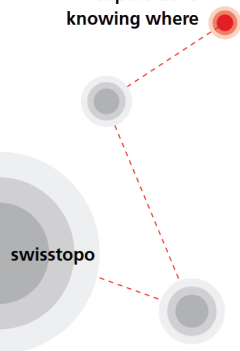




wissen wohin
savoir où
sapere dove
knowing where

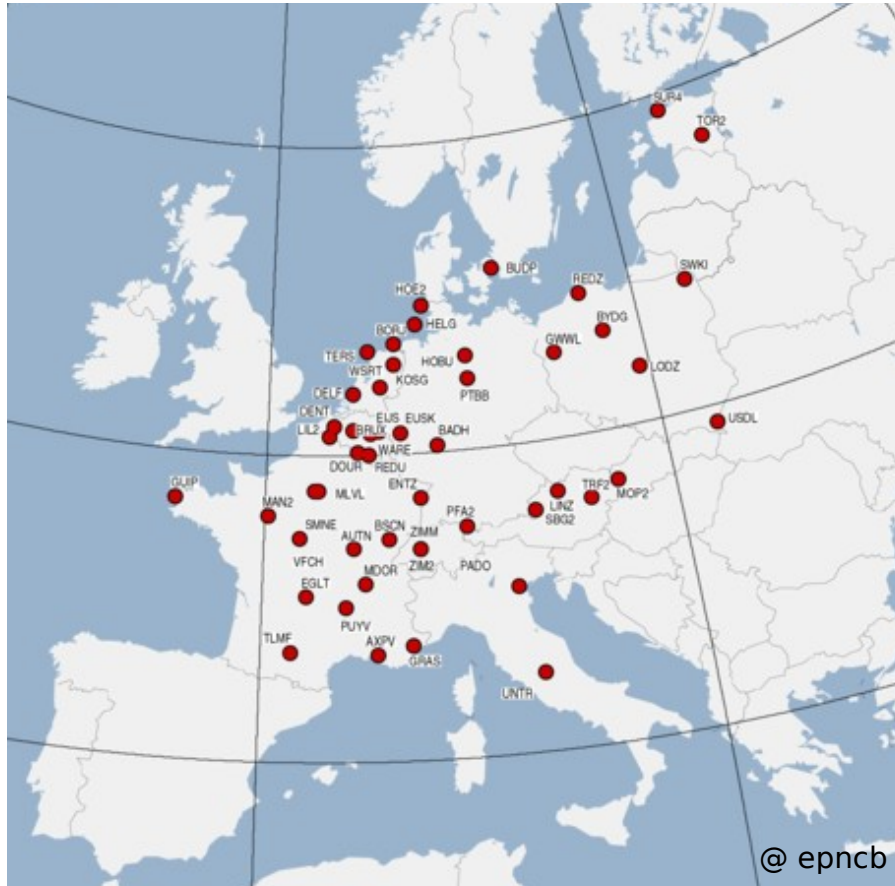


LPT (swisstopo) EPN analysis center and the switch to Bernese GNSS Software V5.2

D. Ineichen, E. Brockmann, S. Schaer



LPT's contribution for the EPN

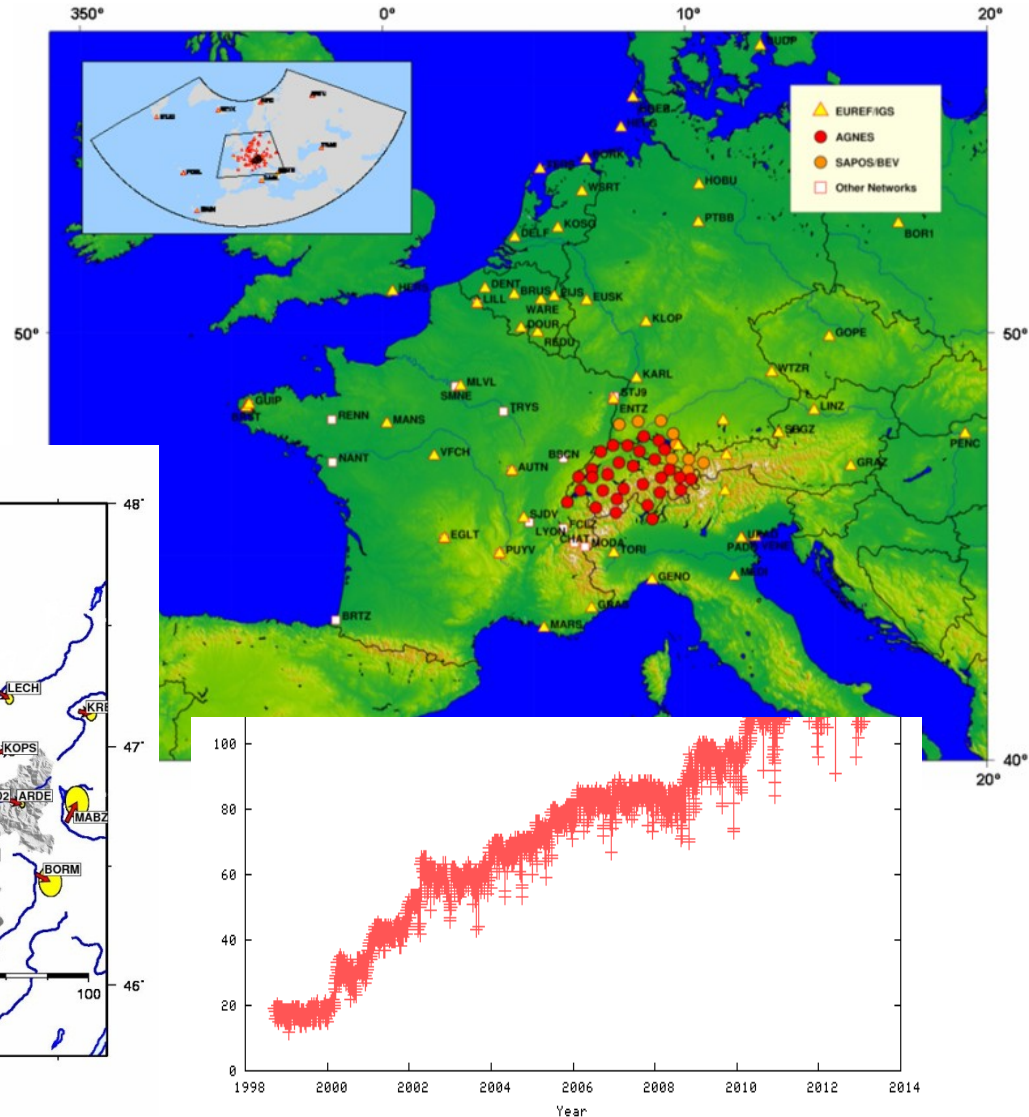


- 52 stations (from France to Estonia)
- Development of GNSS (GPS & GLONASS):
2008: 8 stations
2013: 42 stations (80%)
- Since GPS week 1731 computed with BSW5.2 (8 weeks so far)



LPT: Other GNSS activities (AGNES)

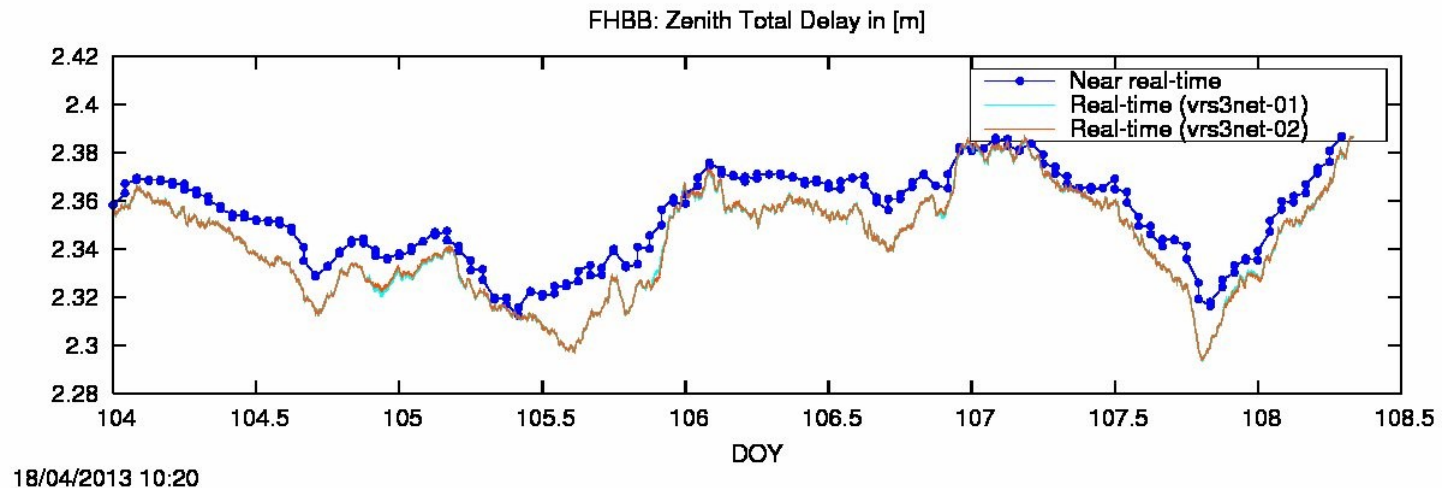
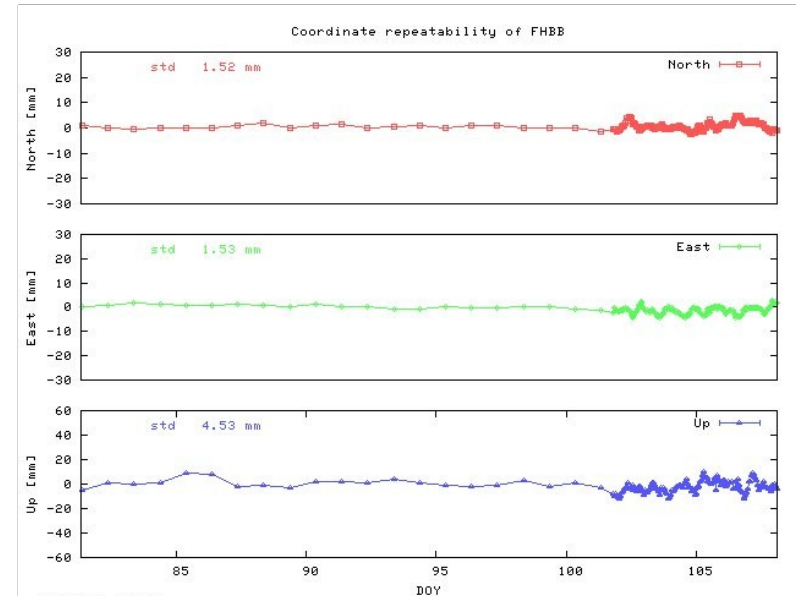
- Currently about 125 stations (NagNet & Tecval/Cogear incl.)
- In real-time available reference frame for CH (swipos positioning)
- Determination of velocity fields (horizontal + vertical)





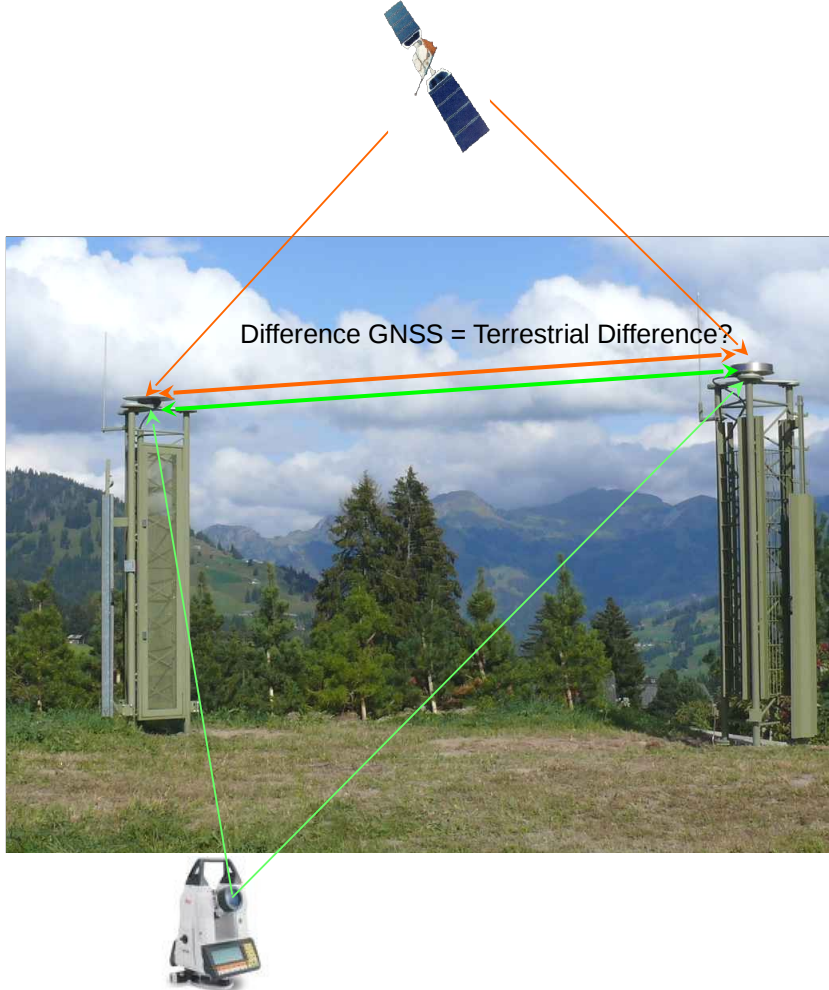
Hourly solutions (Meteo, EPN monitoring)

- “Fast” Monitoring the coordinates of permanent GNSS sites (data problems, snow, pollution of the antennas ...)
- Also submitted to EUREF for EPN sites
- Near real-time troposphere parameters (delay 45 minutes after the end of the observation interval)
- Comparison with tropo estimates from swipos (VRS3Net)

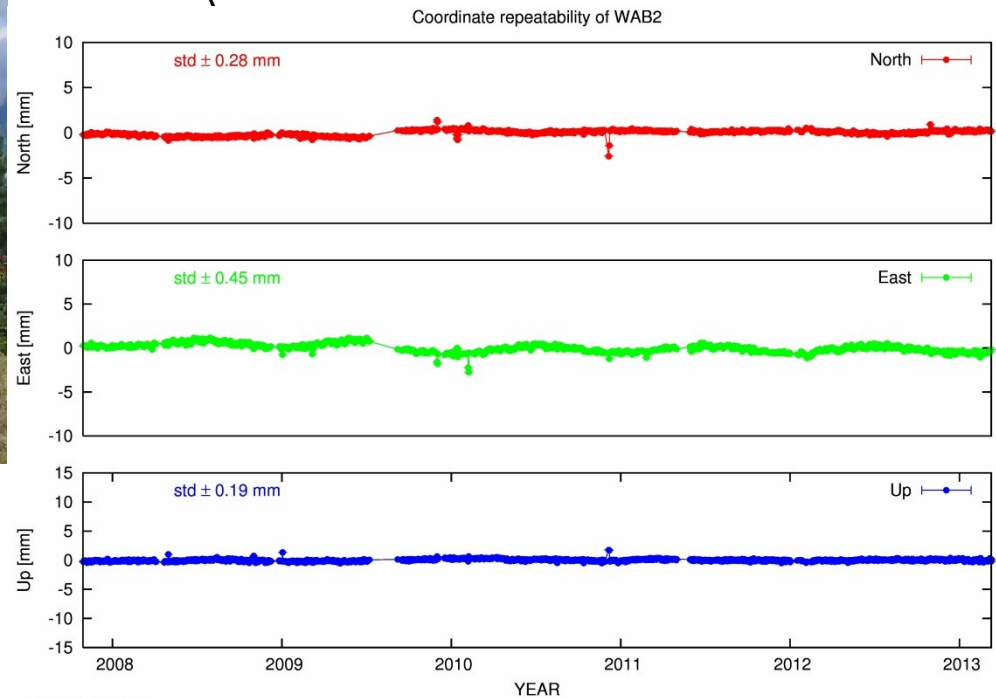




Enhanced processing of double stations



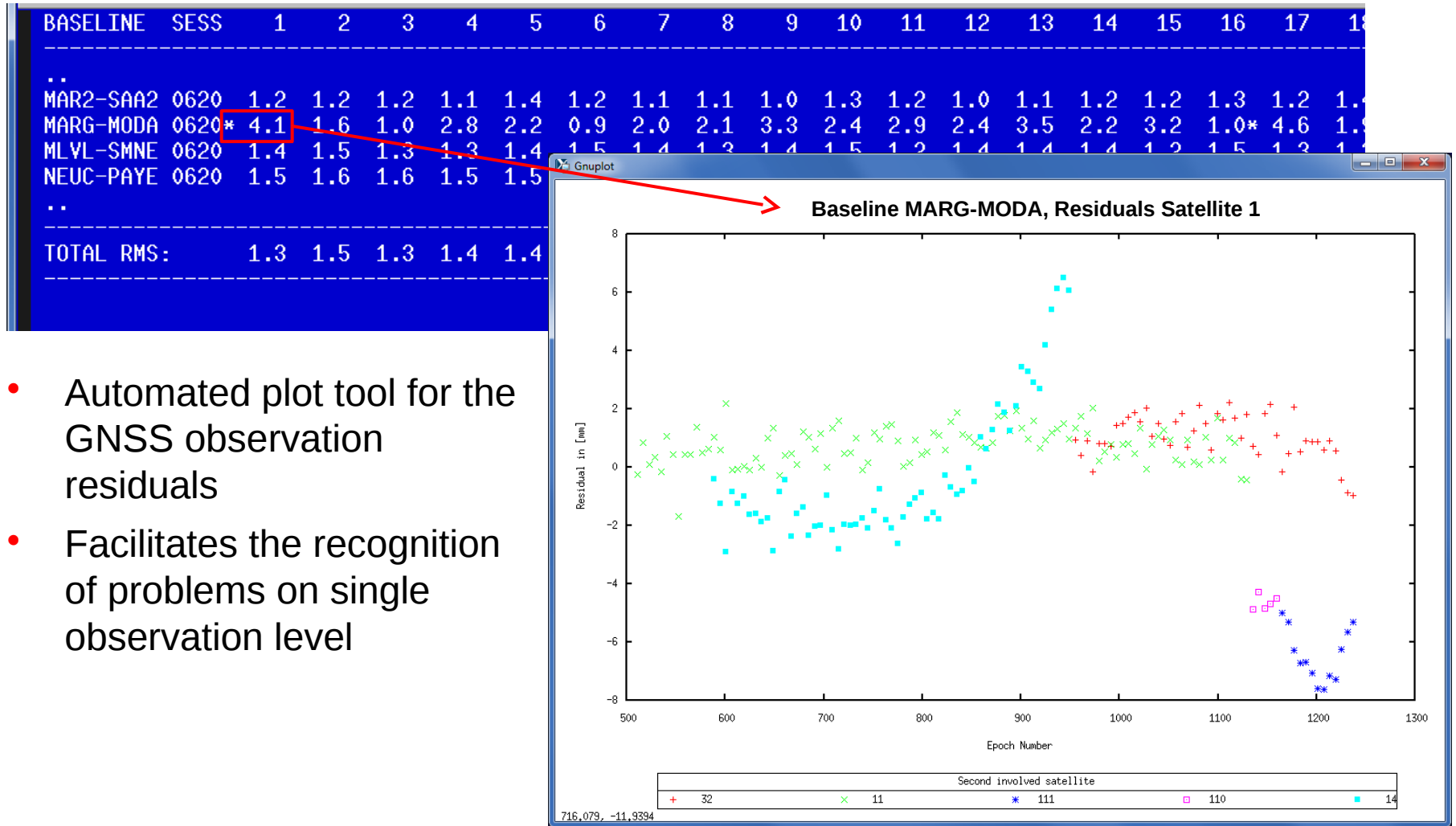
- New «L1/L2 only» long-term series for 9 double sites are computed routinely
- Example Wabern (best performance):
RMS North 0.3mm / East 0.5 mm
RMS Height 0.2 mm (!)
(daily solutions, series longer than 5



17/04/13 18:19



New “residual plot tool”



- Automated plot tool for the GNSS observation residuals
- Facilitates the recognition of problems on single observation level



BLQ update (FES2004)

- New determination of the ocean loading tide values for all sites (using website <http://holt.oso.chalmers.se/loading>)
- Differences due to a bug correction for the post-processor used for sites situated near coasts
- Maximum difference of 0.7 mm for site HELG (for M2 amplitude)
- The influence on the resulting coordinates is very small, with a maximum of 0.1 mm (HELG) for the Up component



BSW5.0 to BSW5.2: Approach

BSW5.0 BPEs transferred to BSW5.2 (no use of RNX2SNX, to keep some specifics of the previous processing procedure)

Two step approach:

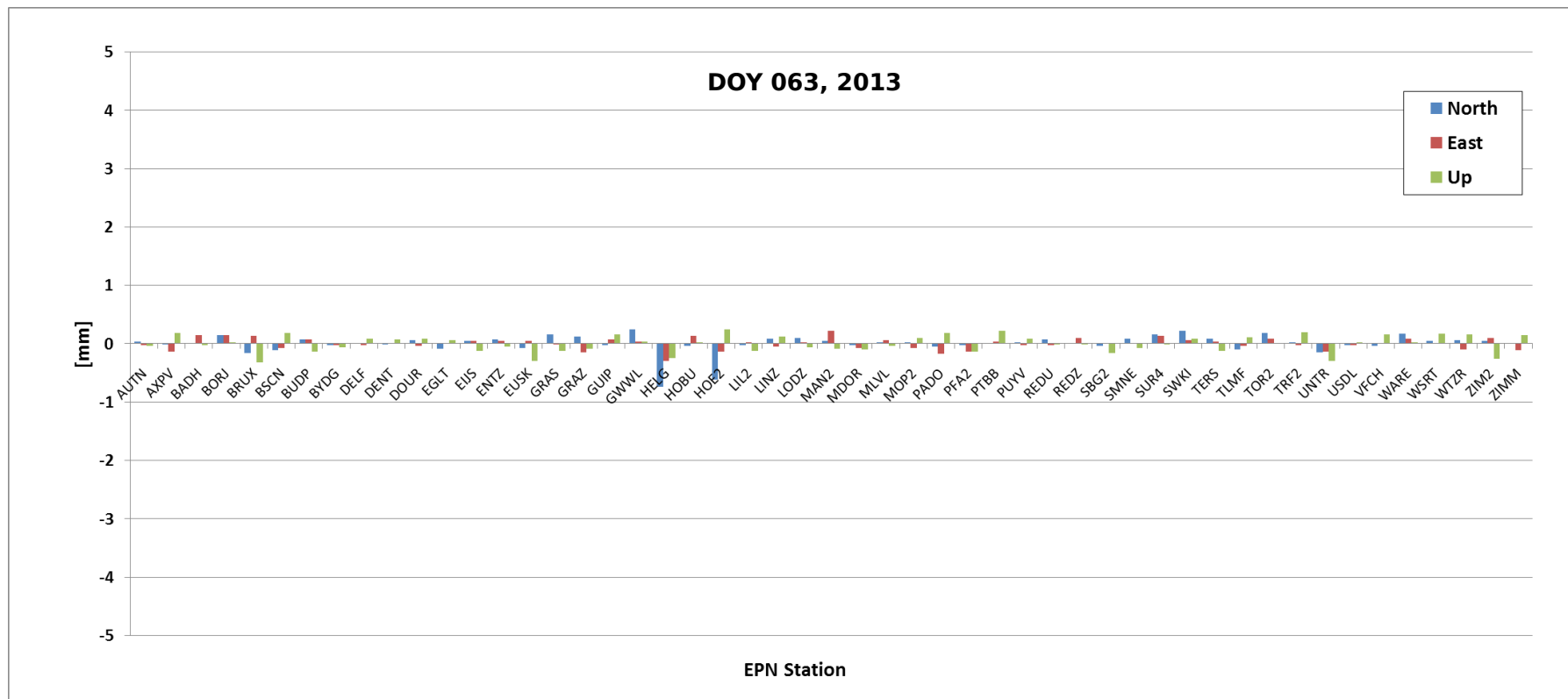
- Step 1: BSW5.0 to BSW5.2 with options as close as possible to “old” processing with BSW5.0
- Step 2: Activate new options, amongst others:
 - Troposphere GMF / Chen Herring for gradients
 - Antenna calibration values for GLONASS
 - IERS2010 conventions
 - Higher order ionosphere
 - Moderate handling of potential GPS quarter cycle phase biases
 - (Intersystem translation parameters and troposphere bias for GLONASS set up, but deleted for final solution)



BSW5.0 to BSW5.2: Coordinate differences

Step 1: Options similar to BSW5.0

- Scale -1.0 ppb (mainly Shapiro)
- Max Delta 0.7 mm North / 0.3 mm East / 0.3 mm Up for baseline HOE2-HELG (with some data problems)

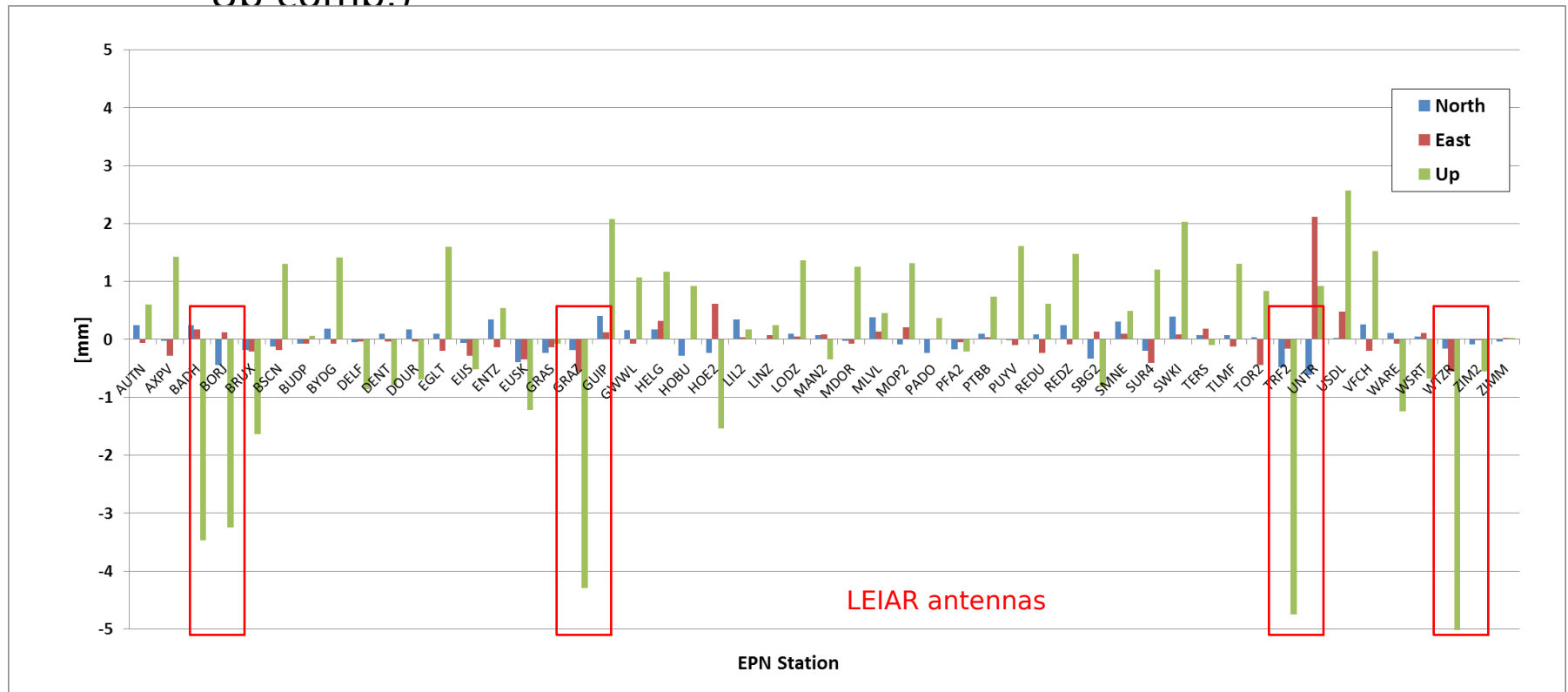




BSW5.0 to BSW5.2: Coordinate differences

Step 2: New options for BSW5.2

- Scale -2.3 ppb (-1.0 Shapiro, -0.3 IERS 2010, -1.0 Tropo mod. (GMF))
- Max Delta 0.9 mm North / 2.0 mm East / 5.5 mm Up
- Identical antennas with similar behaviour (e.g. “LEIAR” antennas for Up comp.)

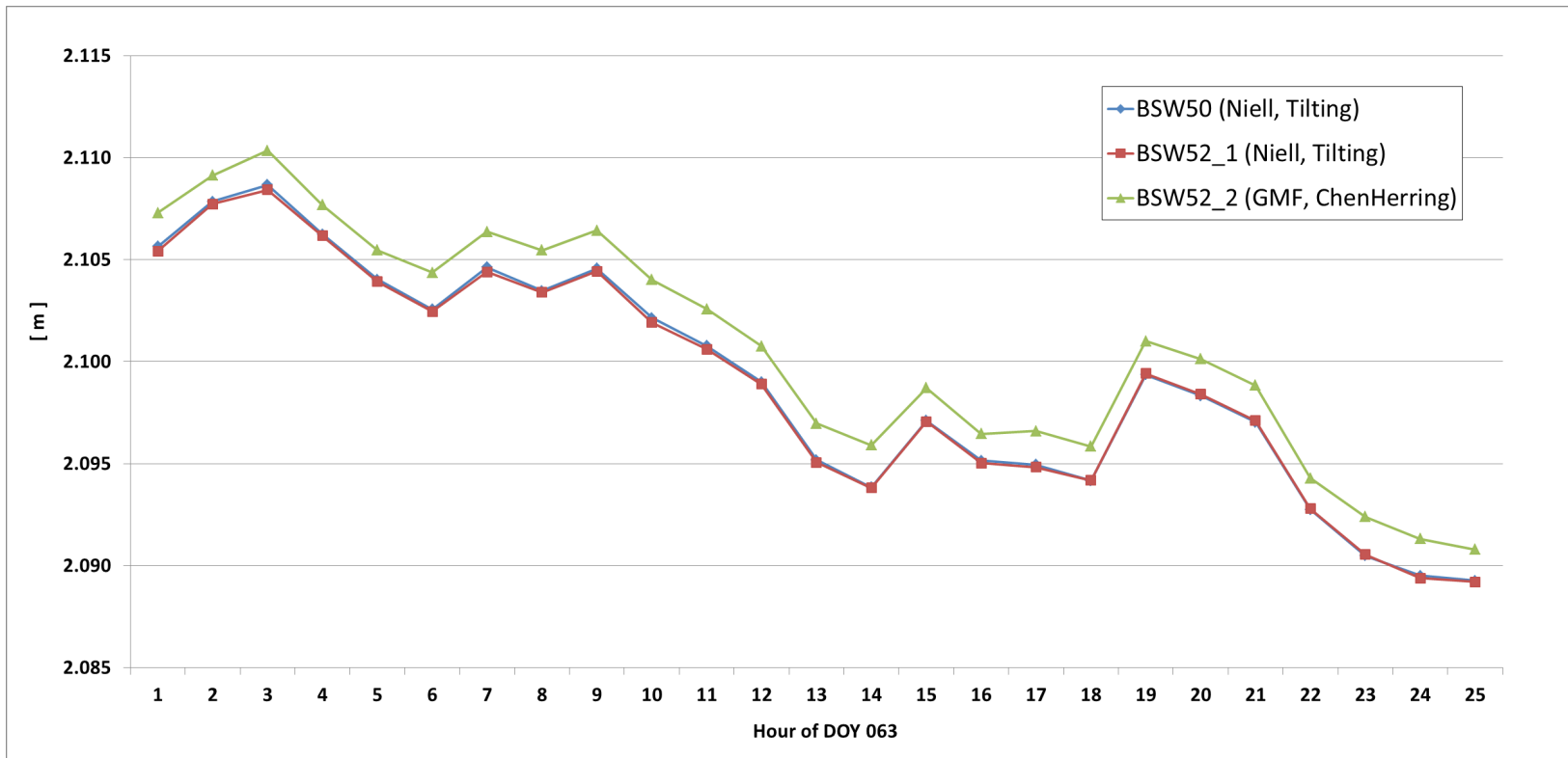




BSW5.0 -> BSW5.2: Troposphere

Influence of new modelling (GMF)

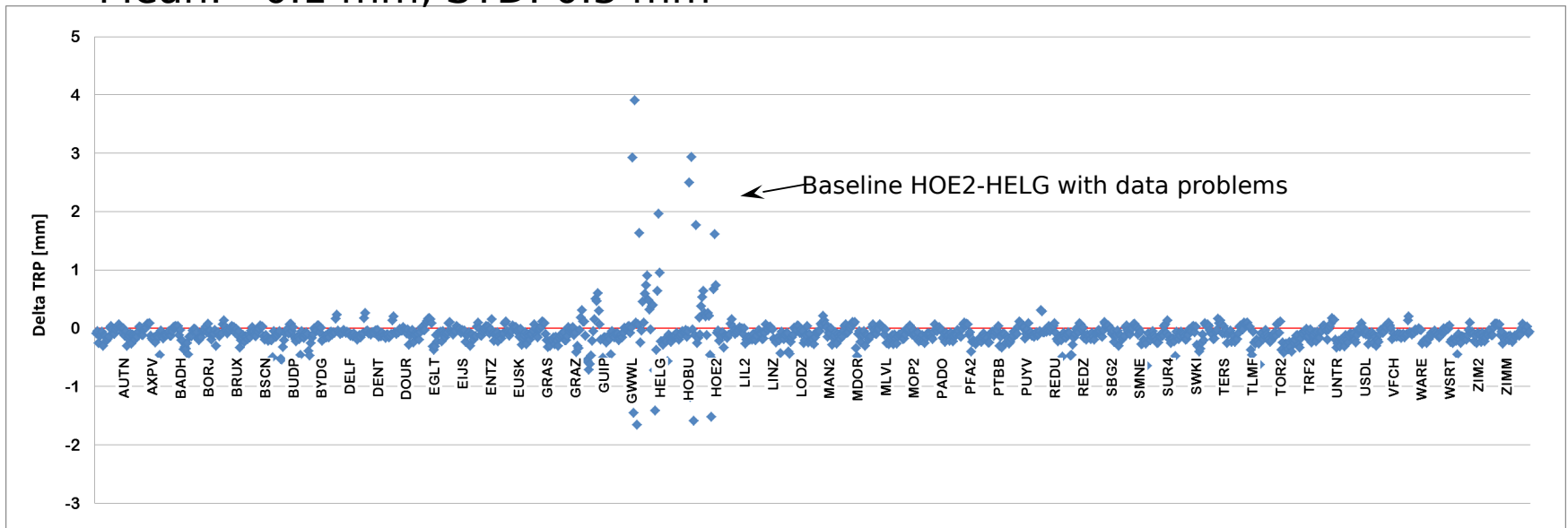
- Site ZIM2, DOY 063 2013, 24 hourly troposphere parameters



BSW5.0 -> BSW5.2: Troposphere

Similar options

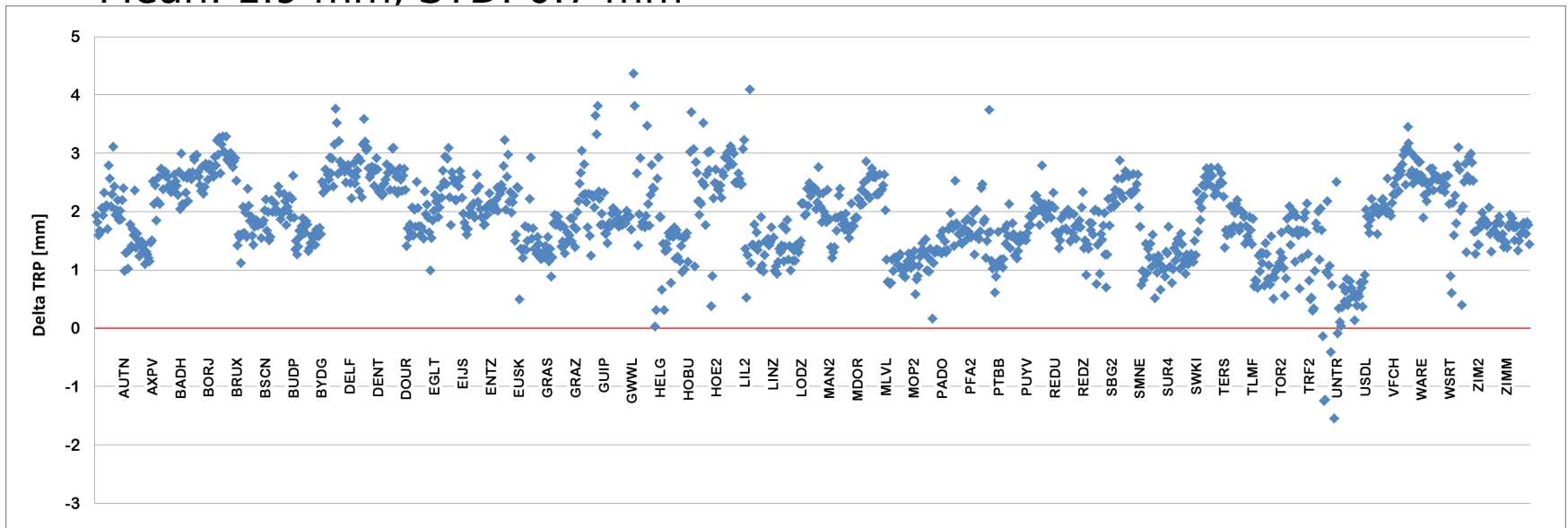
- All sites, DOY 063 2013, 24 hourly troposphere parameters for each site
- Mean: - 0.1 mm, STD: 0.3 mm





BSW5.0 -> BSW5.2 Troposphere GMF/ChenHerring (+ other new options)

- All sites, DOY 063 2013, 24 hourly troposphere parameters for each site
- Mean: 1.9 mm, STD: 0.7 mm





Conclusions

- LPT contributions to EPN since GPS week 1731 computed with BSW5.2
- Other network analysis (AGNES, Near-realtime processing) to be switched in next weeks
- Scale difference of -2.3 ppb (Shapiro, IERS2010, GMF) and coordinate differences (up to 2mm horizontally and 5mm vertically) with new BSW5.2 options
- Mean Troposphere difference of 1.9 mm with new BSW5.2 options (-0.1 mm in case of options close to BSW5.0)