

WUT LAC Report

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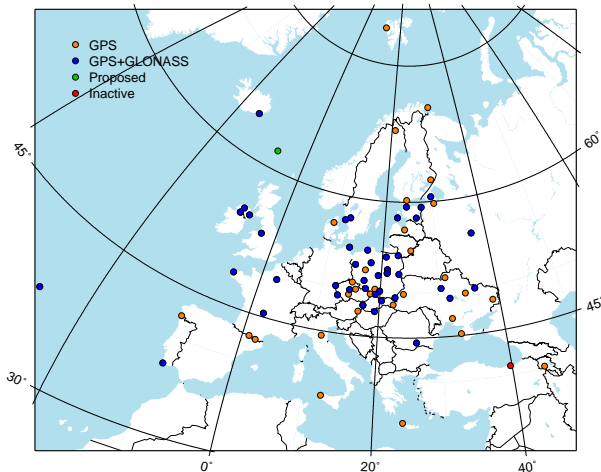


This report contains the following topics:

- Network characteristics
- Products
- Strategy description
- GLONASS analysis
- Reprocessing status
- Troposphere comparisons
- Summary



WUT Subnetwork



- 80 stations:
 - 44 GPS+GLONASS stations
 - 1 inactive (TRAB, Turkey)
 - 1 new proposed (ARGI, Faroe Islands)



Currently WUT contributes to EPN with the following products:

- Final, based on IGS final products
 - weekly coordinate estimates (`wutWWW7.snx`)
 - daily coordinate estimates (`wutWWWWD.snx`)
 - daily tropospheric delays (`wutWWWWD.tro`)
- Rapid product, based on IGS rapid products (since week 1565, January 2010)
 - daily coordinate estimates (`wutWWWWDr.snx`).



WUT uses Bernese GPS Software version 5.0 to analyze GPS data.
Summary of the strategy:

- processing performed according to EPN LAC Guidelines
- IGS orbits and ERPs
- ionosphere model for AR: CODE global
- DCBs: P1C1 and P1P2 from CODE
- antenna calibration tables: EPN
- Ambiguity resolution:
 - up to Wk 1599: QIF
 - from Wk 1600: SIGMA, QIF
- Sites used for NNT minimal constraints: BOR1, GLSV, HOFN, JOZE, ONSA, WTZR. (Up to Wk 1592 also METS was used)
- Reference Frame: IGS05



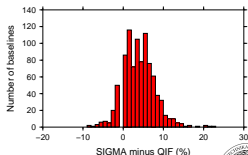
Ambiguity resolution

Since week 1600 ambiguities are solved for in a well known manner:

- SIGMA (L1&L2) for baselines shorter than 20 km
 - Usually 1 baseline (or none) is formed
- SIGMA (L5/L3) for baselines $20 \leq L \leq 200$ km
 - 10–12 baselines
- QIF for baselines longer than 200 km
 - ~ 65 baselines

12 week comparison shows:

- 1 average increase of resolved ambiguities 4%, increase for 80% of baselines (details in the Fig. \rightarrow)
- 2 impact on resulting coordinates very small (absolute max. differences aft. Helmert trans. 0.2, 0.4 and 0.7 mm resp. for N, E, U components)



Currently, all WUT products submitted to EPN are based on GPS observations.

Our network consists of more than 50% (44 out of 80) stations observing GLONASS satellites.

Tests with GPS+GLONASS are being performed in order to include GLONASS in regular analysis.

- We use the same strategy as in case of weekly analysis, but use CODE orbits and ERPs

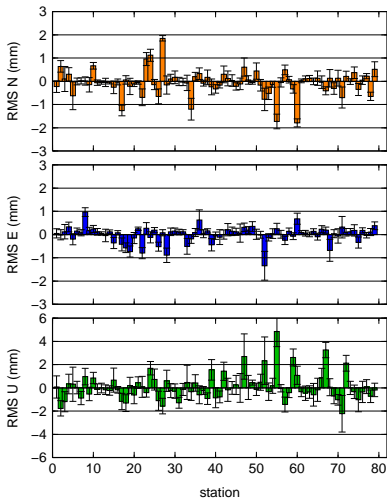
Known problems:

- Station SPT0 (Sweden) provides corrupted (low quality) GLONASS observations; files from SPT0 are converted to 'GPS only' before processing



GPS+GLONASS Analysis – comparison

Mean differences over 12 weeks between 'GPS only' solution and GPS+GLONASS solution and their standard deviations.



N component biases:

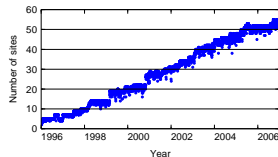
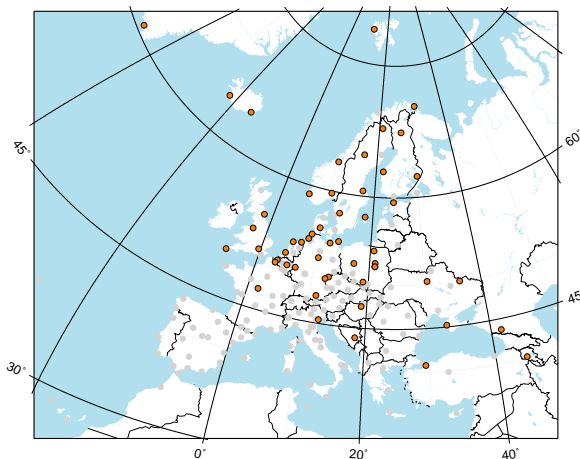
- +1.8 mm (GWWL, PL)
- -1.8 mm (SMLA, UA)
- -1.7 mm (POUS, CZ)

U component biases:

- +4.9 mm (POUS, CZ)
- +3.3 mm (SWKI, PL)



WUT's Reprocessing contribution



Map of the WUT subnetwork in 2006 (55 sites) and its evolution since 1996



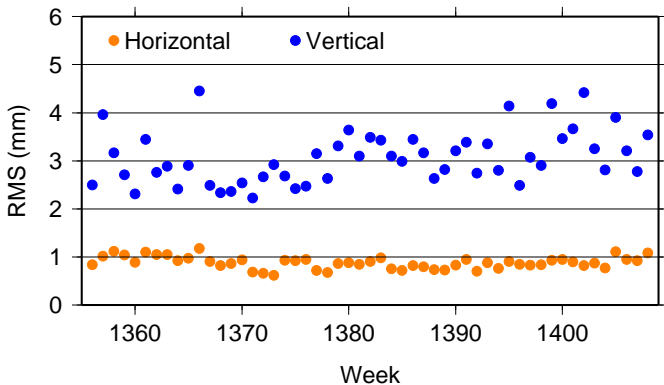
Pilot 2006 Reprocessing characteristics

- Data of 55 sites for the year 2006 has been reprocessed and submitted to BKG DC (April 2010)
- Solutions based on IGS Repro1 products
- same processing strategy as in case of regular weekly analysis
- Following sites were used for NNT minimal constraints: BOR1, GLSV, HOFN, JOZE, KELY, NYA1, QAQ1, REYK, THU3
- all available observations were used; official inclusion/active dates (for a new or temporarily inactive sites) not taken into account

We are ready for continuing reprocessing (database, hardware, software)

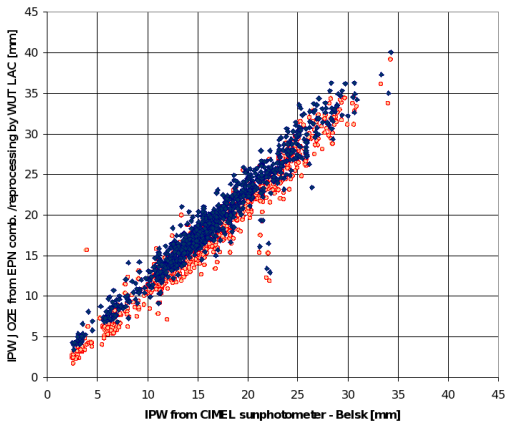


Weekly RMSs – WUT Reprocessing 2006



Comparison of IPW with sun photometer

JOZE: GPS vs. sun photometer (Belsk Geophysical Observatory)



Blue: EPN official comb., Orange: WUT reprocessing



Comparison of GPS IPW with aerological sources

Aerology	GPS (JOZE)	IPW bias (mm)	mean abs. diff. (mm)	RMS (mm)	No. of points
Radiosonde Legionowo	EPN comb.	-0.36	1.56	2.07	522
Radiosonde Legionowo	WUT	+0.43	1.49	1.99	648
Radiosonde Legionowo	WUT repro.	+0.97	1.55	1.88	644
CIMEL 318 Belsk	EPN comb.	-3.11	3.20	1.68	907
CIMEL 318 Belsk	WUT	-2.22	2.36	1.62	968
CIMEL 318 Belsk	WUT repro.	-1.57	1.80	1.56	958

Legionowo located 34 km from Jozefoslaw in North direction

Belsk located 33 km from Jozefoslaw in South direction



- New rapid product has been completed and submission to EPN started in January this year
- Refinement of ambiguity resolution step
- Tests of GPS+GLONASS analysis in progress; products based on GNSS observations are expected later this year
- Data for the year 2006 processed and submitted to BKG
- WUT is prepared for continuing reprocessing analysis

