.51688       -190877.11248      4308106.54269      A
42 ALSA 19419M001        4677251.19713       -176770.94171      4319079.45734      A
44 AMUR 19388M001        4661499.80550       -244591.80563      4332269.46788      A
77 BIAZ 10074M002        4634456.42583       -124345.51920      4365785.04806      A
78 BIDA 00000M000        4644178.19449       -145778.86798      4354832.07038      A
88 BRZR 19387M001        4662221.34810       -220770.44541      4333309.02094      A
 9 CACE 13447M001        4899866.80079       -544567.60365      4033769.76551      W
10 CANT 13438M001        4625924.66400       -307096.77451      4365771.14274      W
112 CHER 00000M000        4645880.69490       -125722.47173      4353623.96184      A
15 CREU 13432M001        4715420.54280        273177.51196      4271946.42888      W
16 EBRE 13410M001        4833520.36680        41536.82724      4147461.29019      W
131 ELGE 19353S001        4657557.76682       -202242.01785      4338991.45516      A
133 EMAZ 17001M001        4645924.56387       -276950.40846      4347759.16674      A
153 GERN 19389M001        4642811.67134       -217223.47535      4353278.46847      A
173 IGEL 19352S001        4645951.79600       -165575.04695      4352550.00547      A
178 ISPS 19484M001        4640596.84353       -206964.31880      4356391.50075      A
182 KAST 19499M001        4646949.43973       -240747.82253      4348014.57821      A
185 LARE 19440M001        4632832.30358       -279026.67690      4360314.01318      A
186 LAZK 19354S001        4666098.70545       -178186.73691      4330463.25899      A
190 LEIT 19428M001        4663521.30736       -155859.26197      4334519.47584      A
242 ORDN 19427M001        4659696.16065       -130865.28211      4338948.47658      A
249 PAS2 19351S001        4644909.42670       -156645.61140      4353622.66492      A
 31 PASA 19351S001        4644909.42868       -156645.61101      4353622.66592      W
 34 RID1 13448M002        4708447.18549       -199490.83307      4284089.31948      W
 35 SALA 13469M001        4803054.80012       -462131.62933      4158378.64848      W
 36 SCDA 10088M002        4639940.87128       -136225.48343      4359552.00448      W
298 SOPU 19386M001        4643998.26951       -255914.45140      4350062.73168      A
 40 TERU 13487M001        4867391.67969       -95523.91864      4108341.25568      W
349 VITO 19385M001        4679398.06003       -218437.05103      4314897.94833      A
 44 YEBE 13420M001        4848724.90637       -261632.49460      4123093.90151      W
 45 ZARA 13462M001        4773803.53607       -73506.54081      4215453.67648      W

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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 1993                                08-APR-18 18:41
-----
LOCAL GEODETIC DATUM: ETRF2014          EPOCH: 2018-03-21 12:00:00
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
1  ACRD 13434M001        4594489.82552      -678368.02763    4357065.91763    W
33 ALDA 19383M001        4687280.47191      -190877.15281    4308106.59046    A
42 ALSA 19419M001        4677251.15222      -176770.98213    4319079.50514    A
44 AMUR 19388M001        4661499.76093      -244591.84588    4332269.51570    A
77 BIAZ 10074M002        4634456.38117      -124345.55994    4365785.09599    A
78 BIDA 00000M000        4644178.14980      -145778.90862    4354832.11827    A
88 BRZR 19387M001        4662221.30346      -220770.48573    4333309.06876    A
9  CACE 13447M001        4899866.75464      -544567.64200    4033769.81274    W
10 CANT 13438M001        4625924.61993      -307096.81468    4365771.19061    W
112 CHER 00000M000        4645880.65014      -125722.51243    4353624.00974    A
15 CREU 13432M001        4715420.49609      273177.47022    4271946.47687    W
16 EBRE 13410M001        4833520.31970      41536.78669    4147461.33777    W
131 ELGE 19353S001        4657557.72217      -202242.05825    4338991.50299    A
133 EMAZ 17001M001        4645924.51954      -276950.44866    4347759.21457    A
153 GERN 19389M001        4642811.62687      -217223.51576    4353278.51633    A
173 IGEL 19352S001        4645951.75135      -165575.08752    4352550.05335    A
178 ISPS 19484M001        4640596.79905      -206964.35925    4356391.54862    A
182 KAST 19499M001        4646949.39529      -240747.86284    4348014.62606    A
185 LARE 19440M001        4632832.25938      -279026.71714    4360314.06105    A
186 LAZK 19354S001        4666098.66065      -178186.77736    4330463.30682    A
190 LEIT 19428M001        4663521.26252      -155859.30251    4334519.52368    A
242 ORDN 19427M001        4659696.11577      -130865.32274    4338948.52444    A
249 PAS2 19351S001        4644909.38203      -156645.65200    4353622.71280    A
31 PASA 19351S001        4644909.38401      -156645.65161    4353622.71380    W
34 RIO1 13448M002        4708447.14035      -199490.87329    4284089.36720    W
35 SALA 13469M001        4803054.75475      -462131.66832    4158378.69592    W
36 SOA 10088M002        4639940.82661      -136225.52411    4359552.05239    W
298 SOPU 19386M001        4643998.22514      -255914.49167    4350062.77953    A
40 TERU 13487M001        4867391.63268      -95523.95861    4108341.30311    W
349 VITO 19385M001        4679398.01522      -218437.09130    4314897.99611    A
44 YEBE 13420M001        4848724.86002      -261632.53409    4123093.94891    W
45 ZARA 13462M001        4773803.48992      -73506.58120    4215453.72412    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 1993 WEEK FINAL COMBINATION: PRECISE ORBITS 08-APR-18 18:41

Station	#Days	Weekday 0123456	Repeatability (mm)		
			N	E	U
ACOR 13434M001	7	XXXXXX	0.87	0.75	1.63
ALDA 19383M001	7	XXXXXX	2.40	1.55	5.04
ALSA 19419M001	7	XXXXXX	1.97	1.74	4.97
AMUR 19388M001	7	XXXXXX	4.68	2.56	5.47
BLAZ 10074M002	7	XXXXXX	1.25	0.47	2.72
BIDA 00000M000	7	XXXXXX	0.91	1.19	3.86
BRZR 19387M001	7	XXXXXX	1.10	3.57	4.02
CACE 13447M001	7	XXXXXX	0.89	0.61	1.35
CANT 13438M001	7	XXXXXX	0.55	0.86	1.18
CHER 00000M000	7	XXXXXX	1.14	1.23	3.27
CREU 13432M001	7	XXXXXX	1.24	0.81	2.87
EBRE 13410M001	7	XXXXXX	1.20	1.89	9.96
ELGE 19353S001	7	XXXXXX	1.03	1.71	2.84
EMAZ 17001M001	7	XXXXXX	1.96	1.21	3.52
GERN 19389M001	7	XXXXXX	0.97	1.14	2.28
IGEL 19352S001	7	XXXXXX	0.99	0.65	1.73
ISPS 19484M001	7	XXXXXX	0.74	1.23	2.71
KAST 19499M001	7	XXXXXX	0.61	1.72	6.66
LARE 19440M001	7	XXXXXX	0.75	1.30	1.85
LAZK 19354S001	7	XXXXXX	1.23	1.16	8.49
LEIT 19428M001	7	XXXXXX	8.18	2.04	7.64
ORON 19427M001	7	XXXXXX	1.88	0.77	2.61
PAS2 19351S001	6	XXXXXX	1.17	0.80	2.91
PASA 19351S001	7	XXXXXX	0.85	0.39	2.56
RI01 13448M002	7	XXXXXX	1.84	0.68	4.96
SALA 13469M001	7	XXXXXX	0.65	0.43	1.83
SCDA 10088M002	7	XXXXXX	0.87	0.75	3.39
SOPU 19386M001	7	XXXXXX	1.10	1.24	2.33
TERU 13487M001	7	XXXXXX	1.30	1.05	2.13
VITD 19385M001	7	XXXXXX	2.47	1.36	2.71
YEBE 13420M001	7	XXXXXX	0.49	0.85	1.55
ZARA 13462M001	7	XXXXXX	0.68	0.58	2.89

Comparison of individual solutions:

ACOR 13434M001	N	0.87	1.05	-1.25	0.52	-0.86	0.22	0.86	0.29
ACOR 13434M001	E	0.75	-0.32	0.48	0.18	0.39	-1.00	1.03	0.88
ACOR 13434M001	U	1.63	0.69	-3.31	0.20	1.39	-0.41	-1.51	0.28
ALDA 19383M001	N	2.40	-0.70	0.87	2.48	4.55	1.72	1.69	-0.91
ALDA 19383M001	E	1.55	1.23	2.33	-2.24	0.32	-0.10	-1.18	0.95
ALDA 19383M001	U	5.04	4.93	0.41	-5.69	2.01	-1.28	3.01	-8.97
ALSA 19419M001	N	1.97	0.55	1.03	-1.13	1.46	0.11	1.82	3.90
ALSA 19419M001	E	1.74	-1.41	-0.15	-0.71	-0.69	-0.09	2.84	2.67
ALSA 19419M001	U	4.97	9.62	-1.77	-0.15	-2.29	6.10	2.39	-2.02
AMUR 19388M001	N	4.68	3.62	-2.04	-9.39	3.55	0.34	2.06	2.98
AMUR 19388M001	E	2.56	1.40	0.72	-5.22	2.74	0.71	0.92	0.92
AMUR 19388M001	U	5.47	-0.12	-5.97	10.56	-3.09	-4.41	-1.83	0.23
BLAZ 10074M002	N	1.25	-0.05	2.29	0.75	-1.16	-0.30	1.43	0.35
BLAZ 10074M002	E	0.47	-0.25	-0.69	0.69	0.19	0.37	-0.14	0.39
BLAZ 10074M002	U	2.72	-0.65	-3.87	-1.44	0.98	1.84	2.65	-3.96
BIDA 00000M000	N	0.91	1.21	1.34	0.89	-0.31	-0.16	-0.72	0.48
BIDA 00000M000	E	1.19	-2.12	-0.37	-0.15	-0.04	0.94	1.42	0.99
BIDA 00000M000	U	3.86	2.48	6.35	-3.48	-3.67	-2.63	-1.98	-2.60
BRZR 19387M001	N	1.10	-0.15	-0.36	-0.58	1.47	2.07	0.47	0.41
BRZR 19387M001	E	3.57	-0.57	-6.01	4.40	3.25	-0.06	-1.06	-2.97
BRZR 19387M001	U	4.02	5.95	-3.74	2.95	0.28	3.59	-2.52	-4.41
CACE 13447M001	N	0.89	-1.00	-1.41	0.73	-0.59	-0.42	-0.71	-0.46
CACE 13447M001	E	0.61	-0.39	0.04	0.10	0.32	0.08	-0.82	-1.14
CACE 13447M001	U	1.35	-0.52	2.25	-2.15	0.16	0.94	0.13	-0.11
CANT 13438M001	N	0.55	0.87	0.23	-0.13	-0.45	-0.71	0.44	0.30
CANT 13438M001	E	0.86	1.47	0.75	0.55	0.37	0.17	-0.18	1.11
CANT 13438M001	U	1.18	1.51	1.20	1.51	1.33	0.36	-0.04	-0.61
CHER 00000M000	N	1.14	2.01	-0.77	-0.57	-0.13	0.53	1.54	0.42
CHER 00000M000	E	1.23	-0.99	-1.05	1.25	1.04	1.62	0.43	-1.21
CHER 00000M000	U	3.27	-1.43	5.38	-0.96	-2.75	-2.36	1.41	-4.13
CREU 13432M001	N	1.24	-1.65	2.20	-1.00	-0.51	0.51	0.33	0.02
CREU 13432M001	E	0.81	0.26	-1.02	0.18	-1.31	-0.93	0.23	0.41
CREU 13432M001	U	2.87	3.79	-2.40	1.53	-3.03	3.64	-0.75	-2.01
EBRE 13410M001	N	1.20	-1.97	1.32	-0.32	0.84	0.75	-1.26	0.30
EBRE 13410M001	E	1.89	2.58	0.41	-1.95	-1.61	-2.10	1.82	-0.70
EBRE 13410M001	U	9.96	-18.85	-2.06	-0.79	3.36	10.00	10.84	-2.44
ELGE 19353S001	N	1.03	0.44	1.72	-0.32	-0.73	1.07	0.61	1.04
ELGE 19353S001	E	1.71	-0.77	0.39	3.54	-0.03	-1.72	-0.66	-0.96
ELGE 19353S001	U	2.84	-0.76	-0.79	-0.37	6.23	0.06	1.59	-2.37
EMAZ 17001M001	N	1.96	-2.91	-1.51	-1.13	-0.92	-1.15	0.00	2.97
EMAZ 17001M001	E	1.21	2.64	0.01	0.22	0.09	0.70	-0.71	-0.83
EMAZ 17001M001	U	3.52	4.04	-0.21	4.26	-0.96	-3.03	2.99	-4.58
GERN 19389M001	N	0.97	0.52	1.75	0.96	-0.95	-0.05	-0.45	0.57
GERN 19389M001	E	1.14	0.05	-0.43	2.15	0.94	0.55	-0.61	-1.18
GERN 19389M001	U	2.28	2.89	-3.02	-1.04	-1.33	-1.28	0.75	2.92
IGEL 19352S001	N	0.99	1.68	0.43	0.34	-0.21	-0.74	1.48	0.13
IGEL 19352S001	E	0.65	-0.04	0.02	1.35	-0.08	-0.64	0.54	-0.05
IGEL 19352S001	U	1.73	1.23	0.37	-0.36	-0.75	-3.08	0.64	-2.37
ISPS 19484M001	N	0.74	0.69	0.87	-0.82	-0.50	0.78	0.73	0.04
ISPS 19484M001	E	1.23	1.17	0.69	-0.91	0.41	-0.77	-1.82	1.52
ISPS 19484M001	U	2.71	-3.77	-0.63	1.63	2.80	3.37	1.84	-2.02
KAST 19499M001	N	0.61	0.65	0.39	0.67	-0.35	-0.36	0.35	-0.90
KAST 19499M001	E	1.72	2.37	0.13	1.44	0.29	1.13	0.31	-2.95
KAST 19499M001	U	6.66	5.93	0.18	6.75	4.98	-4.47	-6.41	-9.98
LARE 19440M001	N	0.75	-0.50	-0.29	0.71	-1.03	-0.97	0.12	0.72
LARE 19440M001	E	1.30	0.64	-0.09	0.80	0.31	1.43	-0.03	-2.64
LARE 19440M001	U	1.85	2.79	1.30	2.42	1.54	0.81	1.42	0.33
LAZK 19354S001	N	1.23	1.39	1.66	0.19	1.55	-0.77	0.08	1.18
LAZK 19354S001	E	1.16	-0.43	1.26	-1.70	1.28	-0.87	0.59	0.78

LAZK	19354S001	U	8.49	11.11	-4.18	-15.37	5.41	0.94	5.04	0.16
LEIT	19428M001	N	8.18	-3.43	-2.36	18.63	2.12	-3.45	-2.42	-3.81
LEIT	19428M001	E	2.04	-0.23	-0.26	4.83	0.05	-0.99	-0.44	-0.67
LEIT	19428M001	U	7.64	2.76	-2.30	13.95	-5.82	-9.60	-4.00	0.58
ORDN	19427M001	N	1.88	-0.74	0.36	3.37	2.57	-1.47	-0.15	-0.70
ORDN	19427M001	E	0.77	0.70	-0.00	0.20	-0.11	-0.45	-0.63	1.55
ORDN	19427M001	U	2.61	-0.41	1.31	3.40	-0.91	-2.74	-1.37	-4.15
PAS2	19351S001	N	1.17		-0.65	0.47	-1.20	1.13	1.55	1.05
PAS2	19351S001	E	0.80		0.09	0.64	0.85	0.35	0.79	-1.13
PAS2	19351S001	U	2.91		4.19	-2.39	-0.91	-2.83	-3.17	-0.32
PASA	19351S001	N	0.85	1.43	0.15	-0.08	-0.62	0.43	1.02	0.78
PASA	19351S001	E	0.39	0.17	-0.14	0.67	0.34	0.30	0.15	-0.41
PASA	19351S001	U	2.56	4.00	1.62	-1.18	-2.06	-3.11	-1.81	-1.49
RID1	13448M002	N	1.84	1.15	0.33	-1.50	-3.20	0.42	1.65	1.90
RID1	13448M002	E	0.68	-0.43	0.66	-0.25	0.56	0.28	1.29	0.20
RID1	13448M002	U	4.96	2.57	0.79	2.98	8.46	-5.63	-2.05	-4.94
SALA	13469M001	N	0.65	-0.28	-0.23	0.37	0.80	-0.63	0.77	-0.81
SALA	13469M001	E	0.43	0.55	0.34	0.44	0.56	0.37	-0.16	-0.03
SALA	13469M001	U	1.83	1.95	1.35	2.05	2.58	-1.42	0.18	1.25
SCDA	10088M002	N	0.87	1.44	1.51	0.10	-0.16	0.17	0.27	-0.22
SCDA	10088M002	E	0.75	-1.15	0.27	0.88	0.26	1.03	-0.24	0.13
SCDA	10088M002	U	3.39	-2.64	-1.27	1.84	2.72	0.32	1.09	-6.95
SOPU	19386M001	N	1.10	0.81	0.90	-0.37	-0.28	0.07	2.34	0.26
SOPU	19386M001	E	1.24	-1.24	-0.25	0.41	2.11	0.79	-1.15	-1.01
SOPU	19386M001	U	2.33	-2.61	0.96	0.01	4.67	-1.38	-0.77	0.70
TERU	13487M001	N	1.30	-1.65	-1.26	-1.59	1.33	0.91	0.28	0.79
TERU	13487M001	E	1.05	-0.11	1.49	-0.41	-0.09	-0.24	-0.26	-2.03
TERU	13487M001	U	2.13	-1.47	1.26	-0.71	2.56	0.69	1.12	-3.82
VITO	19385M001	N	2.47	1.73	-1.75	-3.93	3.63	0.45	0.71	1.15
VITO	19385M001	E	1.36	0.61	2.38	0.46	1.35	-1.06	-1.06	0.88
VITO	19385M001	U	2.71	1.15	-1.84	-0.74	0.45	-5.45	-2.89	-0.74
YEBE	13420M001	N	0.49	-0.25	-0.67	0.08	-0.56	-0.54	-0.31	-0.49
YEBE	13420M001	E	0.85	-0.25	0.65	-1.76	-0.33	0.41	-0.61	-0.21
YEBE	13420M001	U	1.55	0.24	-0.53	1.15	-0.69	-1.39	-2.70	-1.76
ZARA	13462M001	N	0.68	-0.58	0.35	-0.47	0.91	0.69	0.72	0.51
ZARA	13462M001	E	0.58	0.44	0.25	0.11	0.28	-0.66	1.10	0.02
ZARA	13462M001	U	2.89	4.98	1.91	-1.05	-2.53	-3.50	-0.68	-1.18

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	-0.76	0.69	-1.40
2	ALAC 13433M001	I W	0.69	-0.20	-2.77
3	ALBA 13452M001	I W	0.02	-1.57	-2.42
4	ALME 13437M001	I W	-1.03	-0.05	1.79
5	BCLN 13412M001	I W	-1.98	-1.36	-3.87
6	BELL 13431M001	I W	2.70	1.26	-3.33
7	BORR 13480M001	I W	-0.65	-2.40	-2.73
8	BRST 10004M004	I W	-0.28	-0.38	-0.99
9	CACE 13447M001	I W	0.01	-0.25	3.19
10	CANT 13438M001	I W	-0.07	-0.45	-0.65
11	CARG 19412M001	I W	0.93	-1.11	2.35
12	CASC 13909S001	I W	-1.90	-1.07	3.71
13	CEU1 13449M002	I W	0.78	2.02	6.77
14	COBA 13453M001	I W	-0.42	0.47	-0.21
15	CREU 13432M001	I W	-0.37	-0.32	-1.29
16	EBRE 13410M001	I W	1.68	2.49	-2.25
17	ESCO 13435M001	I W	-0.08	-1.31	4.48
18	FUNC 13911S001	I W	2.04	-0.12	-1.75
19	GAIA 13902M001	I W	-0.59	-1.31	4.71
21	HUEL 13451M001	I W	-1.21	3.36	3.22
22	IZAN 13109M002	I W	-0.49	-1.43	3.15
24	LLIV 13436M001	I W	-2.32	-0.82	1.22
25	LPAL 81701M001	I W	-2.26	0.19	1.35
26	LR0C 10023M001	I W	-0.26	-0.84	0.01
27	MALA 13443M001	I W	-1.29	1.12	3.94
28	MAS1 31303M002	I W	0.88	-0.09	0.89
30	MELI 19379M001	I W	-0.88	-0.19	6.02
31	PASA 19351S001	I W	0.73	-0.29	-2.00
32	PDEL 31906M004	I W	-0.43	-0.06	-1.42
33	RABT 35001M002	I W	-0.13	-0.99	-2.03
34	RID1 13448M002	I W	1.20	-0.71	-4.22
35	SALA 13469M001	I W	-0.45	0.56	0.09
36	SCOA 10088M002	I W	-2.06	-0.62	-3.80
38	SONS 13446M001	I W	2.19	1.51	-0.34
39	TERC 31909M001	I W	4.41	-1.82	-1.28
40	TERU 13487M001	I W	1.21	0.52	-3.53
41	VALA 13463M002	I W	-0.60	1.80	-0.36
42	VALE 13439M001	I W	0.08	0.55	-4.00
43	VIGO 13450M001	I W	-0.35	-0.02	1.30
44	YEBE 13420M001	I W	0.11	0.74	1.05
45	ZARA 13462M001	I W	0.12	1.87	-2.39
46	ZIMM 14001M004	I W	1.09	0.62	-0.21
	RMS / COMPONENT		1.36	1.22	2.87
	MEAN		0.00	0.00	-0.00
	MIN		-2.32	-2.40	-4.22
	MAX		4.41	3.36	6.77

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 126
RMS OF TRANSFORMATION : 1.97 MM

BARYCENTER COORDINATES:

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

PARAMETERS:

TRANSLATION IN N : 0.00 +- 0.30 MM
TRANSLATION IN E : 0.00 +- 0.30 MM
TRANSLATION IN U : 0.00 +- 0.30 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          17644441
NUMBER OF UNKNOWN               229889
NUMBER OF DEGREES OF FREEDOM    17414552
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  2.531219198063909

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")
      X          Y          Z          X          Y          Z      Scale (ppm)
-----
 1  0.00256      0.0061  0.0073 -0.0078 -0.0001  0.0003  0.0002 -0.00006
 2  0.00238      0.0005 -0.0058 -0.0031  0.0002  0.0001 -0.0001  0.00019
 3  0.00368     -0.0175  0.0037  0.0101  0.0000 -0.0006  0.0002  0.00131
 4  0.00228      0.0054  0.0175 -0.0026 -0.0003  0.0002  0.0005 -0.00009
 5  0.00228     -0.0115  0.0100  0.0124 -0.0002 -0.0005  0.0002  0.00028
 6  0.00232      0.0126 -0.0068 -0.0114  0.0001  0.0005 -0.0002 -0.00052
 7  0.00278      0.0130 -0.0089 -0.0076  0.0002  0.0005 -0.0002 -0.00107
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
 1  0.00143      2479261      2.04          2513364      3          1014      33092      0
 2  0.00225      2447811      5.04          2482834      3          1020      34006      0
 3  0.00138      2462645      1.90          2496444      3          1014      32788      0
 4  0.00137      2503230      1.89          2535895      3          1017      31651      0
 5  0.00138      2524702      1.91          2556917      3          1020      31198      0
 6  0.00151      2497160      2.27          2531078      3          1011      32910      0
 7  0.00161      2493701      2.59          2527909      3          1002      33209      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 18:077:00000 18:083:86370 LEICA GRX1200PRO -----
ALDA  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
ALSA  A  1 P 18:077:00000 18:083:86370 LEICA GRX1200GGPRO -----
AMUR  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
BIAZ  A  1 P 18:077:00000 18:083:86370 TRI SP90M -----
BIDA  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
BRZR  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
CACE  A  1 P 18:077:00000 18:083:86370 TRIMBLE NETR9 -----
CANT  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
CHER  A  1 P 18:077:00000 18:083:86370 LEICA GRX1200+GNSS -----
CREU  A  1 P 18:077:00000 18:083:86370 LEICA GR50 -----
EBRE  A  1 P 18:077:00000 18:083:86370 LEICA GR50 -----
ELGE  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
EMAZ  A  1 P 18:077:00000 18:083:86370 LEICA GR30 -----
GERN  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
IGEL  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
ISPS  A  1 P 18:077:00000 18:083:86370 TRIMBLE NETR9 -----
KAST  A  1 P 18:077:00000 18:083:86370 LEICA GR30 -----
LARE  A  1 P 18:077:00000 18:083:86370 LEICA GRX1200GGPRO -----
LAZK  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
LEIT  A  1 P 18:077:00000 18:083:86370 LEICA GRX1200+GNSS -----
ORON  A  1 P 18:077:00000 18:083:86370 LEICA GRX1200GGPRO -----
PAS2  A  1 P 18:078:00000 18:083:86370 TPS NET-G3A -----
PASA  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
RIO1  A  1 P 18:077:00000 18:083:86370 LEICA GR25 -----
SALA  A  1 P 18:077:00000 18:083:86370 LEICA GRX1200+GNSS -----
SCOA  A  1 P 18:077:00000 18:083:86370 LEICA GR25 -----
SOPU  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
TERU  A  1 P 18:077:00000 18:083:86370 LEICA GRX1200GGPRO -----
VITO  A  1 P 18:077:00000 18:083:86370 LEICA GR10 -----
YEBE  A  1 P 18:077:00000 18:083:86370 TRIMBLE NETR9 -----
ZARA  A  1 P 18:077:00000 18:083:86370 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 18:077:00000 18:083:86370 LEIAT504      LEIS -----
ALDA  A  1 P 18:077:00000 18:083:86370 LEIAS10      NONE -----
ALSA  A  1 P 18:077:00000 18:083:86370 LEIAX1202GG  NONE -----
AMUR  A  1 P 18:077:00000 18:083:86370 LEIAS10      NONE -----
```

```

BIAZ A 1 P 18:077.00000 18:083:86370 LEIAR25 LEIT -----
BIDA A 1 P 18:077.00000 18:083:86370 LEIAS10 NONE -----
BRZR A 1 P 18:077.00000 18:083:86370 LEIAS10 NONE -----
CACE A 1 P 18:077.00000 18:083:86370 TRM29659.00 NONE -----
CANT A 1 P 18:077.00000 18:083:86370 LEIAR25_R4 LEIT 25066
CHER A 1 P 18:077.00000 18:083:86370 LEIAX1203+GNSS NONE -----
CREU A 1 P 18:077.00000 18:083:86370 LEIAR25_R4 NONE 26357
EBRE A 1 P 18:077.00000 18:083:86370 LEIAR25_R4 NONE 26359
ELGE A 1 P 18:077.00000 18:083:86370 LEIAR25_R4 LEIT -----
EMAZ A 1 P 18:077.00000 18:083:86370 LEIAS10 NONE -----
GERN A 1 P 18:077.00000 18:083:86370 LEIAS10 NONE -----
IGEL A 1 P 18:077.00000 18:083:86370 LEIAR20 LEIM -----
ISPS A 1 P 18:077.00000 18:083:86370 TRM59900.00 SCIS -----
KAST A 1 P 18:077.00000 18:083:86370 LEIAS10 NONE -----
LARE A 1 P 18:077.00000 18:083:86370 LEIAT504 NONE -----
LAZK A 1 P 18:077.00000 18:083:86370 LEIAR25_R4 LEIT -----
LEIT A 1 P 18:077.00000 18:083:86370 LEIAX1203+GNSS NONE -----
ORDN A 1 P 18:077.00000 18:083:86370 LEIAX1202GG NONE -----
PAS2 A 1 P 18:078.00000 18:083:86370 LEIAR20 LEIM 73034
PASA A 1 P 18:077.00000 18:083:86370 LEIAR20 LEIM 73034
RID1 A 1 P 18:077.00000 18:083:86370 LEIAR25_R4 LEIT 25138
SALA A 1 P 18:077.00000 18:083:86370 LEIAR25 NONE -----
SCDA A 1 P 18:077.00000 18:083:86370 TRM55971.00 NONE -----
SOPU A 1 P 18:077.00000 18:083:86370 LEIAS10 NONE -----
TERU A 1 P 18:077.00000 18:083:86370 LEIAT504GG LEIS -----
VITO A 1 P 18:077.00000 18:083:86370 LEIAS10 NONE -----
YEBE A 1 P 18:077.00000 18:083:86370 TRM29659.00 NONE -----
ZARA A 1 P 18:077.00000 18:083:86370 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 18:077.00000 18:083:86370 UNE 3.0460 0.0000 0.0000
ALDA A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
ALSA A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
AMUR A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
BIAZ A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
BIDA A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
BRZR A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
CACE A 1 P 18:077.00000 18:083:86370 UNE 0.0600 0.0000 0.0000
CANT A 1 P 18:077.00000 18:083:86370 UNE 3.0490 0.0000 0.0000
CHER A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
CREU A 1 P 18:077.00000 18:083:86370 UNE 0.0770 0.0000 0.0000
EBRE A 1 P 18:077.00000 18:083:86370 UNE 0.0770 0.0000 0.0000
ELGE A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
EMAZ A 1 P 18:077.00000 18:083:86370 UNE 0.0350 0.0000 0.0000
GERN A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
IGEL A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
ISPS A 1 P 18:077.00000 18:083:86370 UNE 0.0350 0.0000 0.0000
KAST A 1 P 18:077.00000 18:083:86370 UNE 0.0350 0.0000 0.0000
LARE A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
LAZK A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
LEIT A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
ORDN A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
PAS2 A 1 P 18:078.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
PASA A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
RID1 A 1 P 18:077.00000 18:083:86370 UNE 0.0606 0.0000 0.0000
SALA A 1 P 18:077.00000 18:083:86370 UNE 0.0600 0.0000 0.0000
SCDA A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
SOPU A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
TERU A 1 P 18:077.00000 18:083:86370 UNE 0.0600 0.0000 0.0000
VITO A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
YEBE A 1 P 18:077.00000 18:083:86370 UNE 0.0000 0.0000 0.0000
ZARA A 1 P 18:077.00000 18:083:86370 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:

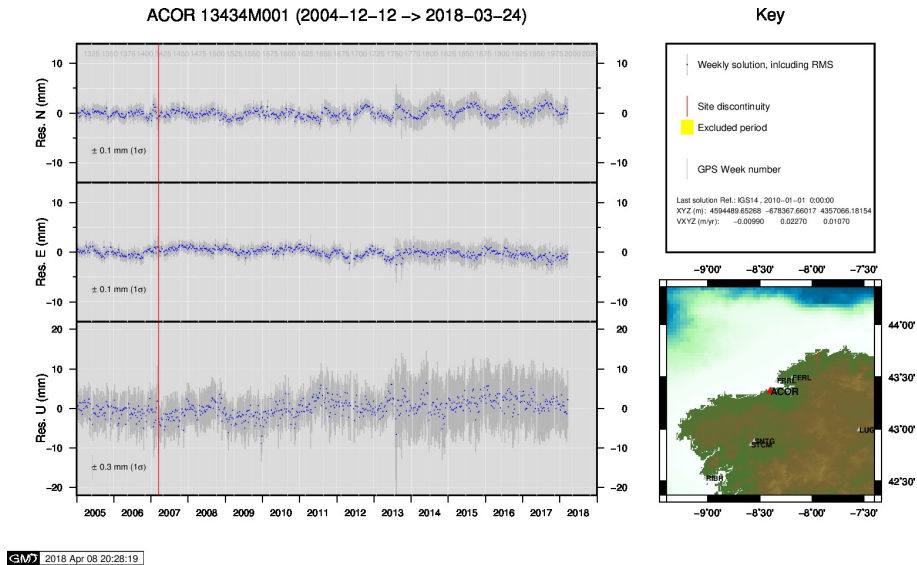
```

2018-04-07 21:18 UTC | BRZR0770.180 | RECEIVER FIRM. VERS. | 4.02 -> 4.02/6.522
2018-04-07 21:19 UTC | GERN0770.180 | RECEIVER FIRM. VERS. | 4.10 -> 4.10/6.523
2018-04-07 21:19 UTC | SOPU0770.180 | RECEIVER FIRM. VERS. | 4.02 -> 4.02/6.522
2018-04-08 00:33 UTC | BRZR0780.180 | RECEIVER FIRM. VERS. | 4.02 -> 4.02/6.522
2018-04-08 00:33 UTC | GERN0780.180 | RECEIVER FIRM. VERS. | 4.10 -> 4.10/6.523
2018-04-08 00:33 UTC | SOPU0780.180 | RECEIVER FIRM. VERS. | 4.02 -> 4.02/6.522

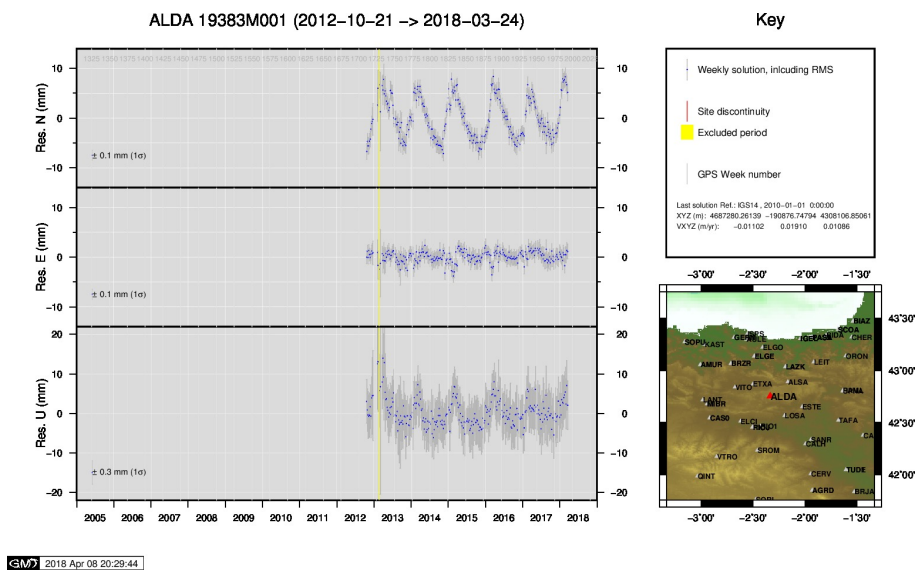
```

9 Cumulative Time Series

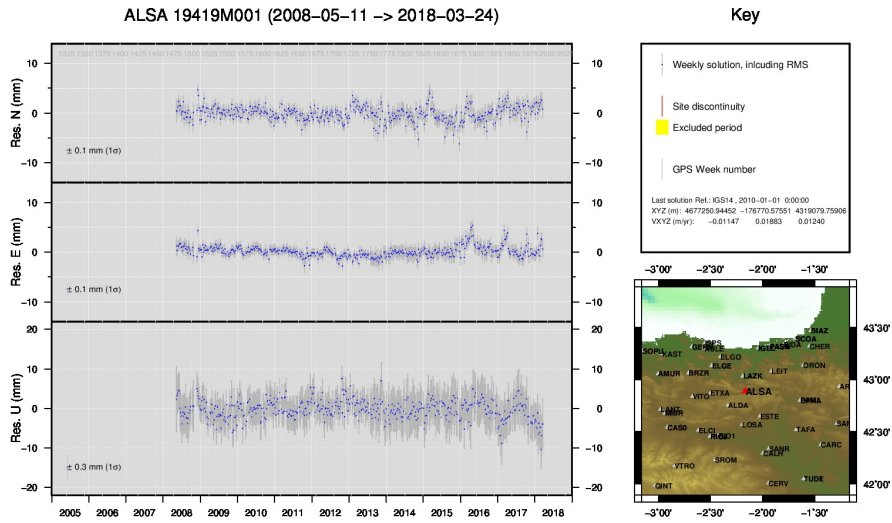
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



1) ACOR

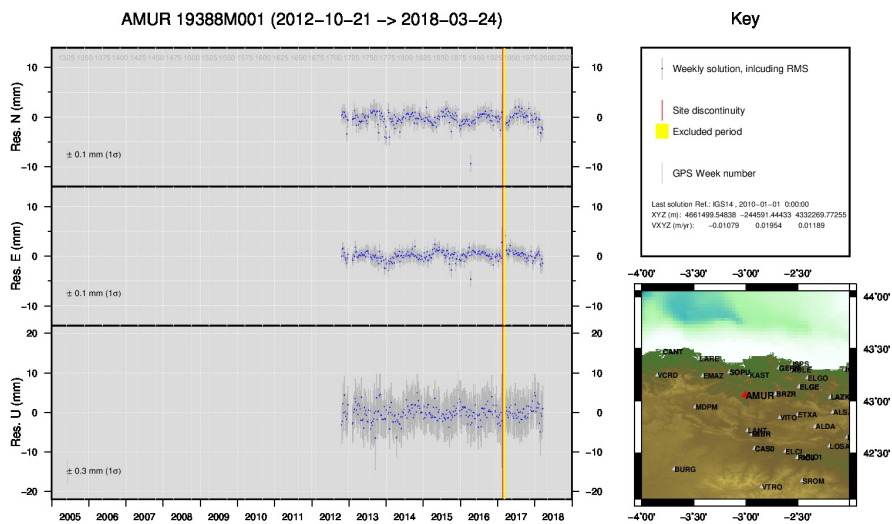


2) ALDA



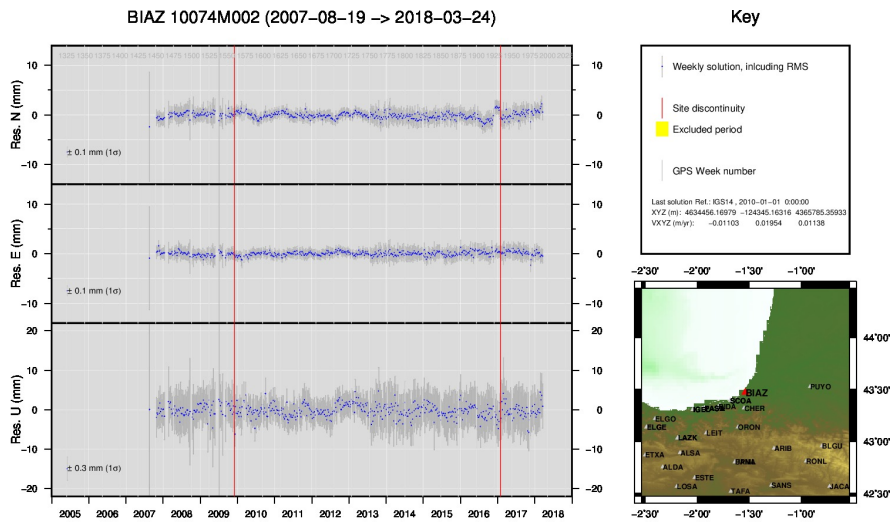
GMW 2018 Apr 08 20:30:44

3) ALSA



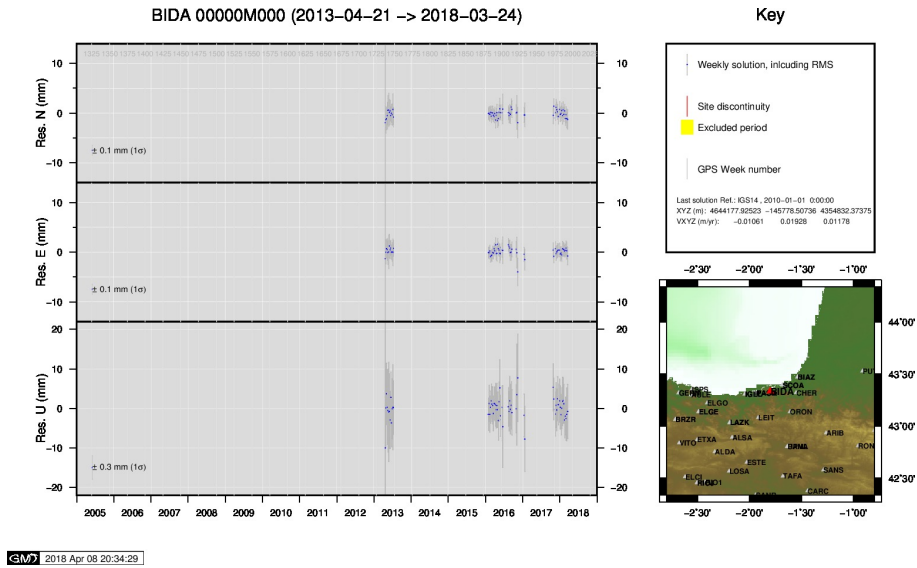
GMW 2018 Apr 08 20:30:57

4) AMUR

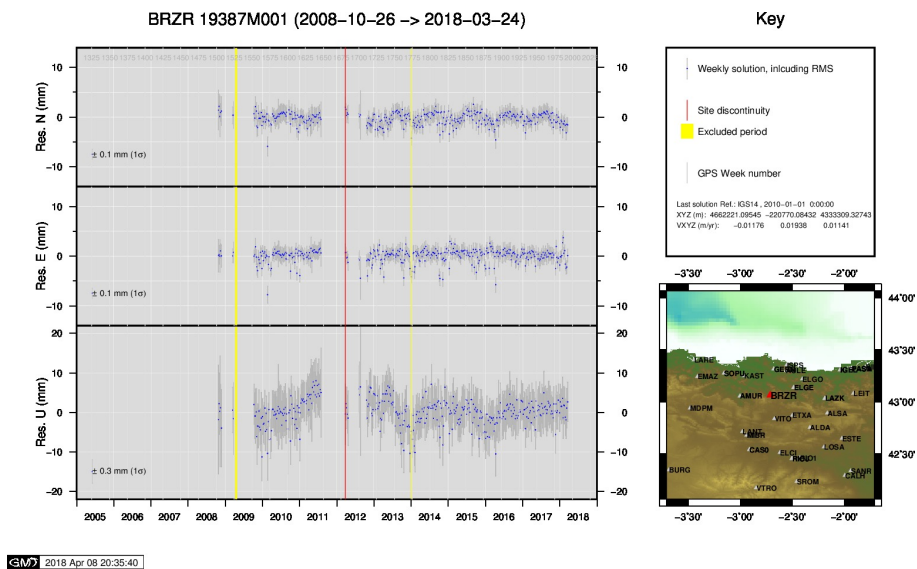


GMW 2018 Apr 08 20:34:22

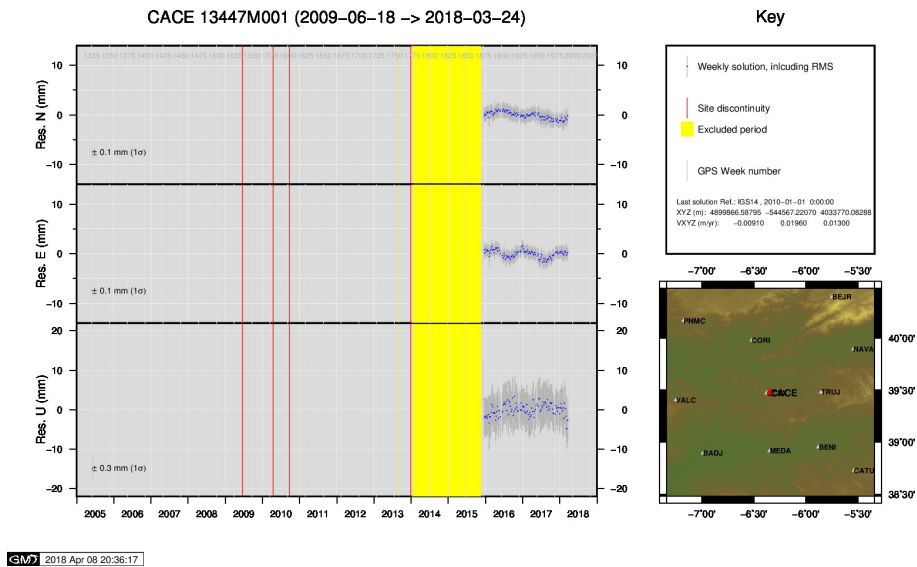
5) BIAZ



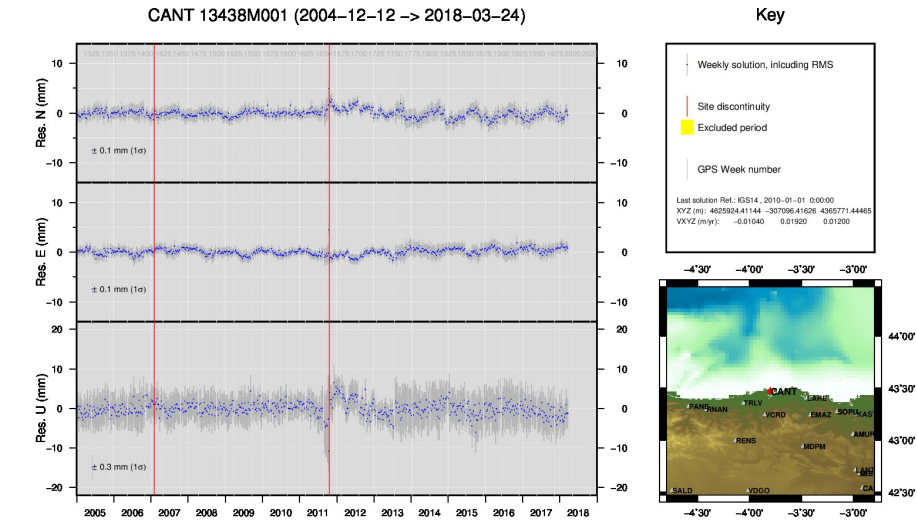
6) BIDA



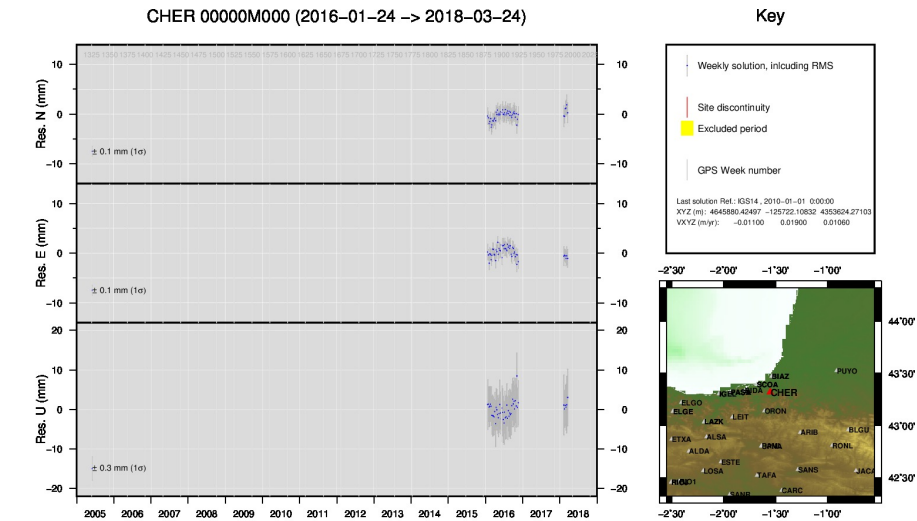
7) BRZR



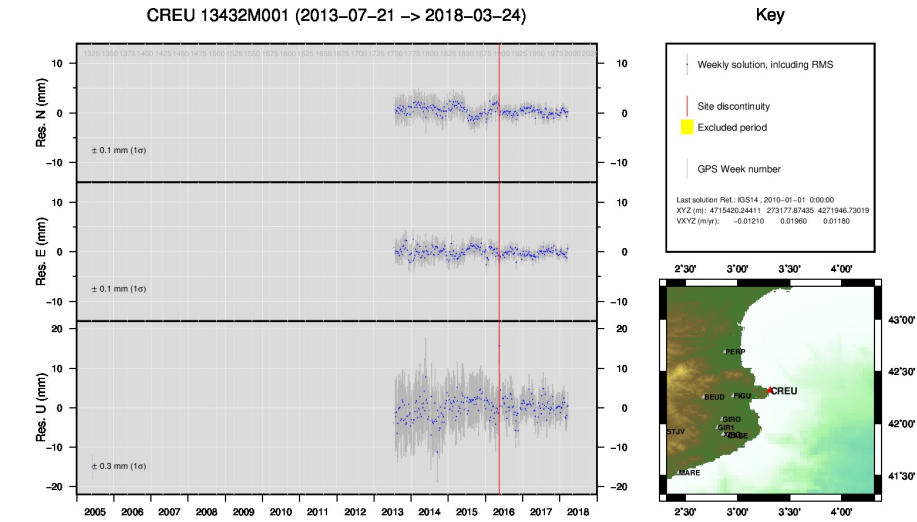
8) CACE



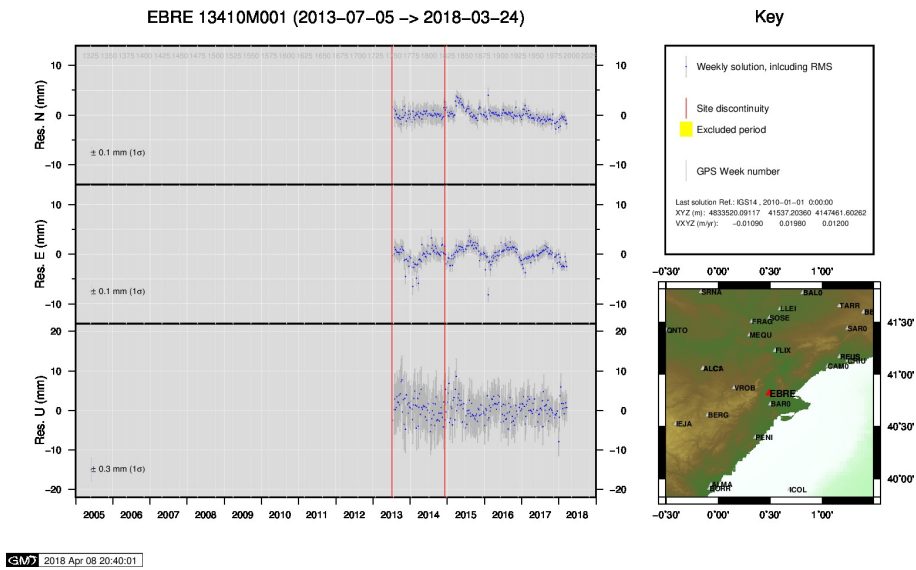
9) CANT



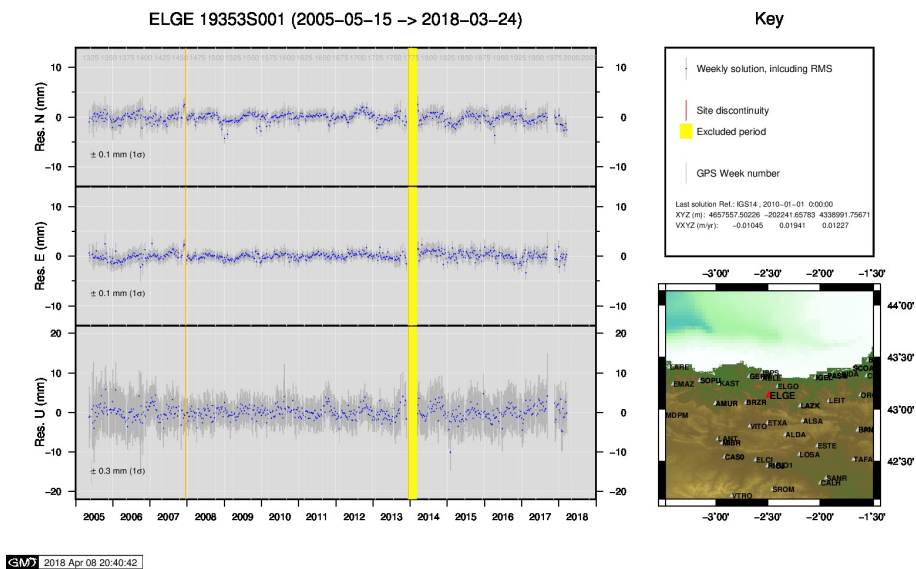
10) CHER



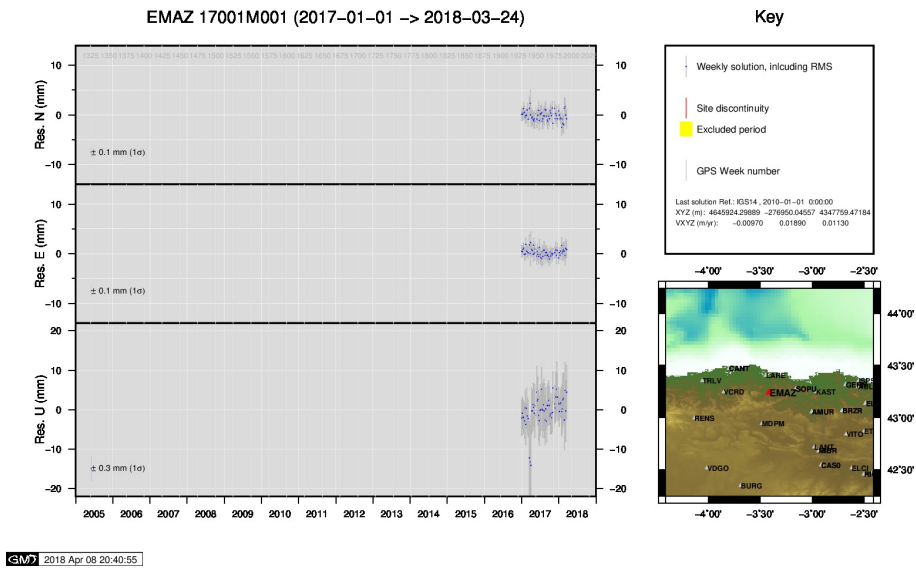
11) CREU



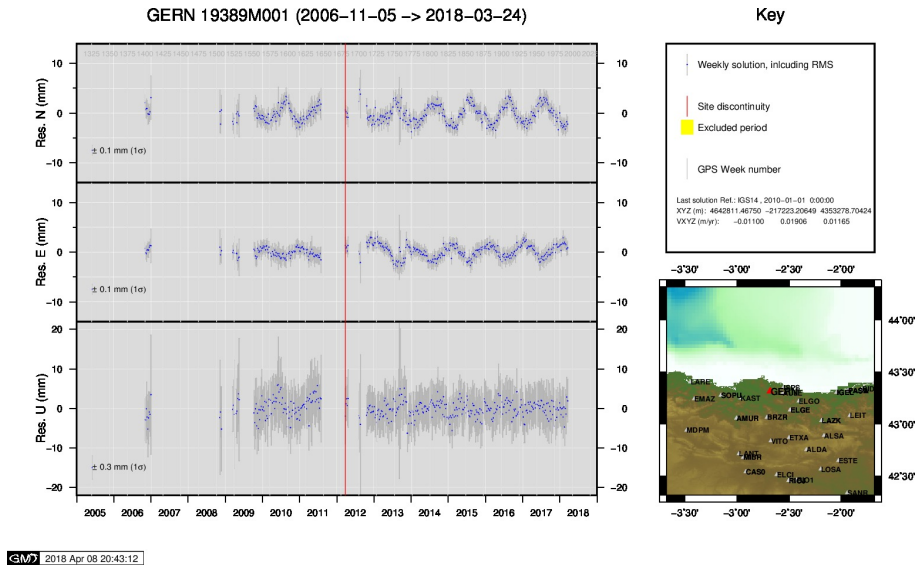
12) EBRE



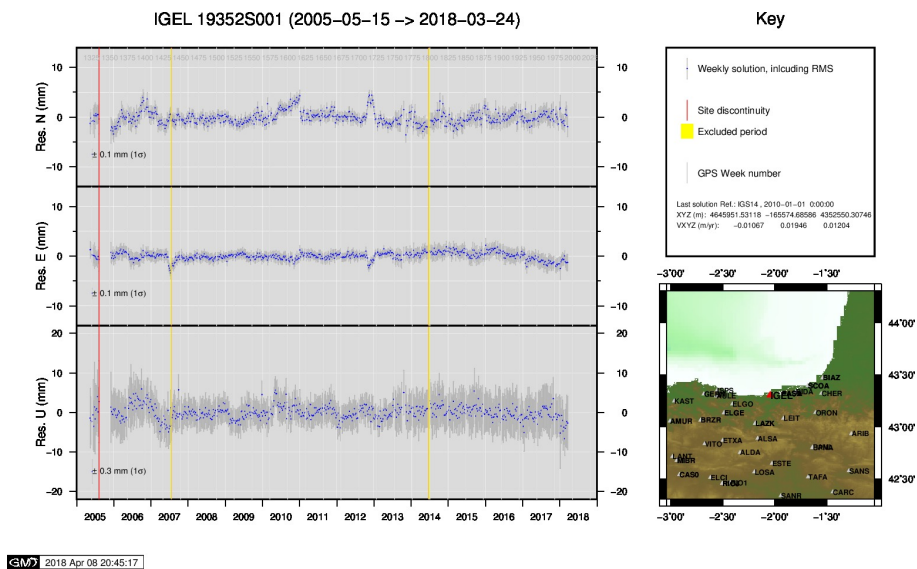
13) ELGE



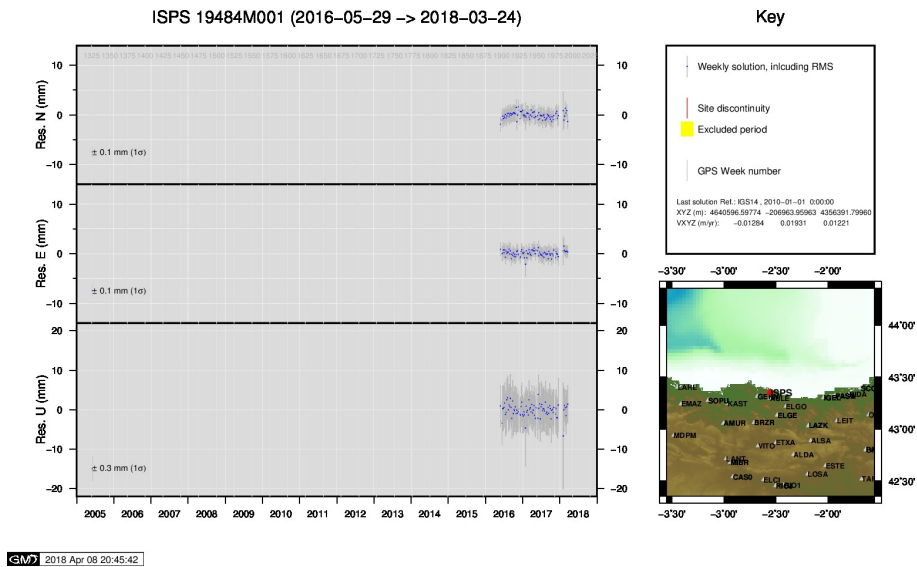
14) EMAZ



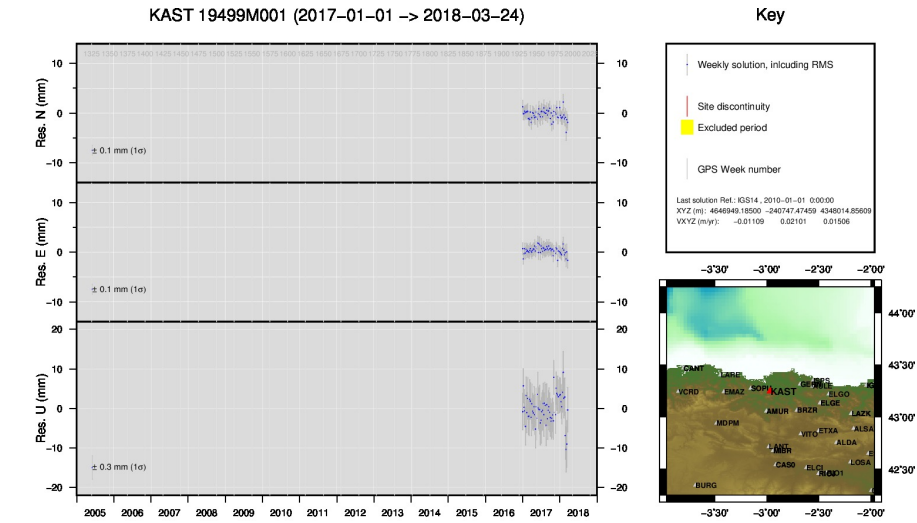
15) GERN



16) IGEL

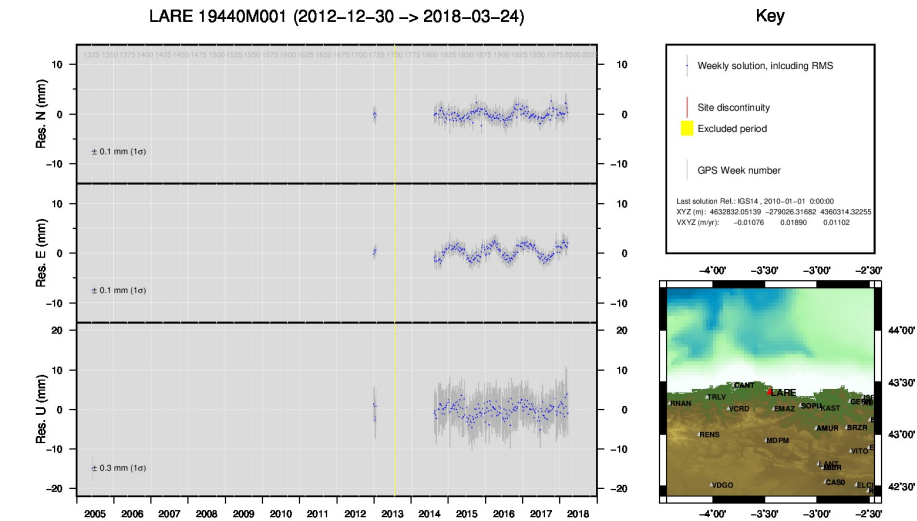


17) ISPS



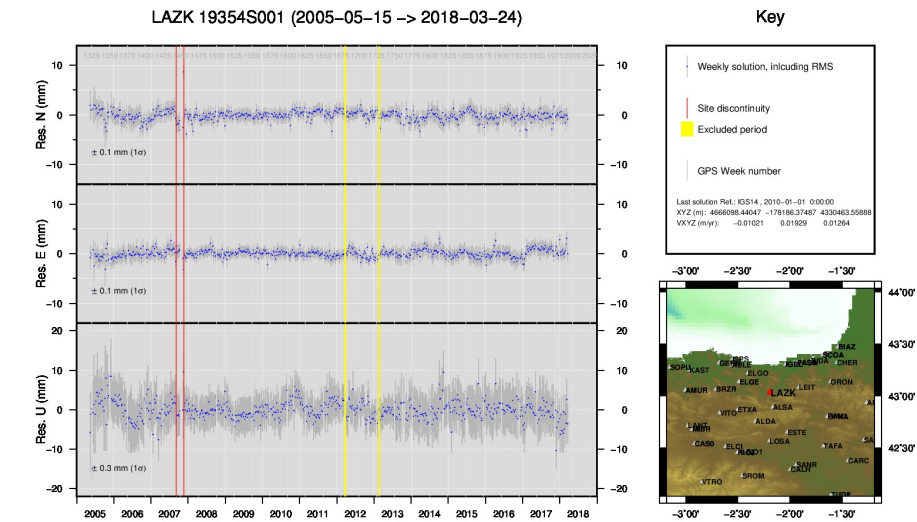
GMW 2018 Apr 08 20:46:12

18) KAST



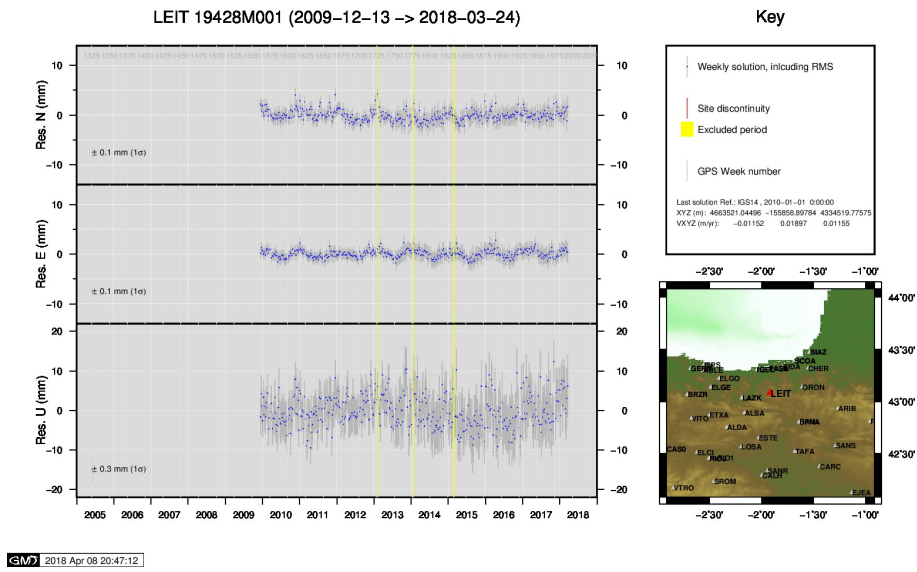
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19) LARE

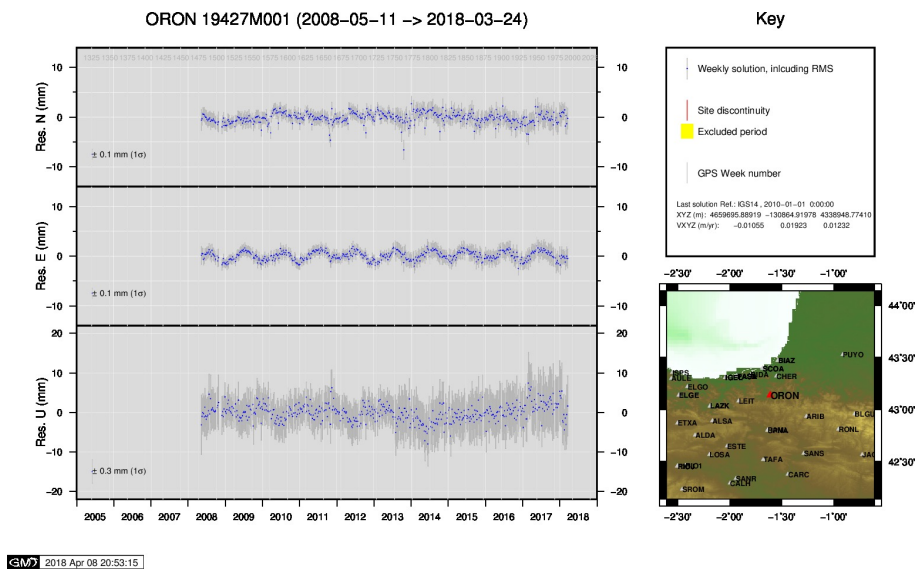


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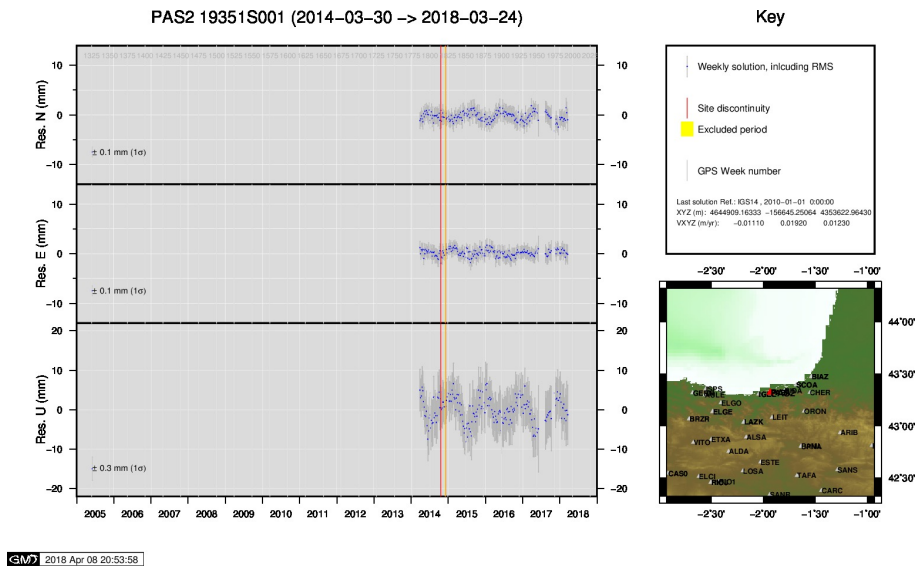
20) LAZK



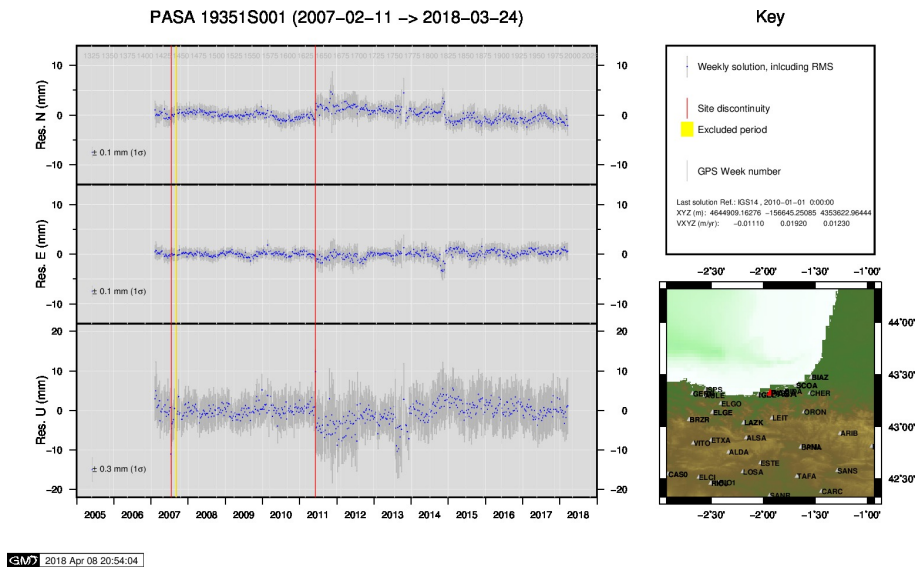
21) LEIT



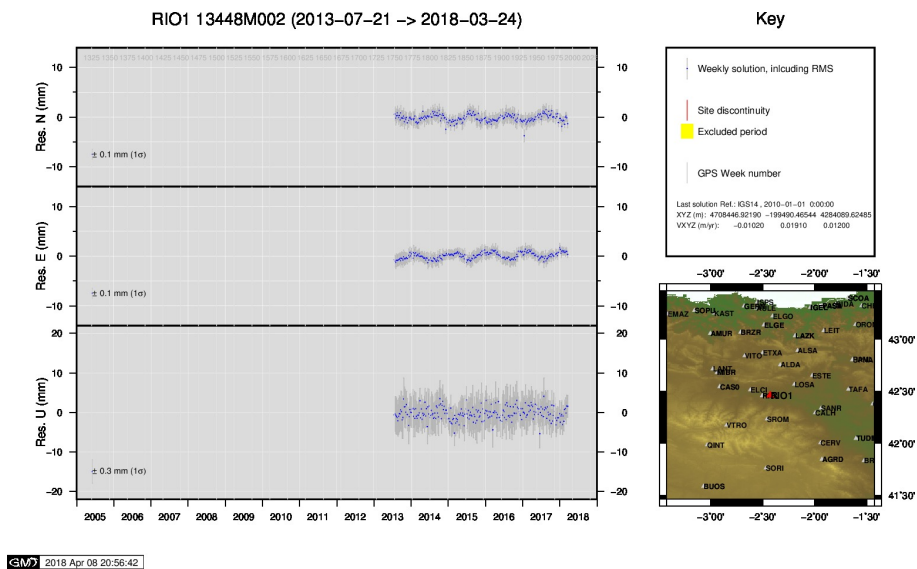
22) ORON



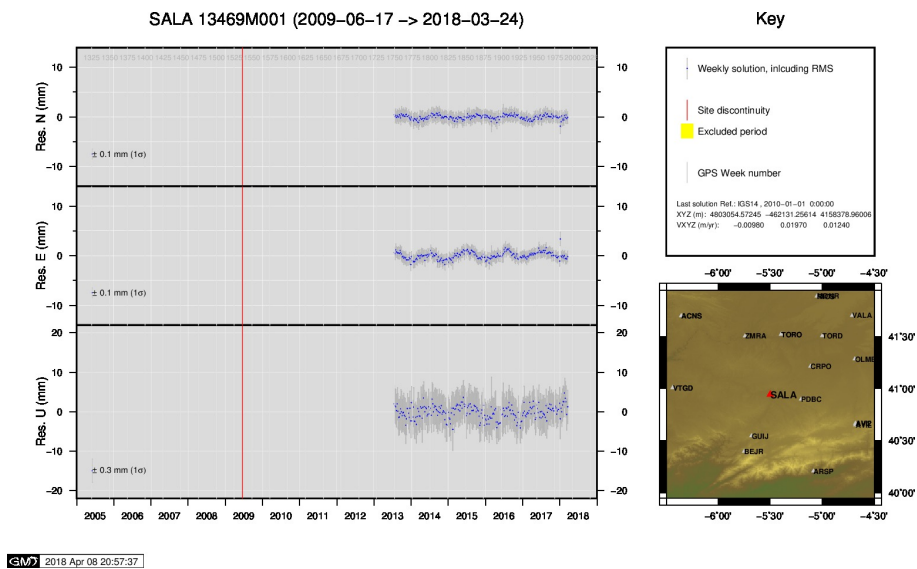
23) PAS2



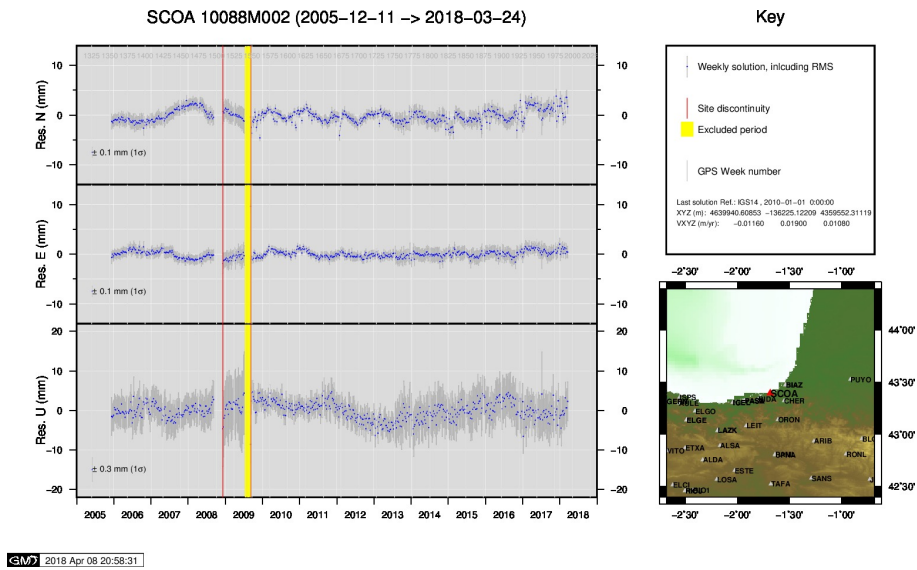
24) PASA



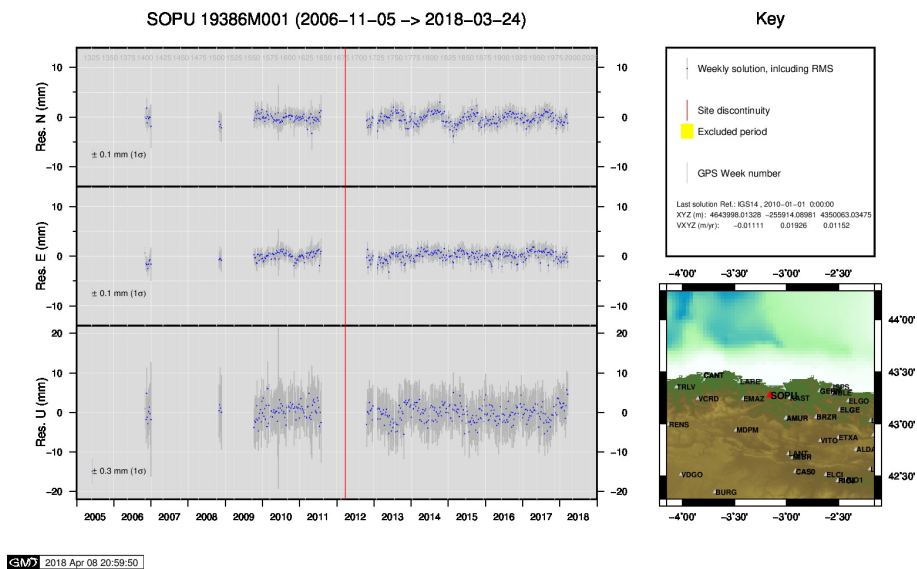
25) RIO1



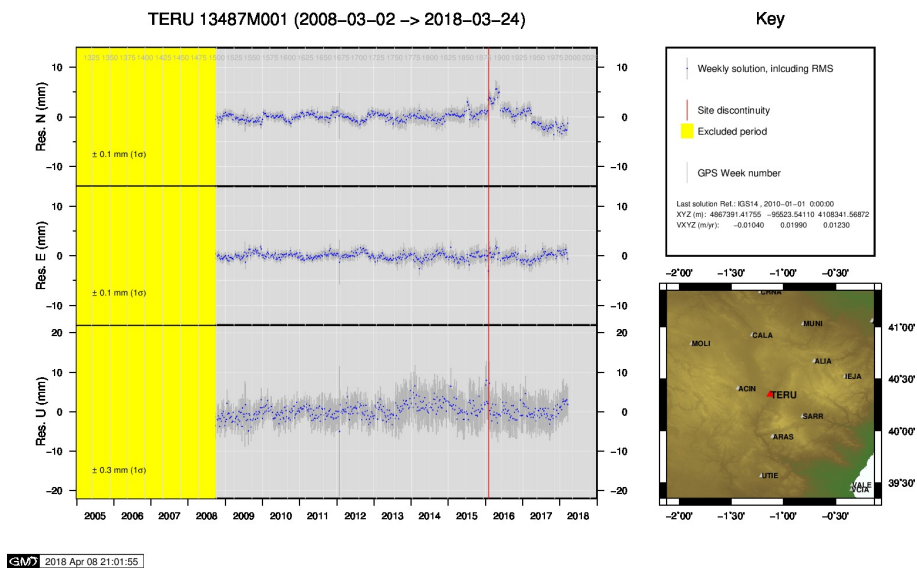
26) SALA



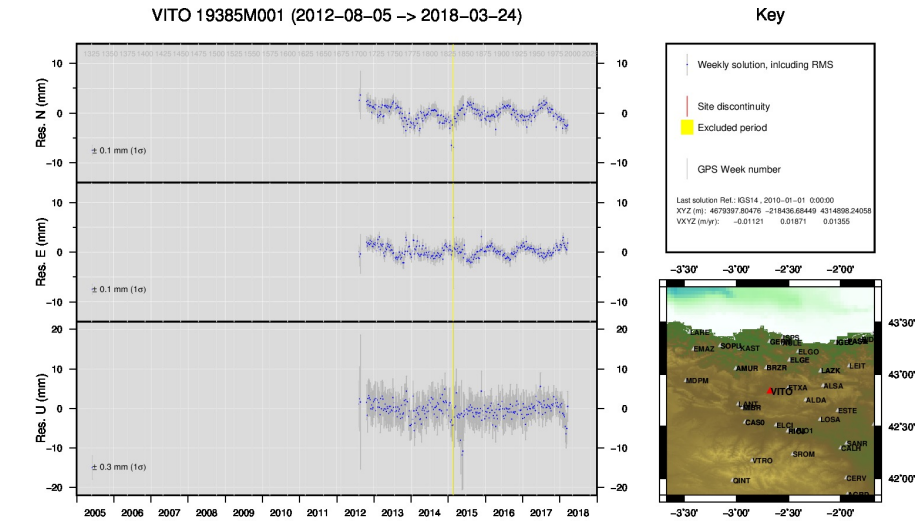
27) SCOA



28) SOPU

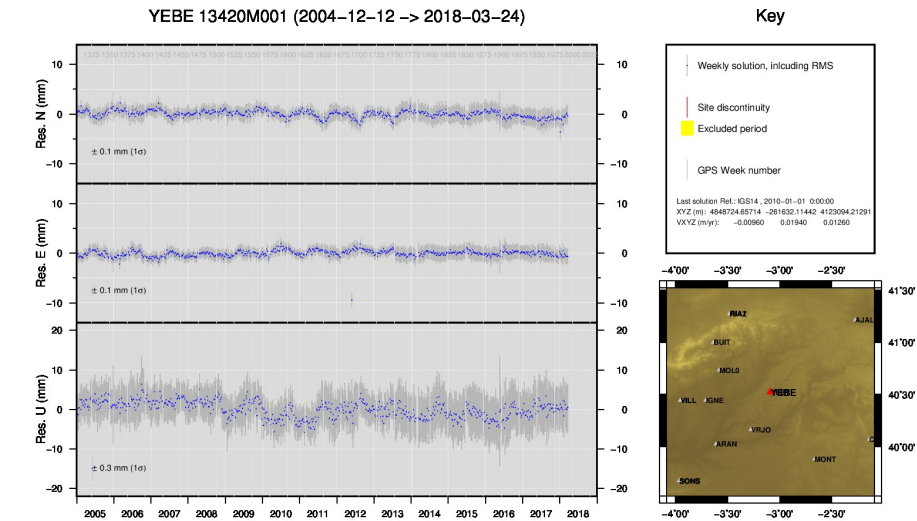


29) TERU



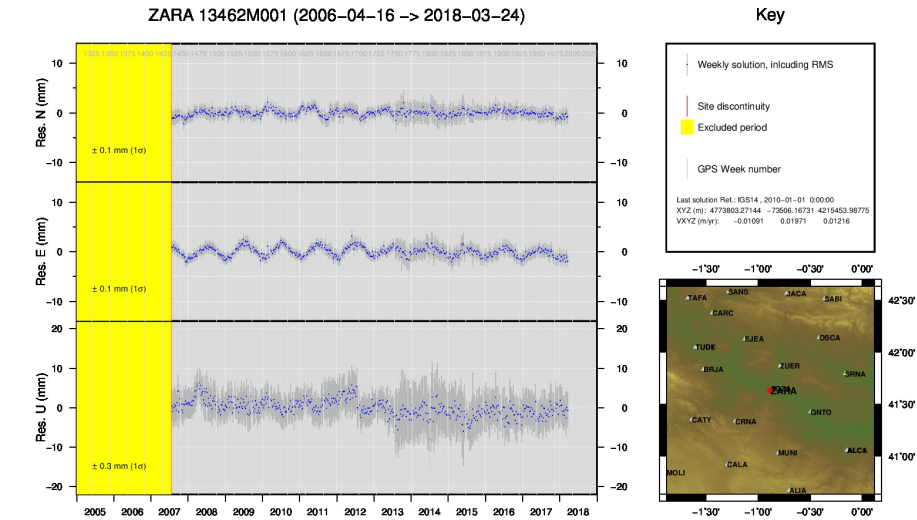
GMW 2018 Apr 08 21:05:20

30) VITO



GMW 2018 Apr 08 21:06:26

31) YEBE



GMW 2018 Apr 08 21:06:33

32) ZARA

