ARA-DAC Weekly Analysis Result: 1983 (GFA)

Technical Report

GPS Week: 1983 (GFA)

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

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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

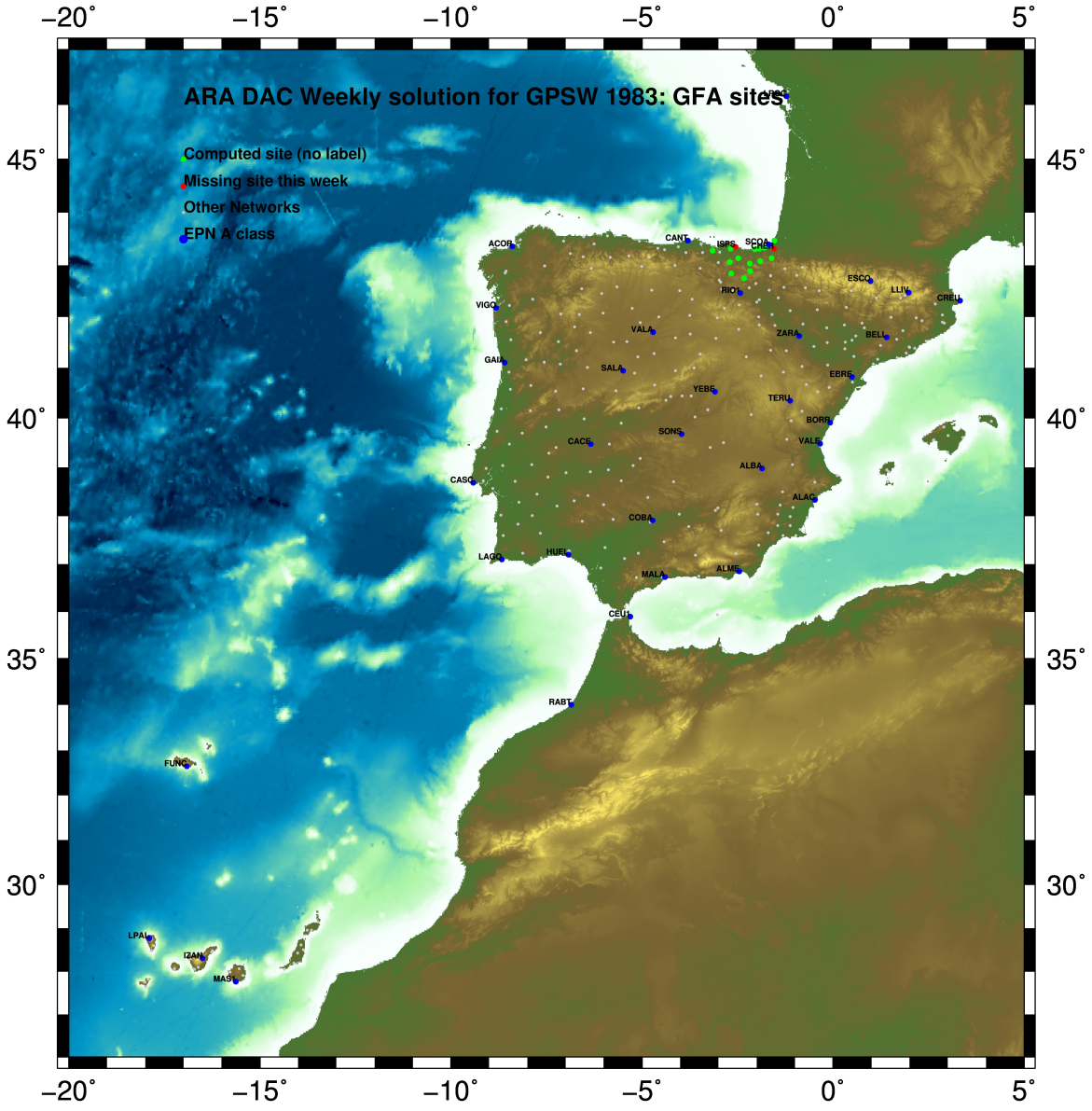

Fig.1: Computed Sites for GPS Week1983 (GFA)

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
- 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 C1950.

```
ARA LAC 1983 WEEK FINAL COMBINATION: PRECISE ORBITS             21-JAN-18 13:19
------------------------------------------------------------------------------
LOCAL GEODETIC DATUM: IGS14              EPOCH: 2018-01-10 12:00:00

NUM  STATION NAME           X (M)          Y (M)          Z (M)     FLAG

  3  ACOR 13434M001    4594489.57311  -678367.47862  4357066.26772    W
 24  ALDA 19383M001    4687280.17285  -190876.59391  4308106.94115    A
 30  ALSA 19419M001    4677250.85034  -176770.42483  4319079.85681    A
 54  BIAZ 10074M002    4634456.06688  -124345.00521  4365785.44286    A
 55  BIDA 00000M000    4644177.84023  -145778.35280  4354832.46856    A
 58  BRZR 19387M001    4662221.00422  -220769.92895  4333309.41971    A
 95  CACE 13447M001    4899866.51613  -544567.06336  4033770.18736    W
106  CANT 13438M001    4625924.32553  -307096.26095  4365771.53943    W
150  CREU 13432M001    4715420.14562   273178.03181  4271946.82403    W
186  EBRE 13410M001    4833520.00272    41537.36100  4147461.69727    W
 85  ELGE 19353S001    4657557.41833  -202241.50403  4338991.85623    A
 98  GERN 19389M001    4642811.32371  -217222.95981  4353278.86525    A
115  IGEL 19352S001    4645951.43951  -165574.53284  4352550.40360    A
126  LAZK 19354S001    4666098.35411  -178186.21941  4330463.65604    A
129  LEIT 19428M001    4663520.95149  -155858.74481  4334519.86774    A
158  ORON 19427M001    4659695.80712  -130864.76716  4338948.87632    A
165  PAS2 19351S001    4644909.07757  -156645.09642  4353623.06541    A
173  PASA 19351S001    4644909.07451  -156645.09644  4353623.06340    A
491  RIO1 13448M002    4708446.83829  -199490.31060  4284089.71970    W
496  SALA 13469M001    4803054.49397  -462131.09459  4158379.05759    W
200  SOPU 19386M001    4643997.92631  -255913.93543  4350063.12834    A
569  TERU 13487M001    4867391.33623   -95523.38092  4108341.66668    W
232  VITO 19385M001    4679397.71631  -218436.53272  4314898.34919    A
671  YEBE 13420M001    4848724.58329  -261631.95897  4123094.31264    W
674  ZARA 13462M001    4773803.18481   -73506.01342  4215454.08330    W
```

5.2 ETRF2000 (ETRS89) Coordinates

European **T**errestrial **R**eference **S**ystem, **1989** (**ETRS89**) is realized by ETRF2000 (Boucher and Altamimi, 2011).

```
ETRF2000 FINAL COORD. wk 1983                                   21-JAN-18 13:19
------------------------------------------------------------------------------
LOCAL GEODETIC DATUM: ETRF2000           EPOCH: 2018-01-10 12:00:00

NUM  STATION NAME           X (M)          Y (M)          Z (M)     FLAG

  3  ACOR 13434M001    4594489.86811  -678367.98949  4357065.86848    W
 24  ALDA 19383M001    4687280.51911  -190877.11298  4308106.54091    A
 30  ALSA 19419M001    4677251.19890  -176770.94286  4319079.45745    A
 54  BIAZ 10074M002    4634456.42436  -124345.51883  4365785.04720    A
 55  BIDA 00000M000    4644178.19460  -145778.86745  4354832.07195    A
 58  BRZR 19387M001    4662221.34880  -220770.44561  4333309.02094    A
 95  CACE 13447M001    4899866.80474  -544567.60415  4033769.76753    W
106  CANT 13438M001    4625924.66261  -307096.77422  4365771.14228    W
150  CREU 13432M001    4715420.54120   273177.51152  4271946.42702    W
186  EBRE 13410M001    4833520.36428    41536.82822  4147461.28907    W
 85  ELGE 19353S001    4657557.76536  -202242.02018  4338991.45801    A
 98  GERN 19389M001    4642811.67000  -217223.47452  4353278.46792    A
115  IGEL 19352S001    4645951.79152  -165575.04773  4352550.00664    A
126  LAZK 19354S001    4666098.70326  -178186.73633  4330463.25747    A
129  LEIT 19428M001    4663521.30340  -155859.26142  4334519.46962    A
158  ORON 19427M001    4659696.16211  -130865.28331  4338948.47876    A
165  PAS2 19351S001    4644909.43065  -156645.61118  4353622.66863    A
173  PASA 19351S001    4644909.42759  -156645.61120  4353622.66662    A
491  RIO1 13448M002    4708447.18200  -199490.83178  4284089.31782    W
496  SALA 13469M001    4803054.80005  -462131.62574  4158378.64578    W
200  SOPU 19386M001    4643998.26807  -255914.45037  4350062.73048    A
569  TERU 13487M001    4867391.67993   -95523.91748  4108341.25445    W
232  VITO 19385M001    4679398.05994  -218437.05108  4314897.94920    A
671  YEBE 13420M001    4848724.90943  -261632.49416  4123093.89985    W
674  ZARA 13462M001    4773803.53804   -73506.54070  4215453.67813    W
```

5.3 ETRF2014 (ETRS89) Coordinates

European **T**errestrial **R**eference **S**ystem, **1989** (**ETRS89**) is realized by ETRF2014 (Boucher and Altamimi, 2011) and (Altamimi, 2017).

```
ETRF2014 FINAL COORD. wk 1983                                   21-JAN-18 13:19
------------------------------------------------------------------------------
LOCAL GEODETIC DATUM: ETRF2014           EPOCH: 2018-01-10 12:00:00

NUM  STATION NAME           X (M)          Y (M)          Z (M)     FLAG

  3  ACOR 13434M001    4594489.82520  -678368.02862  4357065.91626    W
 24  ALDA 19383M001    4687280.47411  -190877.15338  4308106.58859    A
 30  ALSA 19419M001    4677251.15394  -176770.98334  4319079.50517    A
 54  BIAZ 10074M002    4634456.37966  -124345.55964  4365785.09505    A
 55  BIDA 00000M000    4644178.14986  -145778.90815  4354832.11976    A
 58  BRZR 19387M001    4662221.30412  -220770.48600  4333309.06867    A
```

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 95  CACE 13447M001    4899866.75856  -544567.64258  4033769.81469    W
106  CANT 13438M001    4625924.61850  -307096.81446  4365771.19007    W
150  CREU 13432M001    4715420.49446   273177.46973  4271946.47492    W
186  EBRE 13410M001    4833520.31716    41536.78761  4147461.33656    W
 85  ELGE 19353S001    4657557.72066  -202242.06064  4338991.50576    A
 98  GERN 19389M001    4642811.62549  -217223.51500  4353278.51570    A
115  IGEL 19352S001    4645951.74683  -165575.08836  4352550.05443    A
126  LAZK 19354S001    4666098.65841  -178186.77685  4330463.30522    A
129  LEIT 19428M001    4663521.25851  -155859.30202  4334519.51738    A
158  ORON 19427M001    4659696.11718  -130865.32401  4338948.52654    A
165  PAS2 19351S001    4644909.38594  -156645.65184  4353622.71643    A
173  PASA 19351S001    4644909.38288  -156645.65186  4353622.71442    A
491  RIO1 13448M002    4708447.13682  -199490.87207  4284089.36546    W
496  SALA 13469M001    4803054.75464  -462131.66481  4158378.69314    W
200  SOPU 19386M001    4643998.22365  -255914.49071  4350062.77824    A
569  TERU 13487M001    4867391.63289   -95523.95751  4108341.30180    W
232  VITO 19385M001    4679398.01509  -218437.09141  4314897.99689    A
671  YEBE 13420M001    4848724.86305  -261632.53372  4123093.94717    W
674  ZARA 13462M001    4773803.49186   -73506.58115  4215453.72568    W
```

5.4 Mean and Daily Repeatabilities

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

```
ARA LAC 1983 WEEK FINAL COMBINATION: PRECISE ORBITS              21-JAN-18 13:19
-------------------------------------------------------------------------------

                      Weekday     Repeatability (mm)
Station         #Days 0123456       N      E      U
-----------------------------------------------------
ACOR 13434M001     7  XXXXXXX     0.94   1.12   1.45
ALDA 19383M001     7  XXXXXXX     0.49   0.86   2.70
ALSA 19419M001     7  XXXXXXX     4.98   2.78   2.59
BIAZ 10074M002     6   XXXXXX     0.67   0.95   2.97
BIDA 00000M000     7  XXXXXXX     0.87   0.72   3.49
BRZR 19387M001     7  XXXXXXX     2.98   1.78   4.14
CACE 13447M001     7  XXXXXXX     0.39   0.36   4.69
CANT 13438M001     7  XXXXXXX     0.55   0.60   5.89
CREU 13432M001     7  XXXXXXX     1.17   0.54   2.03
EBRE 13410M001     7  XXXXXXX     0.65   2.69   7.54
ELGE 19353S001     7  XXXXXXX     2.11   3.47   7.52
GERN 19389M001     7  XXXXXXX     1.07   1.25   5.06
IGEL 19352S001     1        X     0.47   0.39   1.83
LAZK 19354S001     7  XXXXXXX     1.27   1.36  11.22
LEIT 19428M001     6   XXXXXX     1.34   1.21   8.87
ORON 19427M001     7  XXXXXXX     1.68   0.60   4.52
PAS2 19351S001     6  XXXX XX     1.54   0.77   7.71
PASA 19351S001     7  XXXXXXX     0.86   0.96   3.10
RIO1 13448M002     7  XXXXXXX     0.35   0.72   2.24
SALA 13469M001     4  XX   XX     3.80   6.78   6.15
SOPU 19386M001     7  XXXXXXX     1.75   1.29   4.46
TERU 13487M001     7  XXXXXXX     0.41   0.75   1.61
VITO 19385M001     7  XXXXXXX     1.47   1.10   4.20
YEBE 13420M001     7  XXXXXXX     5.48   2.25   8.42
ZARA 13462M001     7  XXXXXXX     0.41   0.54   1.36

Comparison of individual solutions:
-----------------------------------
ACOR 13434M001   N    0.94      0.63    0.39    1.34    1.14    0.76   -0.57   -0.87
ACOR 13434M001   E    1.12     -0.98   -1.38   -1.34    1.56    0.21    0.68   -0.06
ACOR 13434M001   U    1.45     -0.23    1.34   -0.14   -0.66    1.91   -2.10   -1.51
ALDA 19383M001   N    0.49      0.18    0.55   -0.38    0.03   -0.58   -0.55   -0.57
ALDA 19383M001   E    0.86     -1.46   -0.26   -0.52    1.35    0.26    0.13   -0.34
ALDA 19383M001   U    2.70      0.28   -3.33   -2.01    2.05   -4.60   -0.13    1.80
ALSA 19419M001   N    4.98      6.25    2.44   -1.26    0.92   -0.34    1.40   -9.97
ALSA 19419M001   E    2.78     -5.80    0.88    0.98   -1.03    1.67    0.55    2.60
ALSA 19419M001   U    2.59      3.53   -1.72   -2.73    1.64    2.47   -0.09   -2.94
BIAZ 10074M002   N    0.67             -0.07   -1.38   -0.46   -0.27   -0.04   -0.28
BIAZ 10074M002   E    0.95             -0.22    0.34    0.27    2.04   -0.07   -0.30
BIAZ 10074M002   U    2.97             -3.32    1.51    5.51   -0.19    0.53    0.21
BIDA 00000M000   N    0.87      0.95    0.17   -0.33   -0.61   -1.77   -0.15    0.04
BIDA 00000M000   E    0.72     -0.76    0.25   -0.46    0.50    0.98    1.03   -0.07
BIDA 00000M000   U    3.49      5.80   -4.39   -2.03    1.26    1.71    3.35    0.37
BRZR 19387M001   N    2.98     -6.26    2.84    1.15   -0.44    0.93    1.48    1.30
BRZR 19387M001   E    1.78     -2.24    1.43    0.53   -2.74    1.84    0.80   -0.39
BRZR 19387M001   U    4.14     -1.44   -5.14   -6.64   -3.86    3.67   -0.29   -1.28
CACE 13447M001   N    0.39     -0.01    0.47    0.17    0.68   -0.26   -0.13   -0.33
CACE 13447M001   E    0.36      0.19    0.20    0.34    0.47    0.22    0.19    0.54
CACE 13447M001   U    4.69      2.79    0.58   -4.10   -5.15   -5.34   -5.09    5.08
CANT 13438M001   N    0.55     -0.22    0.09   -0.61    0.71   -0.53   -0.52    0.58
CANT 13438M001   E    0.60     -0.92   -0.07   -0.48   -0.93    0.43   -0.13    0.05
CANT 13438M001   U    5.89     -2.78    8.45    3.81    2.17    7.32    5.51    5.07
CREU 13432M001   N    1.17      0.78   -0.17   -1.10    0.49   -2.07   -1.30    0.33
CREU 13432M001   E    0.54     -0.53    0.21   -0.10   -0.07    1.16    0.14   -0.18
CREU 13432M001   U    2.03     -1.63   -0.60   -2.28   -1.29    3.66    0.52    1.10
EBRE 13410M001   N    0.65     -0.08   -0.51   -0.62   -0.73    0.57    0.13   -1.00
EBRE 13410M001   E    2.69      1.50    1.03    0.90    1.71   -6.01    0.42    0.04
EBRE 13410M001   U    7.54      0.07    3.23    3.81   -0.63  -15.92    7.43    2.71
ELGE 19353S001   N    2.11      1.64    3.75    0.55   -0.96   -2.83   -0.79    0.29
ELGE 19353S001   E    3.47     -1.22   -6.23   -2.01    1.55    4.85    0.92    1.09
ELGE 19353S001   U    7.52     -2.16   -4.12   -2.19   -0.66    0.03  -17.67    0.23
GERN 19389M001   N    1.07      1.63   -0.03   -0.72   -0.06    1.09   -0.37    1.54
GERN 19389M001   E    1.25     -1.06   -0.61   -0.39   -1.47   -0.18    1.22    2.00
GERN 19389M001   U    5.06     -4.32   -8.07   -4.89   -4.93    3.99    1.07    2.17
IGEL 19352S001   N    0.47                                                     0.47
IGEL 19352S001   E    0.39                                                     0.39
IGEL 19352S001   U    1.83                                                    -1.83
LAZK 19354S001   N    1.27      0.84    0.70    0.37   -0.44    1.24   -0.69   -2.48
LAZK 19354S001   E    1.36     -2.59   -0.12    0.33    1.92    0.65   -0.29    0.27
LAZK 19354S001   U   11.22    -25.82    2.19    2.66    4.18    6.90    2.67    2.08
LEIT 19428M001   N    1.34              1.45   -0.03   -1.68    0.74   -0.91    1.62
LEIT 19428M001   E    1.21             -0.99   -0.47   -0.12    0.06   -0.11    2.46
LEIT 19428M001   U    8.87             -7.18   -4.50    3.17   11.36    4.33  -12.81
ORON 19427M001   N    1.68      3.11    0.13   -1.54   -0.14   -0.66   -0.26   -2.09
ORON 19427M001   E    0.60      0.16   -0.50   -0.49    0.81    0.80    0.50    0.26
ORON 19427M001   U    4.52      7.10   -5.92    4.17    3.16   -2.11    2.36    0.09
```

```
PAS2 19351S001   N    1.54      1.56   -0.28   -1.53   -1.81           -0.37    1.89
PAS2 19351S001   E    0.77     -1.29   -0.48    0.21    0.44            0.86    0.37
PAS2 19351S001   U    7.71     -4.06    4.26    3.92   11.44            2.21  -10.56
PASA 19351S001   N    0.86      0.63    0.45   -0.34   -0.97   -1.63   -0.24    0.36
PASA 19351S001   E    0.96     -0.69   -1.14   -0.01   -0.08    1.49    0.81    0.96
PASA 19351S001   U    3.10      1.95   -0.40   -0.58    6.28    1.43    2.01   -2.80
RIO1 13448M002   N    0.35     -0.29    0.05   -0.01    0.43    0.50   -0.25    0.38
RIO1 13448M002   E    0.72      1.31   -0.71   -0.59    0.20    0.07    0.16   -0.70
RIO1 13448M002   U    2.24     -0.99   -0.04    0.83    2.29    3.40   -0.03   -3.40
SALA 13469M001   N    3.80     -4.69    3.51                            2.39    1.78
SALA 13469M001   E    6.78      9.24   -4.45                           -4.32   -3.73
SALA 13469M001   U    6.15     -2.80   -8.47                            5.81    0.10
SOPU 19386M001   N    1.75      2.00    2.97    0.56    0.56   -2.06   -0.15   -0.76
SOPU 19386M001   E    1.29      0.02    1.06    0.39    0.42   -2.90    0.12    0.21
SOPU 19386M001   U    4.46     -1.10   -6.37   -7.56   -3.53    2.69   -0.42    0.73
TERU 13487M001   N    0.41     -0.17   -0.52   -0.34   -0.09   -0.66   -0.26   -0.24
TERU 13487M001   E    0.75      0.91    0.79   -0.11   -0.67   -1.08   -0.21    0.48
TERU 13487M001   U    1.61     -1.42    2.08    0.92    0.63   -1.57   -1.66    1.64
VITO 19385M001   N    1.47     -2.99    0.16    1.01   -0.91   -0.23    0.43    1.40
VITO 19385M001   E    1.10      1.67    0.30   -0.59   -1.53    0.91    0.86   -0.42
VITO 19385M001   U    4.20      2.12   -6.79    0.32   -6.42    3.64    0.73    0.12
YEBE 13420M001   N    5.48    -11.09   -3.01    3.05    3.19    1.92    2.59    4.25
YEBE 13420M001   E    2.25     -1.21    5.11    0.15    0.77   -0.25   -0.61   -1.32
YEBE 13420M001   U    8.42     17.12   -7.54   -2.43   -4.30   -4.69   -4.15    3.38
ZARA 13462M001   N    0.41      0.39   -0.85    0.00    0.22   -0.10    0.19    0.18
ZARA 13462M001   E    0.54      0.10   -0.10   -0.41    0.16    1.00   -0.01   -0.72
ZARA 13462M001   U    1.36      0.19    0.82   -0.88    0.86    0.13   -1.51   -2.55
```

5.5 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		
3	ACOR 13434M001	I W	-0.72	0.85	-0.14
10	ALAC 13433M001	I W	-0.06	0.06	-1.89
13	ALBA 13452M001	I W	-1.04	0.16	-0.17
18	ALME 13437M001	I W	-1.33	-0.23	-0.77
43	BELL 13431M001	I W	-0.16	-0.19	2.10
61	BORR 13480M001	I W	-0.39	-2.67	-1.18
65	BRST 10004M004	I W	0.10	0.92	1.43
95	CACE 13447M001	I W	0.77	0.54	-0.96
106	CANT 13438M001	I W	-1.30	-0.76	1.38
110	CASC 13909S001	I W	-2.09	0.00	2.27
117	CEU1 13449M002	I W	-1.62	1.66	2.50
131	COBA 13453M001	I W	0.06	0.91	-6.36
150	CREU 13432M001	I W	-0.37	-1.17	1.50
186	EBRE 13410M001	I W	1.06	1.88	0.36
203	ESCO 13435M001	I W	0.58	0.52	1.69
213	FUNC 13911S001	I W	4.07	-1.88	4.78
215	GAIA 13902M001	I W	-0.83	-0.24	1.65
271	HUEL 13451M001	I W	-1.26	2.14	-0.53
282	IZAN 31309M002	I W	5.88	-1.49	-1.42
317	LAGO 13903M001	I W	-1.14	-0.42	0.40
337	LLIV 13436M001	I W	-1.00	-3.77	4.83
341	LPAL 81701M001	I W	-2.67	2.64	-0.49
344	LROC 10023M001	I W	0.63	-0.12	-0.85
353	MALA 13443M001	I W	-2.50	1.17	2.47
371	MAS1 31303M002	I W	-0.03	0.87	1.12
442	PDEL 31906M004	I W	0.05	2.47	-1.31
475	RABT 35001M002	I W	0.25	1.14	-2.27
491	RIO1 13448M002	I W	-0.78	-1.33	-0.93
496	SALA 13469M001	I W	0.98	-4.04	1.84
504	SCOA 10088M002	I W	-3.61	0.02	-0.47
532	SONS 13446M001	I W	-0.74	-0.15	-1.65
562	TERC 31909M001	I W	1.91	-2.82	2.07
569	TERU 13487M001	I W	3.63	-0.82	-2.76
629	VALA 13463M002	I W	-1.00	-0.35	-2.90
633	VALE 13439M001	I W	0.22	0.70	-1.25
643	VIGO 13450M001	I W	-0.70	0.54	-2.60
671	YEBE 13420M001	I W	3.50	1.23	-0.32
674	ZARA 13462M001	I W	0.74	1.69	-4.96
683	ZIMM 14001M004	I W	0.93	0.32	3.80
	RMS / COMPONENT		1.86	1.56	2.37
	MEAN		-0.00	-0.00	0.00
	MIN		-3.61	-4.04	-6.36
	MAX		5.88	2.64	4.83

```
NUMBER OF PARAMETERS  :     3
NUMBER OF COORDINATES :   117
RMS OF TRANSFORMATION :    1.96 MM

BARYCENTER COORDINATES:

LATITUDE              :    39 38 22.11
LONGITUDE             :  -  5 53 51.37
HEIGHT                :         -50.253 KM


PARAMETERS:

TRANSLATION IN  N     :           0.00     +-  0.31    MM
TRANSLATION IN  E     :           0.00     +-  0.31    MM
TRANSLATION IN  U     :          -0.00     +-  0.31    MM
```

5.6 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                       15025219
 NUMBER OF UNKNOWNS                             210050
 NUMBER OF DEGREES OF FREEDOM                 14815169
 PHASE MEASUREMENTS SIGMA                      0.00100
 SAMPLING INTERVAL (SECONDS)                       180
 VARIANCE FACTOR                    1.862437956572065
```

Helmert Transformation Parameters With Respect to Combined Solution:

Sol	Rms (m)	Translation (m) X	Y	Z	Rotation (") X	Y	Z	Scale (ppm)
1	0.00356	0.0052	0.0077	0.0029	-0.0003	0.0000	0.0000	-0.00100
2	0.00229	0.0149	0.0104	-0.0187	-0.0001	0.0008	0.0004	0.00032
3	0.00212	0.0454	0.0390	-0.0477	-0.0005	0.0021	0.0013	-0.00024
4	0.00274	0.0071	-0.0061	-0.0137	0.0003	0.0005	-0.0000	0.00041
5	0.00271	0.0218	0.0252	-0.0274	-0.0004	0.0011	0.0007	0.00029
6	0.00209	0.0199	0.0167	-0.0237	-0.0002	0.0010	0.0006	0.00006
7	0.00218	-0.0179	-0.0069	0.0208	0.0001	-0.0009	-0.0002	0.00018

Statistics of individual solutions:

File	RMS (m)	DOF	Chi**2/DOF	#Observations authentic	/ pseudo	#Parameters explicit	/ implicit	/ singular
1	0.00141	2074976	1.98	2105248	3	915	29360	0
2	0.00128	2091483	1.64	2122051	3	933	29638	0
3	0.00131	2107273	1.73	2138391	3	933	30188	0
4	0.00141	2100809	2.00	2132031	3	924	30301	0
5	0.00140	2128044	1.96	2159016	3	930	30045	0
6	0.00129	2152035	1.66	2182134	3	939	29163	0
7	0.00139	2155011	1.92	2186348	3	942	30398	0

6 Equipment

6.1 Receiver List

Serial numbers not shown.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_________ S/N__ FIRMWARE___
 ACOR  A    1 P 18:007:00000 18:013:86370 LEICA GRX1200PRO     ----- -----------
 ALDA  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 ALSA  A    1 P 18:007:00000 18:013:86370 LEICA GRX1200GGPRO   ----- -----------
 BIAZ  A    1 P 18:008:00000 18:013:86370 TRI SP90M            ----- -----------
 BIDA  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 BRZR  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 CACE  A    1 P 18:007:00000 18:013:86370 TRIMBLE NETR9        ----- -----------
 CANT  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 CREU  A    1 P 18:007:00000 18:013:86370 LEICA GR50           ----- -----------
 EBRE  A    1 P 18:007:00000 18:013:86370 LEICA GR50           ----- -----------
 ELGE  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 GERN  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 IGEL  A    1 P 18:013:00000 18:013:86370 LEICA GRX1200GGPRO   ----- -----------
 LAZK  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 LEIT  A    1 P 18:008:42030 18:013:86370 LEICA GRX1200+GNSS   ----- -----------
 ORON  A    1 P 18:007:00000 18:013:86370 LEICA GRX1200GGPRO   ----- -----------
 PAS2  A    1 P 18:007:00000 18:013:86370 TPS NET-G3A          ----- -----------
 PASA  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 RIO1  A    1 P 18:007:00000 18:013:86370 LEICA GR25           ----- -----------
 SALA  A    1 P 18:007:00000 18:013:86370 LEICA GRX1200+GNSS   ----- -----------
 SOPU  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 TERU  A    1 P 18:007:00000 18:013:86370 LEICA GRX1200GGPRO   ----- -----------
 VITO  A    1 P 18:007:00000 18:013:86370 LEICA GR10           ----- -----------
 YEBE  A    1 P 18:007:00000 18:013:86370 TRIMBLE NETRS        ----- -----------
 ZARA  A    1 P 18:007:00000 18:013:86370 TRIMBLE NETR9        ----- -----------
```

6.2 Antennas

Serial number ONLY provided in case individual calibrations are vailable.

```
*SITE PT SOLN T DATA_START__ DATA_END____ DESCRIPTION_________ S/N__
 ACOR  A    1 P 18:007:00000 18:013:86370 LEIAT504         LEIS -----
 ALDA  A    1 P 18:007:00000 18:013:86370 LEIAS10          NONE -----
 ALSA  A    1 P 18:007:00000 18:013:86370 LEIAX1202GG      NONE -----
 BIAZ  A    1 P 18:008:00000 18:013:86370 LEIAR25          LEIT -----
 BIDA  A    1 P 18:007:00000 18:013:86370 LEIAS10          NONE -----
 BRZR  A    1 P 18:007:00000 18:013:86370 LEIAS10          NONE -----
 CACE  A    1 P 18:007:00000 18:013:86370 TRM29659.00      NONE -----
 CANT  A    1 P 18:007:00000 18:013:86370 LEIAR25.R4       LEIT 25066
 CREU  A    1 P 18:007:00000 18:013:86370 LEIAR25.R4       NONE 26357
 EBRE  A    1 P 18:007:00000 18:013:86370 LEIAR25.R4       NONE 26359
 ELGE  A    1 P 18:007:00000 18:013:86370 LEIAR25.R4       LEIT -----
```

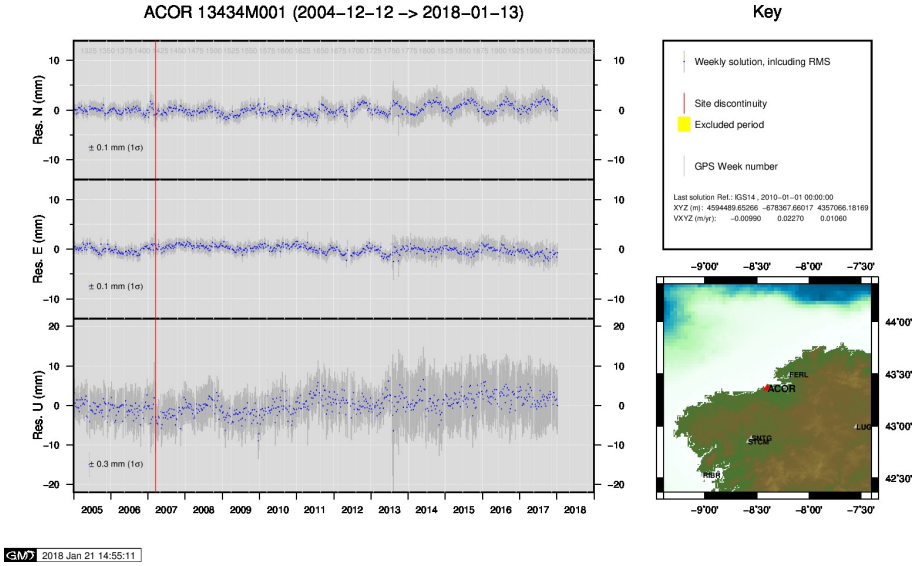
```
 GERN  A    1 P 18:007:00000 18:013:86370 LEIAS10         NONE -----
 IGEL  A    1 P 18:013:00000 18:013:86370 LEIAR20         LEIM -----
 LAZK  A    1 P 18:007:00000 18:013:86370 LEIAR25.R4      LEIT -----
 LEIT  A    1 P 18:008:42030 18:013:86370 LEIAX1203+GNSS  NONE -----
 ORON  A    1 P 18:007:00000 18:013:86370 LEIAX1202GG     NONE -----
 PAS2  A    1 P 18:007:00000 18:013:86370 LEIAR20         LEIM 73034
 PASA  A    1 P 18:007:00000 18:013:86370 LEIAR20         LEIM 73034
 RIO1  A    1 P 18:007:00000 18:013:86370 LEIAR25.R4      LEIT 25138
 SALA  A    1 P 18:007:00000 18:013:86370 LEIAR25         NONE -----
 SOPU  A    1 P 18:007:00000 18:013:86370 LEIAS10         NONE -----
 TERU  A    1 P 18:007:00000 18:013:86370 LEIAT504GG      LEIS -----
 VITO  A    1 P 18:007:00000 18:013:86370 LEIAS10         NONE -----
 YEBE  A    1 P 18:007:00000 18:013:86370 TRM29659.00     NONE -----
 ZARA  A    1 P 18:007:00000 18:013:86370 TRM29659.00     NONE -----
```

6.3 Eccentrities

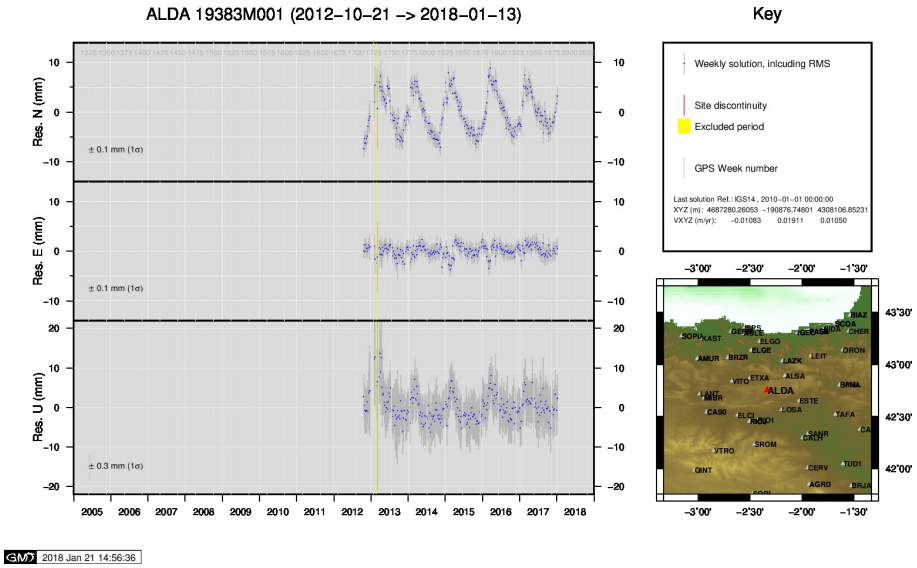
```
*                                          UP______ NORTH___ EAST____
*SITE PT SOLN T DATA_START__ DATA_END____ AXE ARP->BENCHMARK(M)_________
 ACOR  A    1 P 18:007:00000 18:013:86370 UNE   3.0460   0.0000   0.0000
 ALDA  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 ALSA  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 BIAZ  A    1 P 18:008:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 BIDA  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 BRZR  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 CACE  A    1 P 18:007:00000 18:013:86370 UNE   0.0600   0.0000   0.0000
 CANT  A    1 P 18:007:00000 18:013:86370 UNE   3.0490   0.0000   0.0000
 CREU  A    1 P 18:007:00000 18:013:86370 UNE   0.0770   0.0000   0.0000
 EBRE  A    1 P 18:007:00000 18:013:86370 UNE   0.0770   0.0000   0.0000
 ELGE  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 GERN  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 IGEL  A    1 P 18:013:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 LAZK  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 LEIT  A    1 P 18:008:42030 18:013:86370 UNE   0.0000   0.0000   0.0000
 ORON  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 PAS2  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 PASA  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 RIO1  A    1 P 18:007:00000 18:013:86370 UNE   0.0606   0.0000   0.0000
 SALA  A    1 P 18:007:00000 18:013:86370 UNE   0.0600   0.0000   0.0000
 SOPU  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 TERU  A    1 P 18:007:00000 18:013:86370 UNE   0.0600   0.0000   0.0000
 VITO  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 YEBE  A    1 P 18:007:00000 18:013:86370 UNE   0.0000   0.0000   0.0000
 ZARA  A    1 P 18:007:00000 18:013:86370 UNE   3.2590   0.0000   0.0000
```

7 Cumulative Time Series

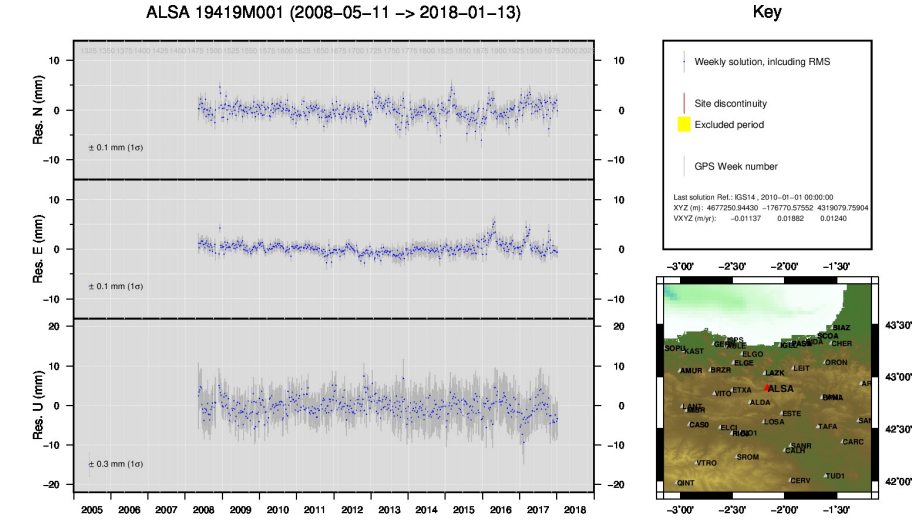
Time series of stations. Latest plots at: http://geolabpasaia.org/gnss/ARA-net/TSeries/, or click on the caption of each image.



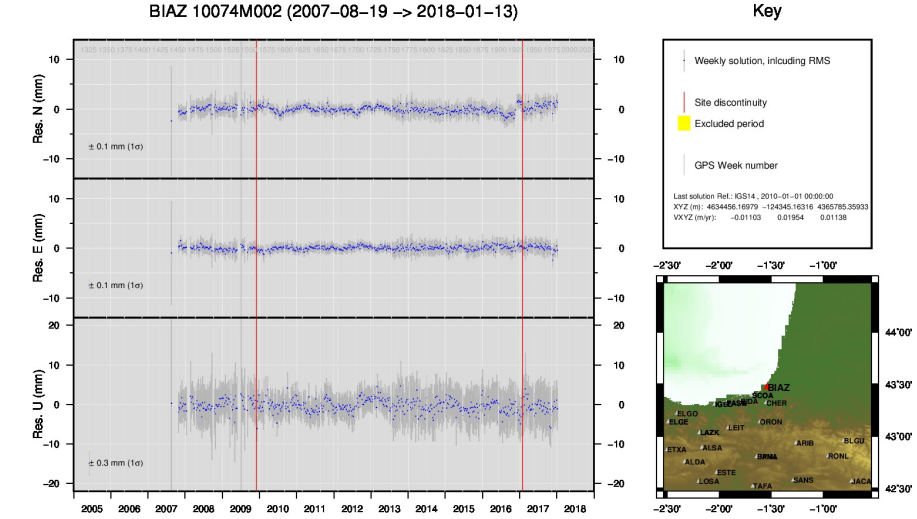
1) ACOR



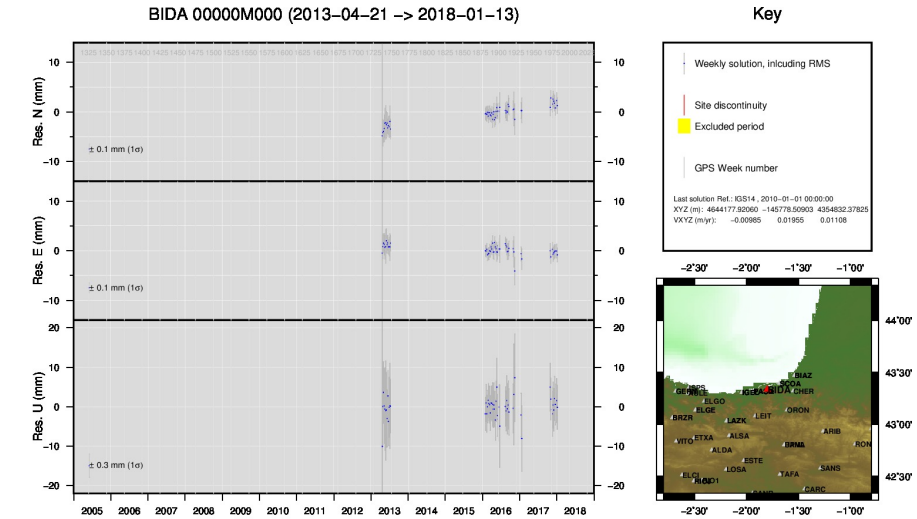
2) ALDA



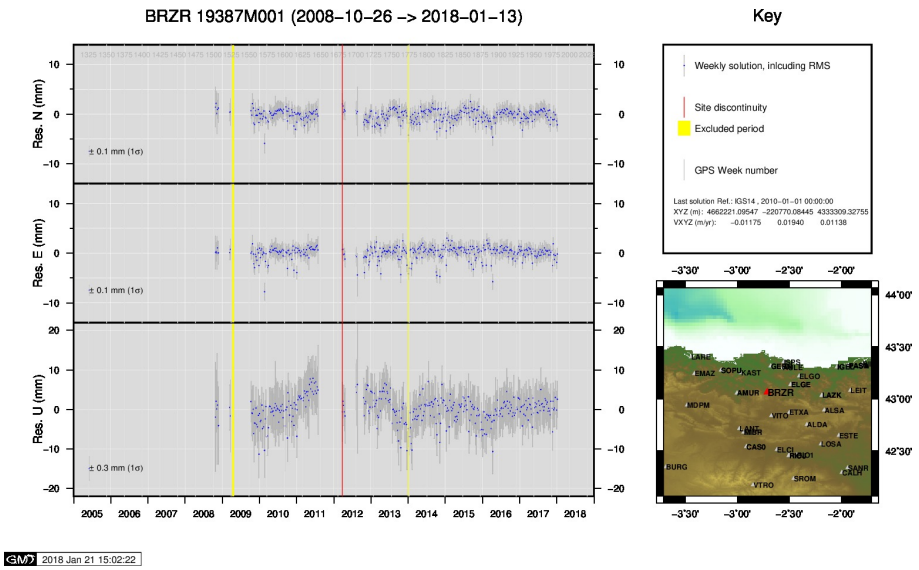
3) ALSA



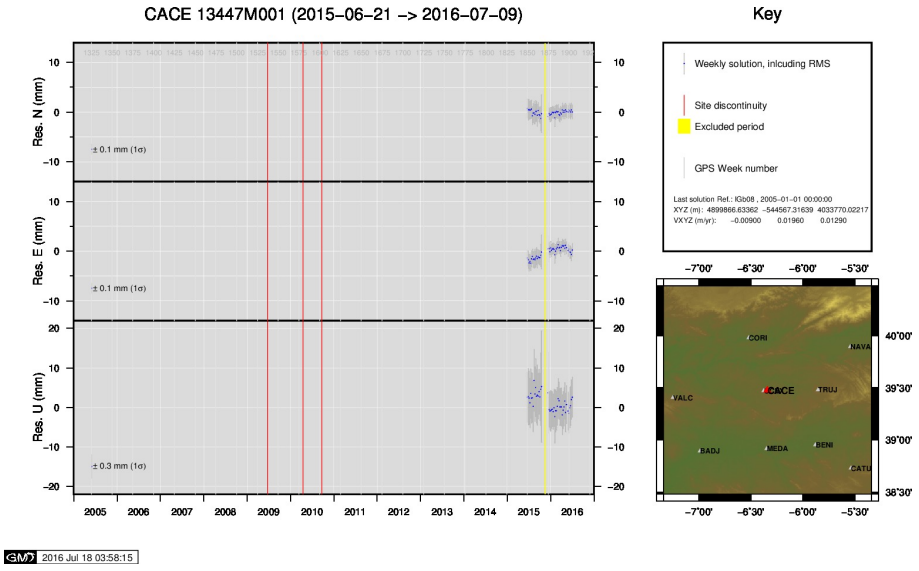
4) BIAZ



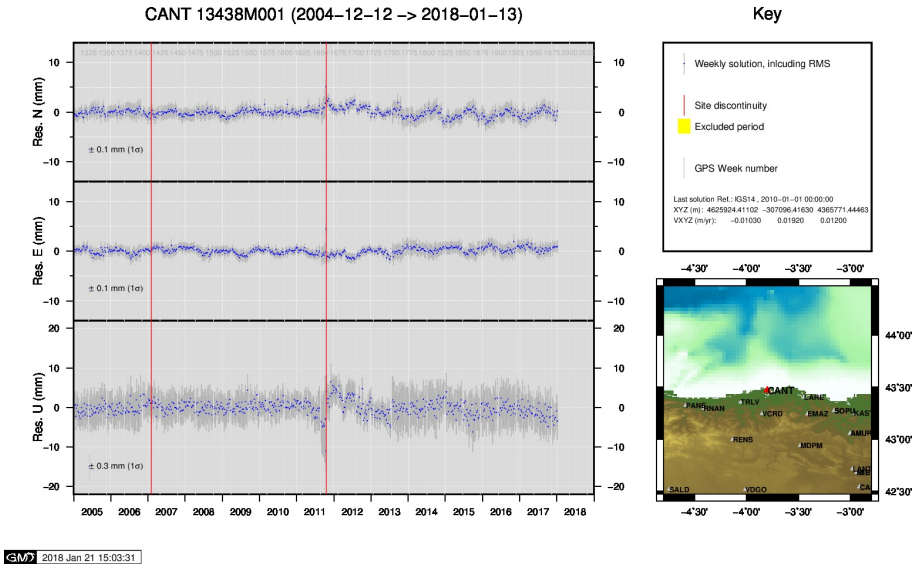
5) BIDA



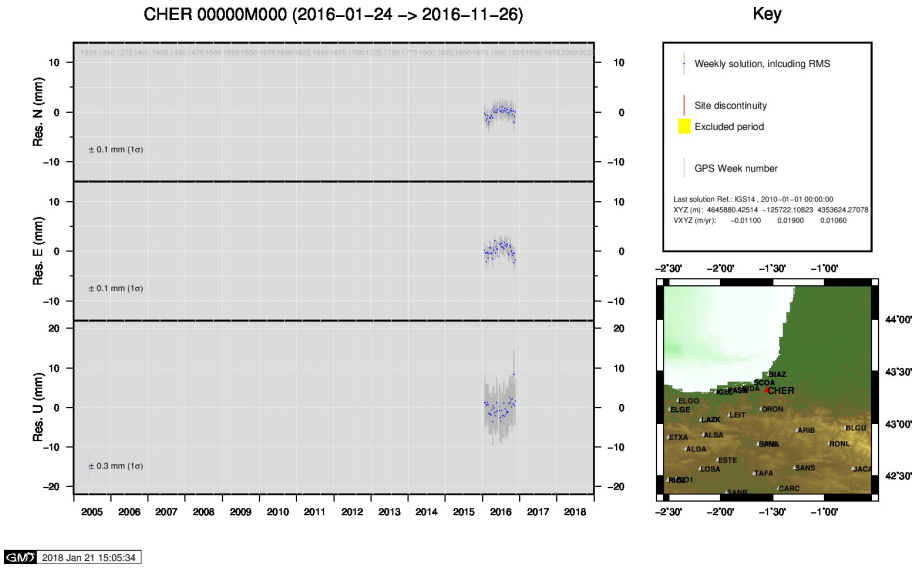
6) BRZR



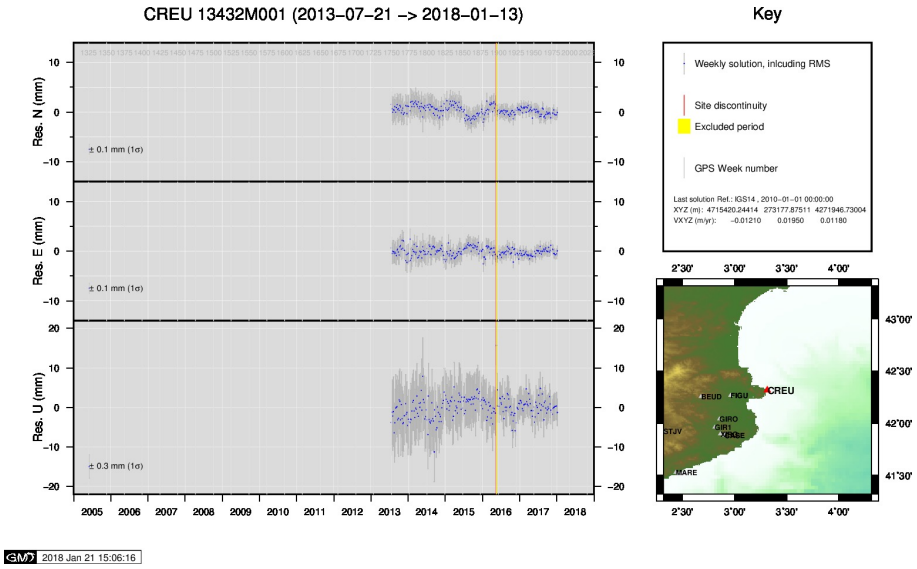
7) CACE



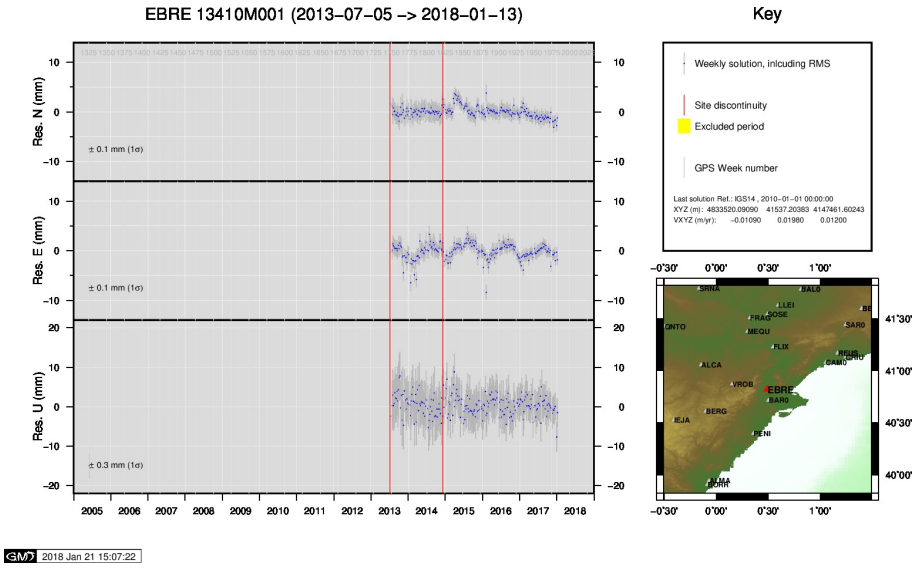
8) CANT



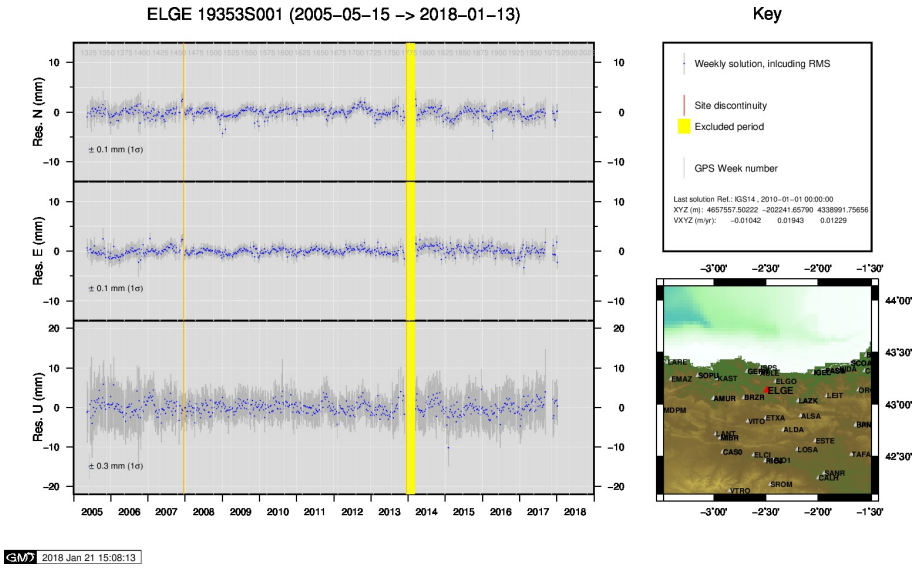
9) CHER



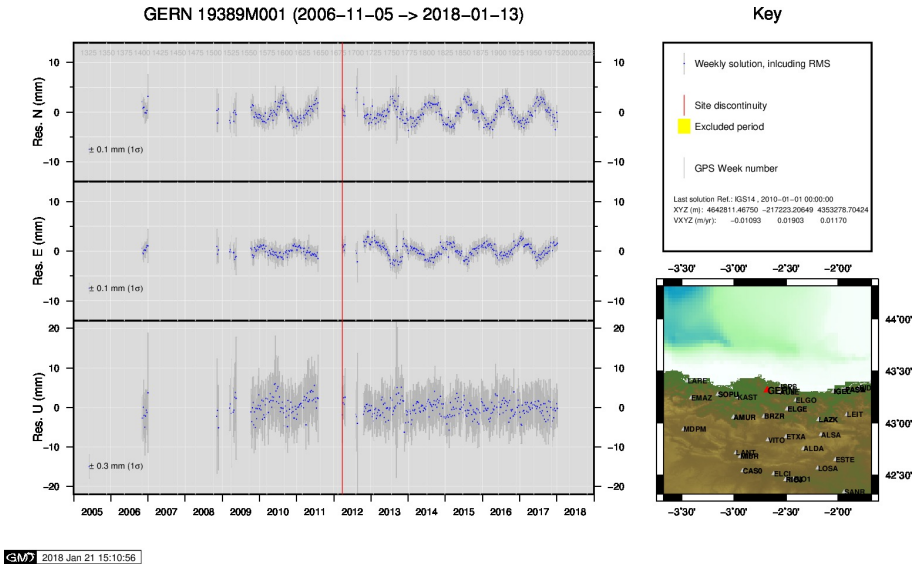
10) CREU



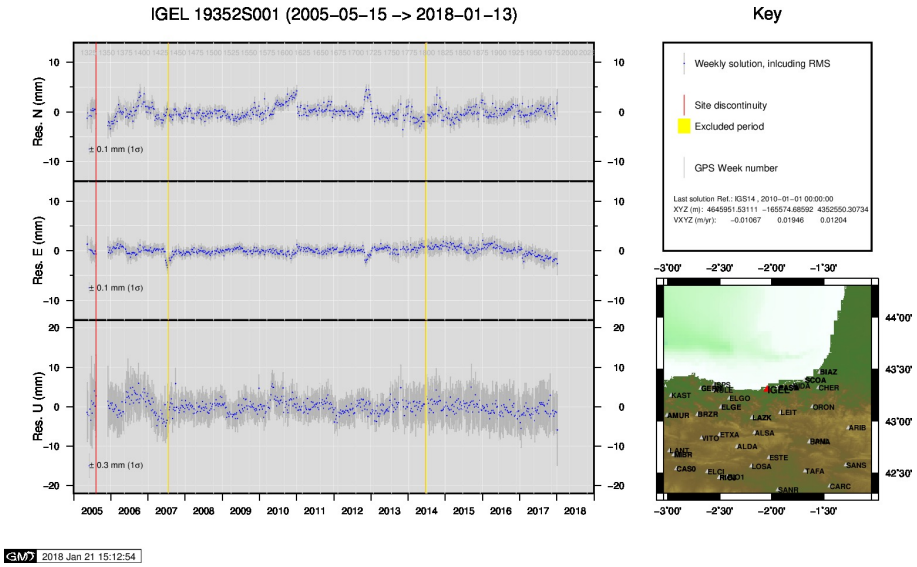
11) EBRE



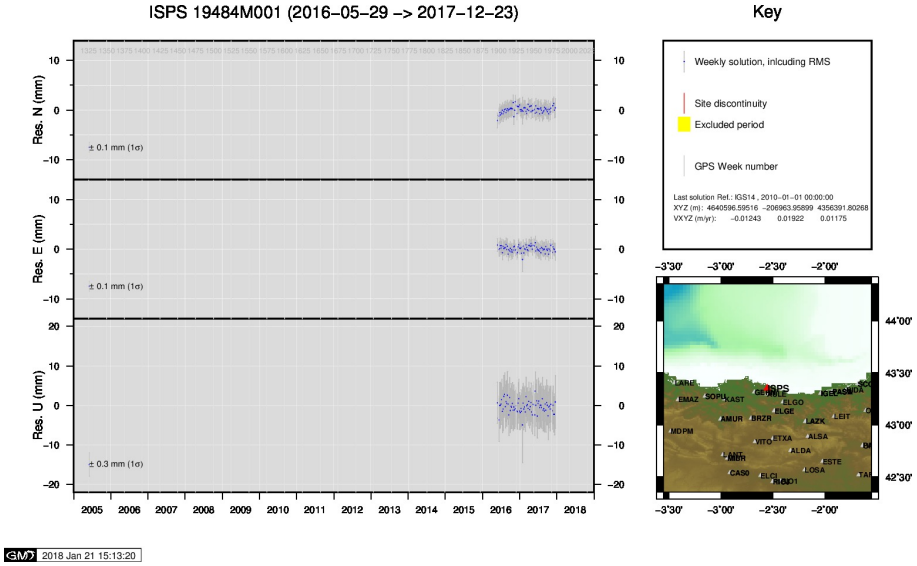
12) ELGE



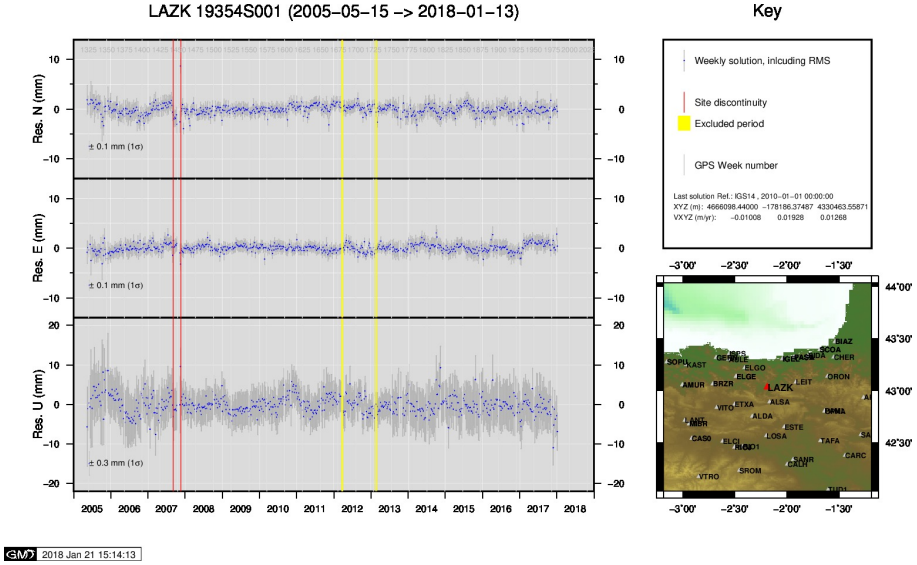
13) GERN



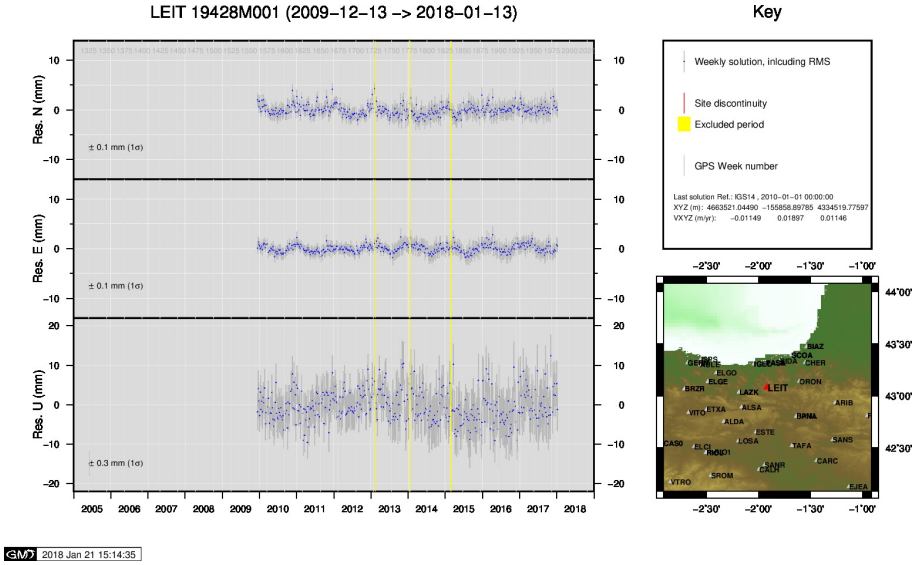
14) IGEL



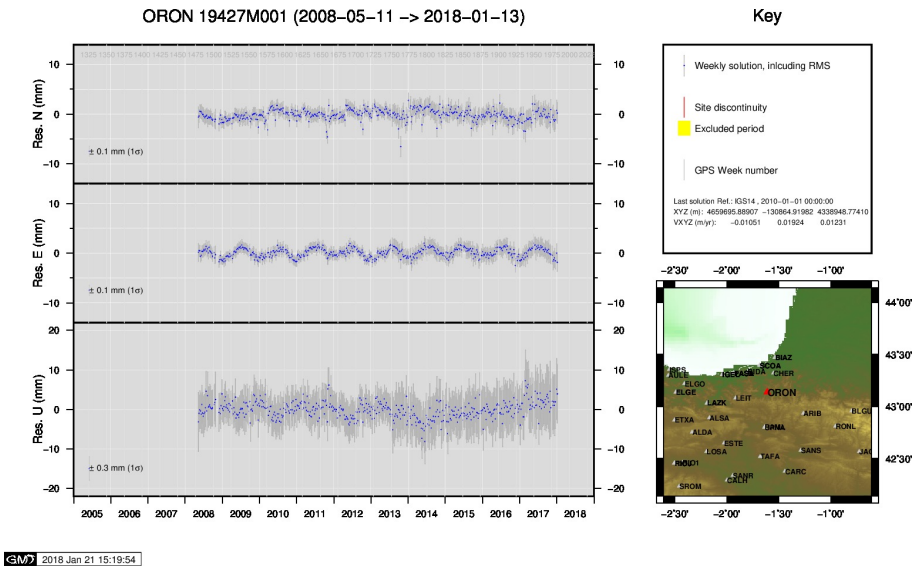
15) ISPS



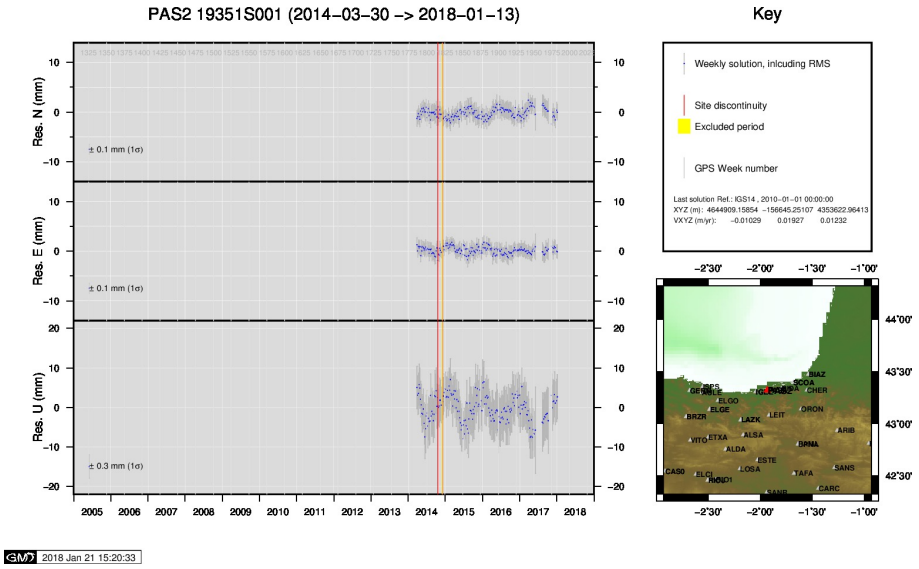
16) LAZK



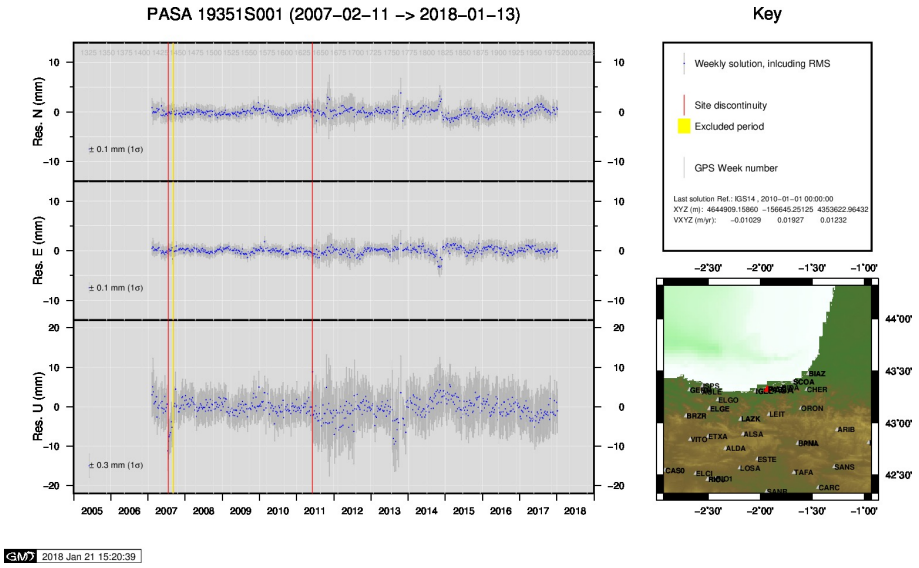
17) LEIT



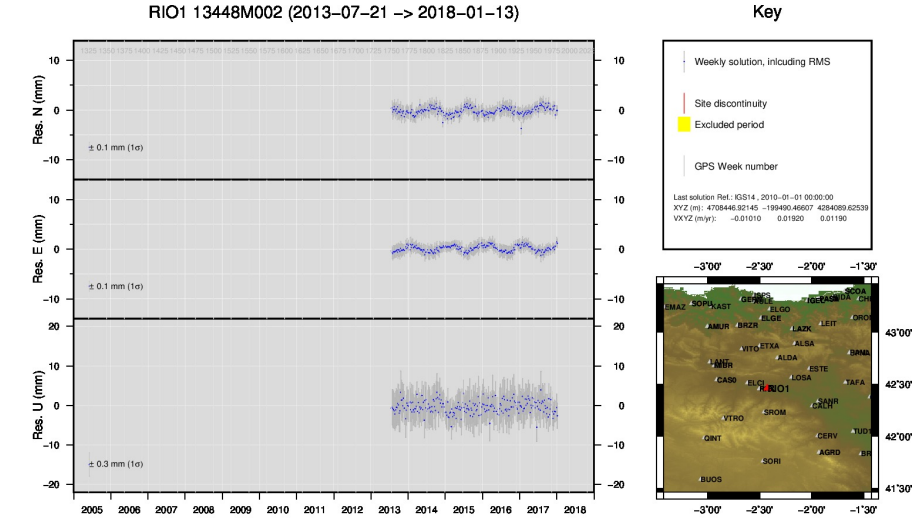
18) ORON



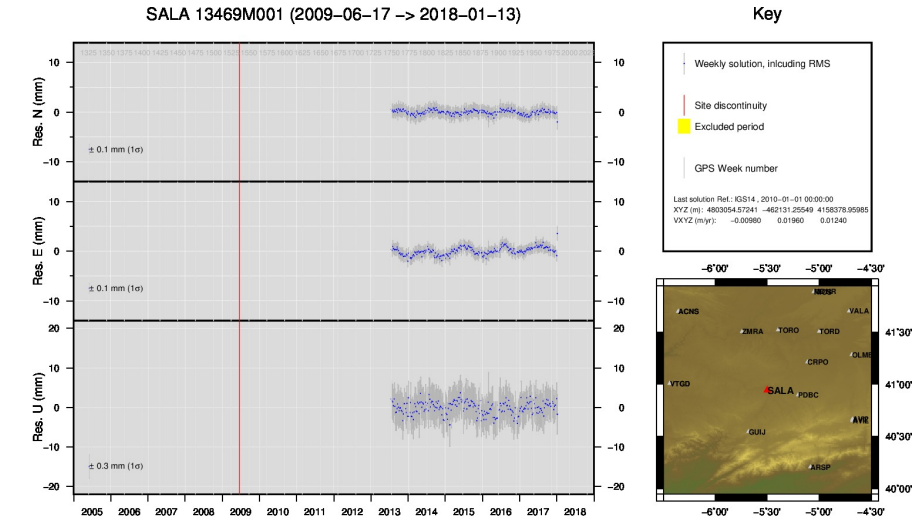
19) PAS2



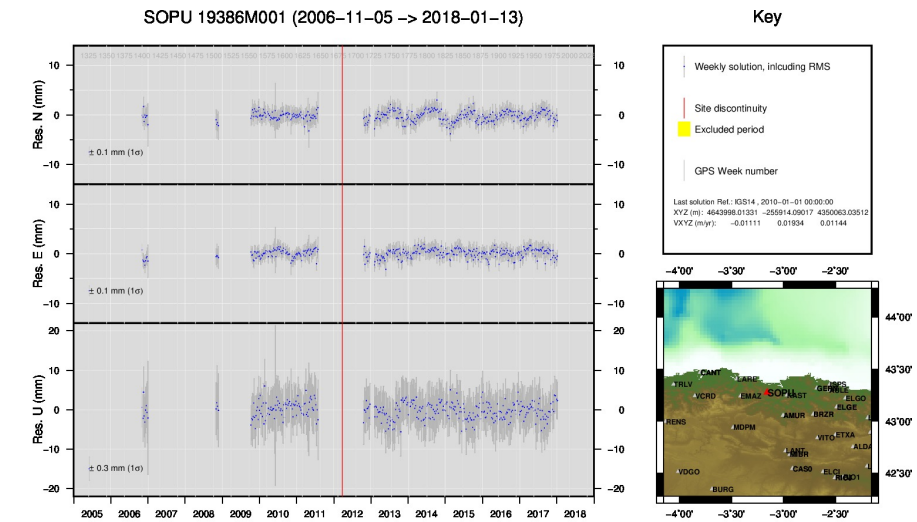
20) PASA



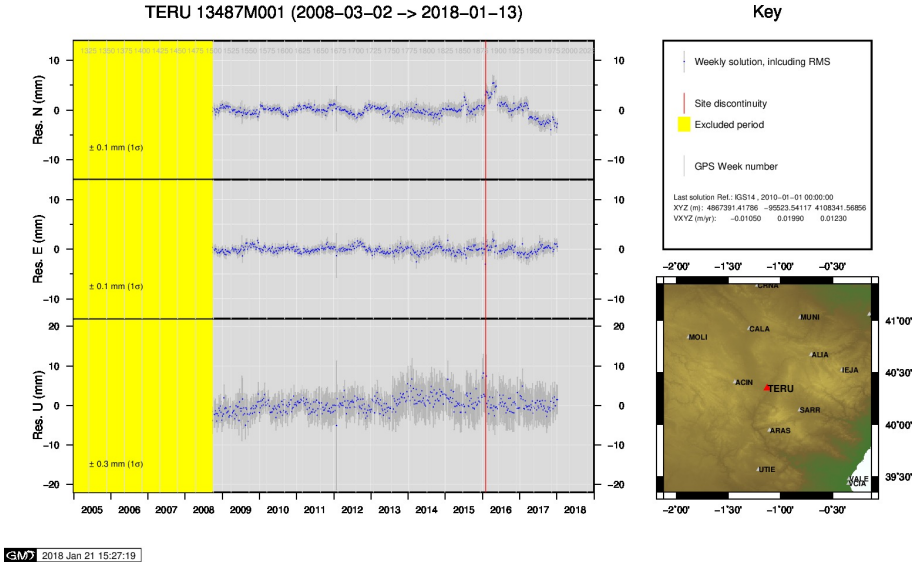
21) RIO1



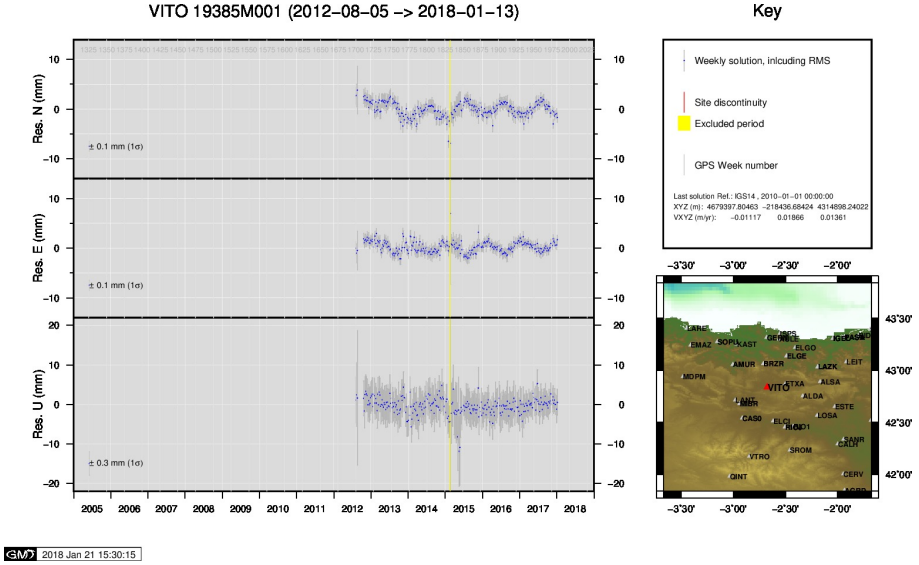
22) SALA



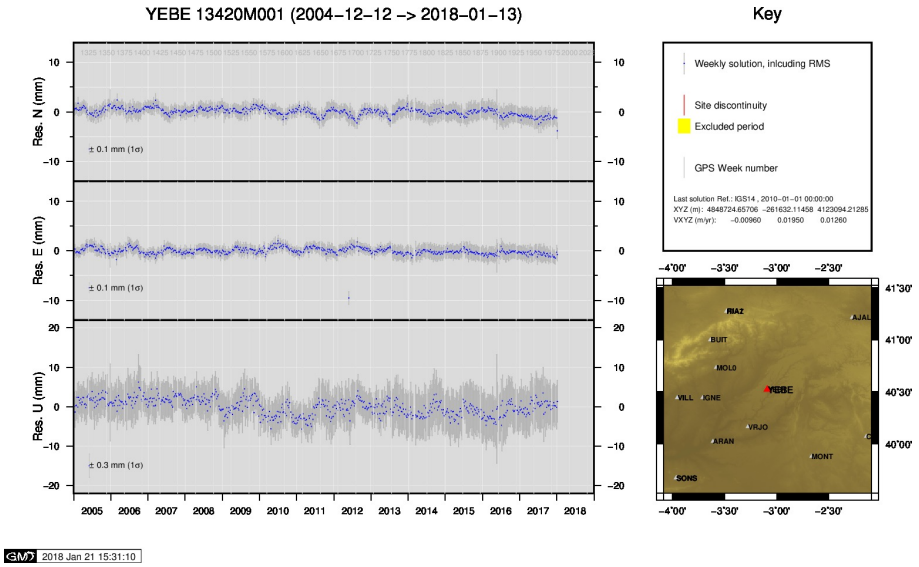
23) SOPU



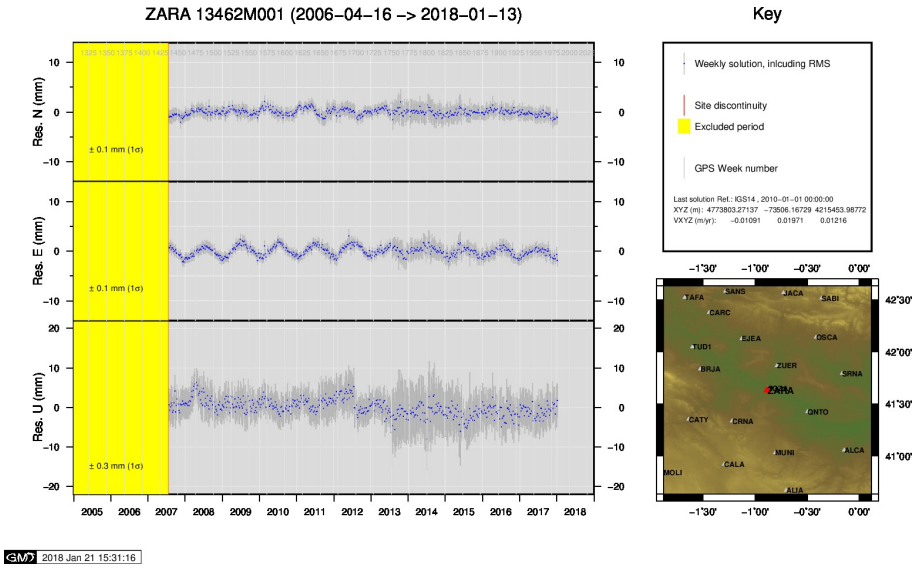
24) TERU



25) VITO



26) YEBE


ZARA 13462M001 (2006–04–16 –> 2018–01–13)
Key
Res. N (mm)
Res. E (mm)
Res. U (mm)
± 0.1 mm (1σ)
± 0.1 mm (1σ)
± 0.3 mm (1σ)
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Weekly solution, inlcuding RMS
Site discontinuity
Excluded period
GPS Week number
Last solution Ref.: IGS14 , 2010–01–01 00:00:00
XYZ (m): 4773803.27137 −73506.16729 4215453.98772
VXYZ (m/yr): −0.01091 0.01971 0.01216
−1°30'
−1°00'
−0°30'
0°00'
42°30'
42°00'
41°30'
41°00'
TAFA
SANS
JACA
SABI
CARC
EJEA
OSCA
TUD1
BRJA
ZUER
SRNA
ZARA
QNTO
CATY
CRNA
MUNI
ALCA
CALA
MOLI
AUA
2018 Jan 21 15:31:16

27) ZARA