

# ARA-DAC Weekly Analysis Result: 2128 (GFA)

## Technical Report

**GPS Week: 2128 (GFA)**

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

**ARA-DAC details:**

Contact person: J. Zurutuza

Contact mail: [geodesia@aranzadi.eus](mailto:geodesia@aranzadi.eus)

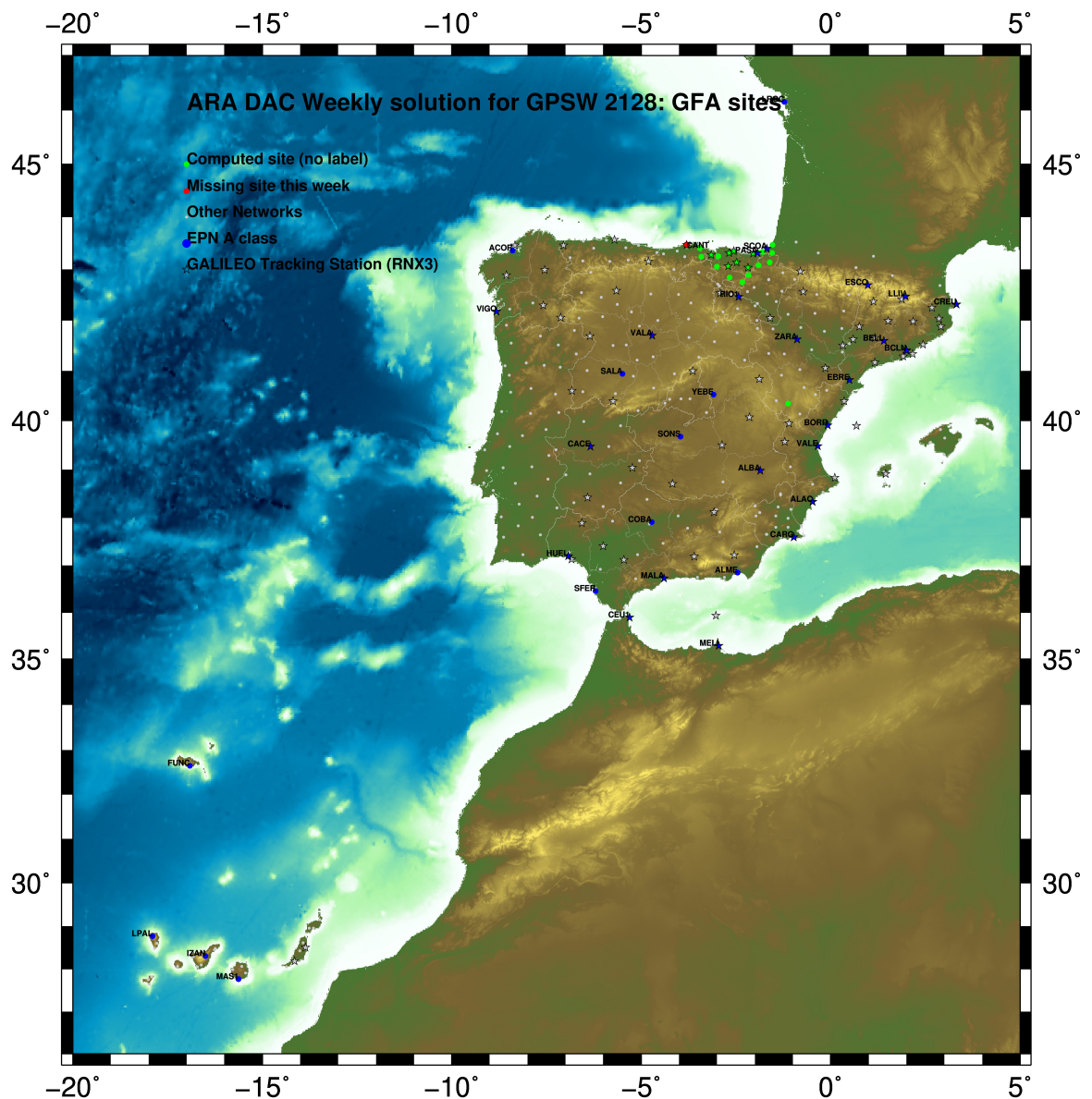
Report generated on 2020/11/08 at 13:27:39



# 1 Introduction

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

# 2 Map of Computed Sites



GM 2020 Nov 08 13:27:30

Fig.1: Computed Sites for GPS Week2128 (GFA)

### 3 Main Computation Parameters

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

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

### 4 Estimated Parameters

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

- Ambiguity: an advanced ambiguity resolution (AR) scheme is included:
  - Code-Based 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 C2085.

```

ARA LAC 2128 WEEK FINAL COMBINATION: PRECISE ORBITS                08-NOV-20 09:44
-----
LOCAL GEODETIC DATUM: IGS14                EPOCH: 2020-10-21 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
  4 ACRD 13434M001        4594489.54581      -678367.41500     4357066.30262    W
 39 ALDA 19383M001        4687280.14980      -190876.54048     4308106.97659    A
 50 ALSA 19419M001        4677250.81654      -176770.36707     4319079.89231    A
 53 AMUR 19388M001        4661499.43608      -244591.23574     4332269.90165    A
100 BIAZ 10074M002        4634456.03817      -124344.95124     4365785.48073    A
101 BIDA 00000M000        4644177.80762      -145778.29766     4354832.49955    A
113 BRZR 19387M001        4662220.97396      -220769.87655     4333309.45753    A
 98 CACE 13447M001        4899866.49019      -544567.01046     4033770.22180    W
154 CHER 00000M000        4645880.00742      -125721.88535     4353624.10605    A
154 CREU 13432M001        4715420.11028      273178.08570     4271946.85651    W
190 EBRE 13410M001        4833519.97304      41537.41709     4147461.73316    W
180 ELGE 19353S001        4657557.38946      -202241.45531     4338991.89239    A
182 EMAZ 17001M001        4645924.18482      -276949.83970     4347759.59375    A
209 GERN 19389M001        4642811.30484      -217222.89974     4353278.89875    A
235 IGEL 19352S001        4645951.41329      -165574.47918     4352550.44003    A
240 ISPS 19484M001        4640596.46282      -206963.75334     4356391.93317    A
245 KAST 19499M001        4646949.06169      -240747.24813     4348015.00824    A
252 LARE 19440M001        4632831.94119      -279026.11708     4360314.45376    A
256 LAZK 19354S001        4666098.32009      -178186.16662     4330463.68716    A
261 LEIT 19428M001        4663520.92062      -155858.69100     4334519.90777    A
334 ORDN 19427M001        4659695.76467      -130864.71202     4338948.89549    A
345 PAS2 19351S001        4644909.04391      -156645.04334     4353623.09823    A
456 PASA 19351S001        4644909.04380      -156645.04325     4353623.09822    W
513 RID1 13448M002        4708446.81548      -199490.25978     4284089.75920    W
518 SALA 13469M001        4803054.46900      -462131.04474     4158379.09628    W
526 SCDA 10088M002        4639940.48484      -136224.91767     4359552.43666    W
418 SOPU 19386M001        4643997.89295      -255913.88217     4350063.16370    A
443 TERU 13487M001        4867391.30882      -95523.32588     4108341.70008    A
493 VITO 19385M001        4679397.68908      -218436.48077     4314898.38574    A
698 YEBE 13420M001        4848724.55426      -261631.90492     4123094.34928    W
701 ZARA 13462M001        4773803.15071      -73505.96010     4215454.11336    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 2128                08-NOV-20 09:44
-----
LOCAL GEODETIC DATUM: ETRF2000            EPOCH: 2020-10-21 12:00:00
-----
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
-----
  4 ACRD 13434M001        4594489.86317      -678367.97951     4357065.86677    W
 39 ALDA 19383M001        4687280.52330      -190877.11410     4308106.53965    A
 50 ALSA 19419M001        4677251.19256      -176770.93955     4319079.45634    A
 53 AMUR 19388M001        4661499.80476      -244591.80669     4332269.46607    A
100 BIAZ 10074M002        4634456.42398      -124345.51891     4365785.04881    A
101 BIDA 00000M000        4644178.19002      -145778.86645     4354832.06659    A
113 BRZR 19387M001        4662221.34563      -220770.44752     4333309.02220    A
 98 CACE 13447M001        4899866.80047      -544567.60779     4033769.76348    W
154 CHER 00000M000        4645880.39218      -125722.45427     4353623.67221    A
154 CREU 13432M001        4715420.53782      273177.51063     4271946.42312    W
190 EBRE 13410M001        4833520.36327      41536.82839     4147461.28755    W
180 ELGE 19353S001        4657557.76281      -202242.02572     4338991.45766    A
182 EMAZ 17001M001        4645924.55067      -276950.40905     4347759.15900    A
209 GERN 19389M001        4642811.67839      -217223.46858     4353278.46499    A
235 IGEL 19352S001        4645951.79310      -165575.04822     4352550.00668    A
240 ISPS 19484M001        4640596.83785      -206964.32191     4356391.49972    A
245 KAST 19499M001        4646949.43198      -240747.81749     4348014.57386    A
252 LARE 19440M001        4632832.30769      -279026.68499     4360314.02001    A
256 LAZK 19354S001        4666098.69876      -178186.73789     4330463.25206    A
261 LEIT 19428M001        4663521.30031      -155859.26193     4334519.47315    A
334 ORDN 19427M001        4659696.14774      -130865.28246     4338948.46149    A
345 PAS2 19351S001        4644909.42489      -156645.61224     4353622.66507    A
456 PASA 19351S001        4644909.42478      -156645.61215     4353622.66506    W
513 RID1 13448M002        4708447.18618      -199490.83571     4284089.32048    W
518 SALA 13469M001        4803054.79844      -462131.63153     4158378.64671    W
526 SCDA 10088M002        4639940.86875      -136225.48597     4359552.00415    W
418 SOPU 19386M001        4643998.26153      -255914.45124     4350062.72936    A
443 TERU 13487M001        4867391.67947      -95523.91869     4108341.25006    A
493 VITO 19385M001        4679398.05970      -218437.05360     4314897.94908    A
698 YEBE 13420M001        4848724.90567      -261632.49618     4123093.89865    W
701 ZARA 13462M001        4773803.53183      -73506.54274     4215453.67105    W
    
```

### 5.3 ETRF2014 (ETRS89) Coordinates

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

```

ETRF2014 FINAL COORD. wk 2128                                08-NOV-20 09:44
-----
LOCAL GEODETIC DATUM: ETRF2014          EPOCH: 2020-10-21 12:00:00
NUM STATION NAME          X (M)          Y (M)          Z (M)          FLAG
4  ACRD 13434M001         4594489.82203    -678368.01765   4357065.91752   W
39 ALDA 19383M001         4687280.47989    -190877.15350   4308106.59028   A
50 ALSA 19419M001         4677251.14921    -176770.97905   4319079.50701   A
53 AMUR 19388M001         4661499.76178    -244591.84602   4332269.51675   A
100 BIAZ 10074M002         4634456.38089    -124345.55875   4365785.09962   A
101 BIDA 00000M000         4644178.14690    -145778.90618   4354832.11736   A
113 BRZR 19387M001         4662221.30257    -220770.48693   4333309.07288   A
98 CACE 13447M001         4899866.75583    -544567.64513   4033769.81345   W
154 CHER 00000M000         4645880.34898    -125722.49406   4353623.72299   A
154 CREU 13432M001         4715420.49251    273177.46981   4271946.47398   W
190 EBRE 13410M001         4833520.31758    41536.78881   4147461.33792   W
180 ELGE 19353S001         4657557.71973    -202242.06521   4338991.50837   A
182 EMAZ 17001M001         4645924.50794    -276950.44833   4347759.20970   A
209 GERN 19389M001         4642811.63551    -217223.50808   4353278.51574   A
235 IGEL 19352S001         4645951.75003    -165575.08788   4352550.05744   A
240 ISPS 19484M001         4640596.79496    -206964.36145   4356391.55047   A
245 KAST 19499M001         4646949.38913    -240747.85689   4348014.62458   A
252 LARE 19440M001         4632832.26509    -279026.72432   4360314.07075   A
256 LAZK 19354S001         4666098.65552    -178186.77742   4330463.30275   A
261 LEIT 19428M001         4663521.25704    -155859.30155   4334519.52387   A
334 ORON 19427M001         4659696.10442    -130865.32217   4338948.51223   A
345 PAS2 19351S001         4644909.38180    -156645.65193   4353622.71584   A
456 PASA 19351S001         4644909.38169    -156645.65184   4353622.71583   W
513 RIO1 13448M002         4708447.14259    -199490.87500   4284089.37105   W
518 SALA 13469M001         4803054.75463    -462131.66955   4158378.69694   W
526 SOA 10088M002         4639940.82564    -136225.52575   4359552.05494   W
418 SOPU 19386M001         4643998.21876    -255914.49060   4350062.78008   A
443 TERU 13487M001         4867391.63388    -95523.95767   4108341.30027   A
493 VITO 19385M001         4679398.01646    -218437.09295   4314897.99972   A
698 YEBE 13420M001         4848724.86080    -261632.53469   4123093.94882   W
701 ZARA 13462M001         4773803.48715    -73506.58218   4215453.72150   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 2128 WEEK FINAL COMBINATION: PRECISE ORBITS 08-NOV-20 09:44

| Station        | #Days | Weekday<br>0123456 | Repeatability (mm) |      |       |
|----------------|-------|--------------------|--------------------|------|-------|
|                |       |                    | N                  | E    | U     |
| ACOR 13434M001 | 7     | XXXXXX             | 2.00               | 1.18 | 4.33  |
| ALDA 19383M001 | 7     | XXXXXX             | 2.54               | 1.16 | 5.87  |
| ALSA 19419M001 | 7     | XXXXXX             | 2.64               | 0.58 | 4.79  |
| AMUR 19388M001 | 7     | XXXXXX             | 2.99               | 6.26 | 7.17  |
| BIAZ 10074M002 | 7     | XXXXXX             | 2.88               | 1.11 | 6.69  |
| BIDA 00000M000 | 7     | XXXXXX             | 2.66               | 1.26 | 5.27  |
| BRZR 19387M001 | 7     | XXXXXX             | 2.96               | 2.93 | 6.57  |
| CACE 13447M001 | 7     | XXXXXX             | 1.33               | 0.57 | 5.15  |
| CHER 00000M000 | 7     | XXXXXX             | 3.12               | 1.03 | 10.41 |
| CREU 13432M001 | 7     | XXXXXX             | 1.45               | 0.84 | 5.80  |
| EBRE 13410M001 | 7     | XXXXXX             | 0.41               | 0.73 | 2.45  |
| ELGE 19353S001 | 7     | XXXXXX             | 3.19               | 4.42 | 4.27  |
| EMAZ 17001M001 | 7     | XXXXXX             | 4.02               | 1.12 | 4.94  |
| GERN 19389M001 | 7     | XXXXXX             | 1.14               | 1.54 | 3.21  |
| IGEL 19352S001 | 7     | XXXXXX             | 2.06               | 1.47 | 3.48  |
| ISPS 19484M001 | 7     | XXXXXX             | 2.08               | 1.65 | 4.04  |
| KAST 19499M001 | 7     | XXXXXX             | 2.81               | 0.82 | 6.36  |
| LARE 19440M001 | 7     | XXXXXX             | 2.93               | 0.79 | 2.61  |
| LAZK 19354S001 | 7     | XXXXXX             | 2.56               | 2.23 | 5.29  |
| LEIT 19428M001 | 7     | XXXXXX             | 4.71               | 2.10 | 8.71  |
| ORON 19427M001 | 7     | XXXXXX             | 9.81               | 2.00 | 5.93  |
| PAS2 19351S001 | 7     | XXXXXX             | 2.50               | 1.26 | 4.47  |
| PASA 19351S001 | 7     | XXXXXX             | 2.52               | 1.28 | 4.26  |
| RI01 13448M002 | 7     | XXXXXX             | 1.83               | 1.20 | 4.51  |
| SALA 13469M001 | 7     | XXXXXX             | 1.15               | 0.41 | 2.22  |
| SCDA 10088M002 | 7     | XXXXXX             | 2.37               | 1.21 | 5.66  |
| SOPU 19386M001 | 7     | XXXXXX             | 1.92               | 1.66 | 5.50  |
| TERU 13487M001 | 7     | XXXXXX             | 0.67               | 0.93 | 4.63  |
| VITO 19385M001 | 7     | XXXXXX             | 1.58               | 1.24 | 3.31  |
| YEBE 13420M001 | 7     | XXXXXX             | 0.68               | 0.85 | 3.54  |
| ZARA 13462M001 | 7     | XXXXXX             | 0.82               | 1.04 | 2.26  |

Comparison of individual solutions:

|                |   |       |       |        |        |        |       |       |       |
|----------------|---|-------|-------|--------|--------|--------|-------|-------|-------|
| ACOR 13434M001 | N | 2.00  | 0.26  | 2.83   | 2.12   | -0.55  | -1.90 | -0.67 | -2.67 |
| ACOR 13434M001 | E | 1.18  | -1.35 | 0.92   | -1.03  | -0.82  | 1.20  | -1.32 | -0.88 |
| ACOR 13434M001 | U | 4.33  | -0.81 | 1.93   | -4.26  | 4.12   | -3.56 | 0.32  | 7.76  |
| ALDA 19383M001 | N | 2.54  | -1.39 | -3.29  | 4.38   | 1.28   | 0.44  | -0.91 | -2.01 |
| ALDA 19383M001 | E | 1.16  | -1.51 | -0.05  | 0.89   | 1.84   | 1.15  | -0.17 | -0.55 |
| ALDA 19383M001 | U | 5.87  | -0.95 | -10.15 | 1.11   | 1.02   | -4.76 | 2.81  | 8.38  |
| ALSA 19419M001 | N | 2.64  | -1.48 | -4.13  | 1.18   | 3.97   | 1.34  | -1.60 | -1.12 |
| ALSA 19419M001 | E | 0.58  | -0.37 | 0.43   | 0.39   | 0.12   | 1.19  | -0.32 | -0.11 |
| ALSA 19419M001 | U | 4.79  | -2.44 | -1.51  | -4.29  | -5.44  | 7.38  | 5.14  | -0.58 |
| AMUR 19388M001 | N | 2.99  | 0.45  | 2.59   | -2.24  | -4.50  | 1.92  | 3.06  | 2.89  |
| AMUR 19388M001 | E | 6.26  | 1.61  | 0.48   | -2.16  | -10.78 | 4.89  | 1.72  | 9.21  |
| AMUR 19388M001 | U | 7.17  | -3.99 | -1.83  | -4.14  | -12.29 | 0.13  | 5.20  | 9.71  |
| BIAZ 10074M002 | N | 2.88  | -0.85 | 0.48   | 5.74   | 1.27   | -3.23 | -1.63 | -1.04 |
| BIAZ 10074M002 | E | 1.11  | 0.30  | 0.33   | 1.89   | -0.64  | -1.57 | 0.85  | 0.17  |
| BIAZ 10074M002 | U | 6.69  | -7.92 | -6.84  | 0.88   | 5.69   | 9.08  | -6.17 | -2.29 |
| BIDA 00000M000 | N | 2.66  | -0.08 | 0.88   | 0.26   | -5.68  | 1.96  | 1.90  | 1.40  |
| BIDA 00000M000 | E | 1.26  | -0.70 | 1.34   | 1.75   | -1.70  | 0.20  | -0.63 | 0.93  |
| BIDA 00000M000 | U | 5.27  | -0.46 | -3.43  | -3.80  | -9.41  | 3.18  | -1.19 | 6.36  |
| BRZR 19387M001 | N | 2.96  | 1.13  | -1.51  | 2.99   | 4.16   | -4.40 | 0.92  | -1.55 |
| BRZR 19387M001 | E | 2.93  | 1.91  | -1.55  | -0.78  | -4.28  | 0.10  | 4.66  | -2.16 |
| BRZR 19387M001 | U | 6.57  | 2.27  | -0.60  | 0.22   | -9.42  | -4.66 | 9.20  | -7.62 |
| CACE 13447M001 | N | 1.33  | 0.61  | 0.64   | 2.46   | -1.44  | -0.96 | 0.38  | -0.84 |
| CACE 13447M001 | E | 0.57  | 0.19  | -0.70  | 0.79   | 0.14   | -0.77 | -0.29 | -0.28 |
| CACE 13447M001 | U | 5.15  | 5.06  | 5.65   | 3.32   | 6.86   | -0.16 | -2.85 | -5.92 |
| CHER 00000M000 | N | 3.12  | 1.46  | 1.81   | -2.80  | -6.23  | 0.63  | -0.07 | 2.46  |
| CHER 00000M000 | E | 1.03  | 0.50  | -0.41  | -0.31  | -1.39  | -0.46 | 1.43  | 1.26  |
| CHER 00000M000 | U | 10.41 | -5.76 | -2.11  | -5.54  | -22.51 | 8.44  | -0.75 | -1.75 |
| CREU 13432M001 | N | 1.45  | 0.13  | 1.61   | 1.30   | 0.05   | -2.46 | -1.13 | 0.99  |
| CREU 13432M001 | E | 0.84  | -0.34 | 1.76   | 0.62   | -0.25  | -0.31 | 0.67  | 0.20  |
| CREU 13432M001 | U | 5.80  | -2.88 | -3.01  | -10.35 | -2.28  | 2.02  | 0.32  | 8.26  |
| EBRE 13410M001 | N | 0.41  | 0.50  | 0.75   | 0.05   | -0.31  | 0.05  | -0.13 | -0.30 |
| EBRE 13410M001 | E | 0.73  | 0.90  | 0.55   | 0.36   | -0.35  | 0.26  | -0.12 | 1.34  |
| EBRE 13410M001 | U | 2.45  | -3.21 | -2.32  | -1.13  | -2.85  | 0.87  | 0.46  | 3.17  |
| ELGE 19353S001 | N | 3.19  | -3.09 | 0.11   | 3.73   | 5.34   | -2.71 | -1.04 | -0.86 |
| ELGE 19353S001 | E | 4.42  | 5.50  | -0.99  | -6.12  | -5.13  | -1.33 | 3.98  | 2.15  |
| ELGE 19353S001 | U | 4.27  | -5.45 | -1.98  | -3.81  | -4.20  | 6.25  | 1.21  | -1.70 |
| EMAZ 17001M001 | N | 4.02  | -3.31 | -2.12  | -2.50  | 7.89   | 1.55  | -2.43 | -2.15 |
| EMAZ 17001M001 | E | 1.12  | -0.68 | 0.13   | -1.30  | 2.01   | 0.13  | -0.68 | -0.92 |
| EMAZ 17001M001 | U | 4.94  | 3.83  | -0.39  | -8.55  | -7.03  | -1.60 | 2.09  | 1.55  |
| GERN 19389M001 | N | 1.14  | 0.97  | -0.37  | 2.06   | 0.29   | -1.39 | -0.40 | 0.50  |
| GERN 19389M001 | E | 1.54  | 0.44  | 0.45   | 1.79   | -2.00  | -2.52 | -0.43 | 0.35  |
| GERN 19389M001 | U | 3.21  | -6.12 | -0.45  | -2.41  | -3.14  | 2.80  | 0.32  | -0.63 |
| IGEL 19352S001 | N | 2.06  | -1.33 | 1.53   | -0.93  | 4.07   | 0.34  | -1.95 | 0.30  |
| IGEL 19352S001 | E | 1.47  | -0.75 | -0.75  | 1.12   | 2.10   | -2.12 | -0.18 | -1.27 |
| IGEL 19352S001 | U | 3.48  | -4.89 | 0.61   | -0.19  | -5.85  | 0.60  | -2.85 | 2.35  |
| ISPS 19484M001 | N | 2.08  | -0.48 | 0.87   | 2.93   | 3.02   | -0.96 | -1.98 | -1.58 |
| ISPS 19484M001 | E | 1.65  | 0.17  | -1.26  | 0.37   | 2.29   | -3.05 | -0.08 | -0.20 |
| ISPS 19484M001 | U | 4.04  | -1.34 | -2.06  | -1.01  | -6.78  | 5.90  | -1.52 | -2.82 |
| KAST 19499M001 | N | 2.81  | 1.47  | 0.00   | 3.99   | -2.32  | -4.16 | 2.45  | 0.84  |
| KAST 19499M001 | E | 0.82  | -0.67 | -0.41  | -0.40  | 0.65   | -1.29 | -1.06 | 0.19  |
| KAST 19499M001 | U | 6.36  | 4.12  | 1.31   | 0.68   | -9.05  | -6.32 | 8.22  | -5.82 |
| LARE 19440M001 | N | 2.93  | 0.82  | -0.11  | -3.49  | 5.18   | -0.36 | -2.52 | -2.28 |
| LARE 19440M001 | E | 0.79  | -0.37 | -0.49  | 1.01   | 0.07   | -1.12 | -0.88 | 0.54  |
| LARE 19440M001 | U | 2.61  | -4.66 | -3.06  | -0.14  | -2.69  | 1.06  | 0.80  | -0.87 |
| LAZK 19354S001 | N | 2.56  | -0.19 | -1.23  | -4.64  | -0.46  | 3.96  | 0.48  | -0.10 |
| LAZK 19354S001 | E | 2.23  | -0.90 | -0.61  | -2.04  | 2.57   | -1.77 | 0.07  | 3.85  |
| LAZK 19354S001 | U | 5.29  | -2.23 | -3.64  | -1.03  | 2.97   | 5.54  | -8.21 | 6.47  |
| LEIT 19428M001 | N | 4.71  | -2.47 | -0.57  | -0.15  | 7.50   | 3.84  | -3.24 | -6.73 |
| LEIT 19428M001 | E | 2.10  | -2.44 | 1.49   | 0.19   | 3.12   | 1.89  | -2.21 | -0.26 |
| LEIT 19428M001 | U | 8.71  | -6.08 | -9.57  | -7.30  | 14.04  | 8.06  | -2.99 | 1.56  |

|                |   |      |       |       |        |        |       |       |       |
|----------------|---|------|-------|-------|--------|--------|-------|-------|-------|
| ORDN 19427M001 | N | 9.81 | 5.66  | 7.58  | -12.96 | -15.36 | -1.41 | 6.31  | 6.53  |
| ORDN 19427M001 | E | 2.00 | 1.37  | 1.57  | -3.33  | -2.25  | 0.36  | 1.42  | 1.14  |
| ORDN 19427M001 | U | 5.93 | -0.95 | 1.49  | -12.04 | 1.87   | -2.12 | 1.85  | 7.19  |
| PAS2 19351S001 | N | 2.50 | -1.37 | -1.58 | 2.13   | 5.12   | -0.39 | -0.88 | -1.15 |
| PAS2 19351S001 | E | 1.26 | -0.83 | -0.89 | -1.90  | 1.20   | -1.12 | 0.96  | 0.87  |
| PAS2 19351S001 | U | 4.47 | -3.66 | 1.12  | -2.17  | -7.94  | 5.59  | -2.32 | -0.85 |
| PASA 19351S001 | N | 2.52 | -1.53 | -1.43 | 2.00   | 5.25   | -0.39 | -0.87 | -1.12 |
| PASA 19351S001 | E | 1.28 | -0.80 | -0.74 | -2.09  | 1.20   | -1.06 | 1.03  | 0.80  |
| PASA 19351S001 | U | 4.26 | -3.81 | 0.65  | -2.02  | -6.92  | 5.73  | -2.95 | -0.78 |
| RID1 13448M002 | N | 1.83 | 0.03  | 1.31  | 0.32   | -3.99  | 1.19  | -0.90 | -0.28 |
| RID1 13448M002 | E | 1.20 | 0.36  | 0.70  | 1.74   | -1.94  | -0.67 | 0.19  | 0.84  |
| RID1 13448M002 | U | 4.51 | -5.27 | -5.01 | 7.03   | 2.13   | 2.81  | -2.62 | 0.43  |
| SALA 13469M001 | N | 1.15 | 0.48  | 0.84  | 0.27   | -2.55  | 0.27  | 0.25  | -0.58 |
| SALA 13469M001 | E | 0.41 | 0.59  | 0.47  | -0.27  | -0.14  | -0.10 | 0.05  | -0.57 |
| SALA 13469M001 | U | 2.22 | 2.26  | 2.30  | -3.12  | 1.23   | 1.81  | -2.12 | 0.45  |
| SCDA 10088M002 | N | 2.37 | -2.29 | 4.59  | 1.18   | 0.49   | -0.32 | -1.53 | -1.82 |
| SCDA 10088M002 | E | 1.21 | 1.91  | 1.67  | 0.02   | -0.66  | -1.19 | 0.15  | -0.63 |
| SCDA 10088M002 | U | 5.66 | -6.57 | -6.56 | -0.51  | 3.45   | 4.64  | -6.55 | 5.43  |
| SOPU 19386M001 | N | 1.92 | 1.21  | 0.22  | 3.27   | 1.98   | -0.31 | -1.06 | -2.16 |
| SOPU 19386M001 | E | 1.66 | -0.24 | 0.36  | 1.91   | -2.04  | -0.33 | 0.21  | -2.89 |
| SOPU 19386M001 | U | 5.50 | -5.36 | -8.43 | 0.31   | -1.71  | -0.57 | 8.81  | -0.82 |
| TERU 13487M001 | N | 0.67 | -0.61 | 0.81  | 0.71   | -0.46  | 0.44  | 0.18  | 0.85  |
| TERU 13487M001 | E | 0.93 | -0.30 | 0.82  | 1.10   | 1.59   | 0.54  | 0.32  | -0.54 |
| TERU 13487M001 | U | 4.63 | -5.01 | -3.99 | 7.09   | 3.99   | 3.77  | -2.57 | -0.76 |
| VITO 19385M001 | N | 1.58 | 1.06  | 0.67  | -1.62  | -1.55  | -2.18 | 1.65  | 0.92  |
| VITO 19385M001 | E | 1.24 | 1.45  | 0.33  | -1.26  | -0.09  | -0.18 | 1.44  | 1.81  |
| VITO 19385M001 | U | 3.31 | -2.82 | -4.16 | -3.94  | 1.37   | 2.63  | 2.61  | 3.07  |
| YEBE 13420M001 | N | 0.68 | 0.65  | 0.64  | 0.27   | -1.23  | 0.01  | 0.56  | -0.10 |
| YEBE 13420M001 | E | 0.85 | -0.32 | -0.44 | -0.80  | -1.52  | -0.58 | 0.87  | 0.15  |
| YEBE 13420M001 | U | 3.54 | 4.44  | -2.80 | -0.24  | 3.92   | -0.71 | 4.57  | -3.31 |
| ZARA 13462M001 | N | 0.82 | 0.41  | -0.13 | -0.89  | 1.14   | 0.10  | -1.20 | -0.52 |
| ZARA 13462M001 | E | 1.04 | 0.34  | 0.73  | -0.57  | 1.83   | -1.44 | 0.17  | 0.10  |
| ZARA 13462M001 | U | 2.26 | -3.47 | -3.50 | 1.51   | -0.15  | -0.01 | -1.42 | -1.39 |

## 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 |       |       |
|-----|-----------------|-----|--------------------------|-------|-------|
| 4   | ACOR 13434M001  | I W | -2.64                    | -0.87 | -3.10 |
| 10  | ALAC 13433M001  | I W | 0.05                     | -0.16 | 1.70  |
| 13  | ALBA 13452M001  | I W | 0.14                     | -1.68 | 0.75  |
| 19  | ALME 13437M001  | I W | 0.30                     | 1.75  | 3.26  |
| 41  | BCLN 13412M001  | I W | -0.06                    | 0.22  | 3.50  |
| 46  | BELL 13431M001  | I W | -2.01                    | -2.76 | 4.79  |
| 65  | BORR 13480M001  | I W | -0.30                    | -1.69 | -0.75 |
| 70  | BRST 10004M004  | I W | -2.23                    | 1.40  | -1.95 |
| 98  | CACE 13447M001  | I W | 1.62                     | 1.11  | 0.65  |
| 110 | CARG 19412M001  | I W | 1.38                     | -1.69 | 0.70  |
| 121 | CEU1 13449M002  | I W | 0.16                     | 0.27  | -1.40 |
| 135 | COBA 13453M001  | I W | 1.00                     | 0.74  | -5.81 |
| 154 | CREU 13432M001  | I W | -0.44                    | 1.23  | 2.08  |
| 190 | EBRE 13410M001  | I W | 0.18                     | -0.22 | -0.88 |
| 208 | ESCO 13435M001  | I W | 4.60                     | 1.65  | -2.77 |
| 219 | FUNC 13911S001  | I W | -1.67                    | -8.15 | 3.57  |
| 286 | HUEL 13451M001  | I W | 3.22                     | -1.16 | -8.56 |
| 300 | IZAN 31309M002  | I W | -0.30                    | -0.11 | 8.79  |
| 359 | LLIV 13436M001  | I W | -0.75                    | 0.36  | -0.56 |
| 364 | LPAL 81701M001  | I W | -3.04                    | -0.98 | 9.41  |
| 366 | LROC 10023M001  | I W | -0.15                    | 1.89  | -1.90 |
| 389 | MAS1 31303M002  | I W | 1.29                     | 0.31  | 8.25  |
| 400 | MELI 19379M001  | I W | 1.53                     | -0.66 | -0.68 |
| 456 | PASA 19351S001  | I W | -2.48                    | 0.53  | -4.79 |
| 513 | RID1 13448M002  | I W | -1.32                    | 1.75  | -8.79 |
| 518 | SALA 13469M001  | I W | 0.33                     | 1.43  | -2.44 |
| 526 | SCOA 10088M002  | I W | -3.98                    | 1.67  | -9.13 |
| 534 | SFER 13402M004  | I W | 1.16                     | -0.87 | 2.76  |
| 557 | SONS 13446M001  | I W | -1.12                    | -0.37 | -1.47 |
| 588 | TERC 31909M001  | I W | 2.91                     | -1.64 | 3.13  |
| 654 | VALA 13463M002  | I W | 0.34                     | 1.06  | -0.94 |
| 658 | VALE 13439M001  | I W | 0.56                     | 1.45  | 1.75  |
| 669 | VIGO 13450M001  | I W | -2.43                    | -0.57 | -0.74 |
| 698 | YEBE 13420M001  | I W | 0.74                     | 1.61  | 0.46  |
| 701 | ZARA 13462M001  | I W | -0.09                    | 1.66  | 0.32  |
| 710 | ZIMM 14001M004  | I W | 0.35                     | 1.35  | 1.40  |
| 84  | MALA 13443M001  | I W | 3.11                     | -0.14 | -0.60 |
|     | RMS / COMPONENT |     | 1.84                     | 1.85  | 4.26  |
|     | MEAN            |     | -0.00                    | 0.00  | 0.00  |
|     | MIN             |     | -3.98                    | -8.15 | -9.13 |
|     | MAX             |     | 4.60                     | 1.89  | 9.41  |

NUMBER OF PARAMETERS : 3  
NUMBER OF COORDINATES : 111  
RMS OF TRANSFORMATION : 2.88 MM

BARYCENTER COORDINATES:

LATITUDE : 39 37 2.69  
LONGITUDE : - 4 44 20.20  
HEIGHT : -46.628 KM

PARAMETERS:

TRANSLATION IN N : 0.00 +- 0.47 MM  
TRANSLATION IN E : 0.00 +- 0.47 MM  
TRANSLATION IN U : 0.00 +- 0.47 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          19150147
NUMBER OF UNKNOWN               229946
NUMBER OF DEGREES OF FREEDOM    18920201
PHASE MEASUREMENTS SIGMA        0.00100
SAMPLING INTERVAL (SECONDS)     180
VARIANCE FACTOR                  2.093786526279440

Helmert Transformation Parameters With Respect to Combined Solution:
-----
Sol  Rms (m)      Translation (m)      Rotation (")      Scale (ppm)
      X          Y          Z          X          Y          Z
-----
 1  0.00272    -0.0140 -0.0048  0.0100  0.0000 -0.0005 -0.0002  0.00059
 2  0.00284     0.0232  0.0285 -0.0274 -0.0005  0.0012  0.0008 -0.00001
 3  0.00324    -0.0049 -0.0274  0.0099  0.0005 -0.0003 -0.0008 -0.00089
 4  0.00362    -0.0129 -0.0537  0.0209  0.0009 -0.0008 -0.0015 -0.00102
 5  0.00222     0.0022 -0.0079  0.0017  0.0002 -0.0000 -0.0002 -0.00043
 6  0.00255    -0.0199 -0.0022  0.0189  0.0000 -0.0009 -0.0001  0.00066
 7  0.00282    -0.0106 -0.0070  0.0029  0.0002 -0.0003 -0.0001  0.00116
```

```
Statistics of individual solutions:
-----
File  RMS (m)      DOF  Ch1**2/DOF  #Observations authentic / pseudo  #Parameters explicit / implicit / singular
-----
 1  0.00126    2702073      1.59          2732909          3          1005          29834          0
 2  0.00140    2695396      1.96          2728915          3          1008          32514          0
 3  0.00151    2686632      2.27          2703779          3          1008          34142          0
 4  0.00166    2699049      2.75          2736858          3          1014          36798          0
 5  0.00151    2699088      2.28          2733031          3          1008          32938          0
 6  0.00138    2701184      1.91          2733860          3          1011          31668          0
 7  0.00133    2748761      1.78          2780795          3          1011          31026          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 20:292:00000 20:298:86370 LEICA GR50 -----
ALDA  A  1 P 20:292:00000 20:298:86370 LEICA GR10 -----
ALSA  A  1 P 20:292:00000 20:298:86370 LEICA GR50 -----
AMUR  A  1 P 20:292:00000 20:298:86370 LEICA GR10 -----
BIAZ  A  1 P 20:292:00000 20:298:86370 SPECTRA SP90M -----
BIDA  A  1 P 20:292:00000 20:298:86370 LEICA GR10 -----
BRZR  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
CACE  A  1 P 20:292:00000 20:298:86370 TRIMBLE NETR9 -----
CHER  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
CREU  A  1 P 20:292:00000 20:298:86370 LEICA GR50 -----
EBRE  A  1 P 20:292:00000 20:298:86370 LEICA GR50 -----
ELGE  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
EMAZ  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
GERN  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
IGEL  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
ISPS  A  1 P 20:292:00000 20:298:86370 TRIMBLE NETR9 -----
KAST  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
LARE  A  1 P 20:292:00000 20:298:86370 LEICA GR50 -----
LAZK  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
LEIT  A  1 P 20:292:00000 20:298:86370 LEICA GR50 -----
ORON  A  1 P 20:292:00000 20:298:86370 LEICA GR50 -----
PAS2  A  1 P 20:292:00030 20:298:86370 STONEX SC2200 -----
PASA  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
RIO1  A  1 P 20:292:00000 20:298:86370 LEICA GR25 -----
SALA  A  1 P 20:292:00000 20:298:86370 LEICA GRX1200+GNSS -----
SCOA  A  1 P 20:292:00000 20:298:86370 LEICA GR25 -----
SOPU  A  1 P 20:292:00000 20:298:86370 LEICA GR30 -----
TERU  A  1 P 20:292:00000 20:298:86370 LEICA GRX1200GGPRO -----
VITO  A  1 P 20:292:00000 20:298:86370 LEICA GR10 -----
YEBE  A  1 P 20:292:00000 20:298:86370 TRIMBLE NETR9 -----
ZARA  A  1 P 20:292:00000 20:298:86370 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 20:292:00000 20:298:86370 LEIAT504      LEIS -----
ALDA  A  1 P 20:292:00000 20:298:86370 LEIAS10       NONE -----
ALSA  A  1 P 20:292:00000 20:298:86370 LEIAR10       NONE -----
AMUR  A  1 P 20:292:00000 20:298:86370 LEIAS10       NONE -----
BIAZ  A  1 P 20:292:00000 20:298:86370 LEIAR25       LEIT -----
```

|      |   |   |   |              |              |             |      |       |
|------|---|---|---|--------------|--------------|-------------|------|-------|
| BIDA | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAS10     | NONE | ----  |
| BRZR | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAS10     | NONE | ----  |
| CACE | A | 1 | P | 20:292:00000 | 20:298:86370 | TRM29659.00 | NONE | ----  |
| CHER | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR10     | NONE | ----  |
| CREU | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR25.R4  | NONE | 26357 |
| EBRE | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR25.R4  | NONE | 26359 |
| ELGE | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR25.R4  | LEIT | ----  |
| EMAZ | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAS10     | NONE | ----  |
| GERN | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAS10     | NONE | ----  |
| IGEL | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR20     | LEIM | ----  |
| ISPS | A | 1 | P | 20:292:00000 | 20:298:86370 | TRM59900.00 | SCIS | ----  |
| KAST | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAS10     | NONE | ----  |
| LARE | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR20     | LEIM | ----  |
| LAZK | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR25.R4  | LEIT | ----  |
| LEIT | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR10     | NONE | ----  |
| ORDN | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR10     | NONE | ----  |
| PAS2 | A | 1 | P | 20:292:00030 | 20:298:86370 | LEIAR20     | LEIM | 73034 |
| PASA | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR20     | LEIM | 73034 |
| RIO1 | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR25.R4  | LEIT | 25138 |
| SALA | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAR25     | NONE | ----  |
| SCDA | A | 1 | P | 20:292:00000 | 20:298:86370 | TRM55971.00 | NONE | ----  |
| SOPU | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAS10     | NONE | ----  |
| TERU | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAT504GG  | LEIS | ----  |
| VITO | A | 1 | P | 20:292:00000 | 20:298:86370 | LEIAS10     | NONE | ----  |
| YEBE | A | 1 | P | 20:292:00000 | 20:298:86370 | TRM29659.00 | NONE | ----  |
| ZARA | A | 1 | P | 20:292:00000 | 20:298:86370 | 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 | 20:292:00000 | 20:298:86370 | UNE | 3.0460            | 0.0000 | 0.0000 | 0.0000 |
| ALDA  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| ALSA  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| AMUR  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| BIAZ  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| BIDA  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| BRZR  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0771            | 0.0000 | 0.0000 | 0.0000 |
| CACE  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0600            | 0.0000 | 0.0000 | 0.0000 |
| CHER  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| CREU  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0770            | 0.0000 | 0.0000 | 0.0000 |
| EBRE  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0770            | 0.0000 | 0.0000 | 0.0000 |
| ELGE  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| EMAZ  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0350            | 0.0000 | 0.0000 | 0.0000 |
| GERN  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0771            | 0.0000 | 0.0000 | 0.0000 |
| IGEL  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| ISPS  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0350            | 0.0000 | 0.0000 | 0.0000 |
| KAST  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0350            | 0.0000 | 0.0000 | 0.0000 |
| LARE  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| LAZK  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| LEIT  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| ORON  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| PAS2  | A  | 1    | P | 20:292:00030 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| PASA  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| RIO1  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0606            | 0.0000 | 0.0000 | 0.0000 |
| SALA  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0600            | 0.0000 | 0.0000 | 0.0000 |
| SCDA  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| SOPU  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0771            | 0.0000 | 0.0000 | 0.0000 |
| TERU  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0600            | 0.0000 | 0.0000 | 0.0000 |
| VITO  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| YEBE  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 0.0000            | 0.0000 | 0.0000 | 0.0000 |
| ZARA  | A  | 1    | P | 20:292:00000 | 20:298:86370 | UNE | 3.2590            | 0.0000 | 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](http://etrs89.ensg.ign.fr/memo-V8.pdf)

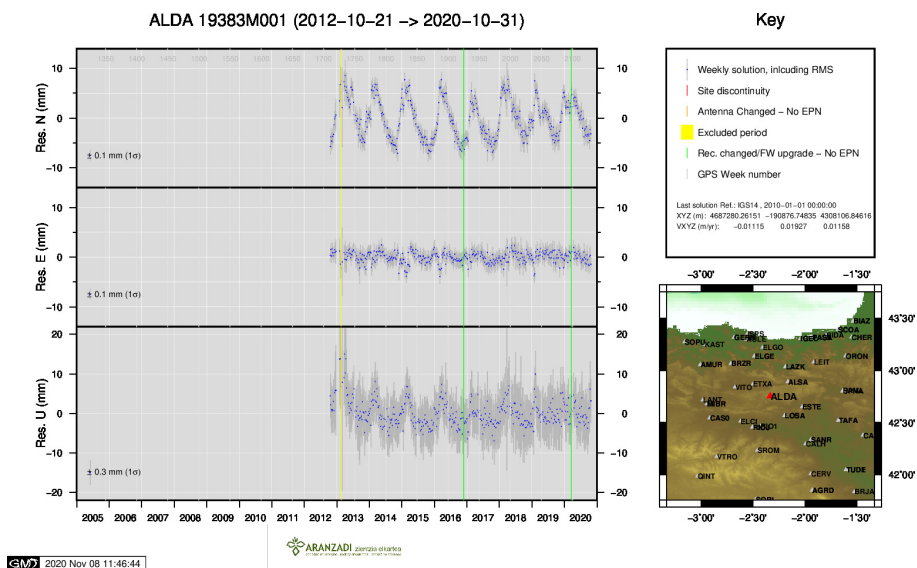
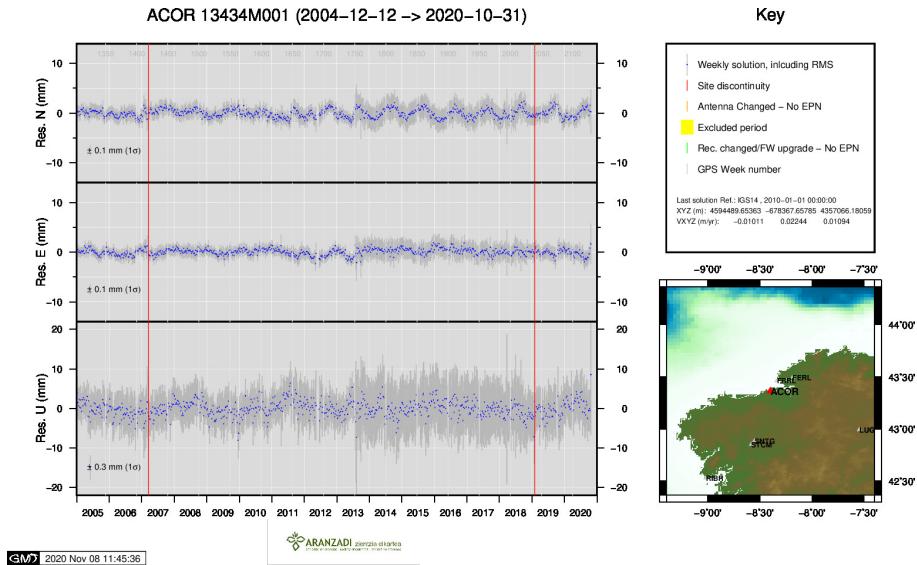
EPN Coordination Group and the EPN Central Bureau (2018): *Guidelines for the EPN Analysis Centres*. [epncb.oma.be/documentation/guidelines/guidelines\\_analysis\\_centres.pdf](http://epncb.oma.be/documentation/guidelines/guidelines_analysis_centres.pdf)

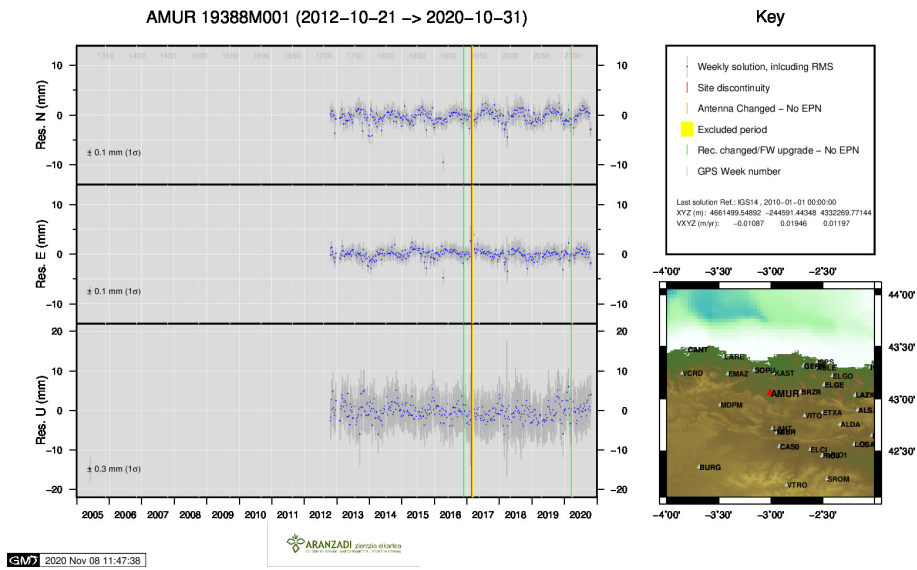
Z. Altamimi (2018): *EUREF Technical Note 1: Relationship and Transformation between the International and the European Terrestrial Reference Systems*. [etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf](http://etrs89.ensg.ign.fr/pub/EUREF-TN-1.pdf)



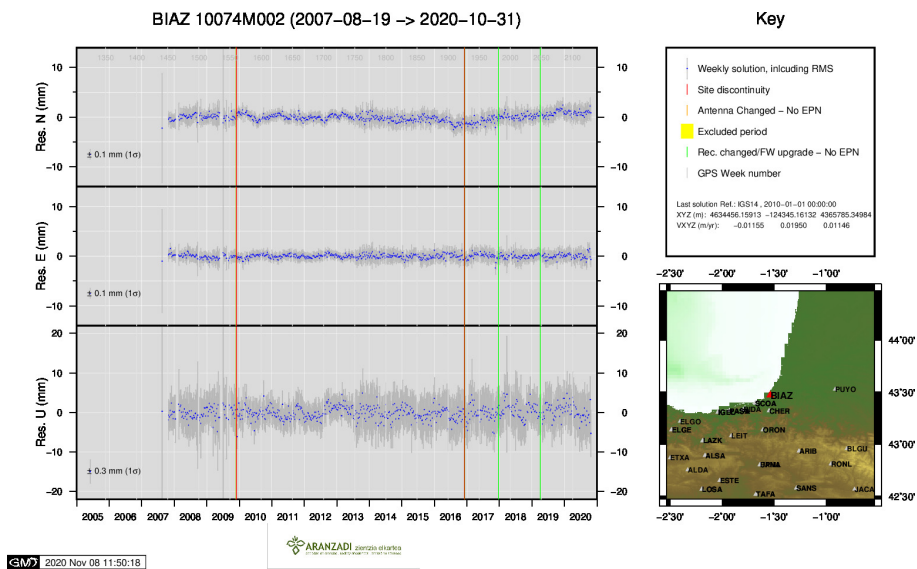
## 9 Cumulative Time Series

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

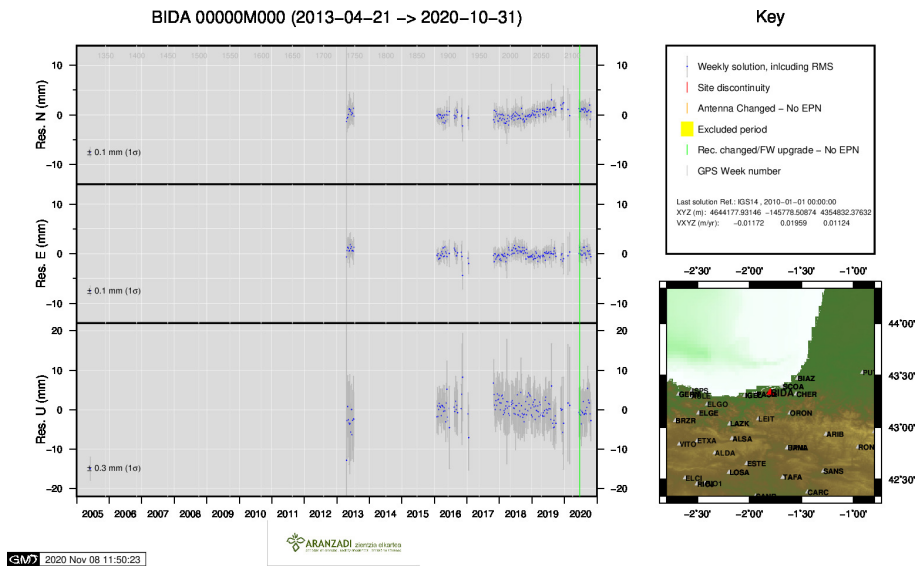




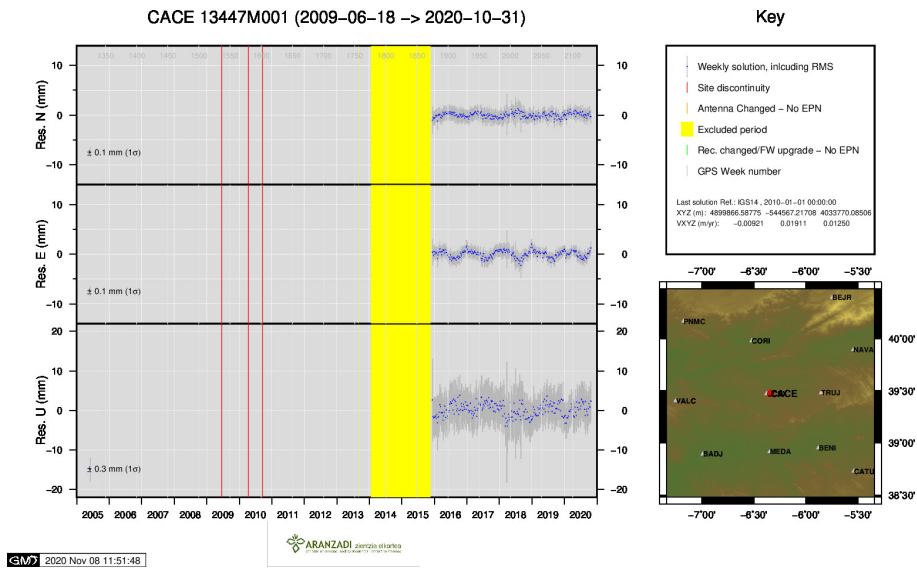
3 ) AMUR



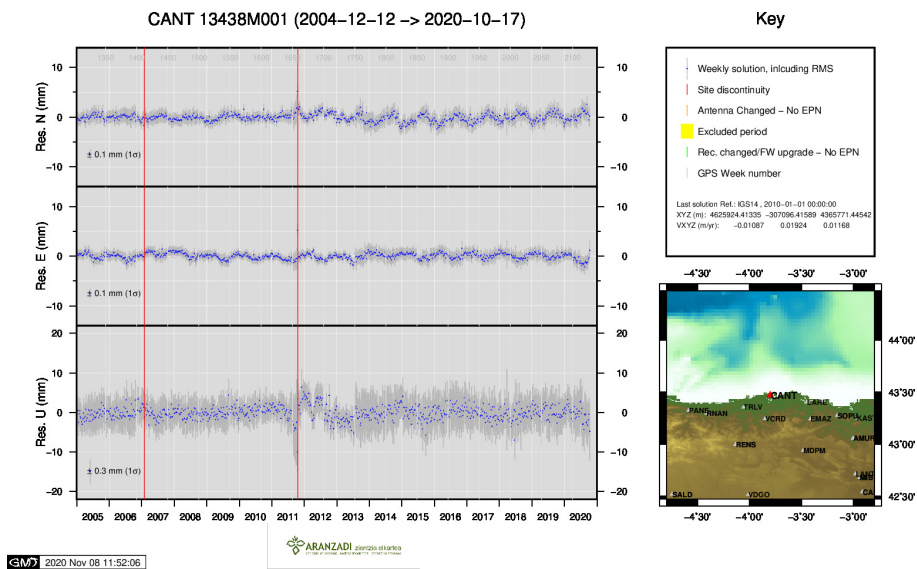
4 ) BIAZ



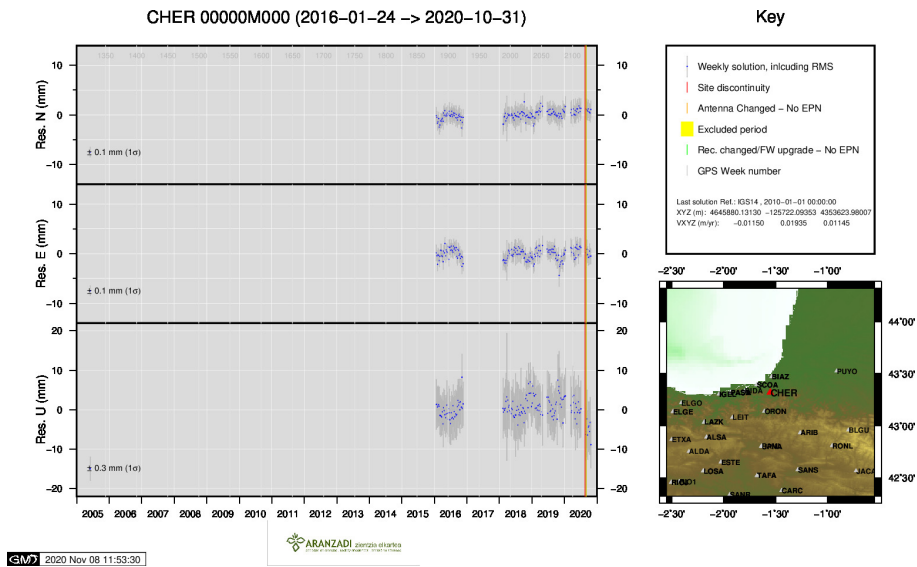
5 ) BIDA



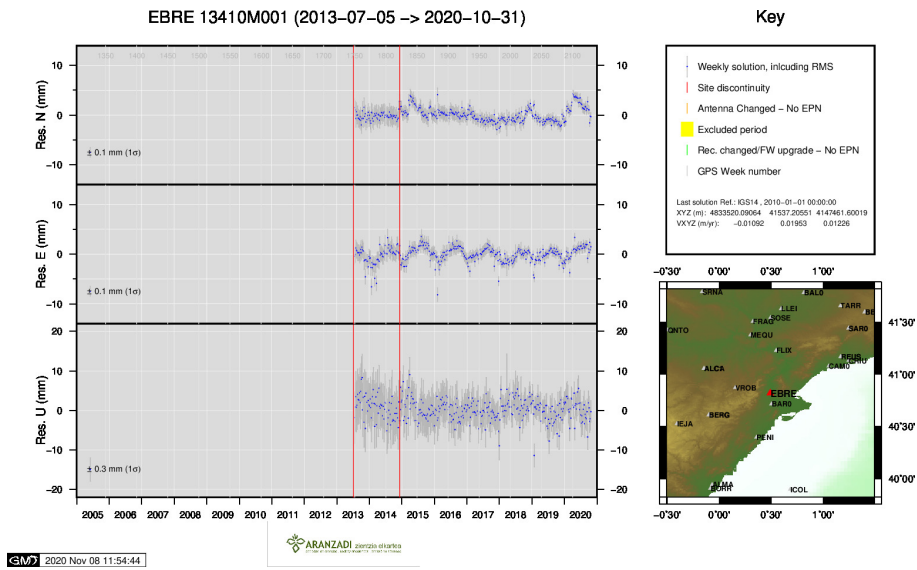
6 ) CACE



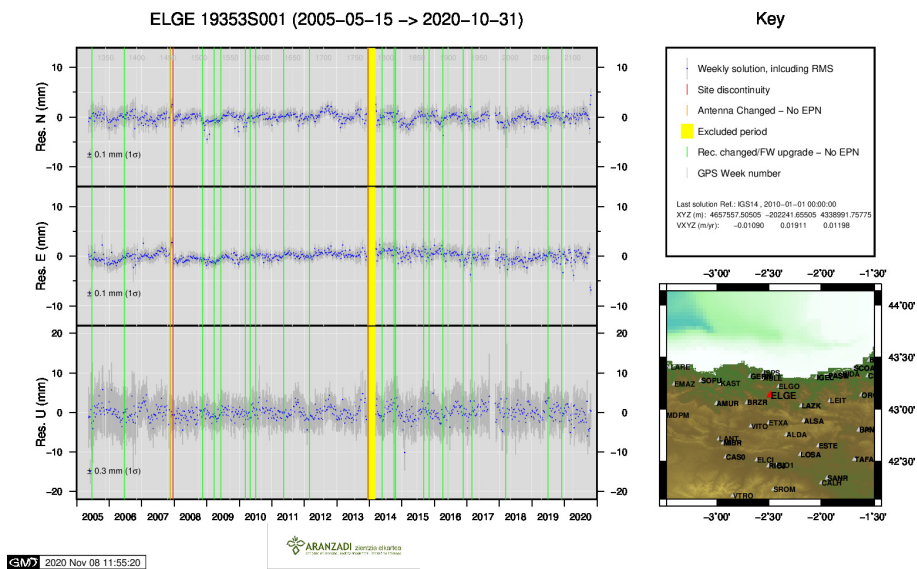
7 ) CANT



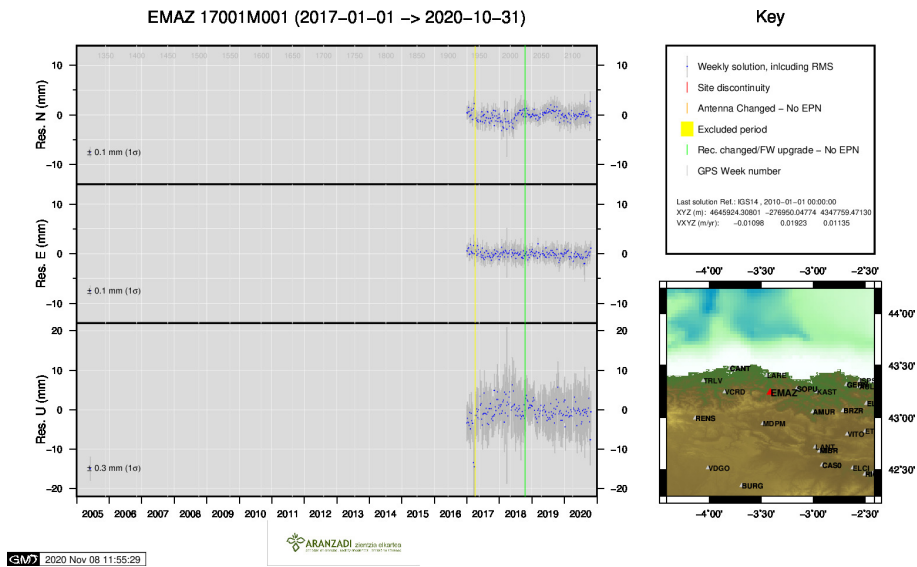
8 ) CHER



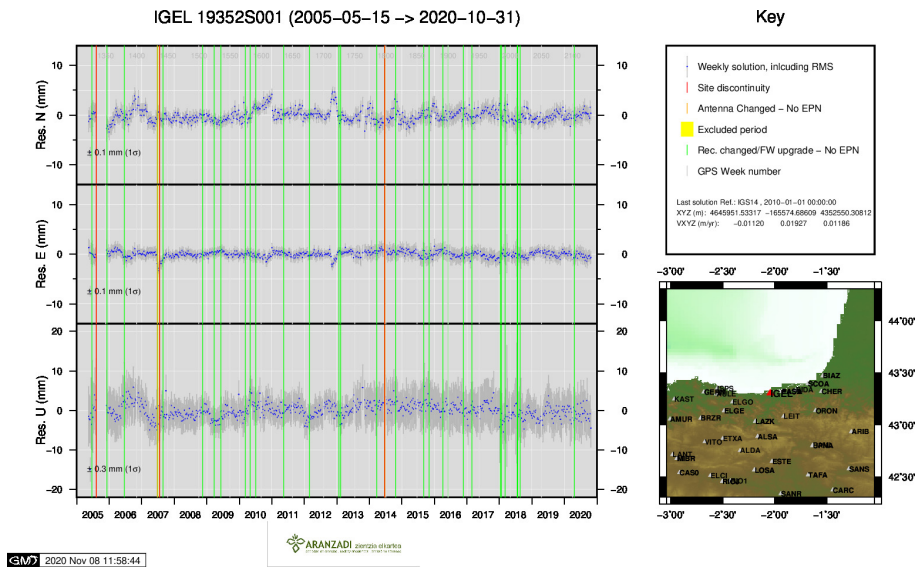
9 ) EBRE



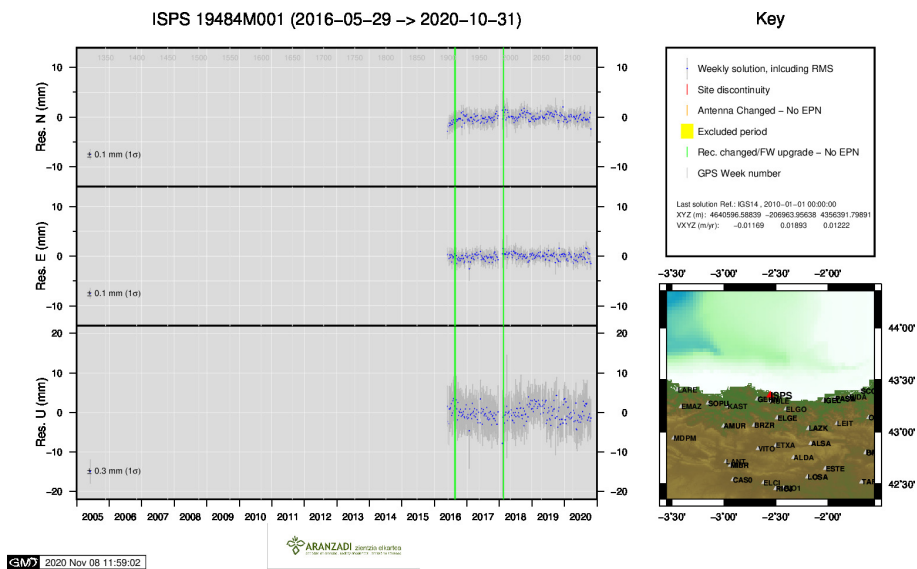
10 ) ELGE



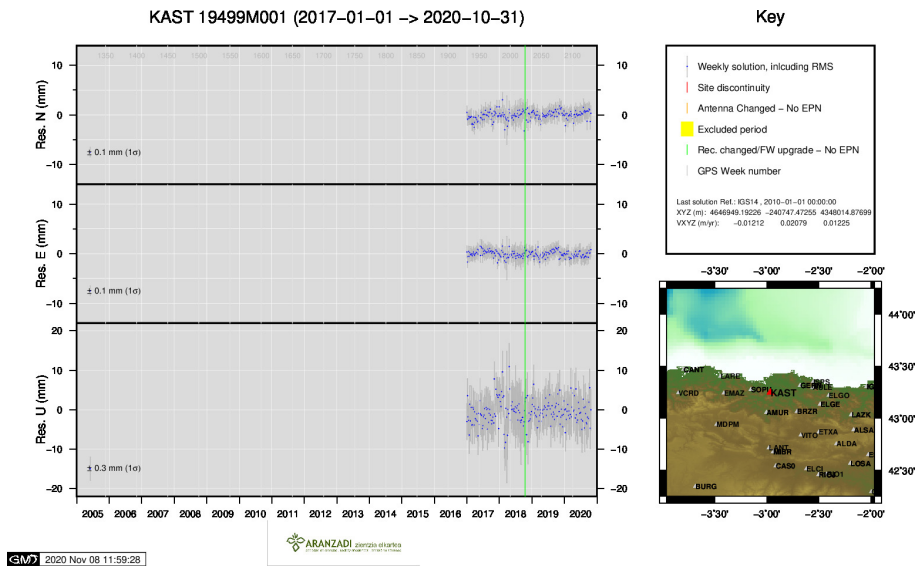
11 ) EMAZ



12 ) IGEL

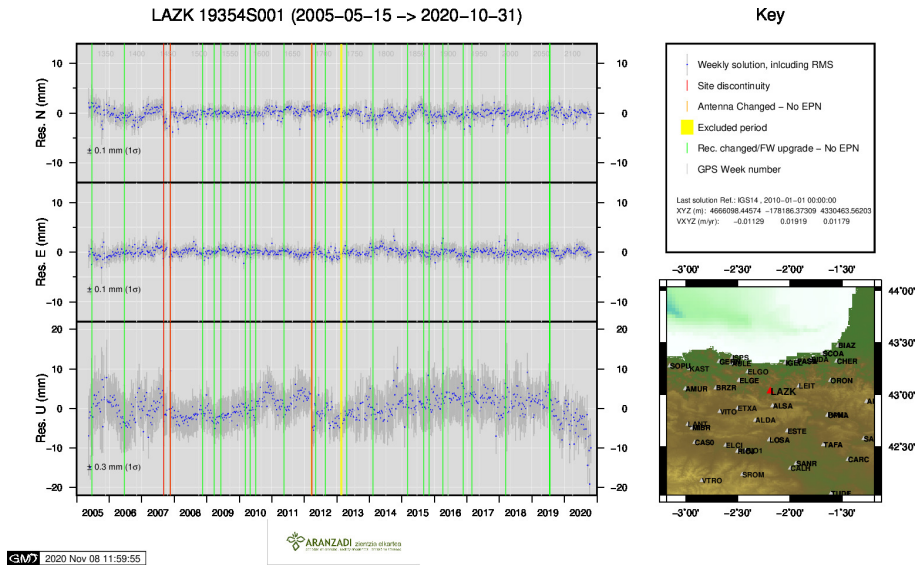


13 ) ISPS

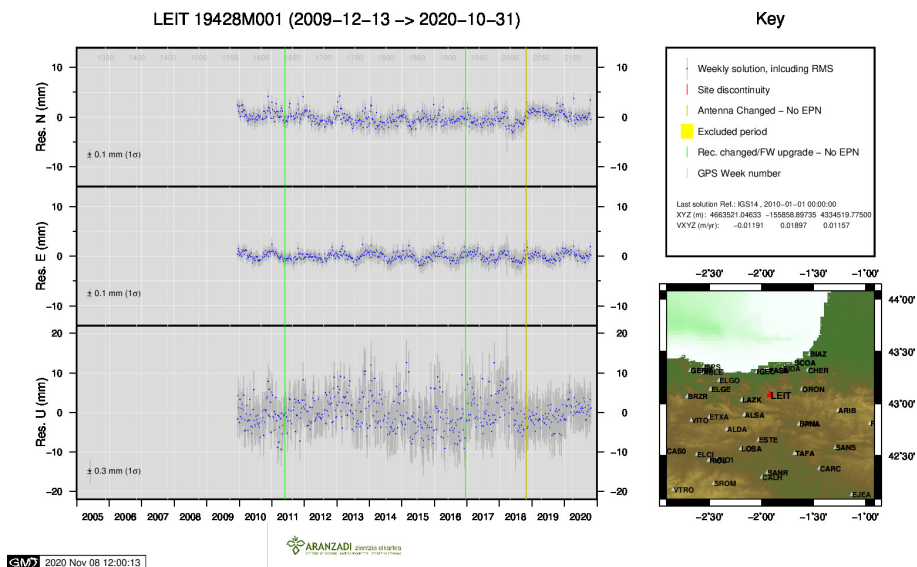


14 ) KAST

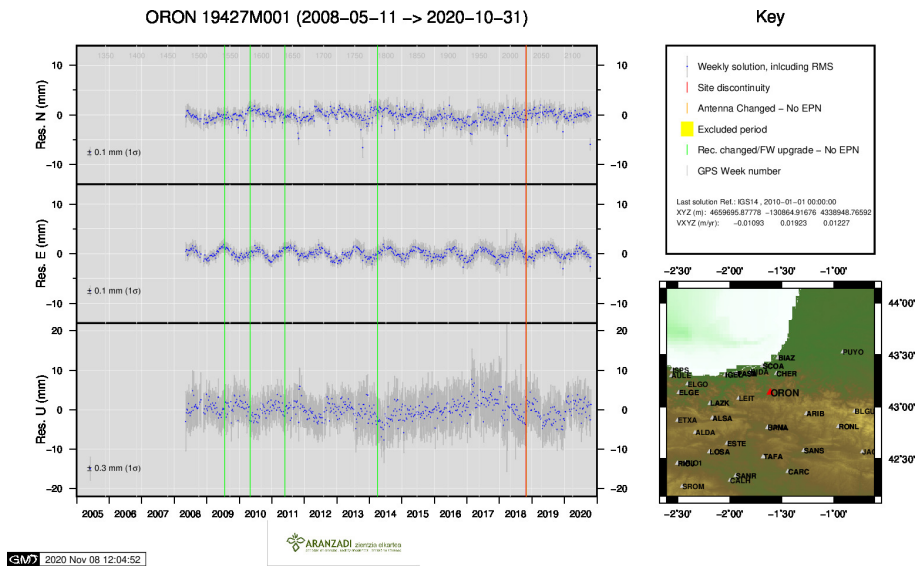




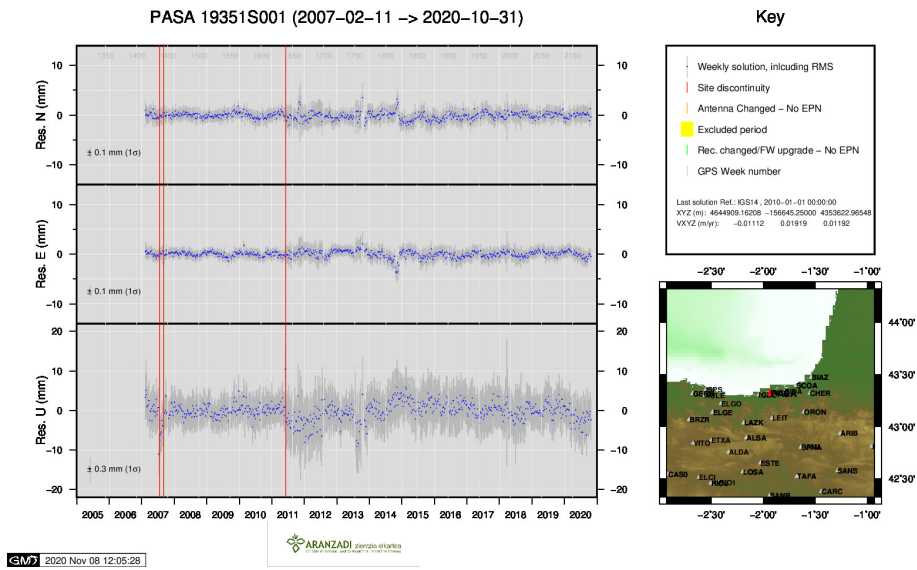
15 ) LAZK



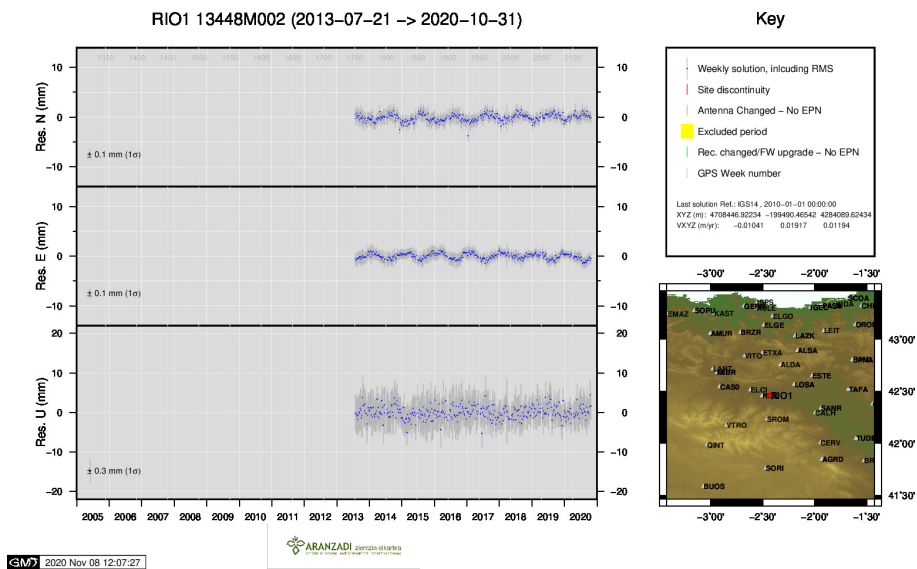
16 ) LEIT



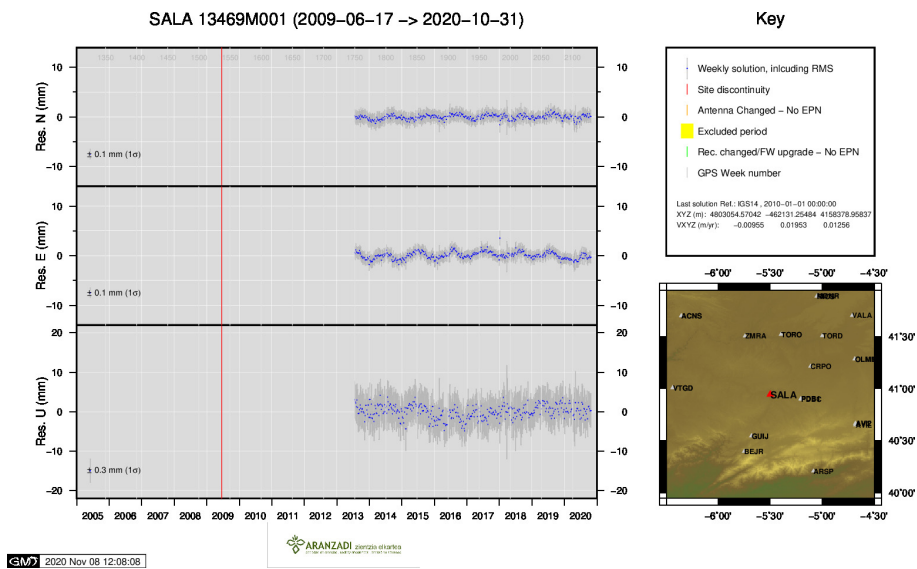
17 ) ORON



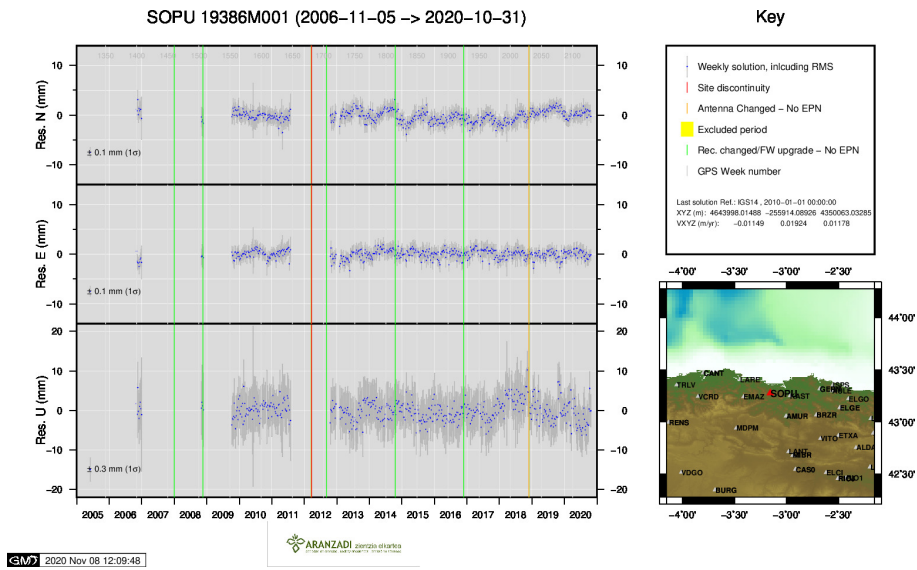
18 ) PASA



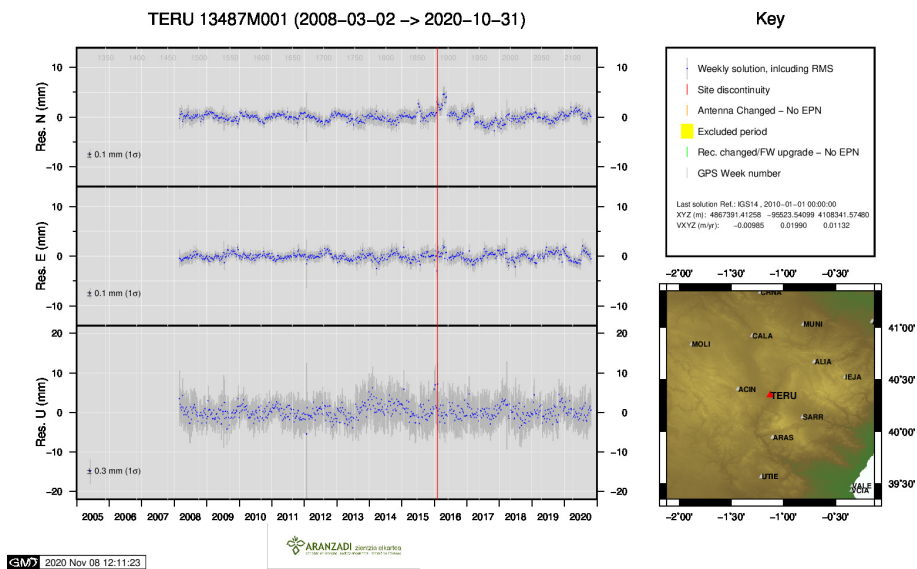
19 ) RIO1



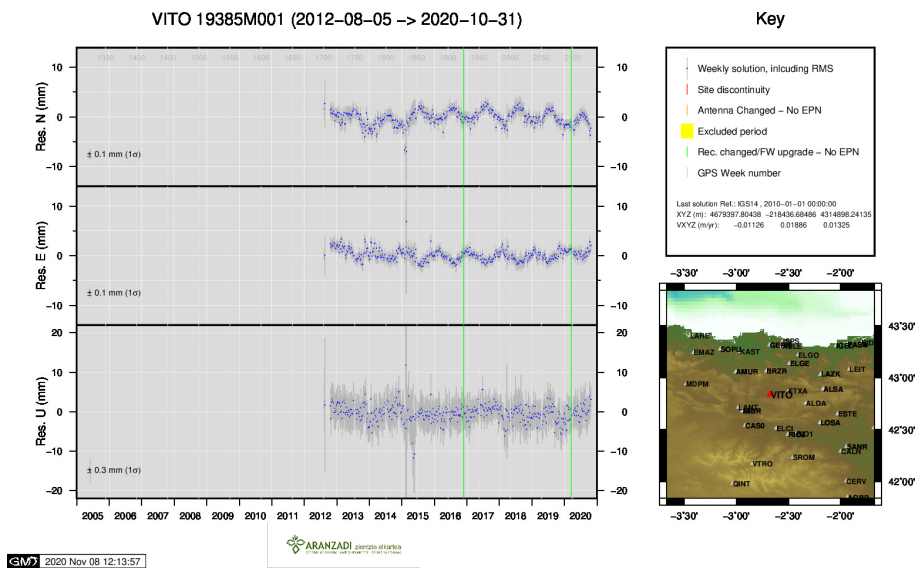
20 ) SALA



21 ) SOPU

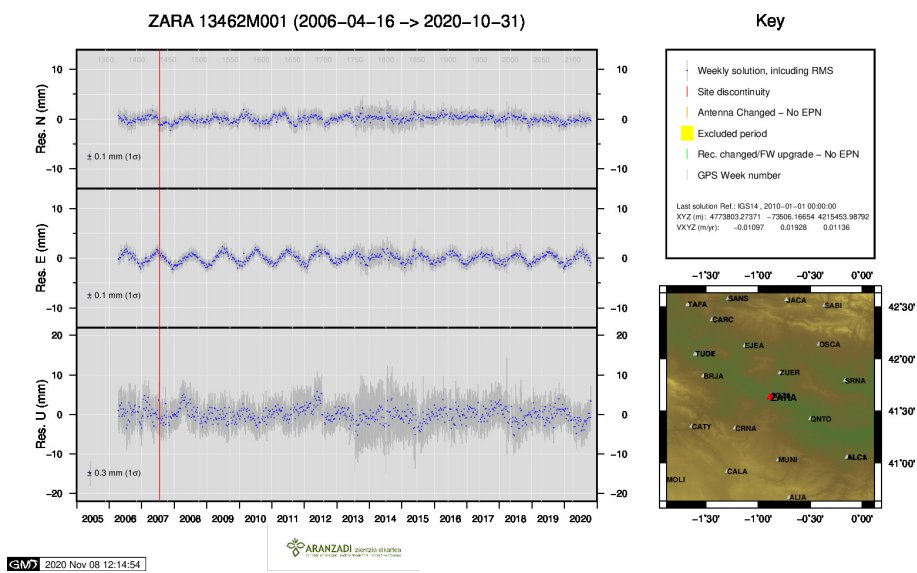


22 ) TERU



23 ) VITO





24 ) ZARA