

ARA-DAC Weekly Analysis Result: 2160 (GFA)

Technical Report

GPS Week: 2160 (GFA)

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

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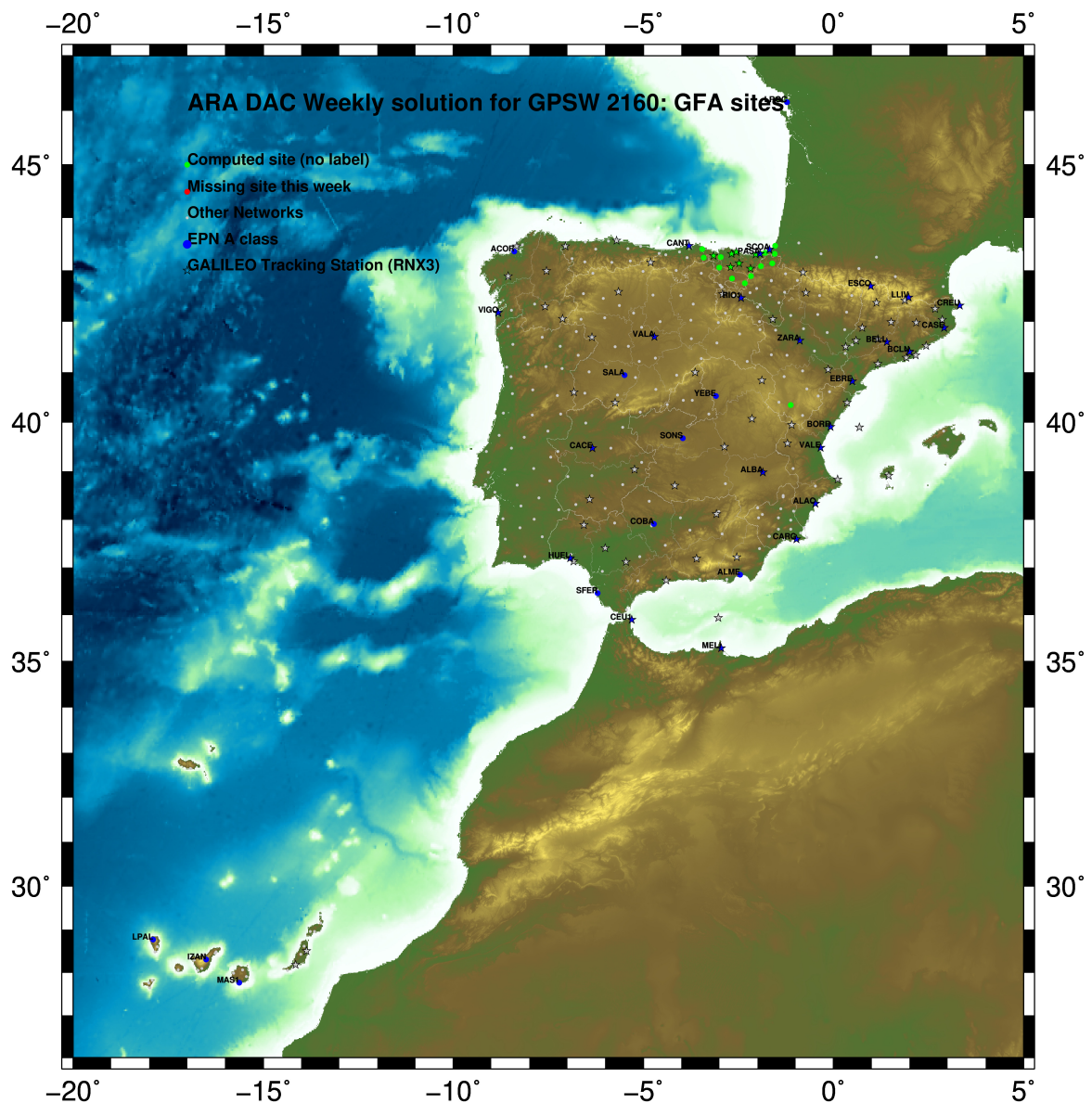
Report generated on 2021/06/20 at 13:37:08



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



2021 Jun 20 13:36:59

Fig.1: Computed Sites for GPS Week2160 (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) IGb14 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 IGB14

The Reference Frame considered in this section is IGB14, release C2130.

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ARA LAC 2160 WEEK FINAL COMBINATION: PRECISE ORBITS                20-JUN-21 10:10
-----
LOCAL GEODETIC DATUM: IGB14                EPOCH: 2021-06-02 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
 4 ACRD 13434M001        4594489.53526        -678367.40258        4357066.30413        W
39 ALDA 19383M001        4687280.13853        -190876.52829        4308106.98030        A
50 ALSA 19419M001        4677250.81169        -176770.35503        4319079.89935        A
53 AMUR 19388M001        4661499.42426        -244591.22040        4332269.90850        A
100 BIAZ 10074M002        4634456.02318        -124344.93874        4365785.47988        A
101 BIDA 00000M000        4644177.79714        -145778.28679        4354832.50602        A
113 BRZR 19387M001        4662220.96527        -220769.86192        4333309.46453        A
104 CACE 13447M001        4899866.48404        -544567.00010        4033770.23120        W
116 CANT 13438M001        4625924.28875        -307096.19637        4365771.57901        W
154 CHER 00000M000        4645879.99554        -125721.87228        4353624.10898        A
162 CREU 13432M001        4715420.10252        273178.09648        4271946.86534        W
204 EBRE 13410M001        4833519.96645        41537.42863        4147461.74127        W
180 ELGE 19353S001        4657557.36659        -202241.43334        4338991.90912        A
182 EMAZ 17001M001        4645924.18187        -276949.82984        4347759.60225        A
209 GERN 19389M001        4642811.29349        -217222.88707        4353278.90347        A
235 IGEL 19352S001        4645951.40706        -165574.46570        4352550.44437        A
240 ISPS 19484M001        4640596.45025        -206963.74005        4356391.93537        A
245 KAST 19499M001        4646949.05500        -240747.23556        4348015.01929        A
252 LARE 19440M001        4632831.93000        -279026.10578        4360314.45442        A
256 LAZK 19354S001        4666098.31105        -178186.15347        4330463.69091        A
261 LEIT 19428M001        4663520.91178        -155858.68026        4334519.90793        A
334 ORDN 19427M001        4659695.75345        -130864.69683        4338948.90598        A
345 PAS2 19351S001        4644909.03230        -156645.03130        4353623.09911        A
493 PASA 19351S001        4644909.03228        -156645.03128        4353623.09922        W
553 RID1 13448M002        4708446.80256        -199490.24725        4284089.76037        W
558 SALA 13469M001        4803054.46125        -462131.03305        4158379.10216        W
566 SCDA 10088M002        4639940.47226        -136224.90495        4359552.43984        W
418 SOPU 19386M001        4643997.88319        -255913.86906        4350063.16702        A
443 TERU 13487M001        4867391.28532        -95523.30834        4108341.70110        A
493 VITO 19385M001        4679397.67762        -218436.46796        4314898.39271        A
752 YEBE 13420M001        4848724.53816        -261631.88971        4123094.35011        W
755 ZARA 13462M001        4773803.14091        -73505.94743        4215454.11820        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 2160                20-JUN-21 10:10
-----
LOCAL GEODETIC DATUM: ETRF2000            EPOCH: 2021-06-02 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
 4 ACRD 13434M001        4594489.85774        -678367.97894        4357065.86055        W
39 ALDA 19383M001        4687280.51823        -190877.11394        4308106.53561        A
50 ALSA 19419M001        4677251.19396        -176770.93952        4319079.45565        A
53 AMUR 19388M001        4661499.79905        -244591.80333        4332269.46520        A
100 BIAZ 10074M002        4634456.41543        -124345.51832        4365785.04030        A
101 BIDA 00000M000        4644178.18591        -145778.86751        4354832.06539        A
113 BRZR 19387M001        4662221.34311        -220770.44487        4333309.02148        A
104 CACE 13447M001        4899866.79930        -544567.60991        4033769.76471        W
116 CANT 13438M001        4625924.65822        -307096.77750        4365771.13777        W
154 CHER 00000M000        4645880.38672        -125722.45313        4353623.66847        A
162 CREU 13432M001        4715420.53730        273177.50936        4271946.42427        W
204 EBRE 13410M001        4833520.36321        41536.82761        4147461.28774        W
180 ELGE 19353S001        4657557.74716        -202242.01572        4338991.46668        A
182 EMAZ 17001M001        4645924.55377        -276950.41113        4347759.15979        A
209 GERN 19389M001        4642811.67324        -217223.46784        4353278.46203        A
235 IGEL 19352S001        4645951.79320        -165575.04668        4352550.00334        A
240 ISPS 19484M001        4640596.83151        -206964.32055        4356391.49424        A
245 KAST 19499M001        4646949.43143        -240747.81686        4348014.57721        A
252 LARE 19440M001        4632832.30257        -279026.68561        4360314.01298        A
256 LAZK 19354S001        4666098.69398        -178186.73672        4330463.24809        A
261 LEIT 19428M001        4663521.29780        -155859.26317        4334519.46561        A
334 ORDN 19427M001        4659696.14191        -130865.27923        4338948.46429        A
345 PAS2 19351S001        4644909.41963        -156645.61214        4353622.65828        A
493 PASA 19351S001        4644909.41961        -156645.61212        4353622.65839        W
553 RID1 13448M002        4708447.17941        -199490.83525        4284089.31386        W
558 SALA 13469M001        4803054.79605        -462131.63212        4158378.64460        W
566 SCDA 10088M002        4639940.86257        -136225.48517        4359551.99967        W
418 SOPU 19386M001        4643998.25788        -255914.45007        4350062.72498        A
443 TERU 13487M001        4867391.66212        -95523.91354        4108341.24308        A
493 VITO 19385M001        4679398.05439        -218437.05280        4314897.94830        A
752 YEBE 13420M001        4848724.89535        -261632.49334        4123093.89147        W
755 ZARA 13462M001        4773803.52838        -73506.54227        4215453.66803        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).

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ETRF2014 FINAL COORD. wk 2160                                20-JUN-21 10:10
-----
LOCAL GEODETIC DATUM: ETRF2014          EPOCH: 2021-06-02 12:00:00
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
4  ACRD 13434M001         4594489.81681    -678368.01685    4357065.91160    W
39 ALDA 19383M001         4687280.47499    -190877.15313    4308106.58654    A
50 ALSA 19419M001         4677251.15077    -176770.97881    4319079.50662    A
53 AMUR 19388M001         4661499.75624    -244591.84245    4332269.51618    A
100 BIAZ 10074M002         4634456.37251    -124345.55796    4365785.09142    A
101 BIDA 00000M000         4644178.14296    -145778.90704    4354832.11646    A
113 BRZR 19387M001         4662221.30022    -220770.48407    4333309.07246    A
104 CACE 13447M001         4899866.75480    -544567.64701    4033769.81497    W
116 CANT 13438M001         4625924.61596    -307096.81656    4365771.18882    W
154 CHER 00000M000         4645880.34368    -125722.49272    4353623.71955    A
162 CREU 13432M001         4715420.49212    273177.46871    4271946.47543    W
204 EBRE 13410M001         4833520.31763    41536.78823    4147461.33841    W
180 ELGE 19353S001         4657557.70425    -202242.05500    4338991.51769    A
182 EMAZ 17001M001         4645924.51122    -276950.45021    4347759.21079    A
209 GERN 19389M001         4642811.63053    -217223.50714    4353278.51307    A
235 IGEL 19352S001         4645951.75029    -165575.08614    4352550.05440    A
240 ISPS 19484M001         4640596.78879    -206964.35989    4356391.54529    A
245 KAST 19499M001         4646949.38875    -240747.85606    4348014.62823    A
252 LARE 19440M001         4632832.26015    -279026.72473    4360314.06403    A
256 LAZK 19354S001         4666098.65091    -178186.77605    4330463.29909    A
261 LEIT 19428M001         4663521.25468    -155859.30258    4334519.51662    A
334 ORDN 19427M001         4659696.09875    -130865.31875    4338948.51533    A
345 PAS2 19351S001         4644909.37670    -156645.65162    4353622.70935    A
493 PASA 19351S001         4644909.37668    -156645.65160    4353622.70946    W
553 RIO1 13448M002         4708447.13597    -199490.87433    4284089.36473    W
558 SALA 13469M001         4803054.75238    -462131.66991    4158378.69512    W
566 SOA 10088M002         4639940.81963    -136225.52475    4359552.05076    W
418 SOPU 19386M001         4643998.21528    -255914.48923    4350062.77601    A
443 TERU 13487M001         4867391.61665    -95523.95231    4108341.29358    A
493 VITO 19385M001         4679398.01131    -218437.09194    4314897.99924    A
752 YEBE 13420M001         4848724.85061    -261632.53162    4123093.94193    W
755 ZARA 13462M001         4773803.48384    -73506.58151    4215453.71879    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 IGB14 solution and are given with respect to the Local frame (North-East-Up).

ARA LAC 2160 WEEK FINAL COMBINATION: PRECISE ORBITS 20-JUN-21 10:10

| Station | #Days | Weekday 0123456 | Repeatability (mm) | | |
|----------------|-------|--------------------|--------------------|------|-------|
| | | | N | E | U |
| ACOR 13434M001 | 6 | XX XXXX | 0.73 | 0.53 | 3.12 |
| ALDA 19383M001 | 7 | XXXXXX | 1.71 | 1.68 | 4.36 |
| ALSA 19419M001 | 7 | XXXXXX | 3.21 | 1.44 | 3.97 |
| AMUR 19388M001 | 7 | XXXXXX | 1.18 | 0.99 | 2.87 |
| BLAZ 10074M002 | 7 | XXXXXX | 1.65 | 1.31 | 3.18 |
| BIDA 00000M000 | 7 | XXXXXX | 0.82 | 1.27 | 7.62 |
| BRZR 19387M001 | 7 | XXXXXX | 1.22 | 1.06 | 5.78 |
| CACE 13447M001 | 7 | XXXXXX | 0.97 | 0.77 | 4.75 |
| CANT 13438M001 | 7 | XXXXXX | 0.81 | 0.96 | 2.87 |
| CHER 00000M000 | 7 | XXXXXX | 1.28 | 3.92 | 17.99 |
| CREU 13432M001 | 7 | XXXXXX | 0.66 | 0.72 | 4.64 |
| EBRE 13410M001 | 7 | XXXXXX | 0.63 | 0.86 | 3.93 |
| ELGE 19353S001 | 7 | XXXXXX | 1.44 | 1.20 | 3.94 |
| EMAZ 17001M001 | 7 | XXXXXX | 1.89 | 1.46 | 4.16 |
| GERN 19389M001 | 7 | XXXXXX | 0.76 | 0.71 | 3.33 |
| IGEL 19352S001 | 7 | XXXXXX | 1.38 | 0.82 | 5.36 |
| ISPS 19484M001 | 7 | XXXXXX | 1.55 | 1.51 | 6.54 |
| KAST 19499M001 | 7 | XXXXXX | 1.38 | 1.18 | 7.58 |
| LARE 19440M001 | 7 | XXXXXX | 1.31 | 0.60 | 3.78 |
| LAZK 19354S001 | 7 | XXXXXX | 1.32 | 1.11 | 11.33 |
| LEIT 19428M001 | 7 | XXXXXX | 1.24 | 0.86 | 3.79 |
| ORON 19427M001 | 7 | XXXXXX | 0.92 | 1.61 | 4.48 |
| PAS2 19351S001 | 7 | XXXXXX | 0.83 | 1.10 | 5.28 |
| PASA 19351S001 | 7 | XXXXXX | 0.81 | 1.00 | 5.24 |
| RI01 13448M002 | 7 | XXXXXX | 0.55 | 0.89 | 2.92 |
| SALA 13469M001 | 7 | XXXXXX | 0.58 | 0.93 | 3.01 |
| SCOA 10088M002 | 7 | XXXXXX | 1.65 | 1.11 | 5.34 |
| SOPU 19386M001 | 7 | XXXXXX | 1.21 | 1.38 | 2.48 |
| TERU 13487M001 | 6 | XX XXXX | 1.27 | 0.55 | 3.99 |
| VITD 19385M001 | 7 | XXXXXX | 0.66 | 0.57 | 4.69 |
| YEBE 13420M001 | 7 | XXXXXX | 0.84 | 0.92 | 2.82 |
| ZARA 13462M001 | 7 | XXXXXX | 0.83 | 1.29 | 4.16 |

Comparison of individual solutions:

| | | | | | | | | | |
|----------------|---|-------|-------|-------|-------|-------|-------|--------|-------|
| ACOR 13434M001 | N | 0.73 | -0.95 | 0.34 | | -0.01 | -0.31 | -0.28 | 1.23 |
| ACOR 13434M001 | E | 0.53 | 0.45 | -0.51 | | 0.40 | -0.08 | -0.88 | 0.11 |
| ACOR 13434M001 | U | 3.12 | 1.28 | 1.19 | | -2.68 | -3.74 | 3.25 | 3.72 |
| ALDA 19383M001 | N | 1.71 | 0.99 | -0.21 | -2.01 | -0.34 | -2.30 | 1.79 | 1.97 |
| ALDA 19383M001 | E | 1.68 | -1.96 | 1.56 | 0.11 | 1.81 | 0.83 | -2.00 | -1.60 |
| ALDA 19383M001 | U | 4.36 | 2.51 | -7.57 | -1.04 | 5.19 | 4.01 | 1.92 | 1.59 |
| ALSA 19419M001 | N | 3.21 | 2.04 | -2.14 | -5.92 | 1.44 | -0.95 | 3.34 | 1.98 |
| ALSA 19419M001 | E | 1.44 | -0.92 | 0.49 | 2.18 | 0.94 | 0.33 | -2.35 | -0.33 |
| ALSA 19419M001 | U | 3.97 | 0.16 | -1.61 | -5.05 | 5.41 | 6.07 | 0.29 | -0.43 |
| AMUR 19388M001 | N | 1.18 | -0.38 | 0.25 | -1.64 | -1.62 | 1.47 | 0.76 | -0.35 |
| AMUR 19388M001 | E | 0.99 | -0.30 | 0.57 | 0.49 | -0.48 | 1.56 | -0.60 | -1.47 |
| AMUR 19388M001 | U | 2.87 | 0.69 | 0.24 | -0.46 | 2.74 | 5.63 | -1.37 | -2.73 |
| BLAZ 10074M002 | N | 1.65 | -0.84 | -1.09 | 1.42 | -0.65 | 1.49 | 3.01 | -0.88 |
| BLAZ 10074M002 | E | 1.31 | -0.47 | -0.35 | -1.61 | 0.30 | 1.02 | 2.41 | 0.66 |
| BLAZ 10074M002 | U | 3.18 | 1.29 | -1.72 | -2.74 | -2.51 | 5.43 | -3.43 | 1.05 |
| BIDA 00000M000 | N | 0.82 | -0.14 | -0.89 | 0.24 | 0.30 | 1.00 | 1.42 | 0.26 |
| BIDA 00000M000 | E | 1.27 | -0.72 | 1.53 | -0.26 | 0.68 | 1.98 | -0.63 | -1.42 |
| BIDA 00000M000 | U | 7.62 | -6.30 | -3.37 | -3.39 | -4.58 | 12.88 | 9.07 | -4.07 |
| BRZR 19387M001 | N | 1.22 | 0.64 | 0.45 | -1.40 | -0.66 | -0.14 | -2.43 | 0.29 |
| BRZR 19387M001 | E | 1.06 | 0.75 | 0.37 | -0.90 | 0.80 | 1.58 | 0.20 | -1.44 |
| BRZR 19387M001 | U | 5.78 | -0.87 | 2.98 | -5.87 | 3.20 | 11.62 | -2.21 | -2.46 |
| CACE 13447M001 | N | 0.97 | -0.10 | -1.29 | -1.34 | -0.21 | 0.83 | 0.03 | 1.20 |
| CACE 13447M001 | E | 0.77 | 0.17 | -1.09 | -0.12 | 0.44 | 1.09 | -0.30 | -0.93 |
| CACE 13447M001 | U | 4.75 | 5.52 | 1.44 | -3.83 | -3.23 | 2.04 | -8.37 | 1.82 |
| CANT 13438M001 | N | 0.81 | -0.56 | -0.60 | 0.59 | -1.38 | 0.21 | 0.30 | -0.92 |
| CANT 13438M001 | E | 0.96 | 0.30 | -1.34 | 0.67 | 0.11 | -1.12 | 1.30 | -0.51 |
| CANT 13438M001 | U | 2.87 | -5.50 | -0.39 | -1.01 | 3.93 | 0.90 | 1.35 | -0.14 |
| CHER 00000M000 | N | 1.28 | -0.53 | -0.65 | 2.72 | -0.11 | 0.27 | 1.26 | -0.19 |
| CHER 00000M000 | E | 3.92 | 0.15 | 1.12 | 0.20 | 0.24 | -9.44 | -1.26 | -0.57 |
| CHER 00000M000 | U | 17.99 | -4.29 | -0.19 | -0.58 | -0.89 | 41.92 | -12.85 | -0.45 |
| CREU 13432M001 | N | 0.66 | 0.67 | 0.14 | -0.95 | -0.58 | 0.67 | 0.41 | -0.56 |
| CREU 13432M001 | E | 0.72 | 0.15 | 0.37 | -0.64 | 0.70 | 0.77 | -1.12 | -0.44 |
| CREU 13432M001 | U | 4.64 | -1.23 | 3.31 | 2.90 | 2.56 | -8.70 | -2.95 | 4.20 |
| EBRE 13410M001 | N | 0.63 | -0.42 | 0.46 | -0.73 | 0.45 | 0.92 | -0.51 | -0.42 |
| EBRE 13410M001 | E | 0.86 | -1.13 | 0.61 | -0.94 | 1.28 | 0.47 | -0.07 | -0.10 |
| EBRE 13410M001 | U | 3.93 | 0.72 | 0.54 | -3.30 | 1.39 | -6.02 | -2.76 | 5.91 |
| ELGE 19353S001 | N | 1.44 | 1.33 | -0.02 | -0.45 | 0.48 | -2.78 | -1.56 | -0.16 |
| ELGE 19353S001 | E | 1.20 | -0.14 | -0.29 | 1.23 | 1.79 | 1.08 | -1.16 | -1.16 |
| ELGE 19353S001 | U | 3.94 | 2.72 | 5.60 | 1.91 | 2.86 | -0.83 | -6.44 | -0.36 |
| EMAZ 17001M001 | N | 1.89 | 0.30 | 0.93 | 1.12 | 0.46 | -3.19 | -2.86 | 0.84 |
| EMAZ 17001M001 | E | 1.46 | 0.92 | -1.65 | -0.83 | 2.46 | -0.65 | -1.28 | 0.62 |
| EMAZ 17001M001 | U | 4.16 | -7.12 | 3.10 | -0.37 | -1.85 | 5.15 | 2.90 | -2.27 |
| GERN 19389M001 | N | 0.76 | 0.35 | -0.17 | -1.08 | -0.64 | -0.58 | -1.18 | -0.04 |
| GERN 19389M001 | E | 0.71 | 0.10 | 0.46 | 0.47 | -0.28 | 1.14 | 0.36 | -1.01 |
| GERN 19389M001 | U | 3.33 | -1.10 | 1.01 | 2.30 | -1.07 | 6.61 | 1.34 | -3.52 |
| IGEL 19352S001 | N | 1.38 | -0.85 | 0.16 | 2.61 | -0.77 | 0.86 | 1.22 | -0.99 |
| IGEL 19352S001 | E | 0.82 | 0.14 | 0.29 | 0.60 | 0.59 | 1.14 | -1.35 | -0.32 |
| IGEL 19352S001 | U | 5.36 | -6.35 | -0.03 | -3.12 | 1.08 | 8.51 | 5.08 | -4.77 |
| ISPS 19484M001 | N | 1.55 | 0.68 | 0.36 | -2.65 | 0.88 | -1.00 | -2.19 | 0.56 |
| ISPS 19484M001 | E | 1.51 | 1.05 | 1.86 | -0.47 | -0.11 | 1.83 | -0.46 | -2.30 |
| ISPS 19484M001 | U | 6.54 | -0.81 | -9.85 | -1.43 | 3.85 | 11.83 | -0.23 | 1.51 |
| KAST 19499M001 | N | 1.38 | -1.20 | -1.95 | -1.18 | -0.38 | 0.09 | 1.81 | -1.18 |
| KAST 19499M001 | E | 1.18 | -0.18 | -2.02 | 0.98 | 0.24 | 1.55 | -0.80 | -0.38 |
| KAST 19499M001 | U | 7.58 | -4.66 | -1.74 | -6.68 | -5.22 | 9.47 | 12.33 | -2.55 |
| LARE 19440M001 | N | 1.31 | 1.73 | 0.30 | 0.19 | 0.01 | -1.52 | -1.91 | -1.13 |
| LARE 19440M001 | E | 0.60 | 0.59 | -0.37 | 0.41 | 0.59 | -0.36 | -0.42 | -0.93 |
| LARE 19440M001 | U | 3.78 | -6.55 | -0.98 | -3.75 | 2.92 | 1.87 | 1.82 | 3.55 |
| LAZK 19354S001 | N | 1.32 | 0.88 | 0.92 | -1.99 | 1.61 | -1.46 | -0.29 | 0.02 |
| LAZK 19354S001 | E | 1.11 | 0.97 | 1.21 | -0.49 | 0.33 | 1.03 | -1.56 | -1.10 |

| | | | | | | | | | | |
|------|-----------|---|-------|-------|-------|-------|-------|-------|--------|-------|
| LAZK | 19354S001 | U | 11.33 | 10.26 | -8.76 | 14.49 | 9.55 | -8.49 | -14.57 | 1.61 |
| LEIT | 19428M001 | N | 1.24 | 1.10 | -2.26 | 0.90 | -0.54 | 1.17 | 0.20 | 0.64 |
| LEIT | 19428M001 | E | 0.86 | -0.34 | 0.04 | 1.25 | 0.94 | 0.25 | -0.77 | -1.11 |
| LEIT | 19428M001 | U | 3.79 | 0.82 | 4.68 | -7.22 | 0.72 | -1.74 | 0.43 | -2.76 |
| ORDN | 19427M001 | N | 0.92 | 0.03 | -0.94 | 1.40 | 0.13 | 0.22 | -1.41 | 0.39 |
| ORDN | 19427M001 | E | 1.61 | -0.33 | 2.42 | -1.98 | -0.18 | 1.77 | -0.16 | -1.56 |
| ORDN | 19427M001 | U | 4.48 | -6.26 | 6.92 | 4.94 | 0.15 | 0.45 | 0.41 | -2.88 |
| PAS2 | 19351S001 | N | 0.83 | 1.43 | -0.40 | 1.17 | -0.18 | -0.05 | 0.69 | 0.31 |
| PAS2 | 19351S001 | E | 1.10 | -1.05 | 1.24 | -0.25 | 1.15 | 1.40 | -1.01 | -0.53 |
| PAS2 | 19351S001 | U | 5.28 | -5.52 | 4.60 | -3.21 | -4.12 | 7.09 | 3.66 | -4.98 |
| PASA | 19351S001 | N | 0.81 | 1.12 | -0.62 | 1.26 | -0.42 | -0.02 | 0.67 | 0.28 |
| PASA | 19351S001 | E | 1.00 | -0.63 | 0.93 | -0.34 | 1.30 | 1.31 | -0.92 | -0.57 |
| PASA | 19351S001 | U | 5.24 | -5.53 | 3.58 | -3.43 | -3.14 | 8.20 | 4.09 | -3.94 |
| RID1 | 13448M002 | N | 0.55 | 0.66 | -0.18 | -0.07 | -0.15 | -0.03 | -1.14 | -0.03 |
| RID1 | 13448M002 | E | 0.89 | -0.10 | -1.39 | 0.74 | 1.01 | -0.59 | 0.87 | -0.28 |
| RID1 | 13448M002 | U | 2.92 | 1.09 | 4.18 | 3.20 | 0.64 | 2.09 | -1.60 | -3.87 |
| SALA | 13469M001 | N | 0.58 | -0.37 | 0.62 | 0.67 | -0.44 | 0.30 | -0.30 | -0.84 |
| SALA | 13469M001 | E | 0.93 | 1.17 | -1.40 | -0.35 | 0.72 | -1.01 | 0.39 | -0.23 |
| SALA | 13469M001 | U | 3.01 | 3.27 | 3.21 | 2.78 | -0.32 | -1.00 | -2.36 | -4.37 |
| SCDA | 10088M002 | N | 1.65 | -0.85 | 1.57 | 3.18 | 0.90 | -0.19 | -0.70 | -1.34 |
| SCDA | 10088M002 | E | 1.11 | -0.26 | 1.40 | 1.32 | 0.11 | 1.07 | -0.93 | -1.28 |
| SCDA | 10088M002 | U | 5.34 | -4.80 | -3.26 | -3.56 | 1.66 | 10.44 | -3.34 | 1.43 |
| SOPU | 19386M001 | N | 1.21 | 0.78 | -0.05 | -2.34 | 0.26 | -1.40 | -0.75 | -0.27 |
| SOPU | 19386M001 | E | 1.38 | -0.78 | -1.50 | -0.23 | 0.45 | 2.52 | 0.42 | -1.37 |
| SOPU | 19386M001 | U | 2.48 | -2.17 | 2.51 | -0.98 | -0.45 | -0.85 | 4.70 | -1.40 |
| TERU | 13487M001 | N | 1.27 | -1.71 | -0.25 | | 1.42 | -0.28 | 1.71 | 0.12 |
| TERU | 13487M001 | E | 0.55 | 0.29 | 0.14 | | -0.21 | -1.07 | -0.25 | -0.43 |
| TERU | 13487M001 | U | 3.99 | -2.74 | -4.10 | | -3.75 | -0.36 | 1.13 | 6.31 |
| VITO | 19385M001 | N | 0.66 | -0.49 | 0.31 | 0.86 | 0.01 | -1.15 | 0.14 | 0.47 |
| VITO | 19385M001 | E | 0.57 | -0.16 | 0.26 | 0.28 | 0.37 | 0.58 | -0.74 | -0.87 |
| VITO | 19385M001 | U | 4.69 | 2.65 | -0.30 | 6.95 | 3.86 | -7.43 | -2.02 | -1.56 |
| YEBE | 13420M001 | N | 0.84 | 0.14 | -0.93 | 0.67 | -1.21 | 1.02 | -0.02 | 0.67 |
| YEBE | 13420M001 | E | 0.92 | 1.14 | -0.15 | 0.46 | 0.81 | -1.22 | -0.51 | -1.05 |
| YEBE | 13420M001 | U | 2.82 | -1.86 | 2.25 | 3.74 | 1.46 | -3.13 | -2.91 | 2.21 |
| ZARA | 13462M001 | N | 0.83 | -1.31 | 0.99 | -0.54 | -0.76 | 0.07 | -0.08 | 0.76 |
| ZARA | 13462M001 | E | 1.29 | 0.89 | 0.92 | -1.74 | 1.52 | -1.39 | 0.27 | 0.97 |
| ZARA | 13462M001 | U | 4.16 | 2.65 | -1.90 | 1.47 | 0.30 | -2.50 | 5.53 | 7.34 |

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: Igb14
RESIDUALS IN LOCAL SYSTEM (NORTH, EAST, UP)

| NUM | NAME | FLG | RESIDUALS IN MILLIMETERS | | |
|-----|-----------------|-----|--------------------------|-------|-------|
| 4 | ACOR 13434M001 | I W | -0.82 | 0.79 | 2.60 |
| 12 | ALAC 13433M001 | I W | 0.09 | 0.28 | -0.86 |
| 15 | ALBA 13452M001 | I W | -0.14 | -0.56 | -3.19 |
| 21 | ALME 13437M001 | I W | -1.21 | -0.52 | 2.58 |
| 47 | BCLN 13412M001 | I W | -0.10 | -1.86 | -0.33 |
| 52 | BELL 13431M001 | I W | -0.19 | -0.49 | 3.82 |
| 71 | BORR 13480M001 | I W | -0.93 | -0.16 | -0.46 |
| 76 | BRST 10004M004 | I W | -2.81 | -0.76 | 1.66 |
| 104 | CACE 13447M001 | I W | 0.12 | 1.62 | 0.23 |
| 116 | CANT 13438M001 | I W | -1.07 | 1.60 | -0.93 |
| 117 | CARG 19412M001 | I W | 1.25 | -0.59 | -3.22 |
| 122 | CASE 13494M001 | I W | -1.51 | 0.10 | -0.91 |
| 128 | CEU1 13449M002 | I W | 0.85 | -1.01 | -2.60 |
| 143 | COBA 13453M001 | I W | 1.18 | 0.69 | -4.35 |
| 162 | CREU 13432M001 | I W | -1.17 | 1.24 | 0.46 |
| 204 | EBRE 13410M001 | I W | -0.39 | 0.32 | -3.03 |
| 222 | ESCO 13435M001 | I W | -0.77 | 1.35 | -0.03 |
| 299 | HUEL 13451M001 | I W | 1.57 | -3.26 | -3.33 |
| 316 | IZAN 31309M002 | I W | 0.37 | 0.40 | -1.85 |
| 385 | LLIV 13436M001 | I W | 0.31 | 0.87 | 4.00 |
| 390 | LPAL 81701M001 | I W | -2.37 | 1.20 | -2.70 |
| 392 | LROC 10023M001 | I W | 0.88 | 0.15 | -2.04 |
| 421 | MAS1 31303M002 | I W | 1.18 | 0.92 | 0.41 |
| 432 | MELI 19379M001 | I W | 3.22 | -0.70 | -6.39 |
| 493 | PASA 19351S001 | I W | 0.50 | -0.49 | 0.44 |
| 553 | RID1 13448M002 | I W | -1.04 | 0.32 | -1.30 |
| 558 | SALA 13469M001 | I W | 1.05 | 0.69 | -2.36 |
| 566 | SCOA 10088M002 | I W | -2.43 | -0.18 | -3.70 |
| 574 | SFER 13402M004 | I W | 1.15 | -1.30 | 1.10 |
| 599 | SONS 13446M001 | I W | 0.29 | 2.91 | 3.94 |
| 700 | VALA 13463M002 | I W | 0.89 | 0.68 | 0.91 |
| 704 | VALE 13439M001 | I W | 0.40 | 0.24 | -0.77 |
| 715 | VIGO 13450M001 | I W | 2.83 | -2.73 | 2.90 |
| 752 | YEBE 13420M001 | I W | -1.64 | -2.21 | 10.69 |
| 755 | ZARA 13462M001 | I W | -0.41 | 0.94 | 2.65 |
| 764 | ZIMM 14001M004 | I W | 0.86 | -0.49 | 5.99 |
| | | | | | |
| | RMS / COMPONENT | | 1.34 | 1.26 | 3.28 |
| | MEAN | | -0.00 | 0.00 | 0.00 |
| | MIN | | -2.81 | -3.26 | -6.39 |
| | MAX | | 3.22 | 2.91 | 10.69 |

NUMBER OF PARAMETERS : 3
NUMBER OF COORDINATES : 108
RMS OF TRANSFORMATION : 2.17 MM

BARYCENTER COORDINATES:

LATITUDE : 40 0 32.53
LONGITUDE : - 3 31 28.72
HEIGHT : -36.203 KM

PARAMETERS:

TRANSLATION IN N : -0.00 +- 0.36 MM
TRANSLATION IN E : 0.00 +- 0.36 MM
TRANSLATION IN U : -0.00 +- 0.36 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 to the daily solutions are shown.

```
* STATISTICAL PARAMETER-----VALUE(S)-----
NUMBER OF OBSERVATIONS          19090678
NUMBER OF UNKNOWN               241642
NUMBER OF DEGREES OF FREEDOM    18849036
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)      180
VARIANCE FACTOR                  2.257690929854794

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")
      X          Y          Z          X          Y          Z      Scale (ppm)
-----
  1  0.00215     -0.0067 -0.0211  0.0029  0.0004 -0.0002 -0.0006  0.00023
  2  0.00218      0.0157 -0.0005 -0.0106  0.0001  0.0006  0.0001  -0.00075
  3  0.00209      0.0034 -0.0118  0.0035  0.0003 -0.0000 -0.0003  -0.00085
  4  0.00196      0.0170  0.0222 -0.0239  -0.0003  0.0009  0.0007  0.00042
  5  0.00303     -0.0005 -0.0096 -0.0033  0.0001  0.0001 -0.0003  0.00026
  6  0.00225     -0.0251 -0.0180  0.0235  0.0003 -0.0011 -0.0005  0.00057
  7  0.00231     -0.0154  0.0028  0.0183  -0.0001 -0.0008  0.0000  0.00020
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Chi**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
  1  0.00151      2671251  2.27                2705281      3      963      33070      0
  2  0.00158      2668761  2.50                2704294      3      963      34573      0
  3  0.00158      2641142  2.51                2677333      3      963      35231      0
  4  0.00141      2700126  1.98                2734874      3      966      33785      0
  5  0.00152      2676196  2.30                2712550      3      969      35388      0
  6  0.00147      2733361  2.16                2767929      3      981      33590      0
  7  0.00143      2752430  2.04                2788417      3      975      35015      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 21:150:00000 21:156:86370 LEICA GR50      -----
ALDA  A   1 P 21:150:00000 21:156:86370 LEICA GR10      -----
ALSA  A   1 P 21:150:00000 21:156:86370 LEICA GR50      -----
AMUR  A   1 P 21:150:00000 21:156:86370 LEICA GR10      -----
BIAZ  A   1 P 21:150:00000 21:156:86370 SPECTRA SP90M   -----
BIDA  A   1 P 21:150:00000 21:156:86370 LEICA GR10      -----
BRZR  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
CACE  A   1 P 21:150:00000 21:156:86370 TRIMBLE NETR9   -----
CANT  A   1 P 21:150:00000 21:156:86370 LEICA GR10      -----
CHER  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
CREU  A   1 P 21:150:00000 21:156:86370 LEICA GR50      -----
EBRE  A   1 P 21:150:00000 21:156:86370 LEICA GR50      -----
ELGE  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
EMAZ  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
GERN  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
IGEL  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
ISPS  A   1 P 21:150:00000 21:156:86370 TRIMBLE NETR9   -----
KAST  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
LARE  A   1 P 21:150:00000 21:156:86370 LEICA GR50      -----
LAZK  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
LEIT  A   1 P 21:150:00000 21:156:86370 LEICA GR50      -----
ORON  A   1 P 21:150:00000 21:156:86370 LEICA GR50      -----
PAS2  A   1 P 21:150:00030 21:156:82770 STONEX SC2200   -----
PASA  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
RIO1  A   1 P 21:150:00000 21:156:86370 LEICA GR25      -----
SALA  A   1 P 21:150:00000 21:156:86370 LEICA GRX1200+GNSS -----
SCOA  A   1 P 21:150:00000 21:156:86370 LEICA GR25      -----
SOPU  A   1 P 21:150:00000 21:156:86370 LEICA GR30      -----
TERU  A   1 P 21:150:00000 21:156:86370 LEICA GR50      -----
VITO  A   1 P 21:150:00000 21:156:86370 LEICA GR10      -----
YEBE  A   1 P 21:150:00000 21:156:86370 LEICA GR50      -----
ZARA  A   1 P 21:150:00000 21:156:86370 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 21:150:00000 21:156:86370 LEIAS04      LEIS -----
ALDA  A   1 P 21:150:00000 21:156:86370 LEIAS10      NONE -----
ALSA  A   1 P 21:150:00000 21:156:86370 LEIAS10      NONE -----
AMUR  A   1 P 21:150:00000 21:156:86370 LEIAS10      NONE -----
```

```

BIAZ A 1 P 21:150:00000 21:156:86370 LEIAR25 LEIT -----
BIDA A 1 P 21:150:00000 21:156:86370 LEIAS10 NONE -----
BRZR A 1 P 21:150:00000 21:156:86370 LEIAS10 NONE -----
CACE A 1 P 21:150:00000 21:156:86370 TRM29659.00 NONE -----
CANT A 1 P 21:150:00000 21:156:86370 LEIAR25_R4 LEIT 25066
CHER A 1 P 21:150:00000 21:156:86370 LEIAR10 NONE -----
CREU A 1 P 21:150:00000 21:156:86370 LEIAR25_R4 NONE 26357
EBRE A 1 P 21:150:00000 21:156:86370 LEIAR25_R4 NONE 26359
ELGE A 1 P 21:150:00000 21:156:86370 LEIAR25_R4 LEIT -----
EMAZ A 1 P 21:150:00000 21:156:86370 LEIAS10 NONE -----
GERN A 1 P 21:150:00000 21:156:86370 LEIAS10 NONE -----
IGEL A 1 P 21:150:00000 21:156:86370 LEIAS10 NONE -----
ISPS A 1 P 21:150:00000 21:156:86370 TRM59900.00 SCIS -----
KAST A 1 P 21:150:00000 21:156:86370 LEIAS10 NONE -----
LARE A 1 P 21:150:00000 21:156:86370 LEIAR20 LEIM -----
LAZK A 1 P 21:150:00000 21:156:86370 LEIAR25_R4 LEIT -----
LEIT A 1 P 21:150:00000 21:156:86370 LEIAR10 NONE -----
ORDN A 1 P 21:150:00000 21:156:86370 LEIAR10 NONE -----
PAS2 A 1 P 21:150:00030 21:156:82770 LEIAR20 LEIM 73034
PASA A 1 P 21:150:00000 21:156:86370 LEIAR20 LEIM 73034
RID1 A 1 P 21:150:00000 21:156:86370 LEIAR25_R4 LEIT 25138
SALA A 1 P 21:150:00000 21:156:86370 LEIAR25 NONE -----
SCOA A 1 P 21:150:00000 21:156:86370 TRM55971.00 NONE -----
SOPU A 1 P 21:150:00000 21:156:86370 LEIAS10 NONE -----
TERU A 1 P 21:150:00000 21:156:86370 LEIAR20 LEIM 49044
VITO A 1 P 21:150:00000 21:156:86370 LEIAS10 NONE -----
YEBE A 1 P 21:150:00000 21:156:86370 LEIAR20 LEIM 49016
ZARA A 1 P 21:150:00000 21:156:86370 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 21:150:00000 21:156:86370 UNE 3.0460 0.0000 0.0000
ALDA A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
ALSA A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
AMUR A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
BIAZ A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
BIDA A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
BRZR A 1 P 21:150:00000 21:156:86370 UNE 0.0771 0.0000 0.0000
CACE A 1 P 21:150:00000 21:156:86370 UNE 0.0600 0.0000 0.0000
CANT A 1 P 21:150:00000 21:156:86370 UNE 3.0490 0.0000 0.0000
CHER A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
CREU A 1 P 21:150:00000 21:156:86370 UNE 0.0770 0.0000 0.0000
EBRE A 1 P 21:150:00000 21:156:86370 UNE 0.0770 0.0000 0.0000
ELGE A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
EMAZ A 1 P 21:150:00000 21:156:86370 UNE 0.0350 0.0000 0.0000
GERN A 1 P 21:150:00000 21:156:86370 UNE 0.0771 0.0000 0.0000
IGEL A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
ISPS A 1 P 21:150:00000 21:156:86370 UNE 0.0350 0.0000 0.0000
KAST A 1 P 21:150:00000 21:156:86370 UNE 0.0350 0.0000 0.0000
LARE A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
LAZK A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
LEIT A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
ORDN A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
PAS2 A 1 P 21:150:00030 21:156:82770 UNE 0.0000 0.0000 0.0000
PASA A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
RID1 A 1 P 21:150:00000 21:156:86370 UNE 0.0606 0.0000 0.0000
SALA A 1 P 21:150:00000 21:156:86370 UNE 0.0600 0.0000 0.0000
SCOA A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
SOPU A 1 P 21:150:00000 21:156:86370 UNE 0.0771 0.0000 0.0000
TERU A 1 P 21:150:00000 21:156:86370 UNE 0.0600 0.0000 0.0000
VITO A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
YEBE A 1 P 21:150:00000 21:156:86370 UNE 0.0000 0.0000 0.0000
ZARA A 1 P 21:150:00000 21:156:86370 UNE 3.2590 0.0000 0.0000

```

8 References

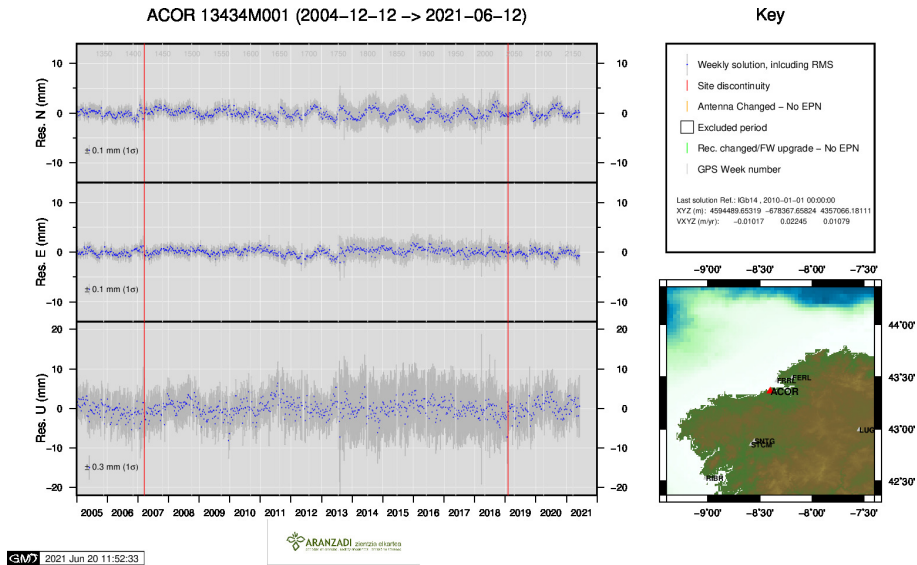
C. Boucher and Z. Altamimi (2011): *Specifications for reference frame fixing in the analysis of a EUREF GPS campaign*. etrs89.ensg.ign.fr/memo-V8.pdf

EPN Coordination Group and the EPN Central Bureau (2018): *Guidelines for the EPN Analysis Centres*. epncb.oma.be/documentation/guidelines/guidelines_analysis_centres.pdf

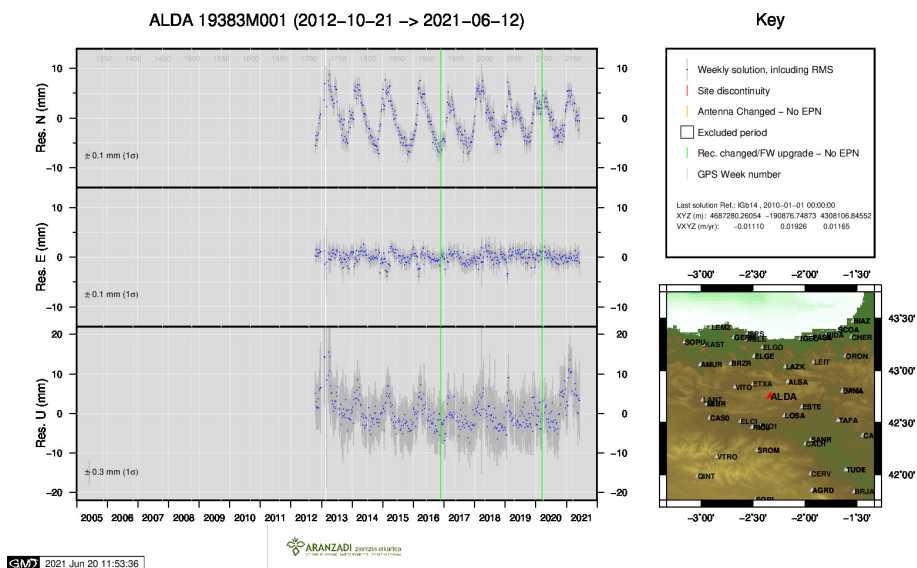
Z. Altamimi (2018): *EUREF Technical Note 1: Relationship and Transformation between the International and the European Terrestrial Reference Systems*. etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf

9 Cumulative Time Series

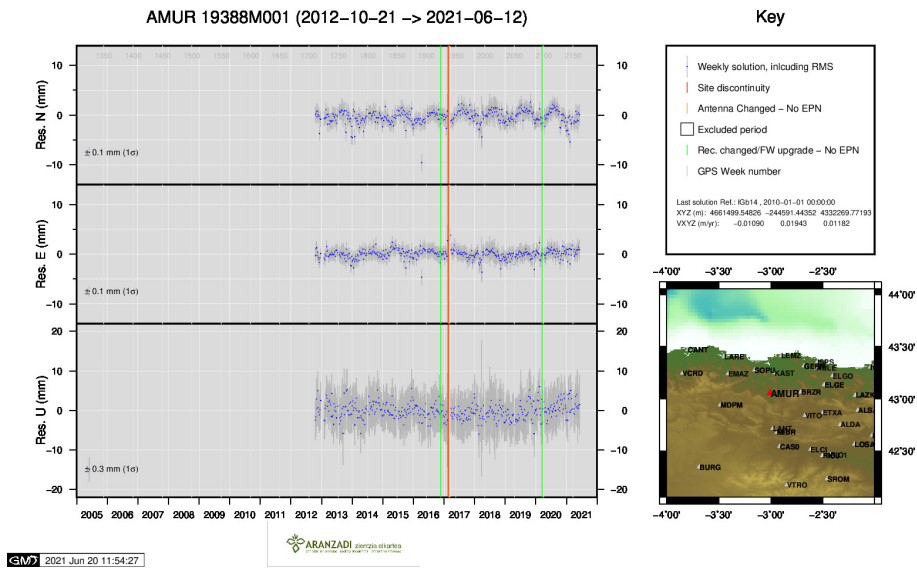
Time series of stations. Latest plots at: <http://geolabpasaia.org/gnss/ARA-net/TSeries/>, or click on the caption of each image.



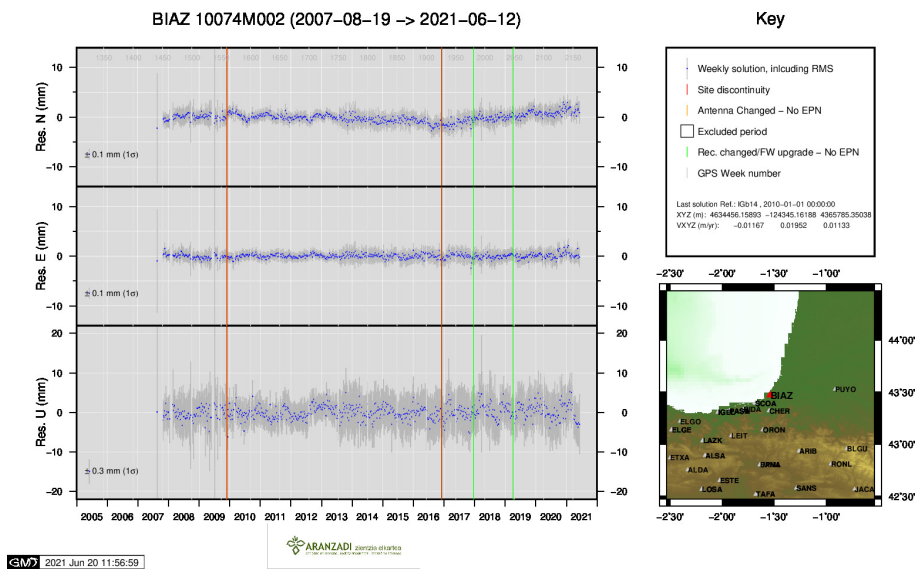
1) ACOR



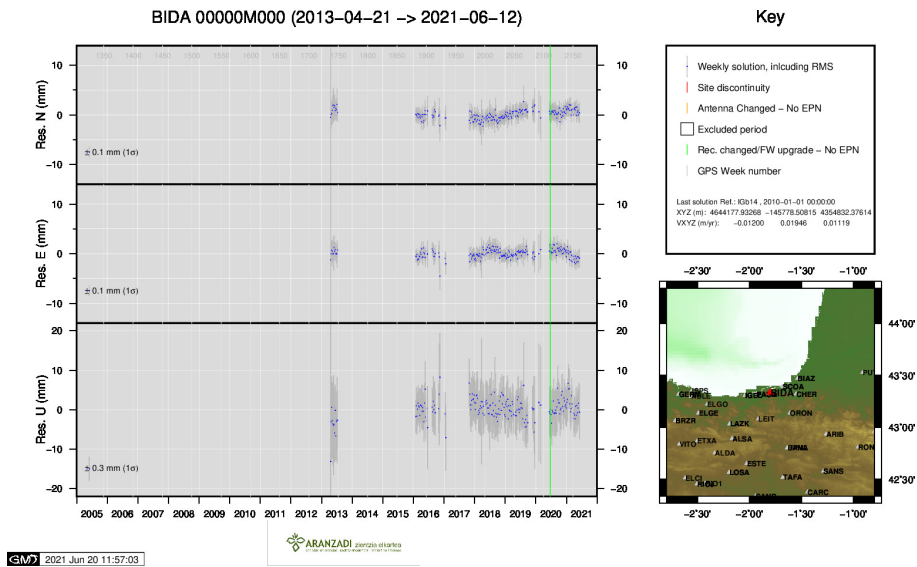
2) ALDA



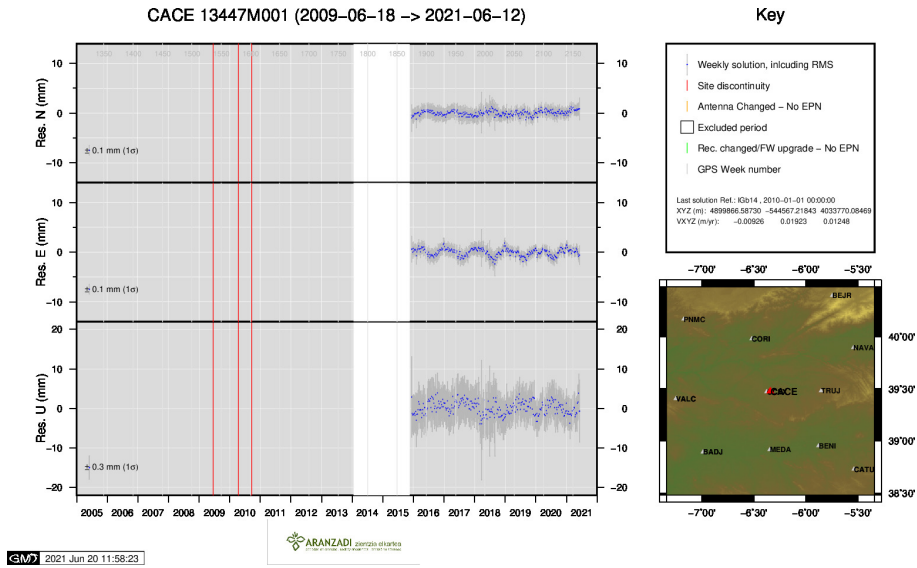
3) AMUR



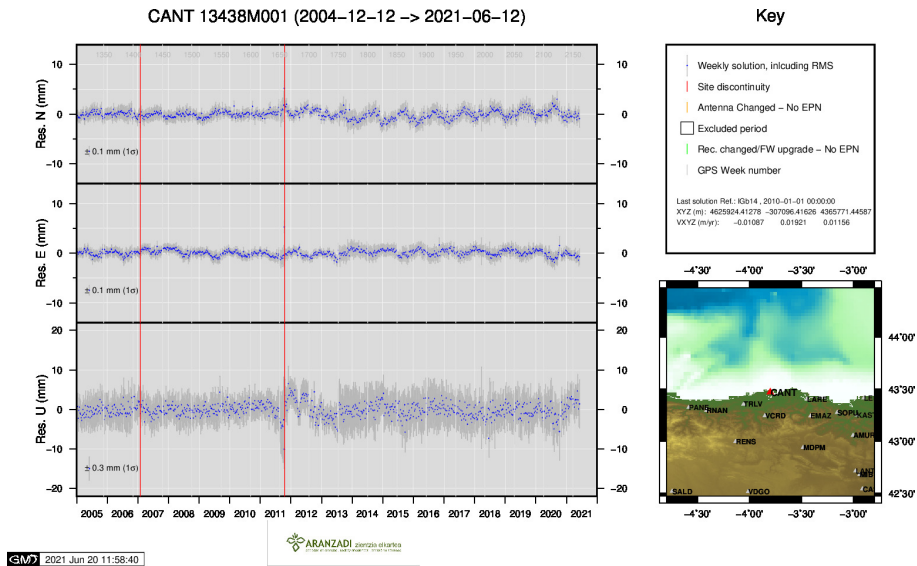
4) BIAZ



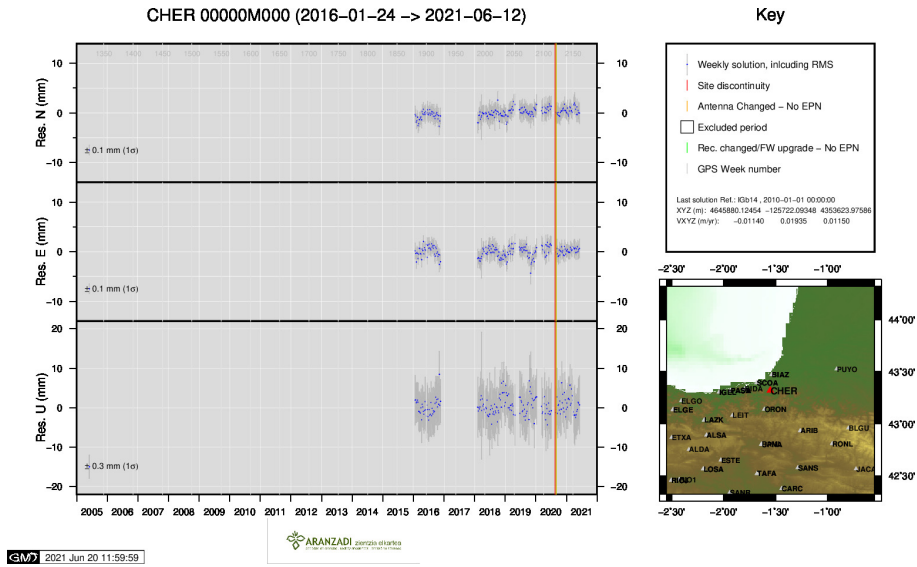
5) BIDA



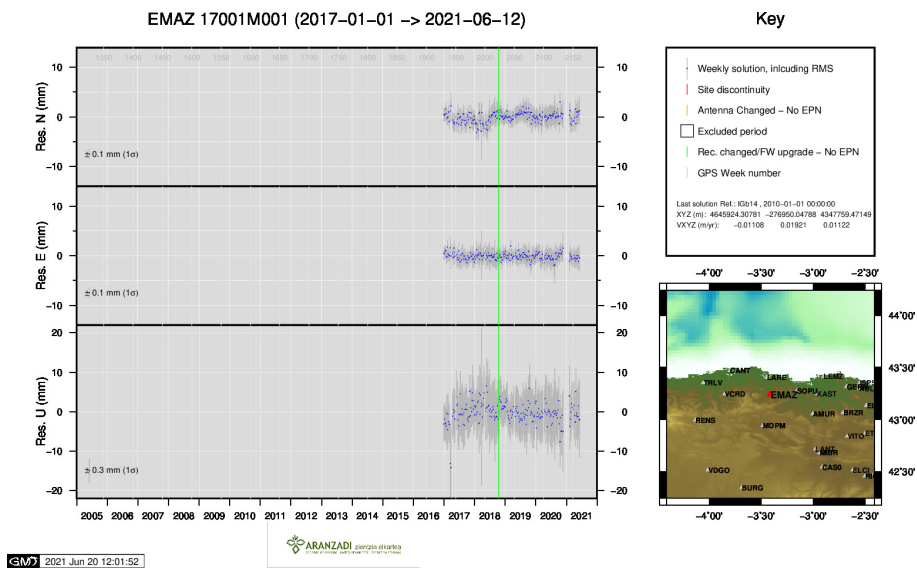
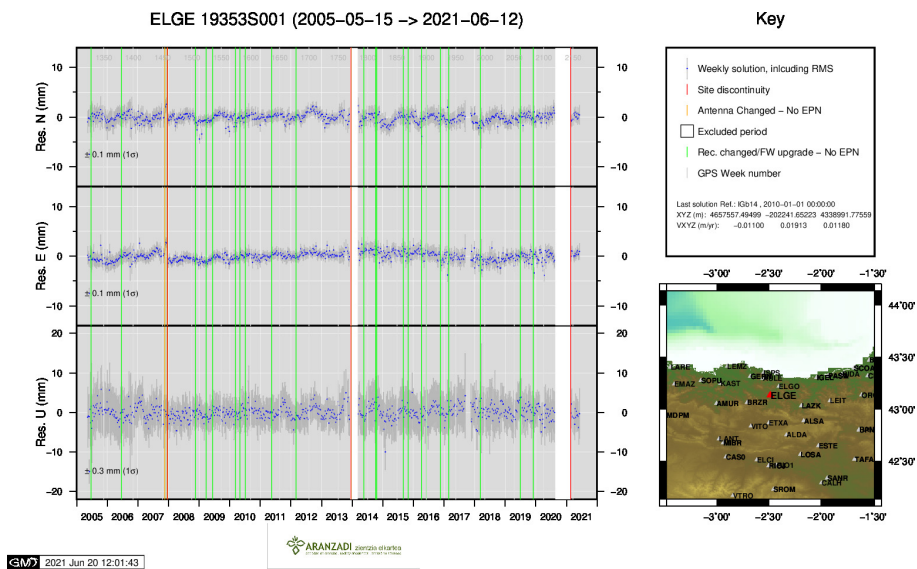
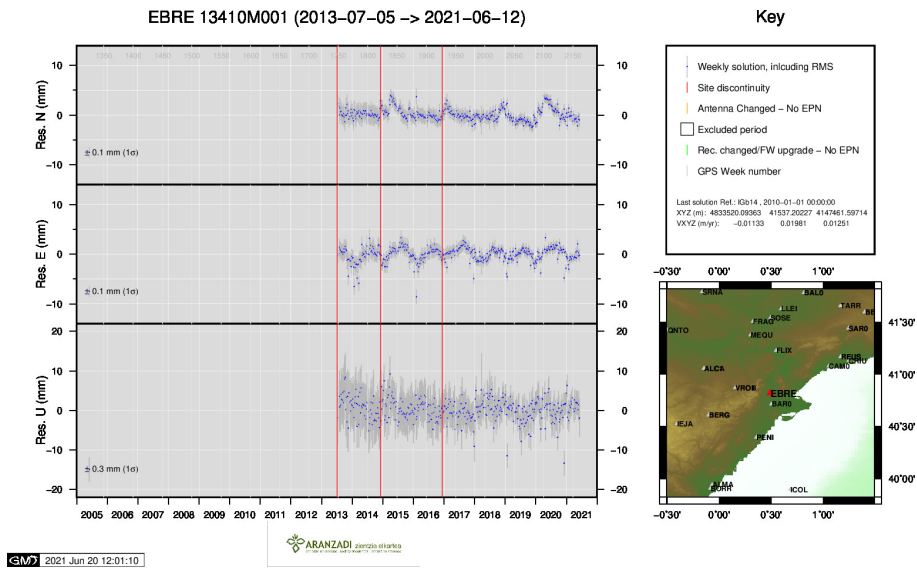
6) CACE

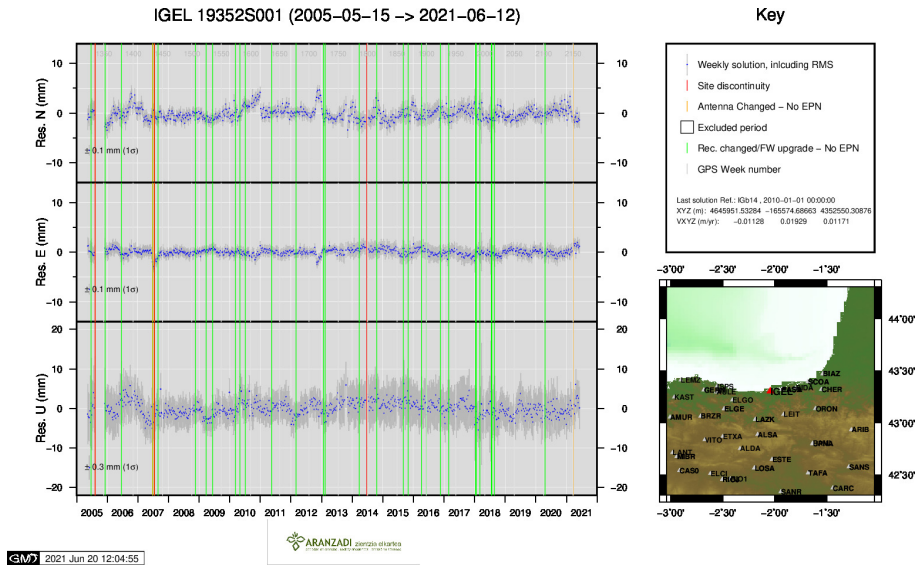


7) CANT

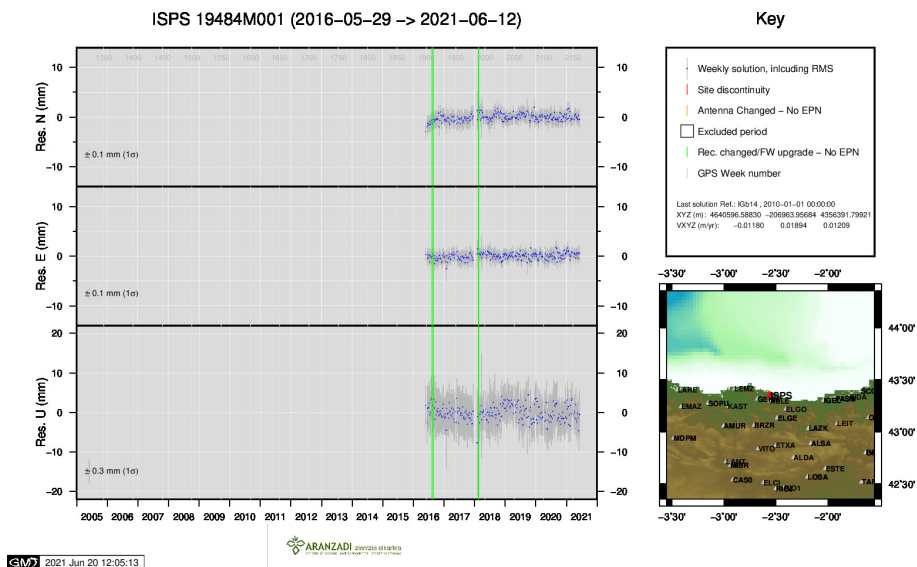


8) CHER

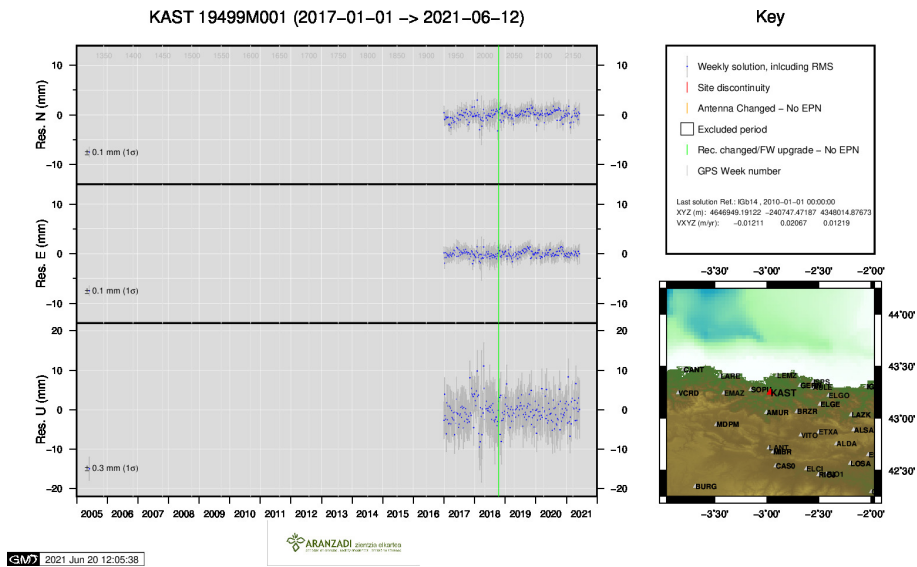




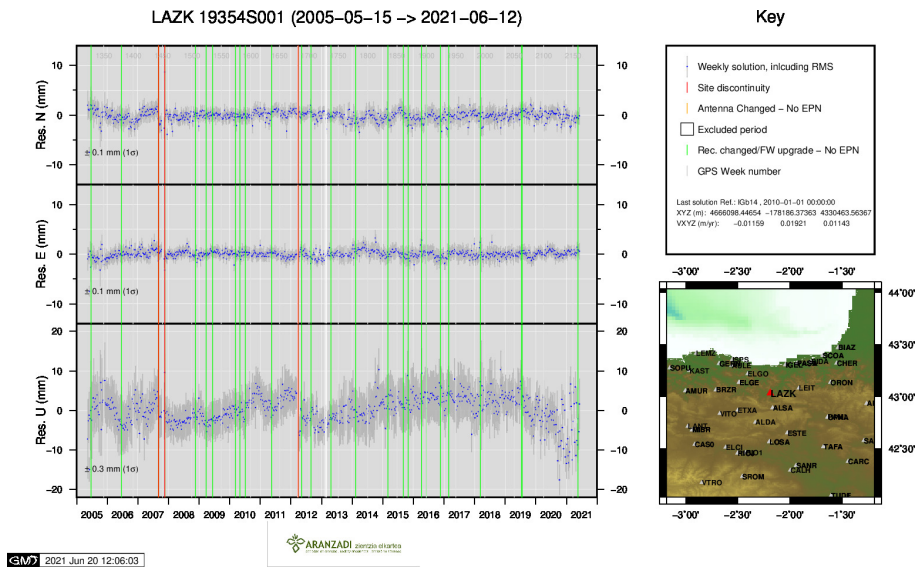
12) IGEL



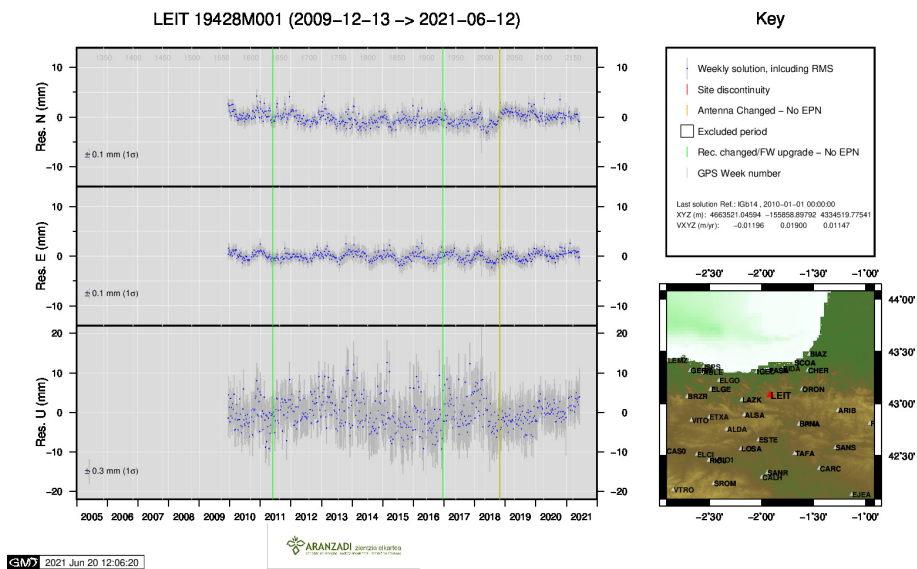
13) ISPS



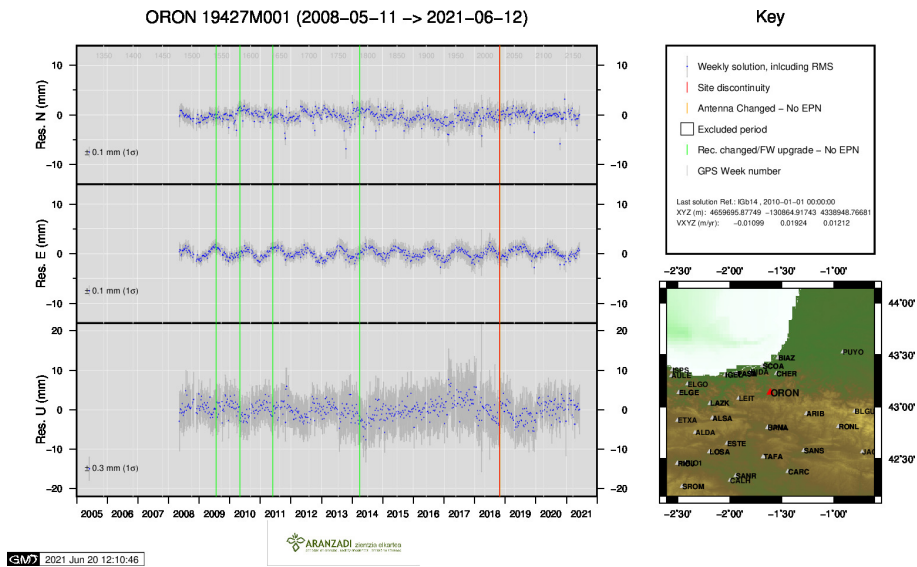
14) KAST



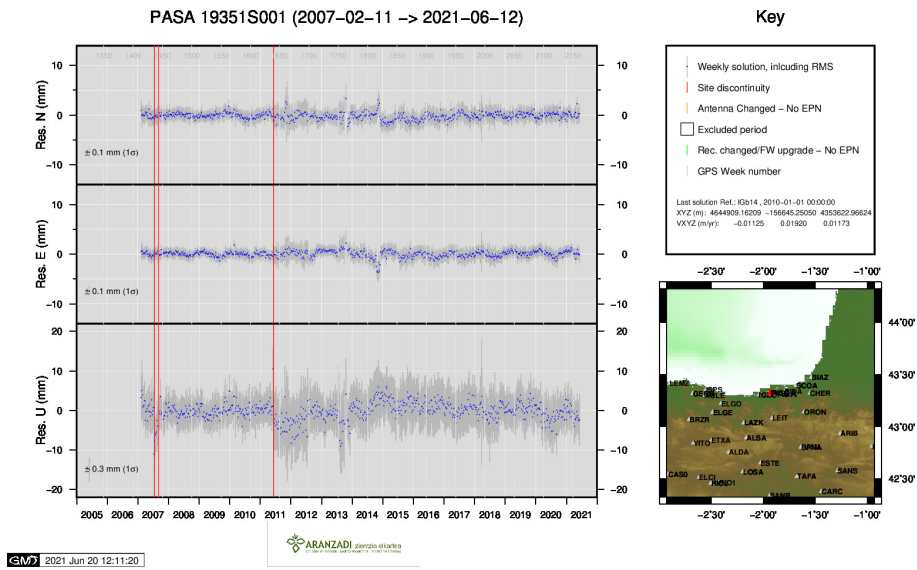
15) LAZK



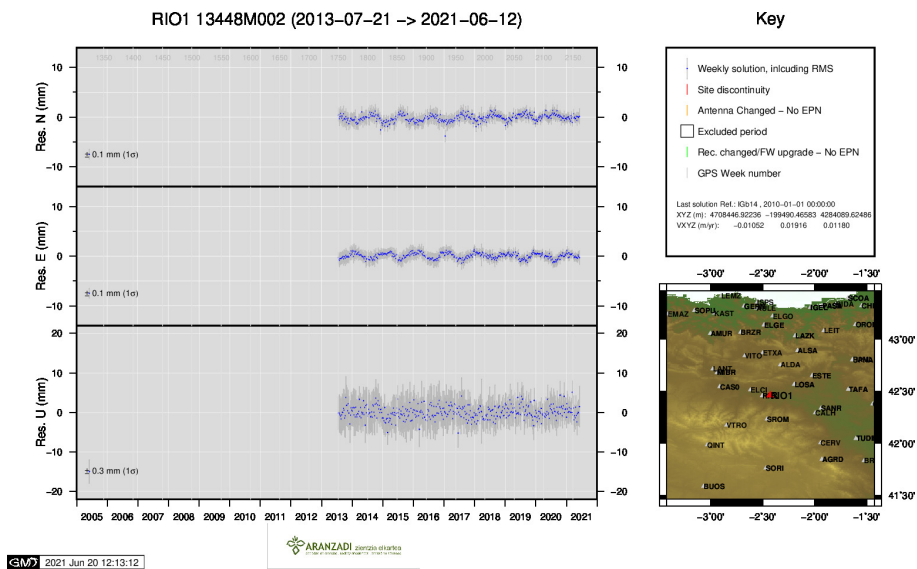
16) LEIT



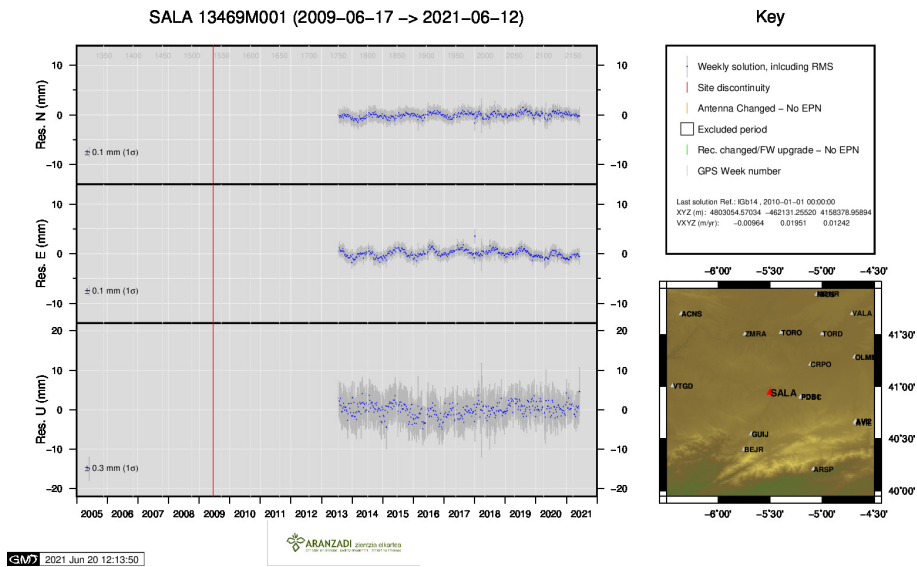
17) ORON



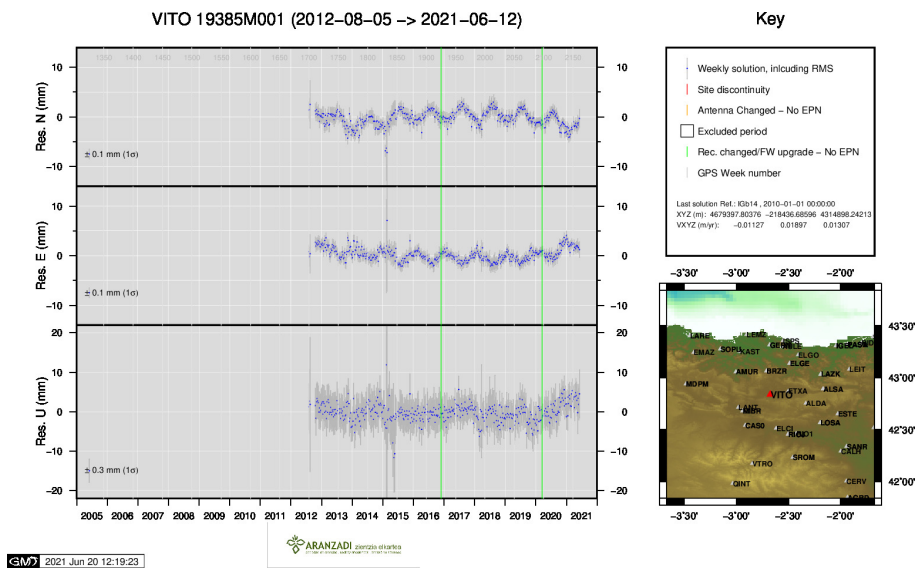
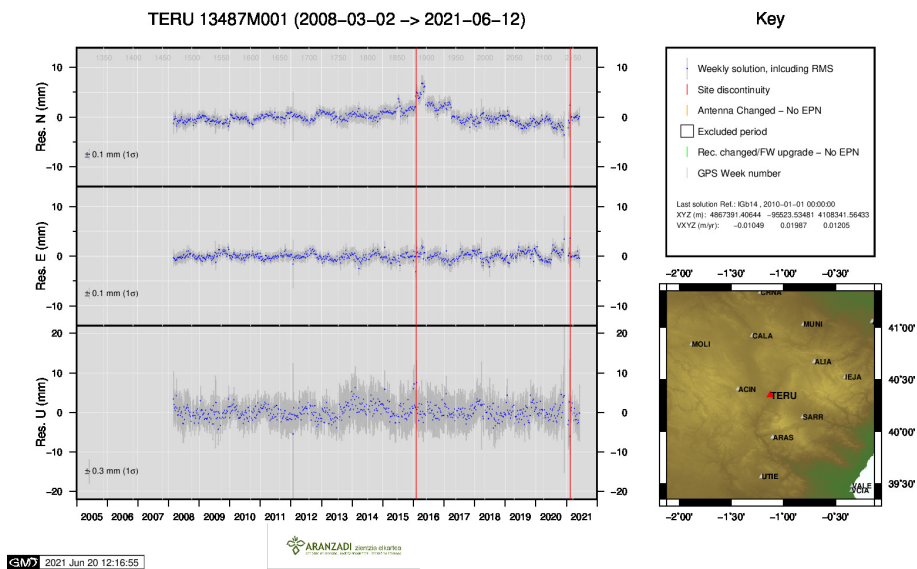
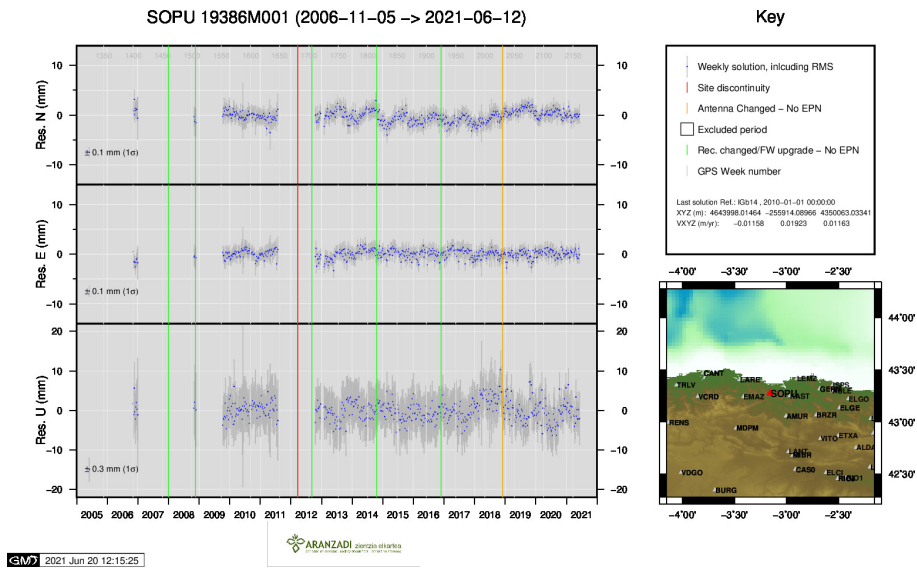
18) PASA

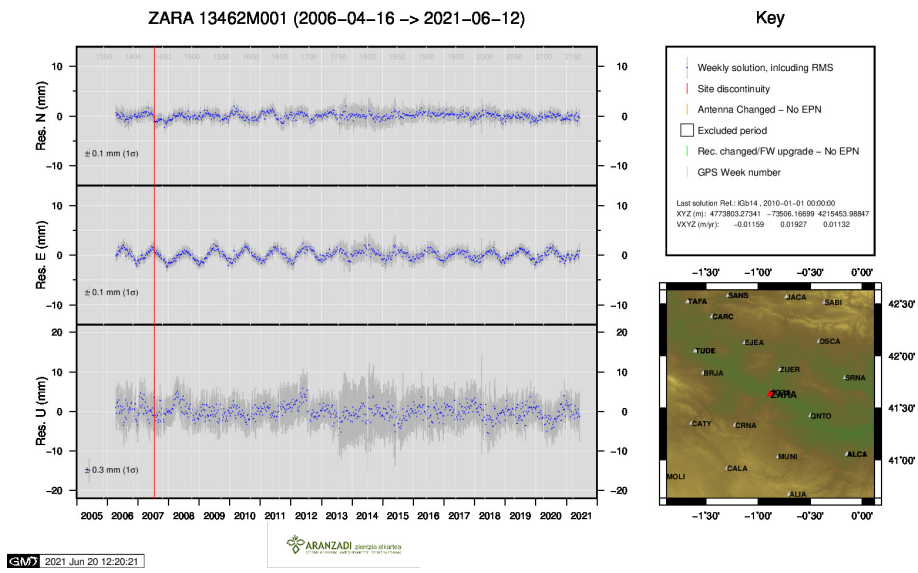


19) RIO1



20) SALA





24) ZARA