

Reprocessing the EUREF GB 2001 Campaign

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Introduction

Why reprocess? Network overview Processing methodology Results Summary

Why reprocess?

Problem discovered in antenna phase centre offsets

Elevation dependant values incorrectly converted from IGS format to Bernese format

EUREF GB 2001 station height values therefore incorrect

EUREF GB 2001 network

40 stations in total

- 6 IGS fiducial stations
- 30 Ordnance Survey COGR
- 1 University of Nottingham COGR
- 3 Non COGR "ground" stations

23 stations chosen to be in EUREF

- 19 Ordnance Survey COGR
- 1 University of Nottingham COGR
- 3 Non COGR "ground" stations



Processing methodology

2 weeks (1123 & 1124) of data; 30 sec epoch; 10 degree elevation IGS ITRF97 coords moved to mid campaign epoch (2001.55) Advice from EPN CB and IGS CB on phase centre offsets IGS phase centre offsets, precise orbits and ERPs CODE troposphere parameters and ionosphere models Ocean tide loading FES95 from AIUB automated service L_3 ionosphere free linear combination Troposphere parameters every 2 hours; full delay using dry Niell; elevation dependant weighting Ambiguity fixed solution

Processing results

Minimal constrained solution (KOSG fixed to ITRF97 e2001.55)

- Mean overall ambiguity resolution = 79%
- Baseline repeatability < 5 mm N, E & < 15 mm U
- Coordinate repeatability < 3.2 mm N, E & 7.6 mm U
- IGS coordinates recovered to generally < 10 mm N, E, U

Constrained solution (all IGS stations fixed to ITRF97 e2001.55)

- Coordinate repeatability < 2.7 mm N, E & 7.3 mm U
- Effect of fixing -0.3 mm N, 0.4 mm E & 0.7 mm U

Comparison with previous campaigns (1)

Final ETRS89 coordinates compared to previous campaigns: FBM Project, EUVN97, UKGauge (91, 92, 93, 96), EUREF EIR/GB95, EUREF GB 92

Coordinate recovery generally better than **10 mm**, but...

... some larger than expected differences

Station OS08 recoveries not consistent.

- Unexplained weakness in East recovery (20 mm) with EUVN97. Reason may be OS08 is 'passive' + 4 year time period between campaigns
- 29 mm height difference with FBM Project. Reason may be different observational techniques

Comparison with previous campaigns (2)

Station IESG recoveries not consistent

- IESG is a permanent station belonging to IESSG
- Has not changed in any way since installation
- Close agreement between EUVN97 coordinates and FBM Project but 11 mm North difference and 30 mm height difference with EUREF GB 2001
- IESSG coordinates from same data show < 4 mm N, E & <10 mm U compared to EUREF GB 2001
- IESSG are aware of some settlement and periodic variations at IESG

Comparison with previous campaigns (3)

Comparison with older campaigns

- Up to 1995 and ITRF93
- Coordinate recoveries not as consistent
- EUREF GB 92 plan recovery better than 20 mm but height up to 70 mm
- UKGauge93 all recoveries better than 16 mm but
- UKGauge92 East and Up OK but North up to 44 mm

These variations perhaps expected when time span between campaigns and differences in underlying ITRFs taken into account

Comparison with original EUREF GB 2001

Mean height variations by antenna type

- ASH700936 variants +11.2 mm
- LEIAT504 + 6.2 mm
- TRM33429.00+GP 23.3 mm

Summary

Processing carried out to latest high precision guidelines

- Internal quality of solution better than 3 mm horizontally and 8 mm vertically
- ITRF97 realised to 10 mm level
- Comparison with previous campaigns recovers ETRS89 to generally better than 10 mm despite some larger differences which can be explained
- The correction of the antenna phase centre offset error and standardisation to IGS offsets has resulted in a change in station heights

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