OLG LAC Report 2010

G. Stangl[1], C. Aichhorn[2], S. Krauss[2]

(1) Federal Office of Metrology and Surveying (BEV)

(2) Space Research Institute, Austrian Academy of Science

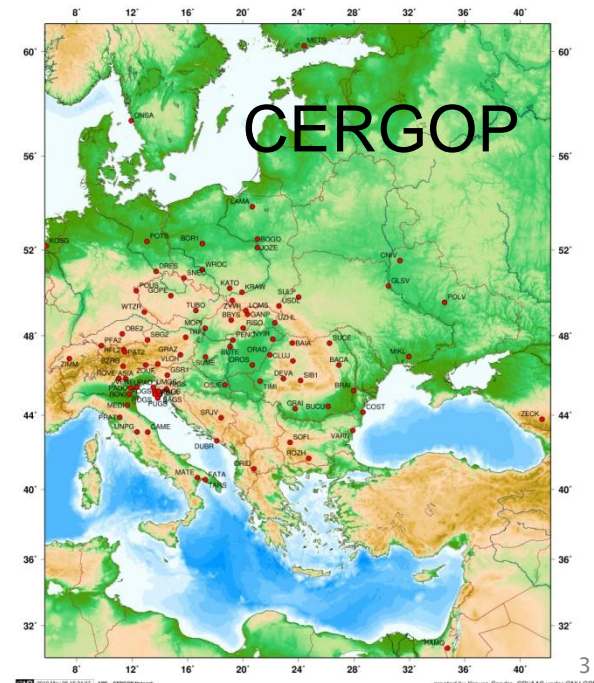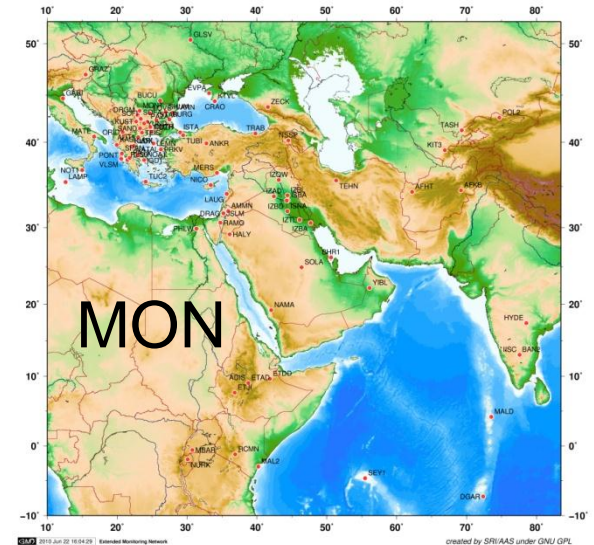# OLG LAC Structure

- **Structure**

  - 3 Persons (total 1.5 person years), reduced to 2 (total 0.8 person years) since December 1st 2010

  - 3 Linux – Workstations, up to 4 Virtual Workstations on Xen Servers

  - 2 Bernese Software 5.0 release February 10

  - Own unix shell and perl scripts (data preparation + check, transmitting and archiving products) for automatization

  - Generic Mapping Tool 4.2 (map design)
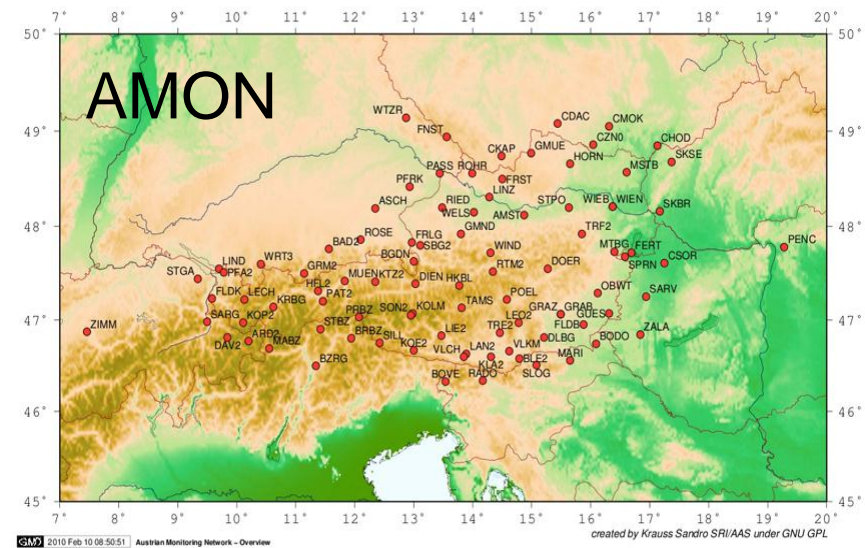
  - Matlab R2008a (signal analysis)
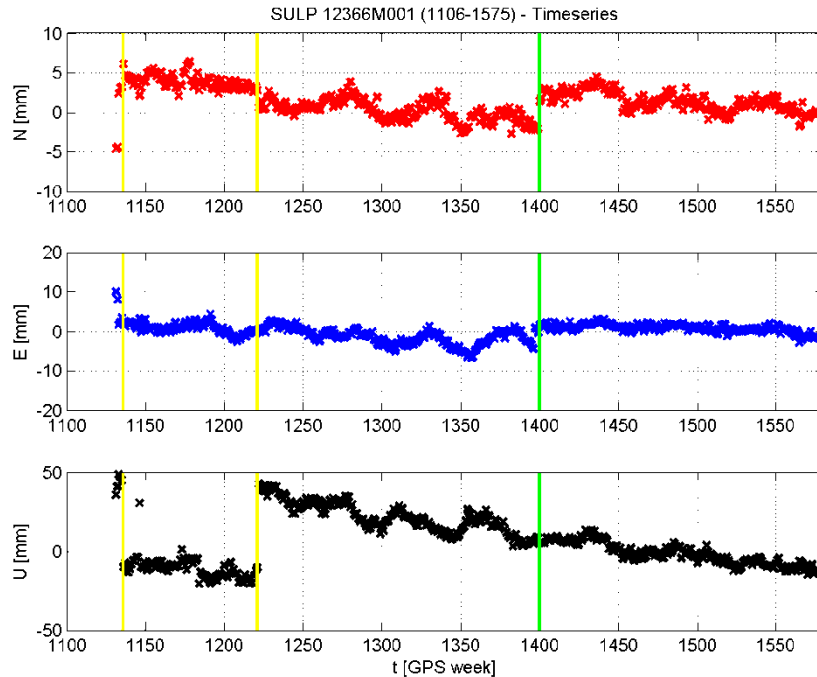
  - Web page

- **Main Topics**

  - Network analysis (5 networks, 300 stations)

  - Time series analysis and velocity determination

  - Regional TEC maps NRT + postprocessing

  - Research testbeds (NRT monitoring, earthquakes, landslides)

ALBPOS

MON

CERGOP

Stations outside the printing area:
AQUI, BUCU, GLSV, GRAZ, ISTA, MEDI, MIKL
NICO, NOT1, PENC, RAMO,TUC2

EPN

AMON

SULP 12366M001 (1106-1575) - Timeseries

BSW residuals → Matlab scripts → raw timeseries (left) → discontinuity determination + outlier removals → cleaned time series (down)
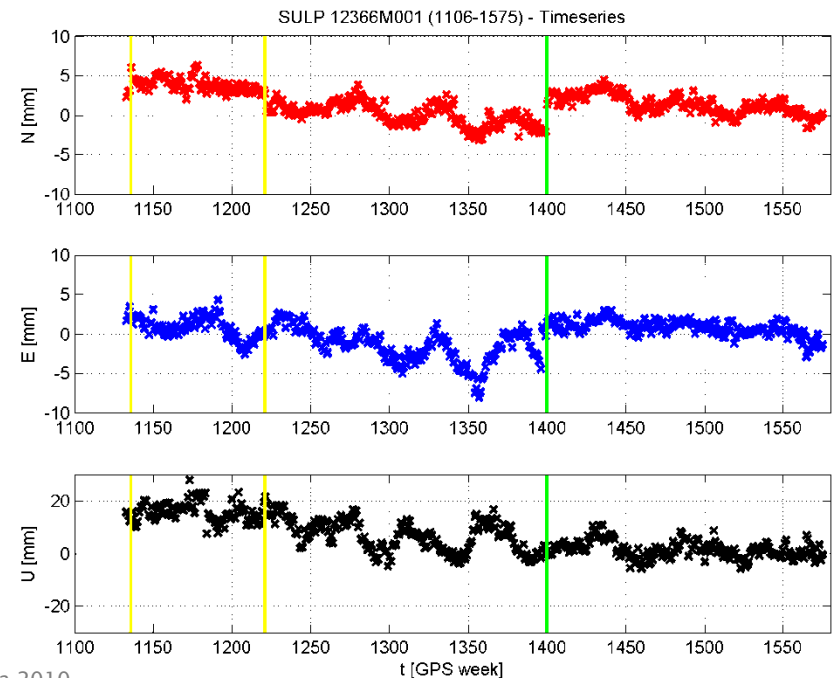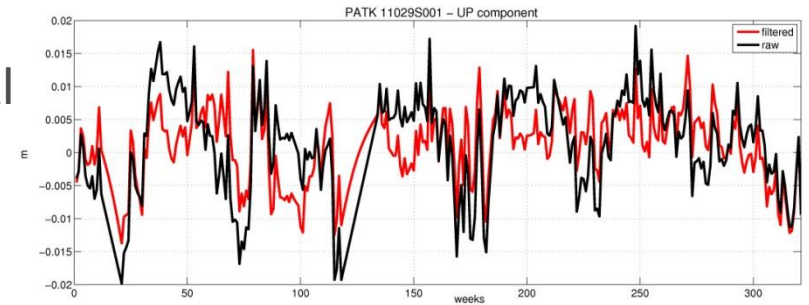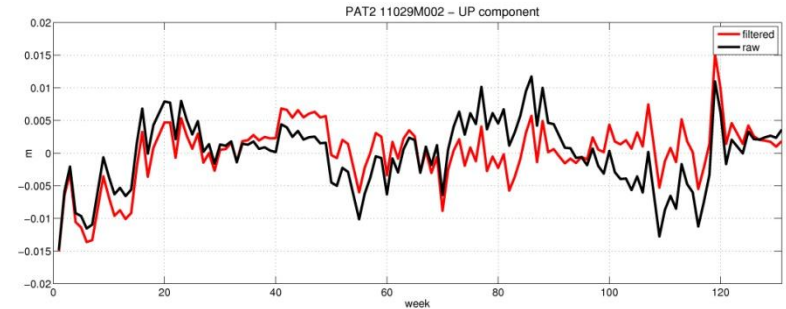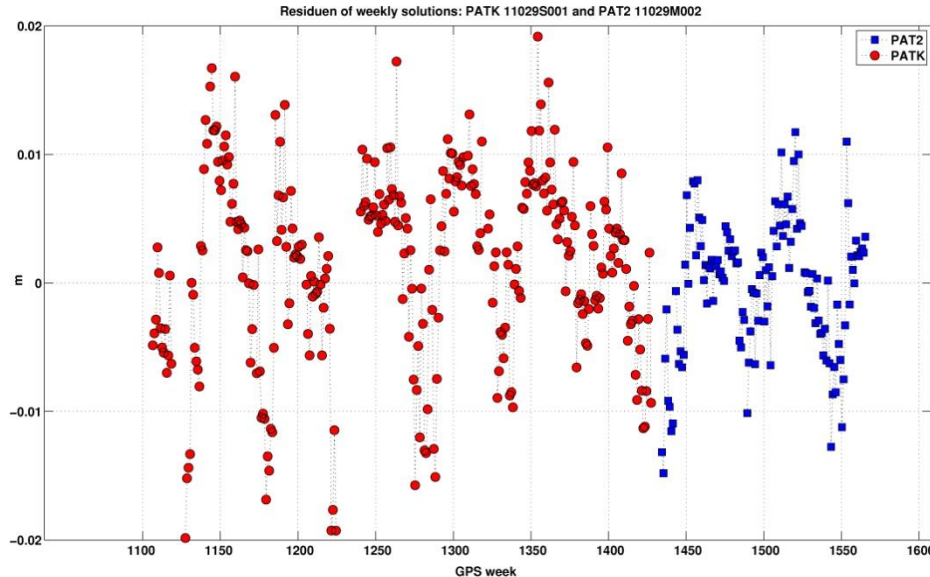

SULP 12366M001 (1106-1575) - Timeseries

Offset estimation only in extreme cases:

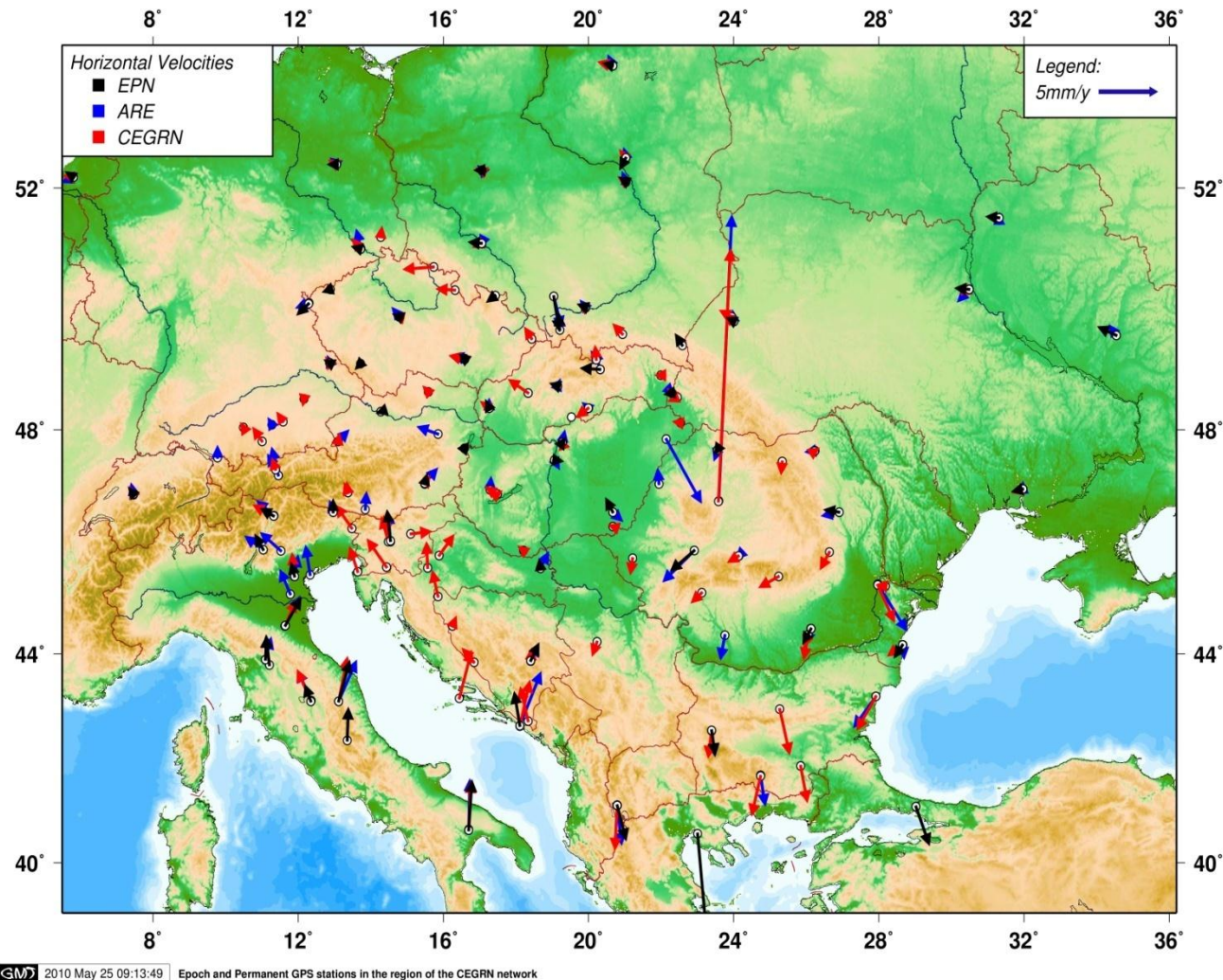offset in U (~56 mm)

discontinuity in N+E

- Matlab R2008a (Start September 2008)
- Input: Bernese .PLT – File
- Output:
  - Time series
  - Power Density Spectrum
  - Highpass or Bandpass filtered signal
 - annual amplitude

Residuen of weekly solutions: PATK 11029S001 and PAT2 11029M002

PAT2 11029M002 – UP component

PATK 11029S001 – UP component

PAT2 11029M002

PATK 11029S001
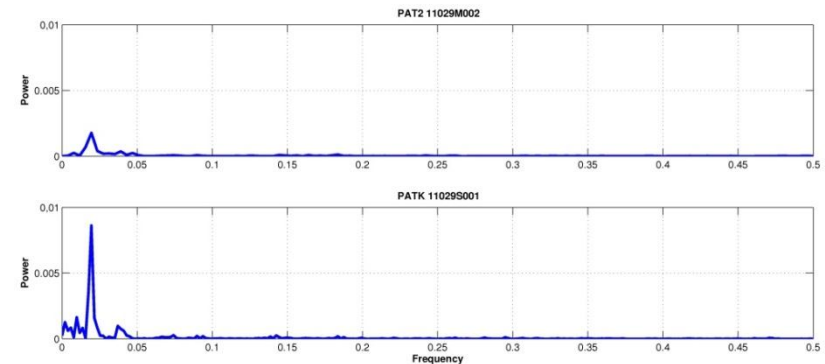
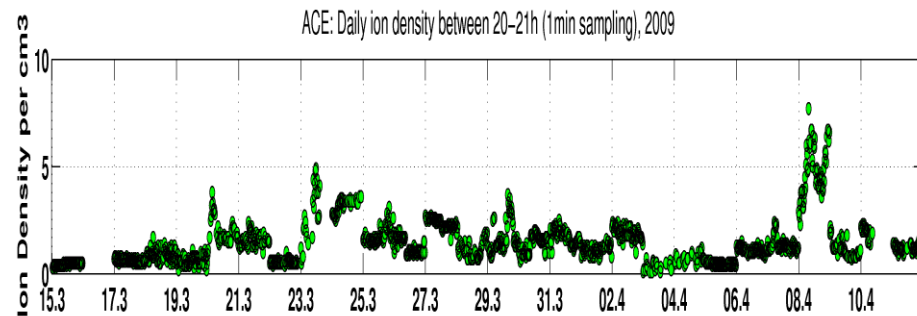## Annual Term: Up Component
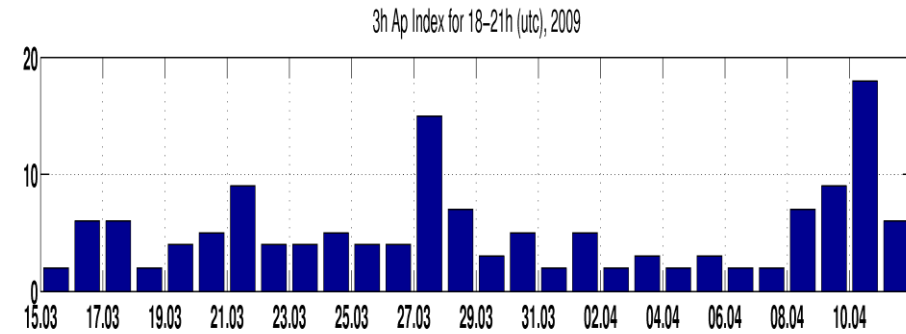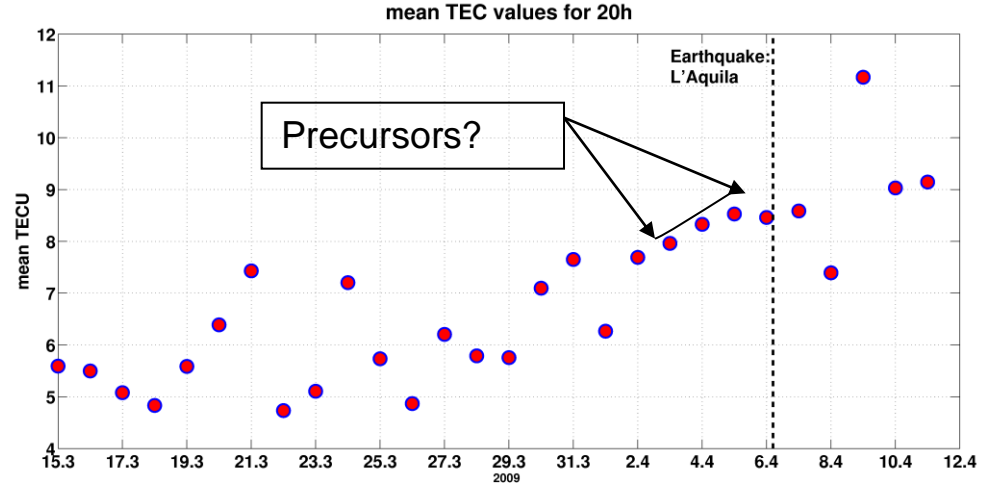PATK: 12.1mm | PAT2: 5.9 mm

Present status: Discern between local and tectonic movements at 1-2 mm/year + fit into geophysical background

Present status: Major offsets applied, annual term not yet removed, waiting for reprocessing

Austria Monitoring Network – Velocities

created by Sandro Krauss SRI/AAS under GNU GPL
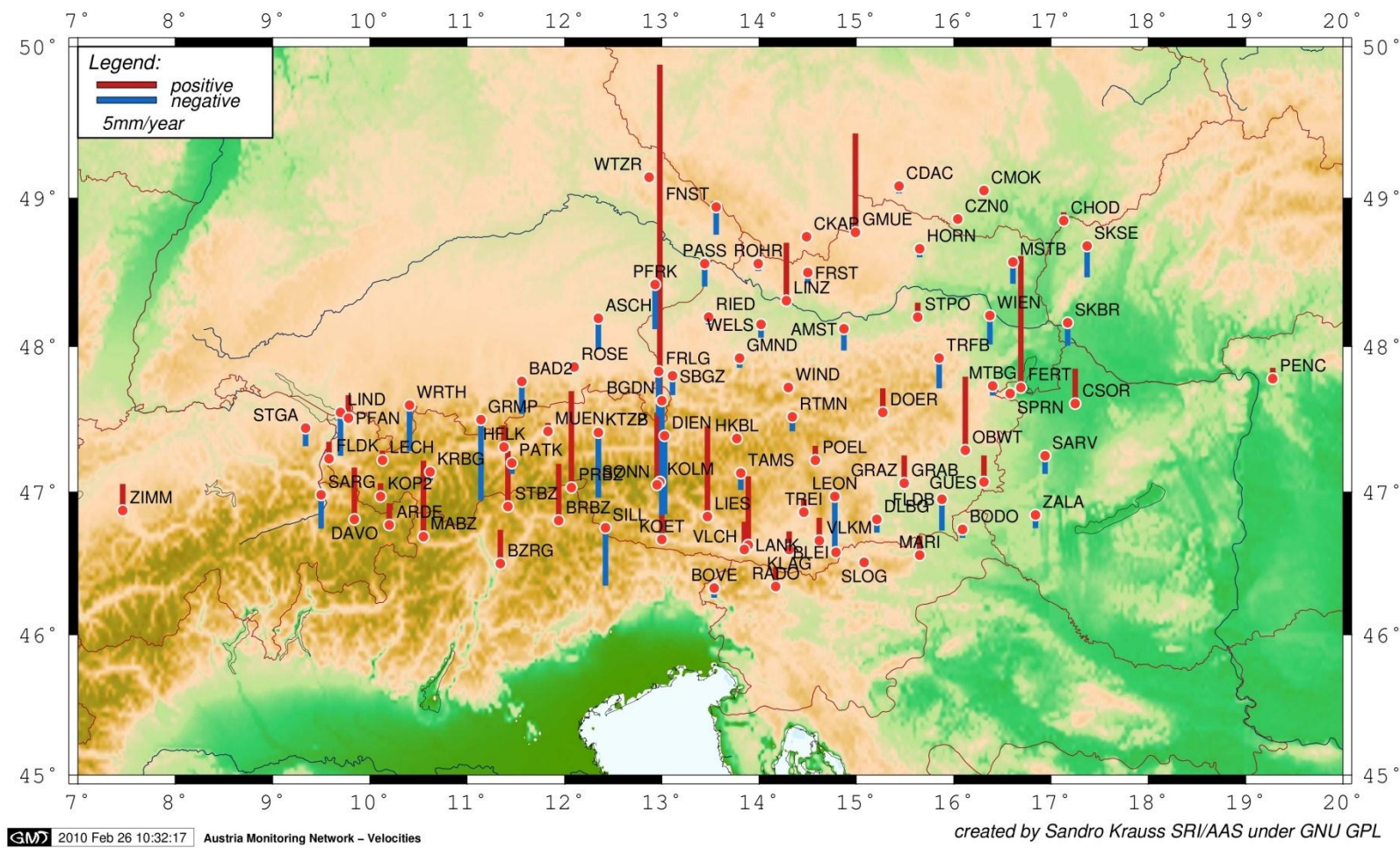
- Generated from GPS stations

- Phase + double differences

- IONEX files 1°x1°x1 h

- Riolas (2008) and L'Aquila (2009) earthquakes studied

- Contribution to the EEP (Electronic Earthquake Precursors) and Solar Activity research groups

mean TEC values for 20h

Precursors?

Earthquake: L'Aquila

3h Ap Index for 18–21h (utc), 2009

ACE: Daily ion density between 20–21h (1min sampling), 2009

- National Project 2008–2010

- 4 local + 12 regional Stations

- Ultra Rapid orbits

- Hourly RINEX (L1 only)

- fully automated computation

- Processing time ~12min

- Data sent to OEGNOS server for computing corrections

- Fall–back strategies in cases of outages (orbits, stations, transmission)

- Positions better than 1 m

- Important for next sun–spot maximum

- Improvement of troposphere investigated, but almost negligible
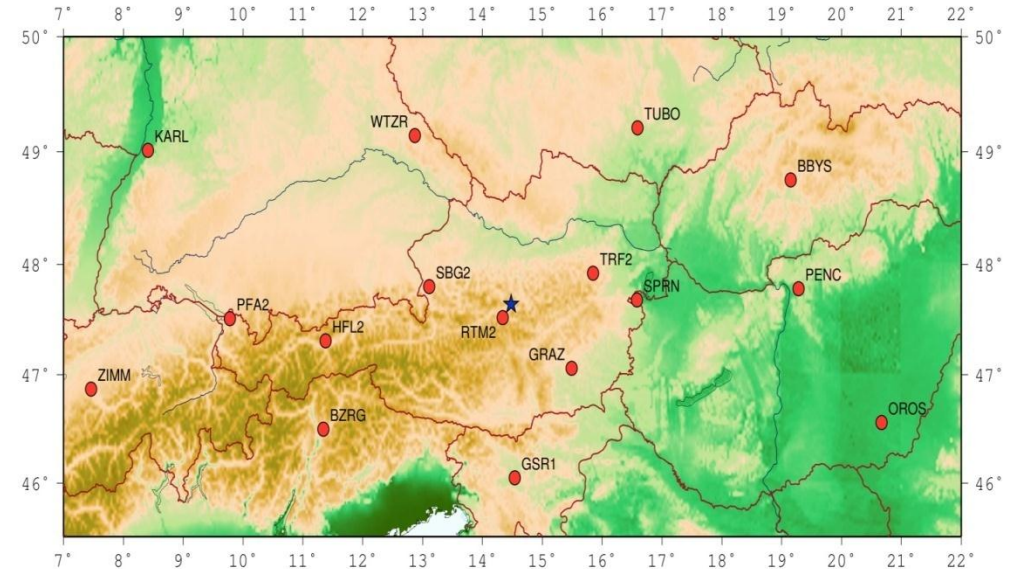
GMT 2010 Jun 11 12:22:37   GPS station distribution – NRT Approach

RMS: Coordinate Differences – 2006 – Post Processing

2002
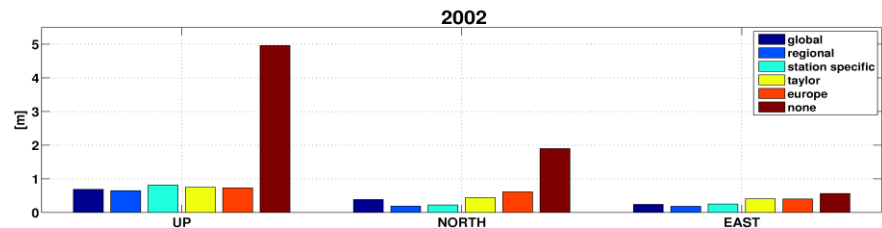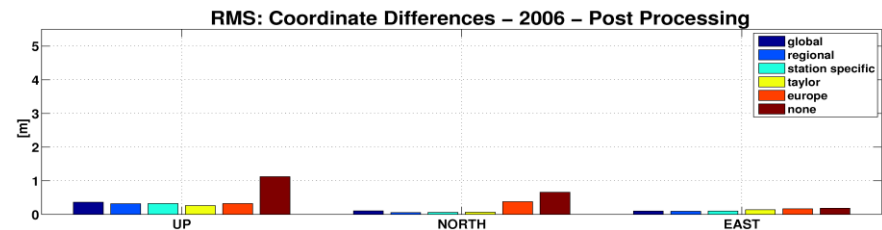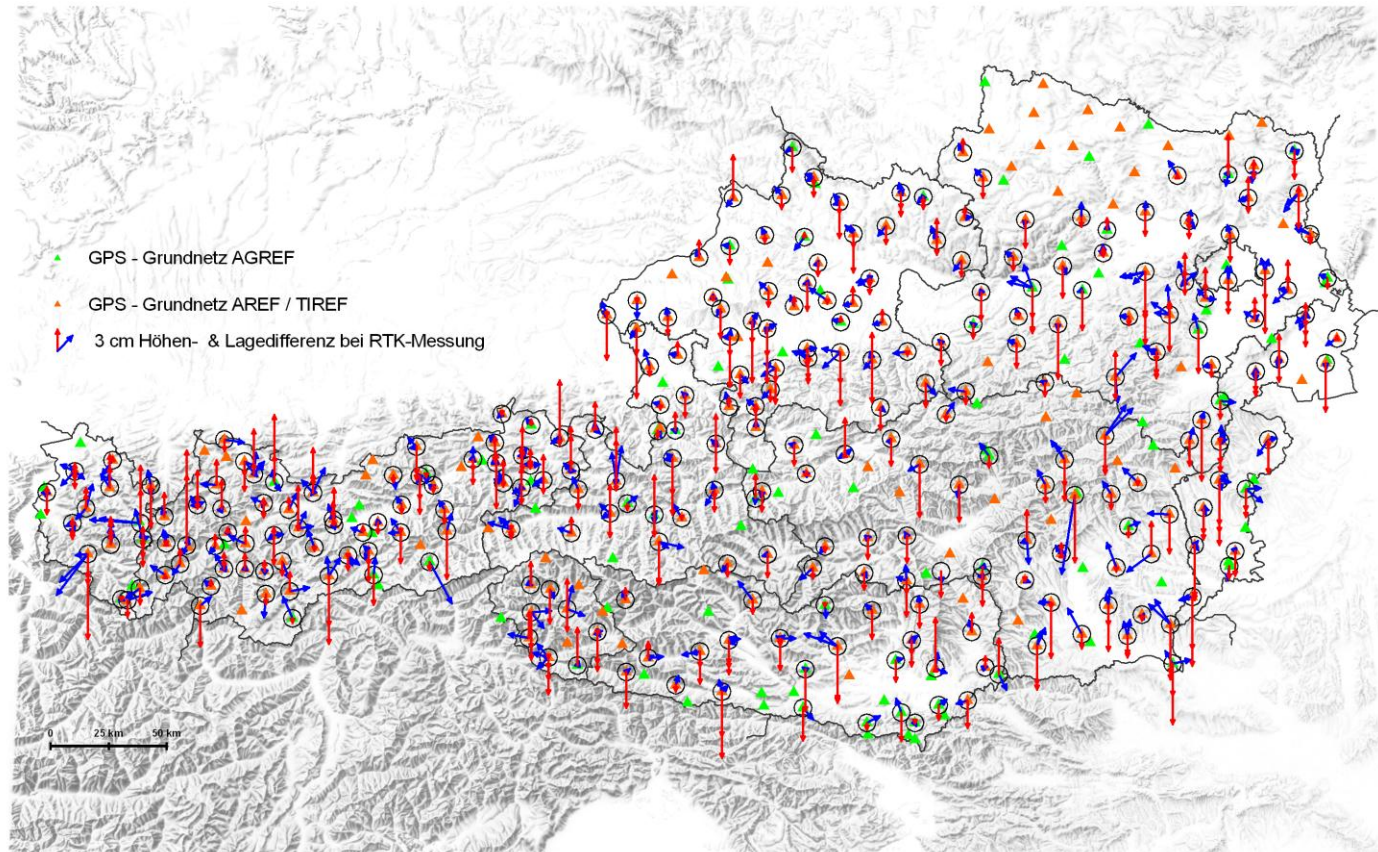
Analysis AREF 2006-2010 completed

1992 – 2006 need reprocessing, but horizontal already good

Combination with traditional triangulation network + GPS baselines measurements → landslide hazard zones

- Contribution to EPN reprocessing, subnetworks?

- Reprocessing of other networks and campaigns

- Densified velocity and strain field in Central Europe and the Mediterranean

- NRT Local and regional TEC maps for positioning

- Projects stopped: Earthquake precursors from the ionosphere, NRT monitoring, Hafelekar (will be removed 2011)

Thank you