GPS data analysis at the swisstopo (LPT) LAC

D. Ineichen, E. Brockmann

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Bundesamt für Landestopographie
Office fédéral de topographie
Ufficio federale di topografia
Uffizi federal da topografia

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# Map of swisstopo's contribution to the EPN

© epncb

- The subnetwork consists of 23 sites

- New included sites since the last LAC workshop:

  - BUDP
  - REDU
  - LINZ

- At present, 1 site (LINZ) not included in data processing due to missing data (inactive site)
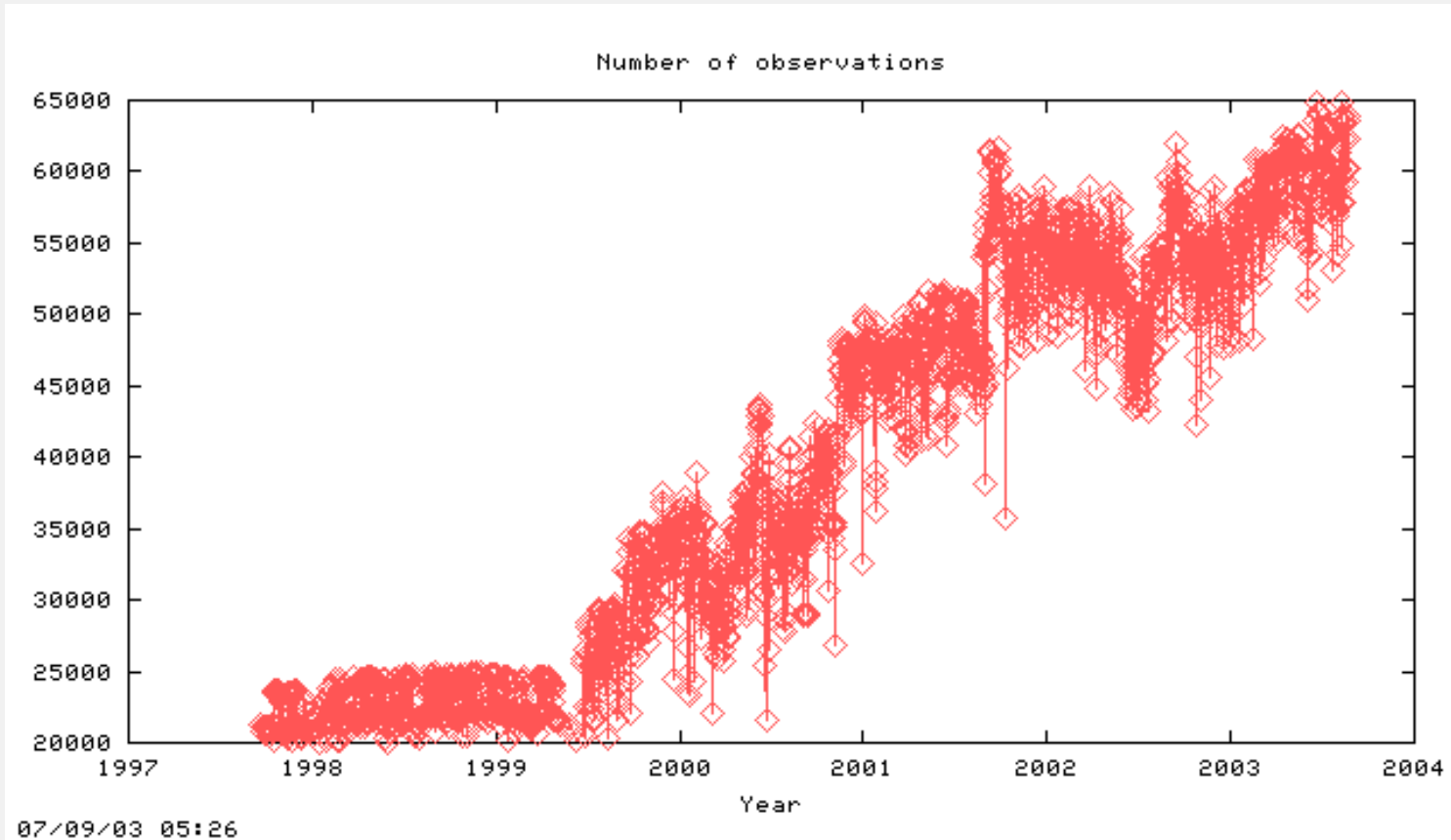
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Processing options

The processing options are in accordance to the processing options proposed at the last LAC workshop in Warsaw:

- IGS precise orbits

- Ambiguity fixed, elevation dependent weighting

- Elevation cut-off angle 10 degrees

- Estimation of 24 Troposphere parameters per day

- Mapping function Dry-Niell, no a priori troposphere

- 180 second sampling rate for the final solution

- The final troposphere parameters generated after constraining the coordinates of the daily NEQ to the weekly coordinate solution
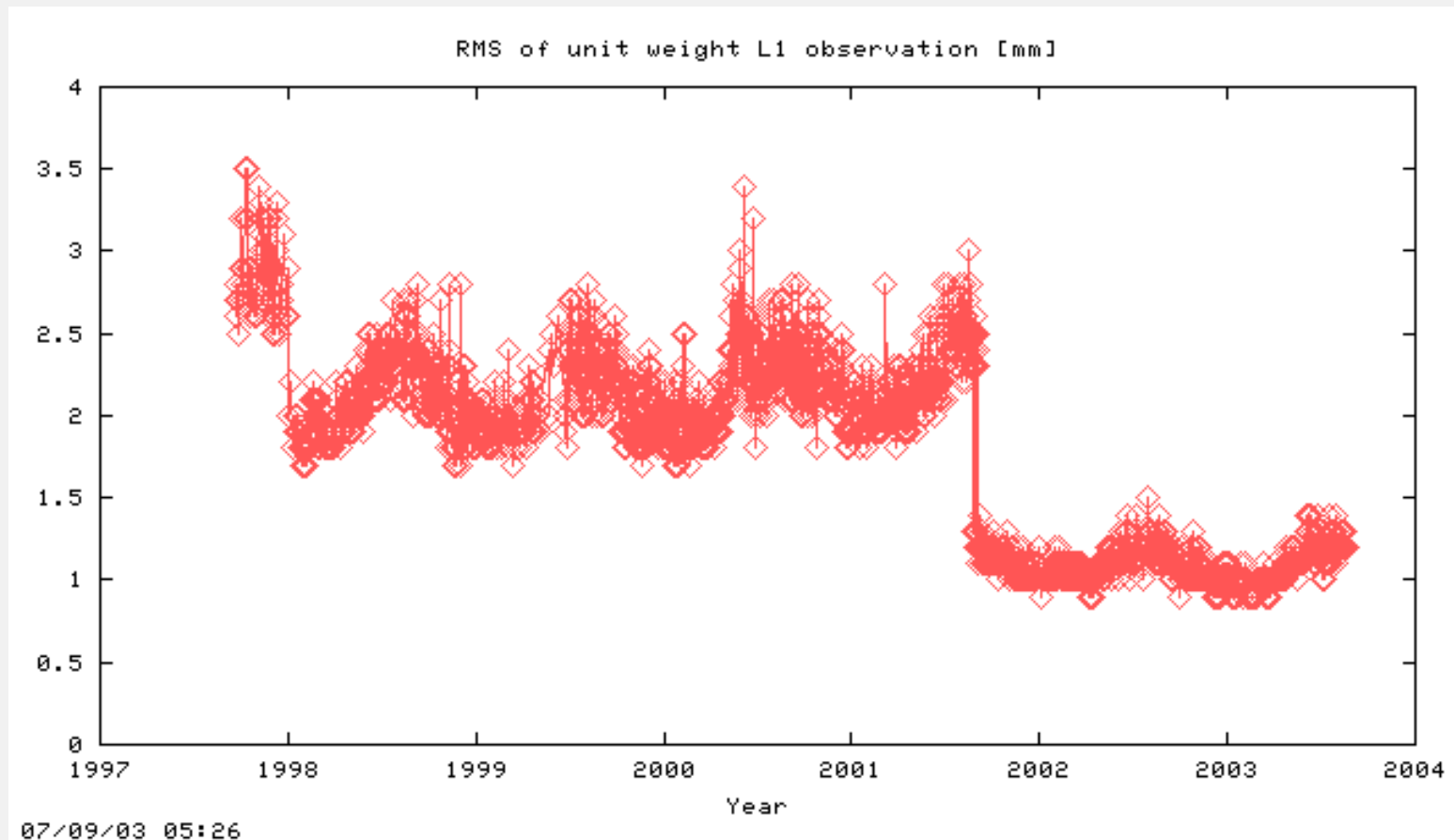
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swisstopo contribution to EUREF: Number of stations
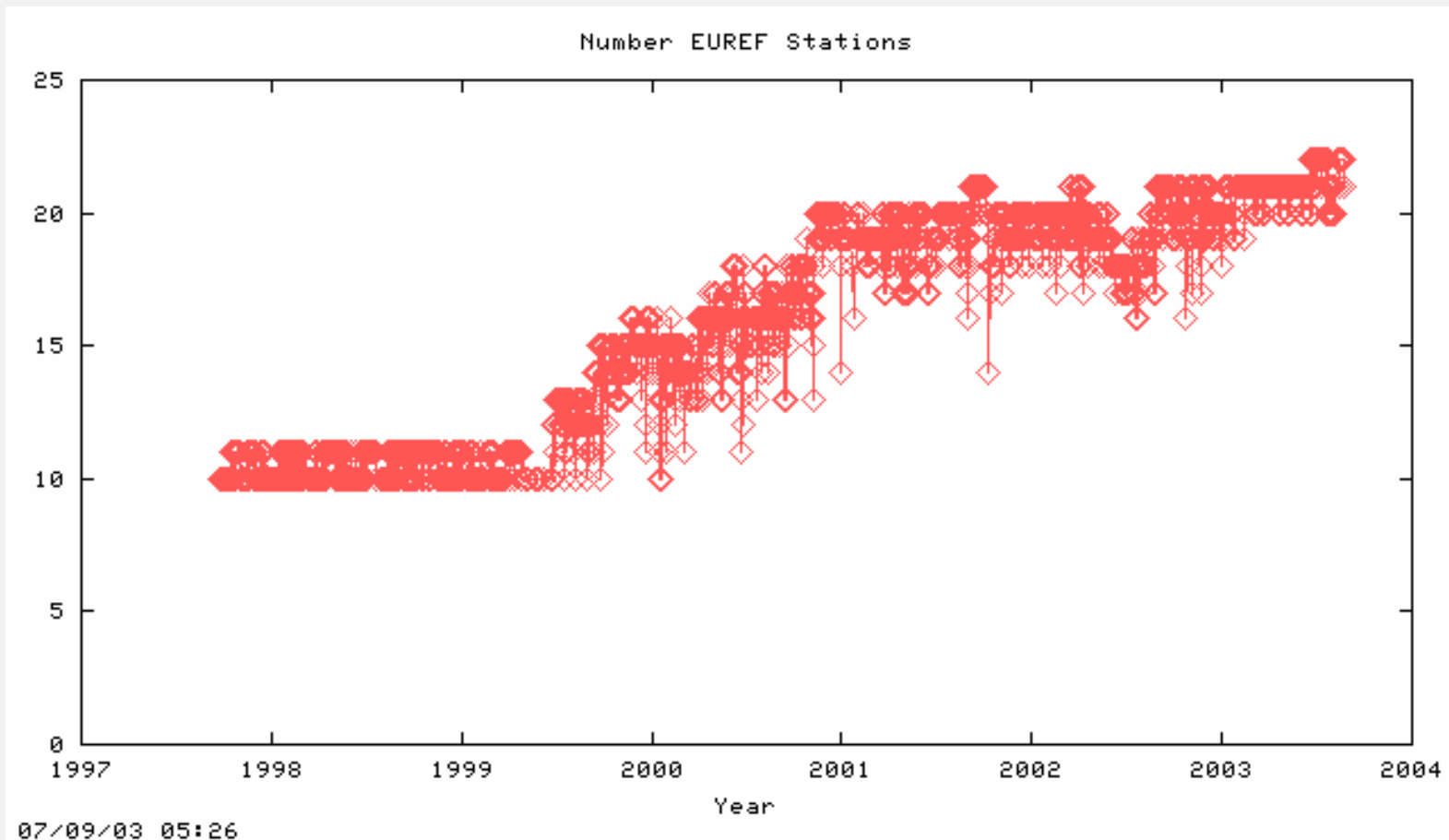
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swisstopo contribution to EUREF: Number of observations

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swisstopo contribution to EUREF: RMS of unit weight

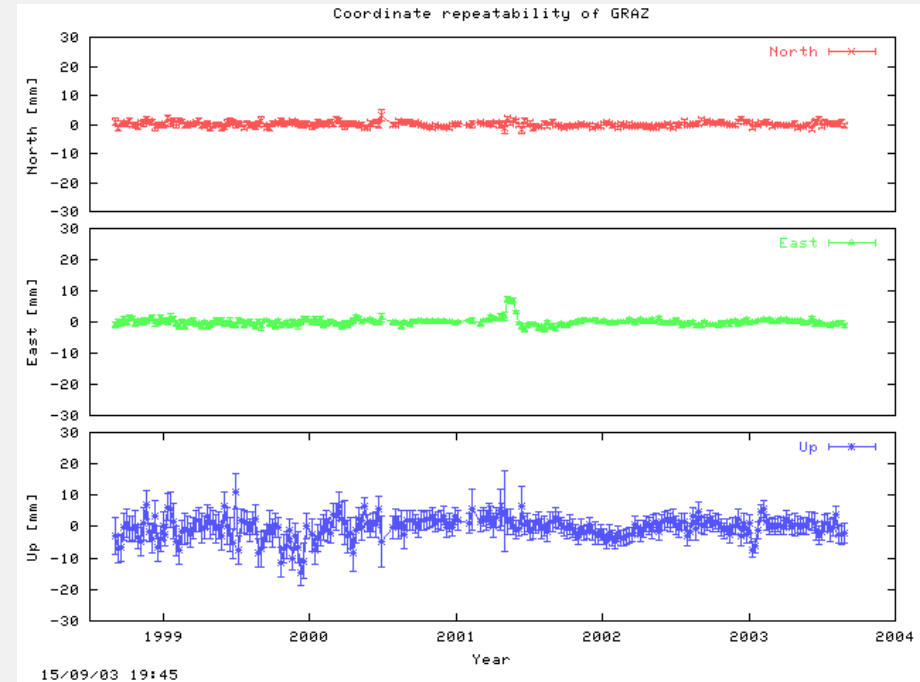RMS of unit weight L1 observation [mm]

07/09/03 05:26

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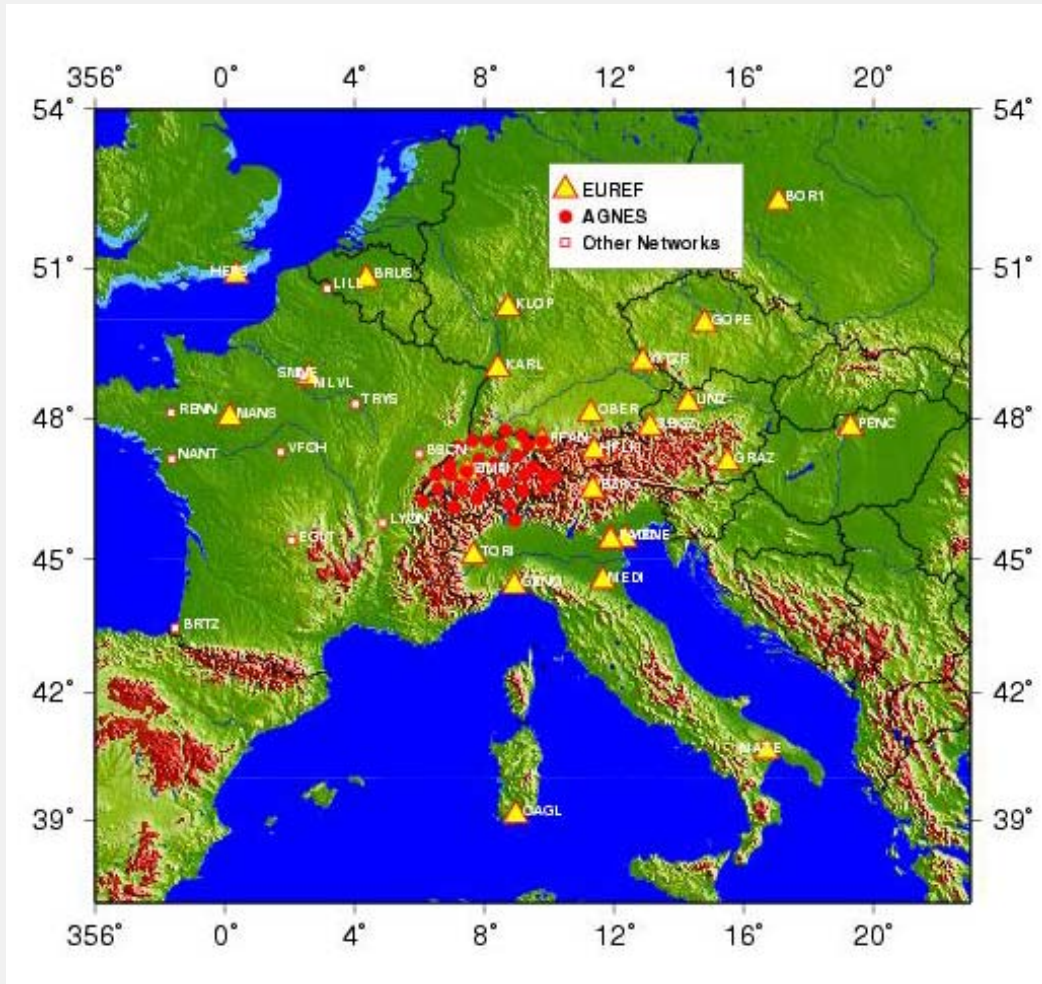# Time series (examples)

Site Zimmerwald
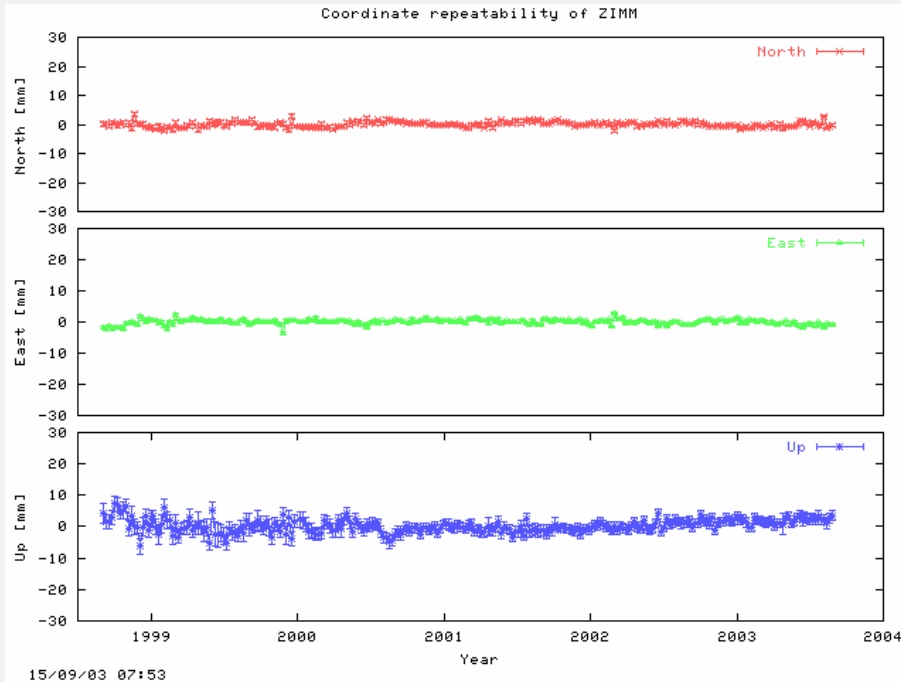
Site Graz

All results are weekly updated and available at
www.swisstopo.ch/en/geo/pnac.htm

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AGNES and METEO solutions

Two more network solutions are routinely processed at LPT:

- „AGNES" solution:

  - 29 swiss permanent stations (AGNES network) and about 30 European sites

- „METEO" solution:

  - hourly data processing of the 29 AGNES sites and about 30 European sites (emphasis on France)

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Estimation of troposphere parameters (post-processed, near-realtime, and realtime)
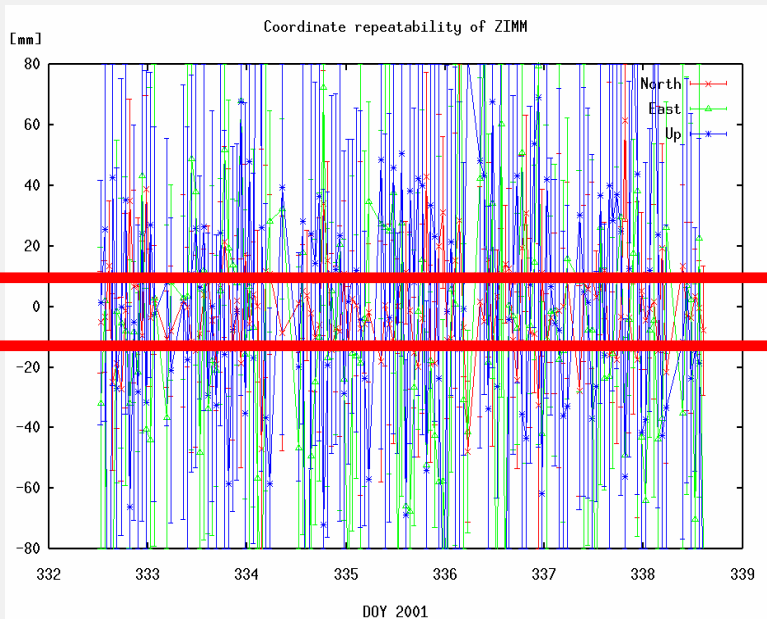
- Post-processed solutions (EUREF, AGNES, delay 21 days)

- Within the scope of EU projects COST and TOUGH:
  Near-realtime: hourly processing with a time delay of
  1 hour and 15 minutes

- Realtime estimates generated by the realtime positioning
  software of the AGNES network (GPSNet) by Kalman filtering,
  available with a time delay of a few minutes

- Comparison with ZTD's extracted from numerical weather
  predictions and radiosonde data
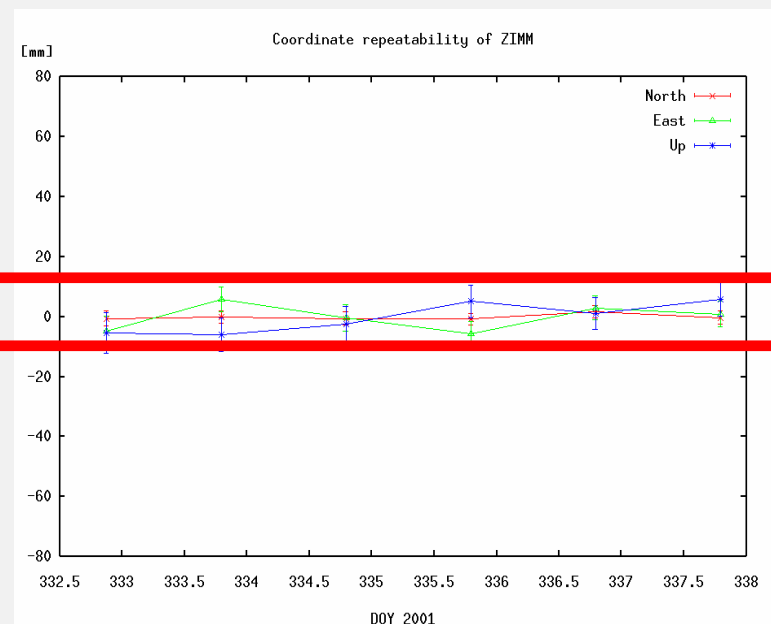
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Timeliness of hourly solutions (from COST-716)
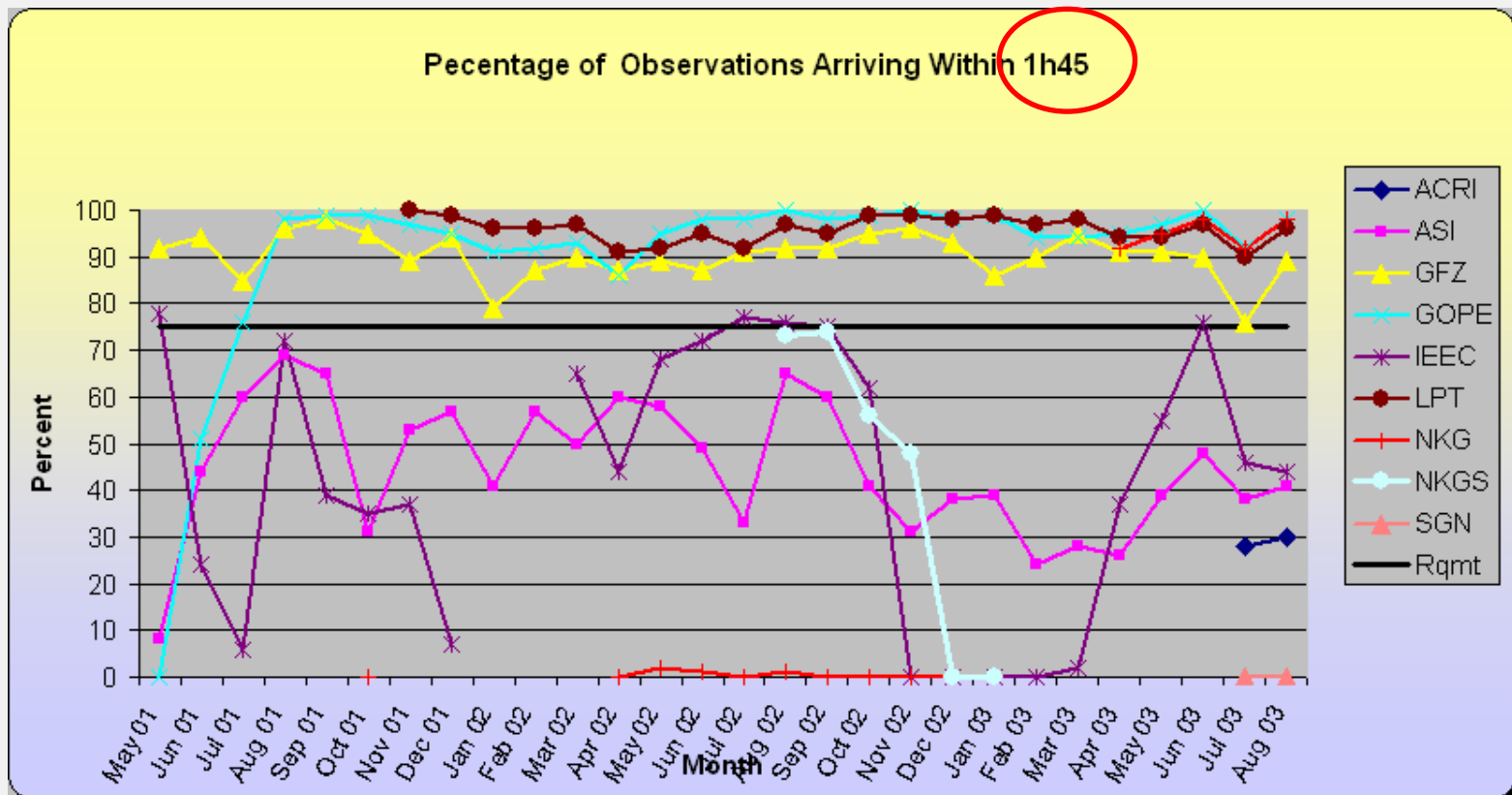
By-product: Station Coordinate validation of the AGNES sites in NRT...

Hourly ...

24-hour average...

± 1 cm

		Hourly...	7x24-hours ø	150 weeks
Zimmerwald:	North	16.0	1.0	0.9
Repeatability [mm]	East	45.0	4.6	0.8
	Up	52.0	5.1	2.5

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ZTD comparisons (site PAYE)

PAYE zenith total delay of GPS week 1201 in [m]

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ZTD comparisons (site PAYE) (2)

PAYE zenith total delay of GPS week 1203 in [m]

PAYE zenith total delay of GPS week 1209 in [m]

Legend:
- Postproc. (24 hours)
- Near real-time (1 hour)
- Near real-time (7 hours)
- Real-time
- Assimilation
- Local model
- Radiosonde

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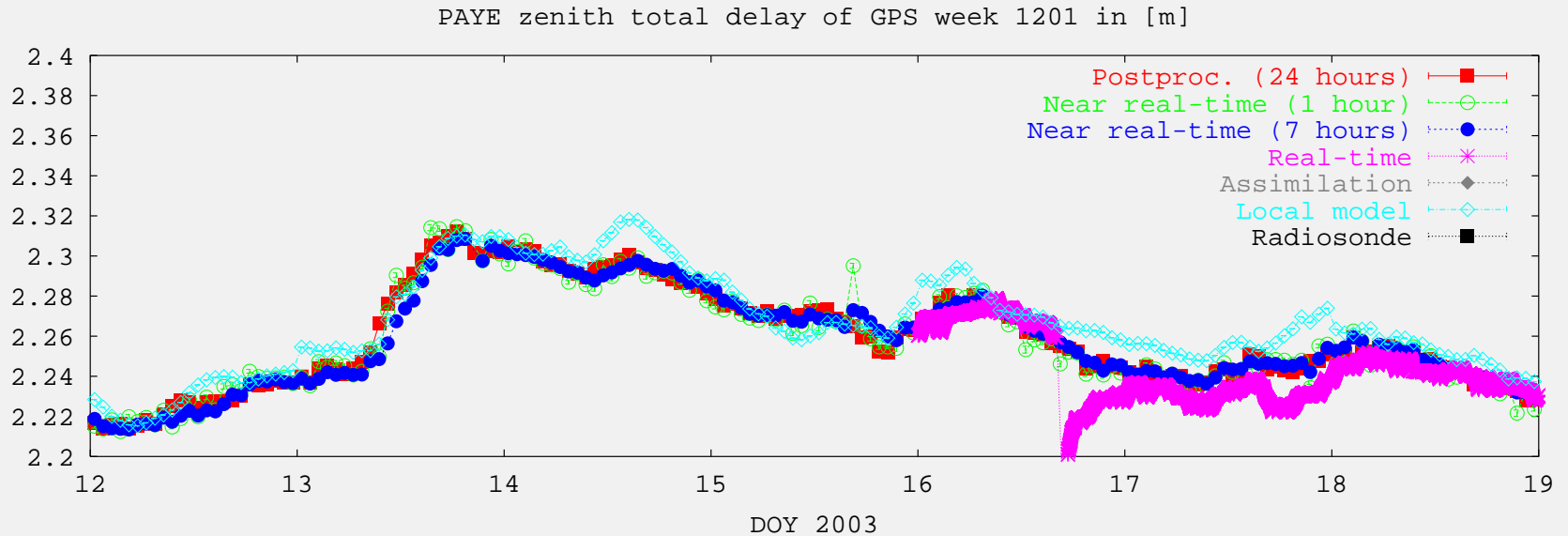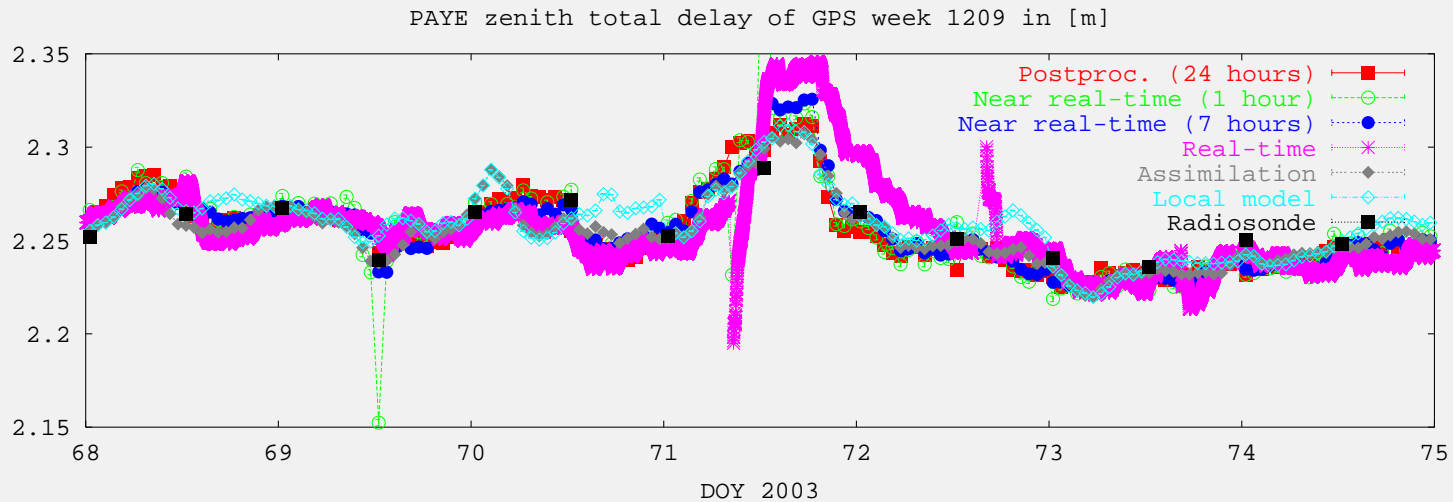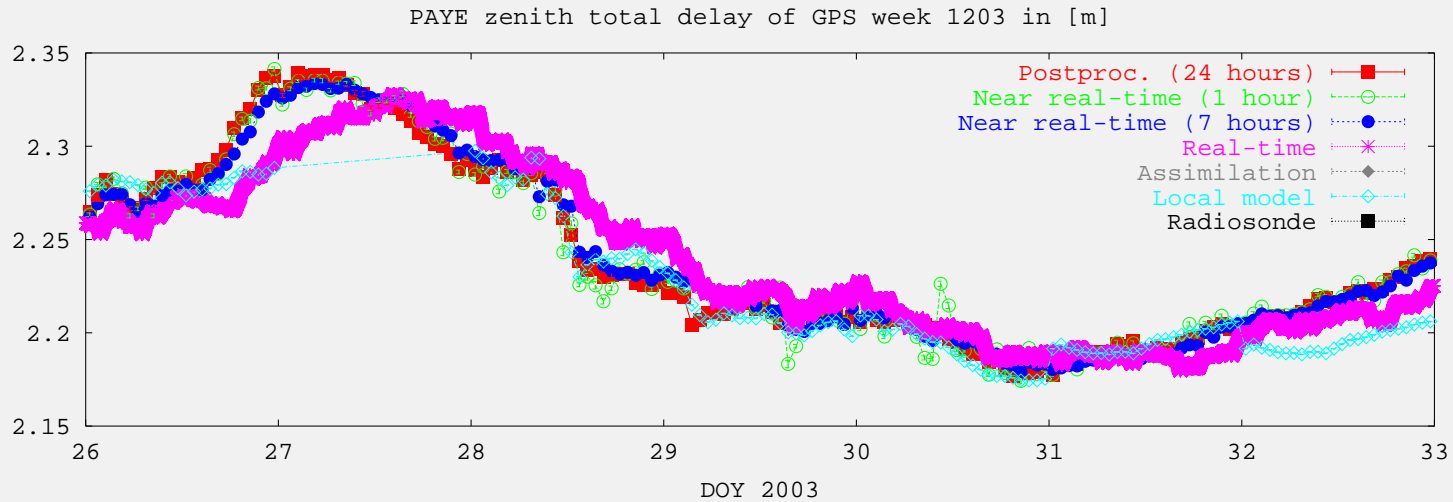
Other Activities

- CHCGN (ECGN): Improvement of the national geoid model
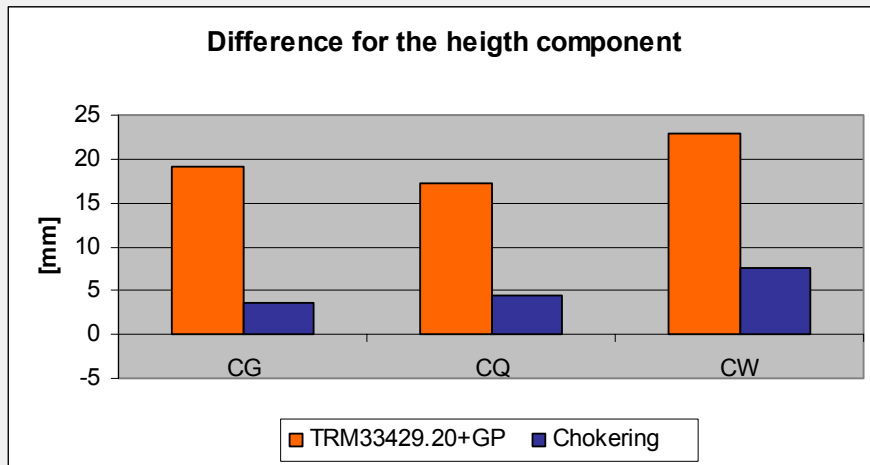
- Automated procedures for campaign processing (federal and engineering surveying...)

- Validation of the VRS concept (cooperation with AIUB)

- Site Zimmerwald: Participation in EUREF-IP project

- Troposphere tomography tests (cooperation with ETHZ)

- Swiss-4D: Deformation Analysis (Strain rates) for Switzerland (collaboration with ETHZ)

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Some problems:
Antennas

Different heigth results due to
adapter change only:

Difference for the heigth component

Legend: ■ TRM33429.20+GP ■ Chokering

Y-axis: [mm], values -5, 0, 5, 10, 15, 20, 25
X-axis categories: CG, CQ, CW

Solution types:

CG: L3, no amb. fixed, 10 degree
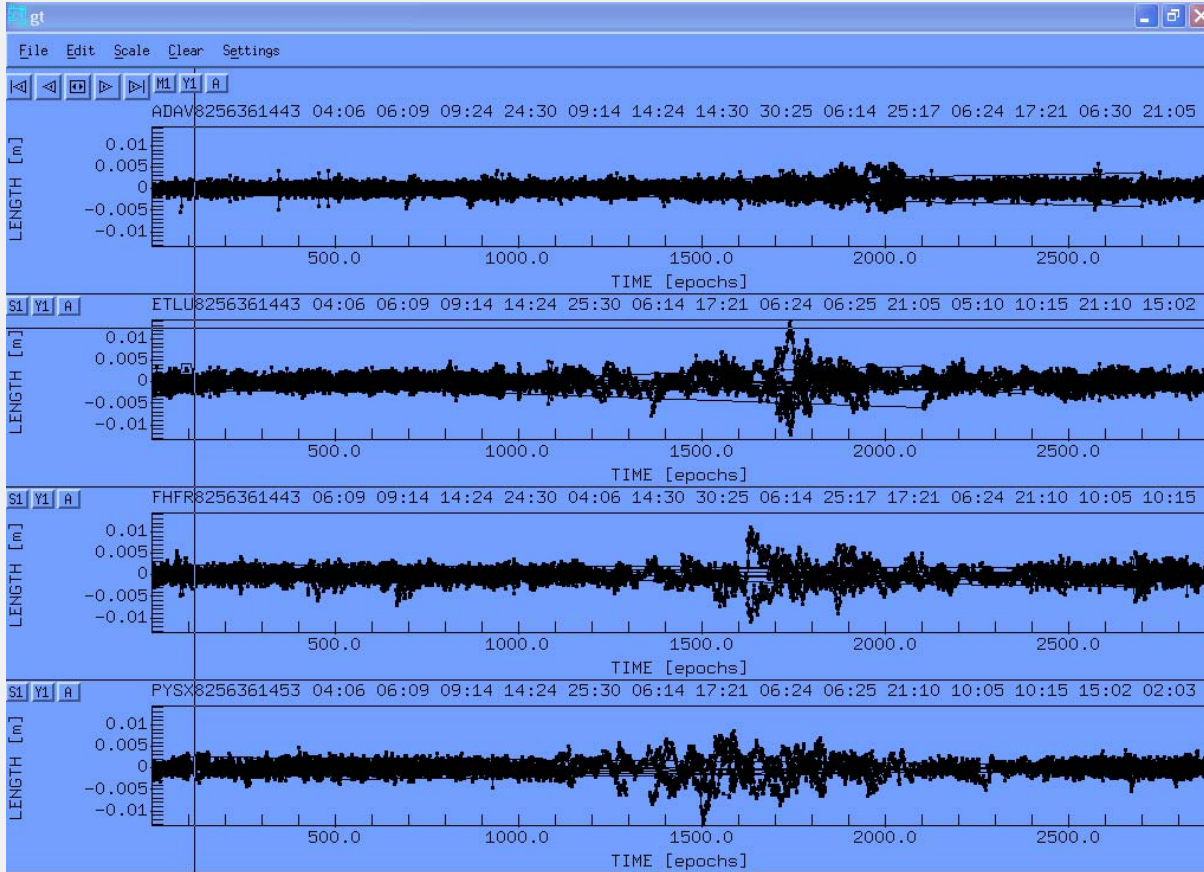CQ: L3, amb. fixed, 10 degree
CW: 15 degress, no elev. dep. weight.

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Increased RMS values on some days: Residual plots of DOY 165, 2003

4 Baselines of the swiss AGNES network

Sorted from West to East:

- ANDE-DAVO
- ETHZ-LUZE
- FHBB-FRIC
- PAYE-STCX

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Outlook

- Adoption of the new version of the Bernese GPS Software (5.0) in our routine processing procedures

- Introduction of absolute receiver and satellite antenna phase patterns

- Tests concerning the analysis strategies (e.g., estimating tropospheric gradients)

- Involvement in the TOUGH EU meteo project (follow-up action of COST)

- Involvement in ALPS-GPSQUAKENET (INTERREG III B)?

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