Symposium of the IAG Subcommission for Europe
(EUREF)
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National Report of the Czech Republic

EUREF Related Activities in the Czech Republic 2008 - 2009 National Report

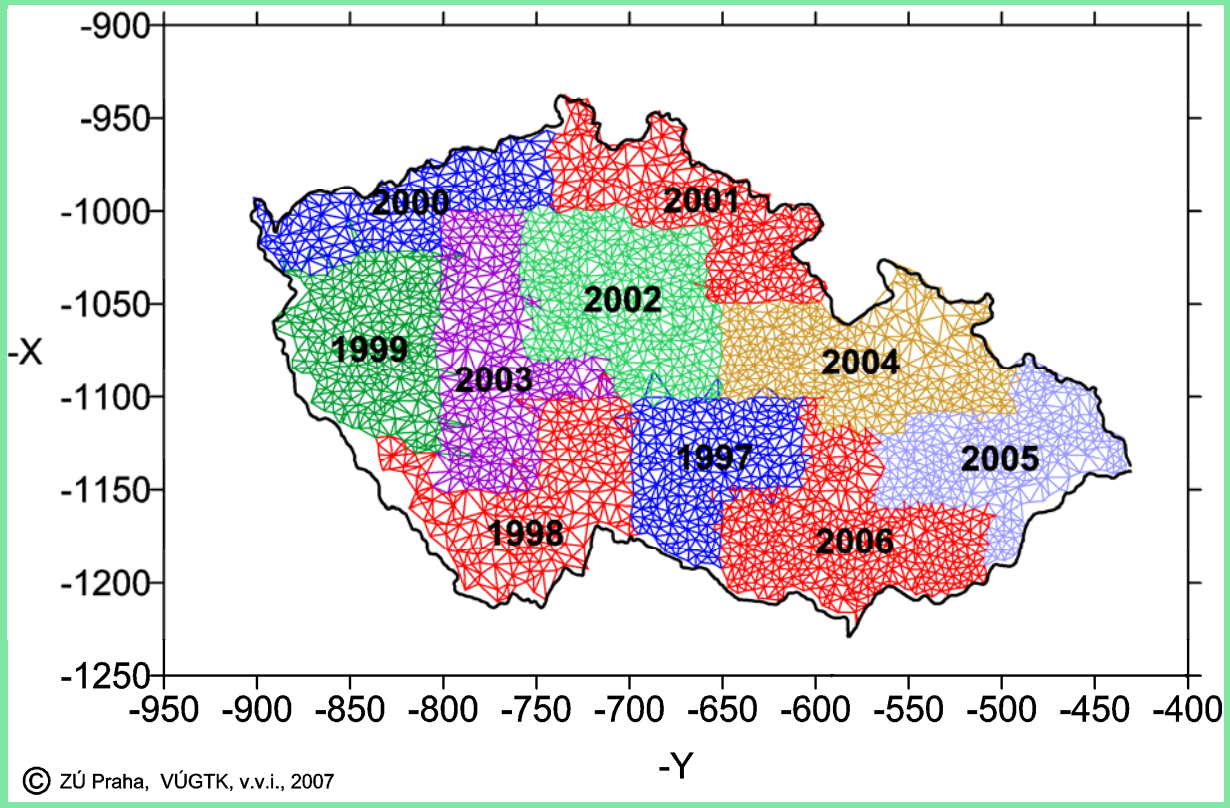
presented by J. Šimek

ETRF-based modernization of the Czech national user system JTSK

- ETRF2000(R05) realization in CR: 48 GNSS PS incl. 7 Czech EPN PS, 5 EPN PS, 27 CZEPOS PS, 9 GEONAS PS, 176 national reference GNSS stations, 3,100 „selective GNSS stations“, 36,000 GNSS densification stations
- modified *Křovák* oblique conical conformal projection
- linear conformal transformation between ETRF2000(R05) 3-D cartesian coordinates and 3-D coordinates derived from the national user coordinates

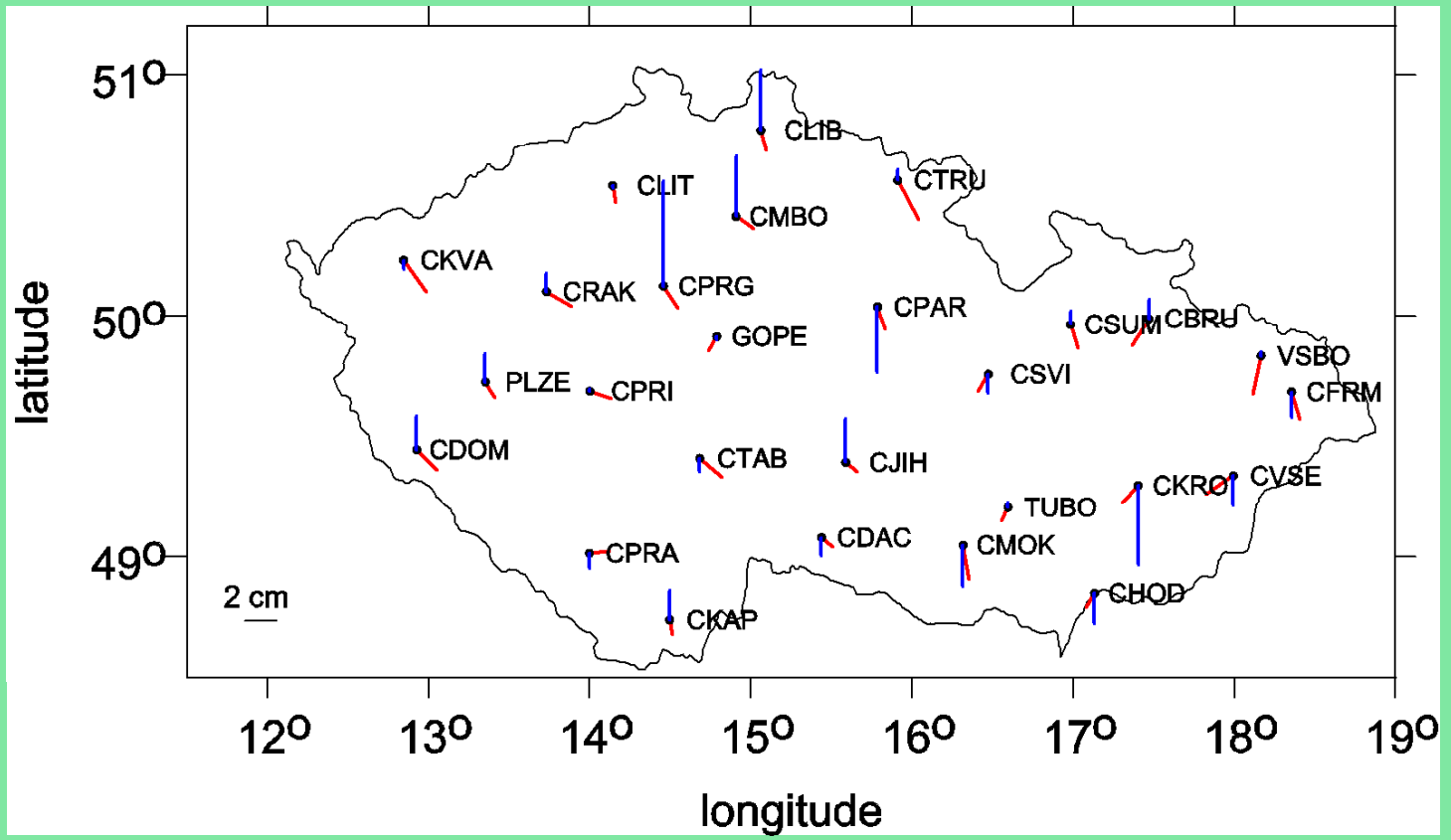
ETRF densification in the Czech Rep.

Progress of densification by „Selective maintenance“ performed by Land Survey Office

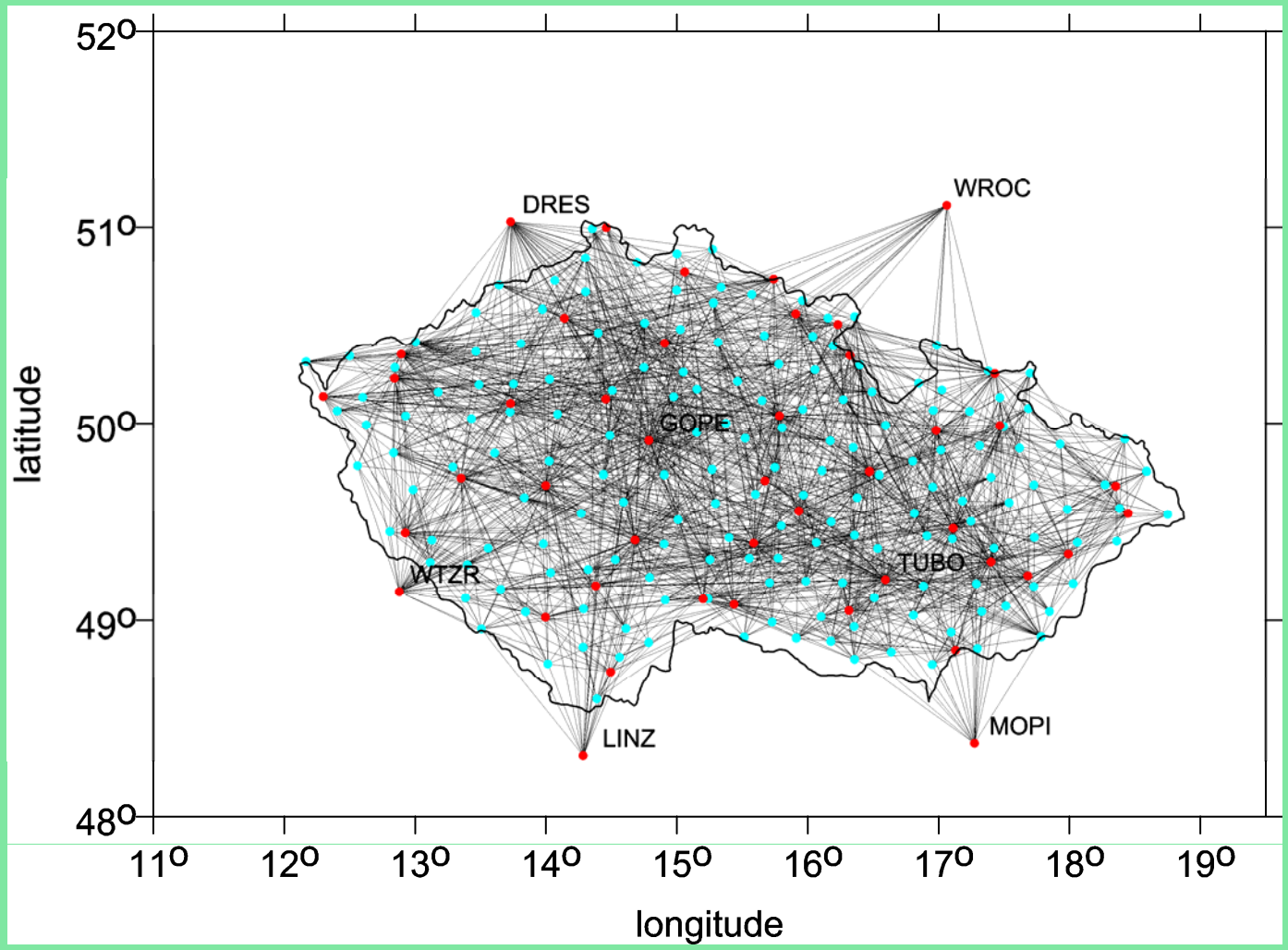


1997 – 2006: 3094 new (GPS) stations, accomplished in 2006 by Land Survey Office

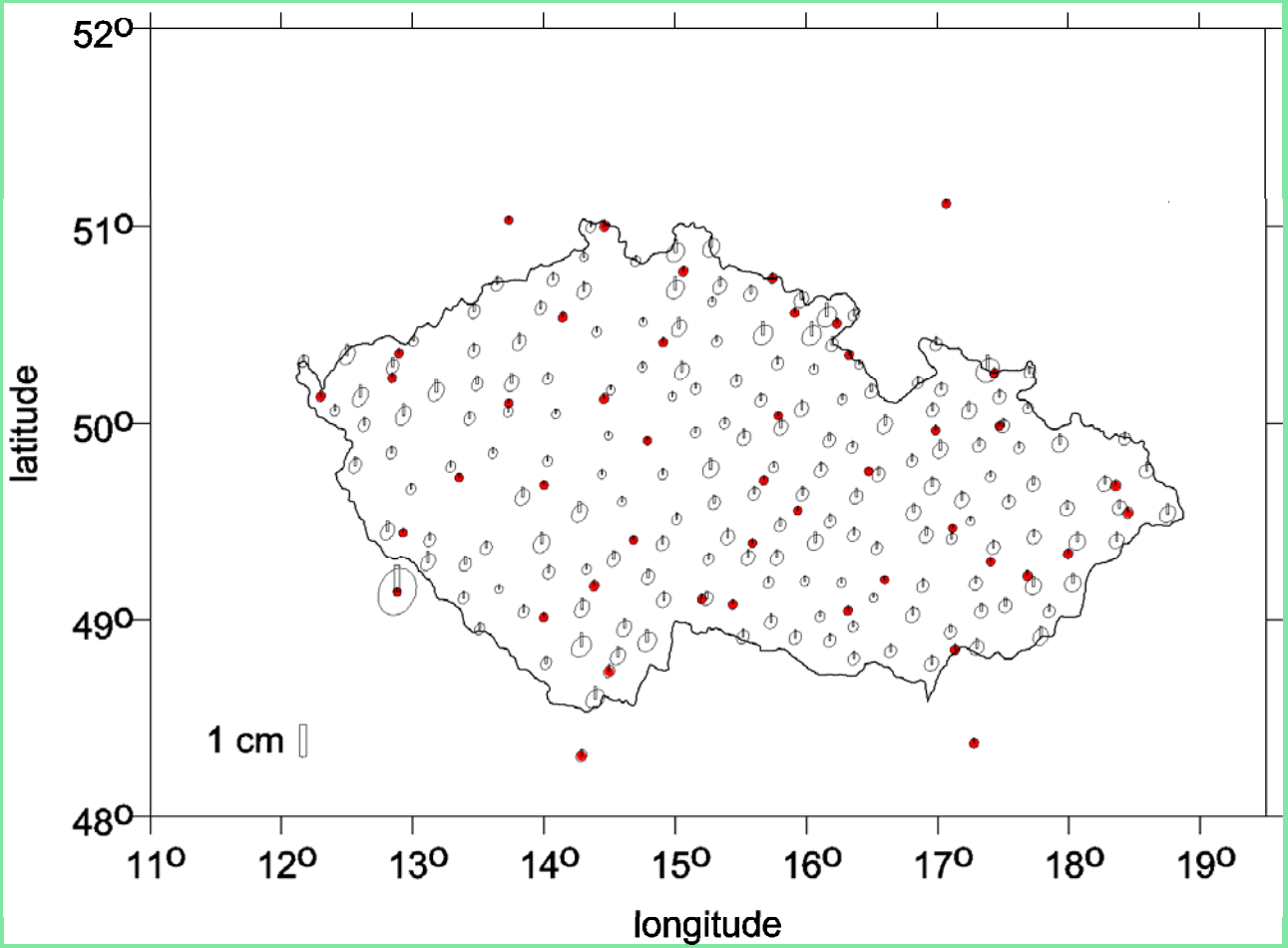
PS: differences between ETRF2000(R05) and ETRF89(1989) coordinates



Re-computation of the National GNSS reference network (DOPNUL) - 176 stations; red dots = PS

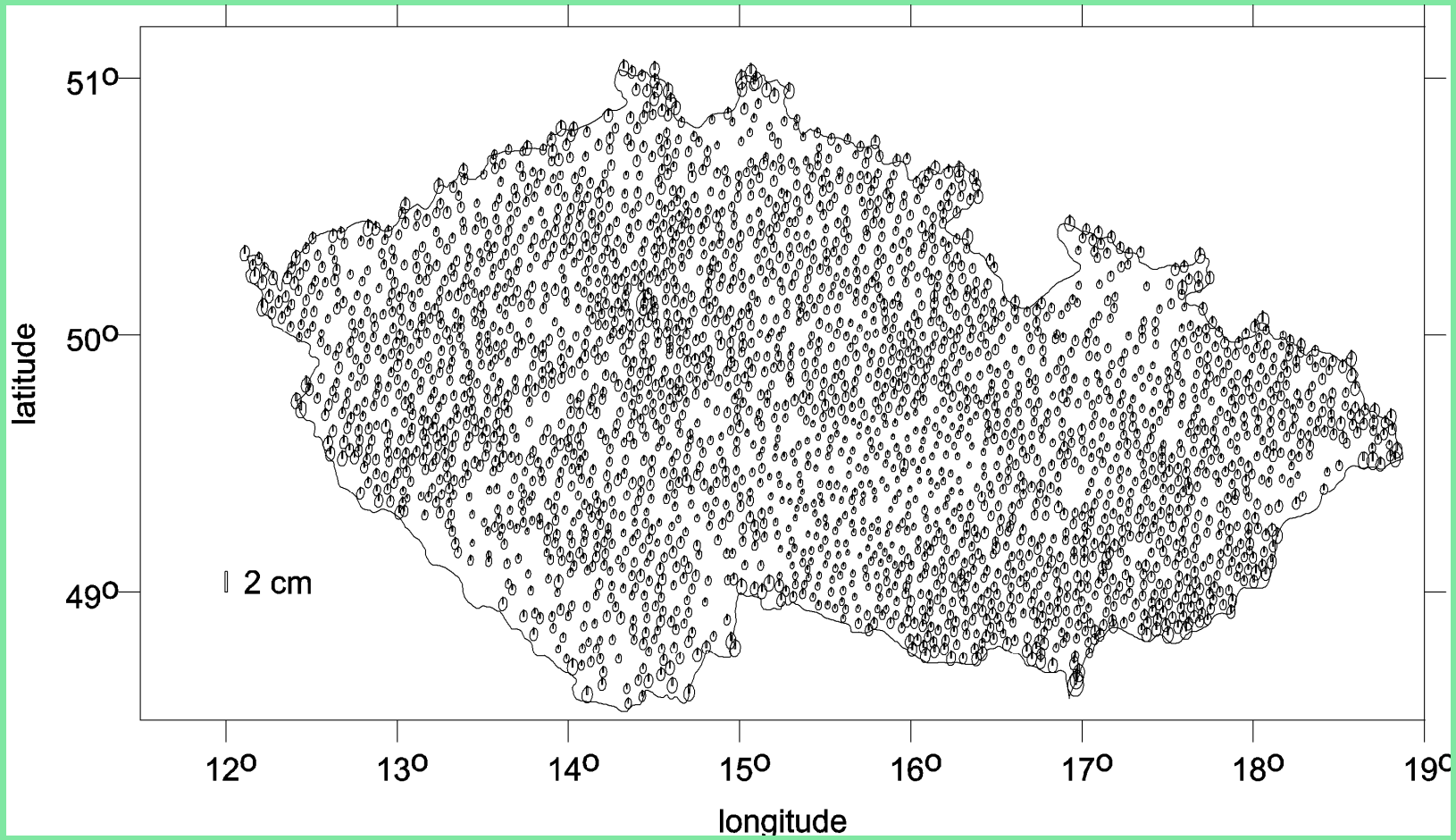


Results of adjustment of the National GNSS reference network (DOPNUL) - 176 stations

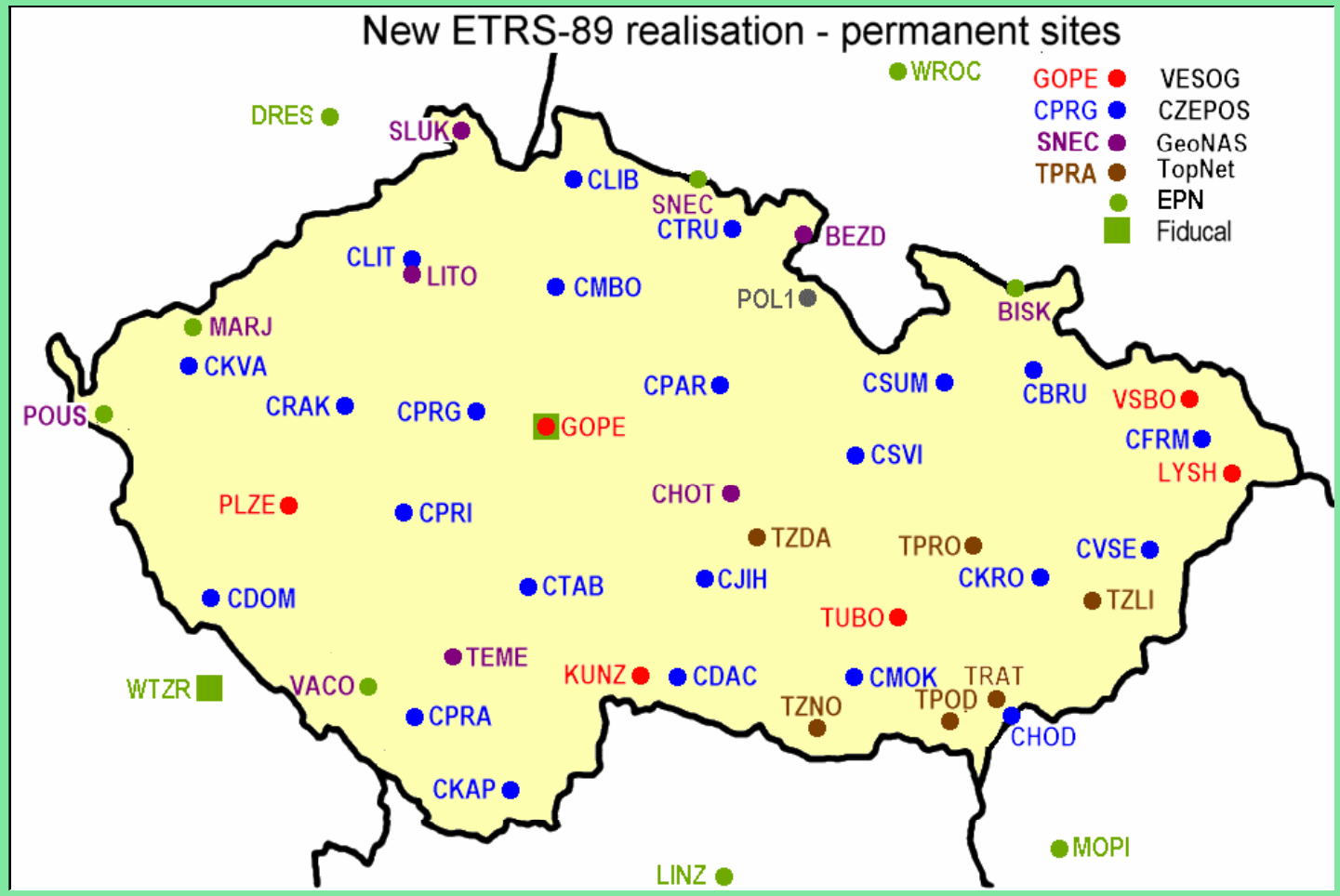


Results of adjustment of densification action „Selective Maintenance“ - 3,100 points

Error ellipses and rms errors of heights



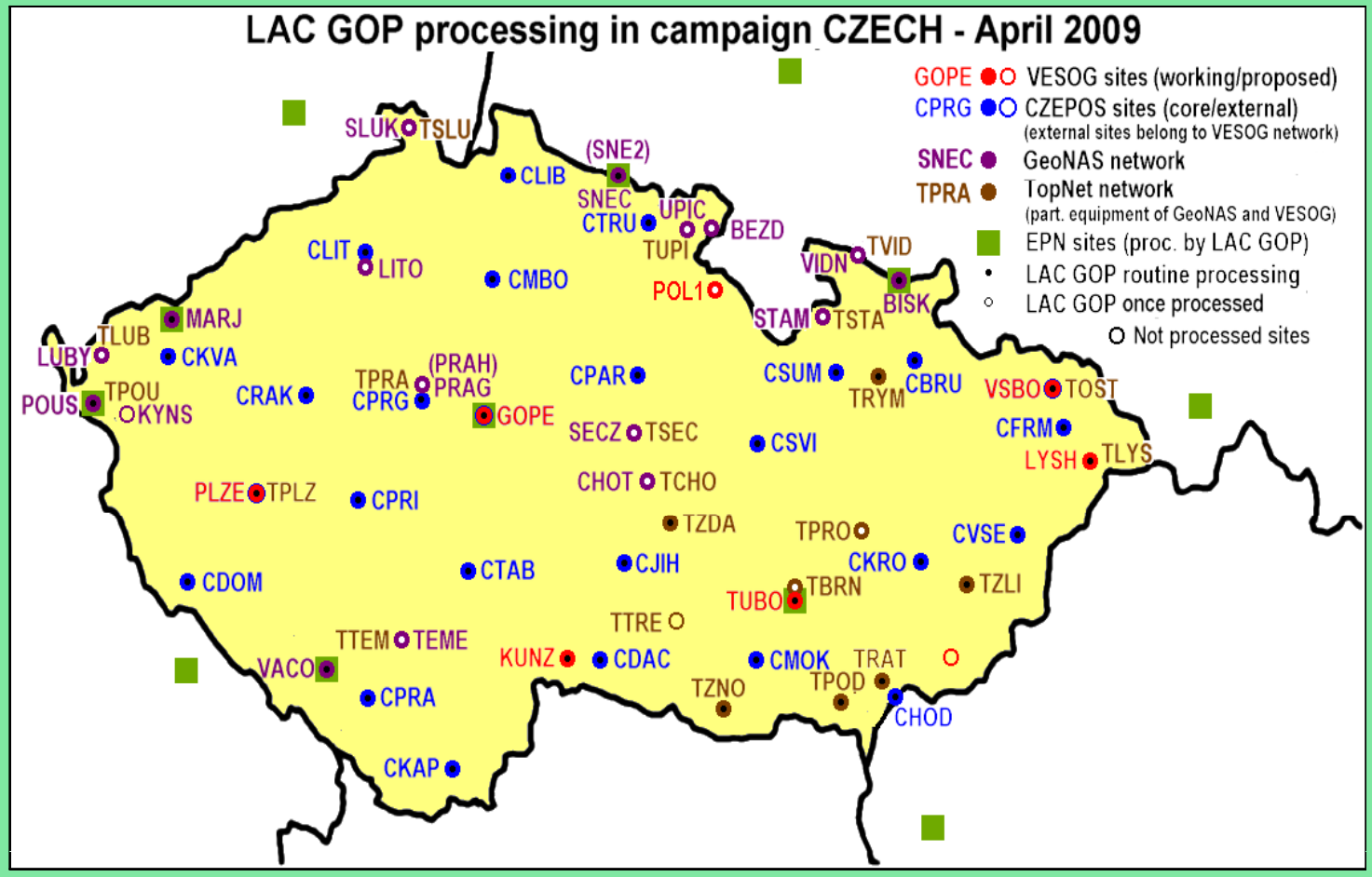
New ETRS89 realization in the CR: Permanent GNSS sites = top-level ETRF2000(R05) in the CR



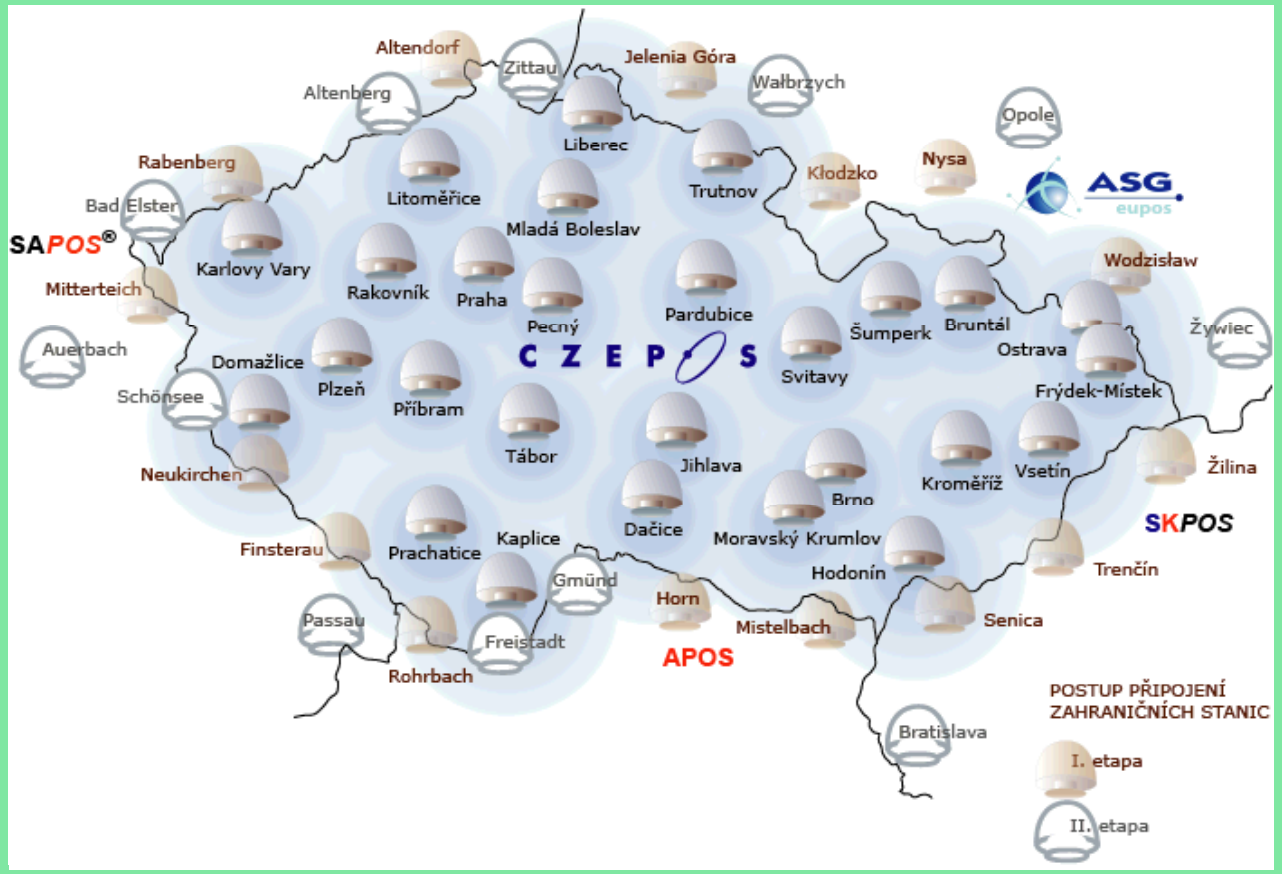
Permanent GNSS networks in the CR (1)

- CZEPOS: http://czepos.cuzk.cz, Czech Positioning System, 27 PS, operated by the Land Survey Office
- GEONAS: http://geonas.irsm.asc.cz, 16 PS, 2 temporary PS, experimental monitoring network operated by the Institute of Rock Structure and Mechanics, Acad. Sci. CR
- VESOG: http://pecny.asu.cas.cz/vesog/, research and experimental GNSS network operated by the RIGTC GOP and academic institutions, 6 PS, 2 PS proposed
- TopNet: http://www.geodis.cz, 6 PS, includes also 8 GEONAS and 3 VESOG PS, operated by the private company GEODIS Brno
- several smaller networks, operated by private companies, e.g. *byS@T* and others

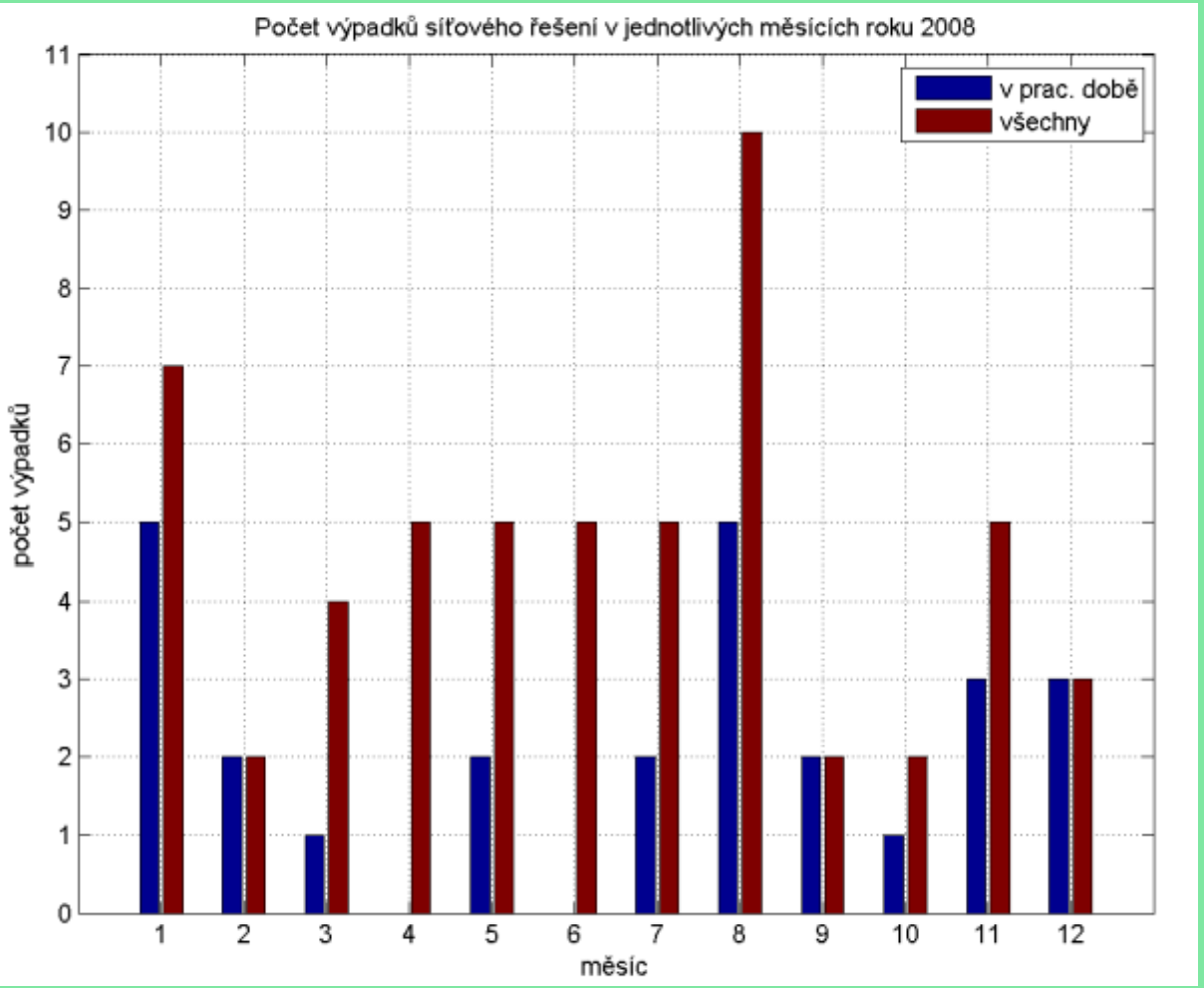
Permanent GNSS networks in the CR (2)



CZEPOS: cross-border links



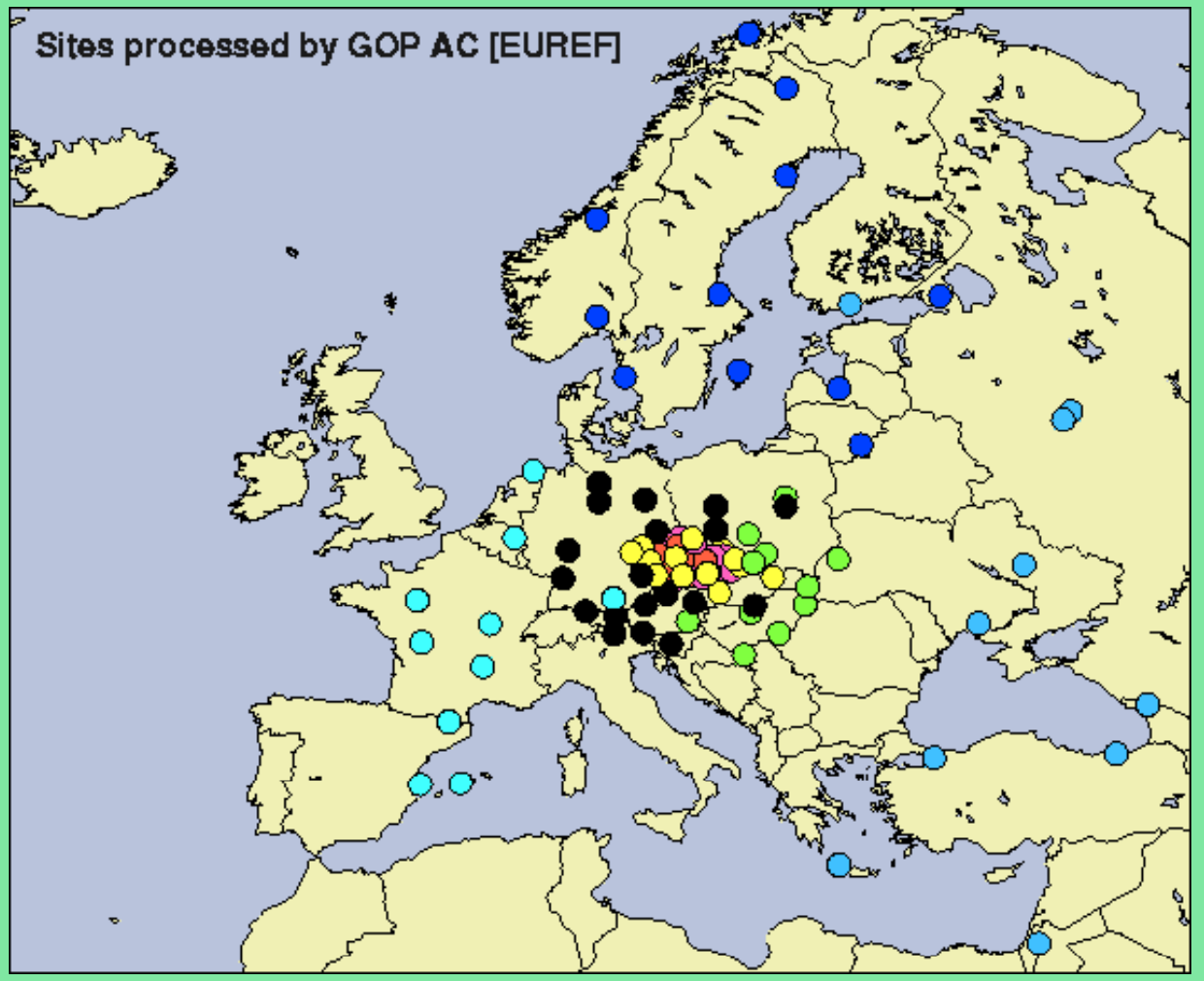
CZEPOS: outages in 2008



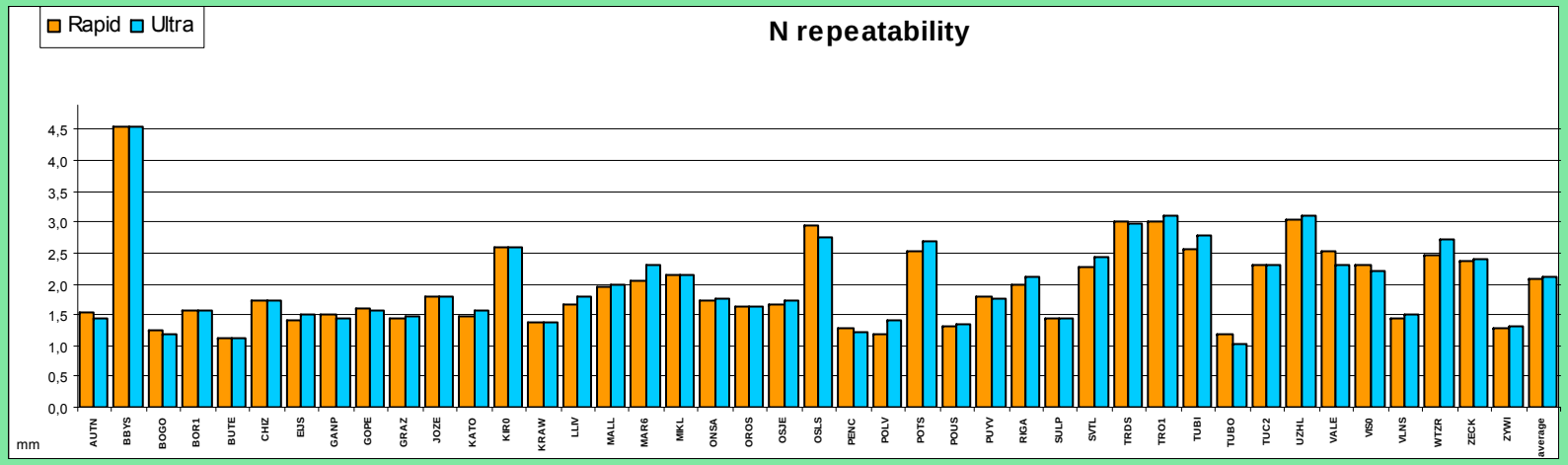
EPN Local Analysis Center GOP

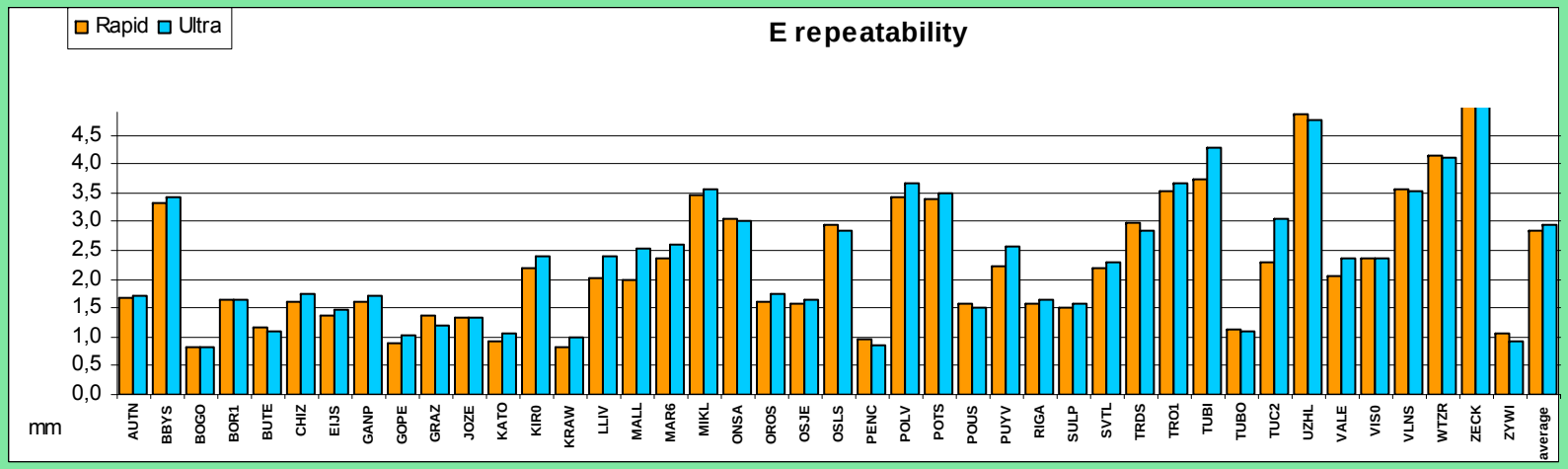
- data analysis from 79 IGS/EPN + 49 Czech PS
- EPN standards and processing strategy
- extension of services and products
- precise GLONASS ultra-rapid orbits
- hourly data files from RT streams
- NRT ZTD procedure extended to GLONASS
- EPN routine processing extended to rapid and hourly solutions

EPN Local Analysis Center GOP: EPN subnetwork processed by LAC GOP

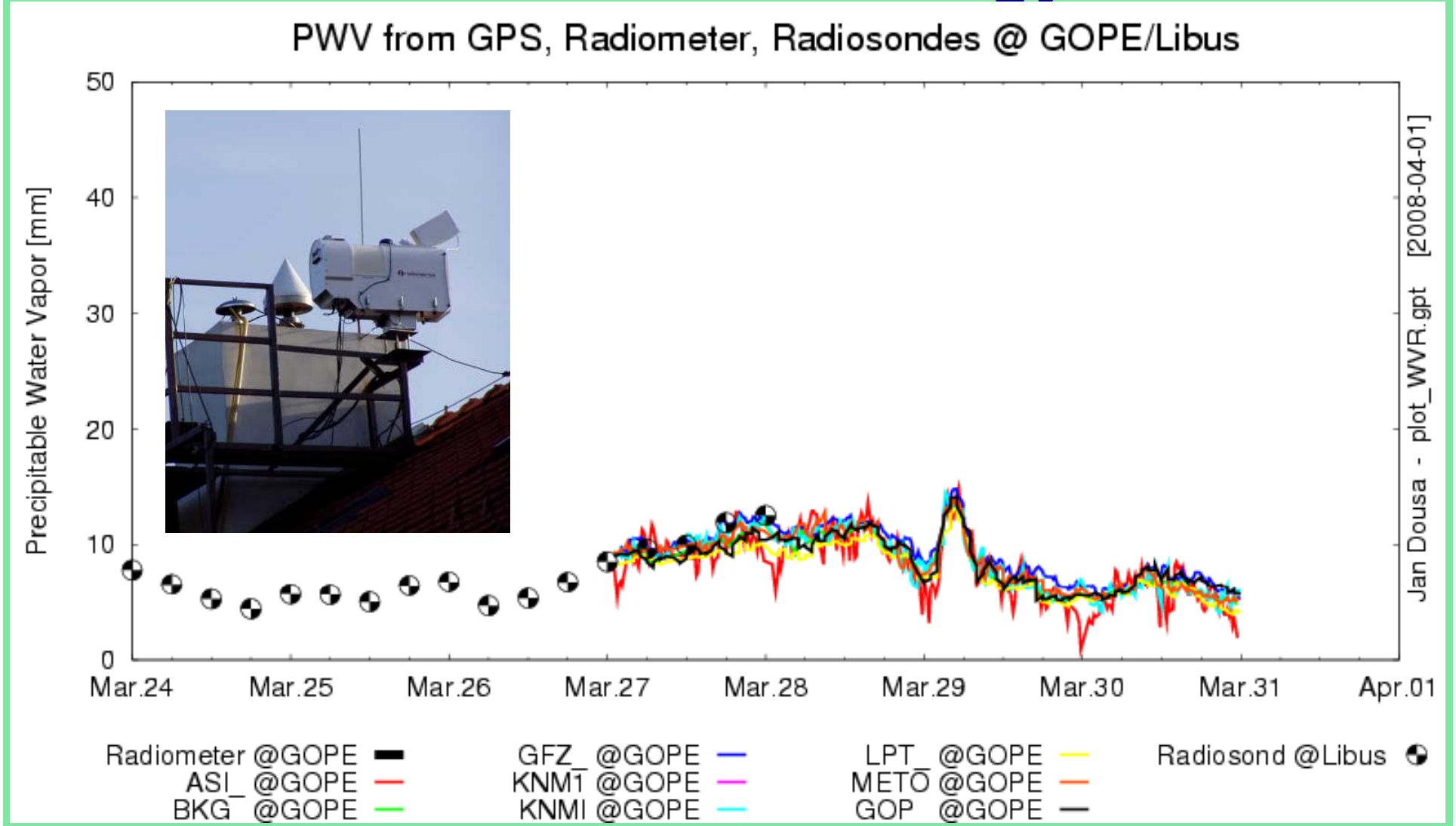


Rapid and ultra-rapid EPN LAC GOP solutions





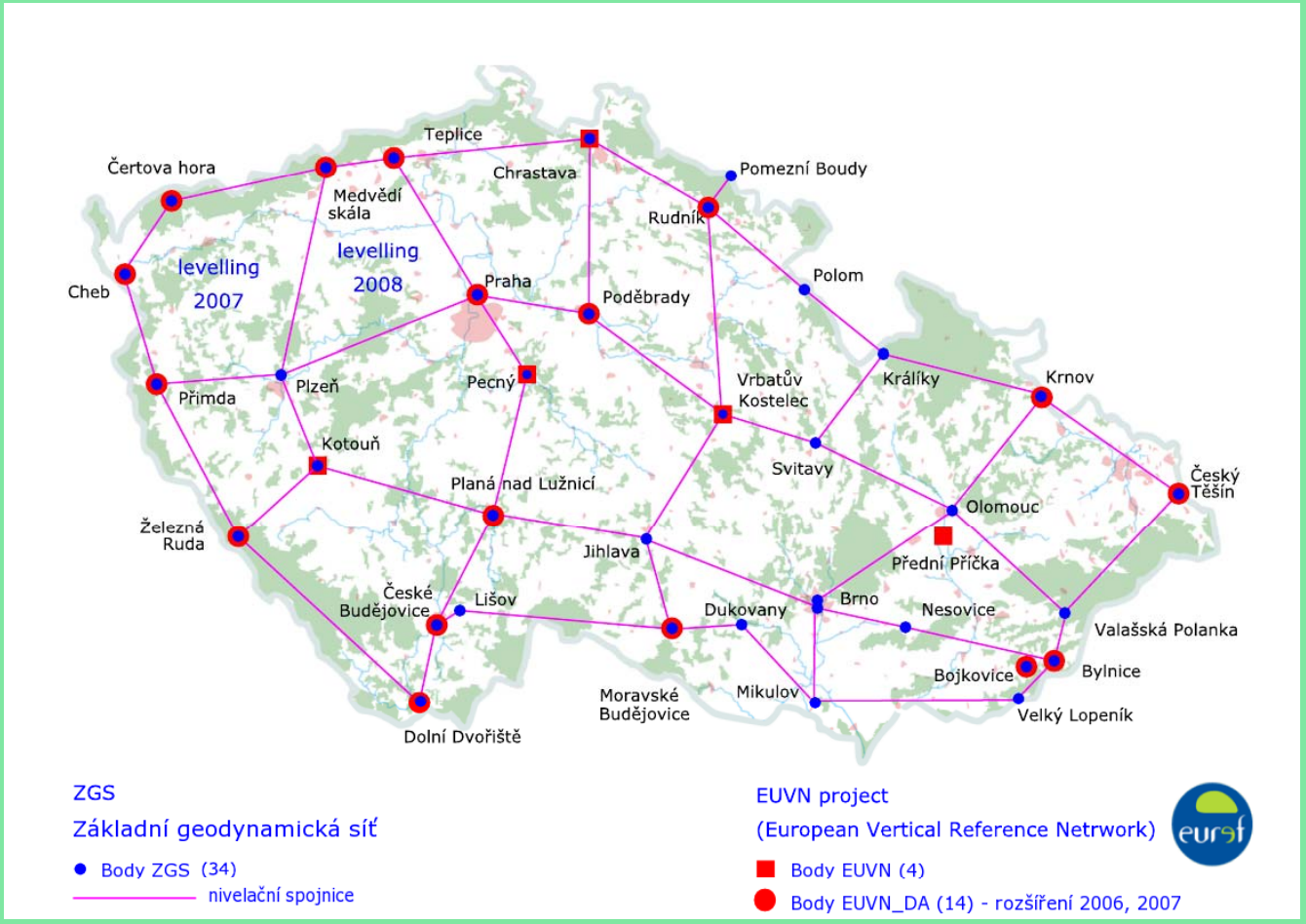
GNSS Meteorology



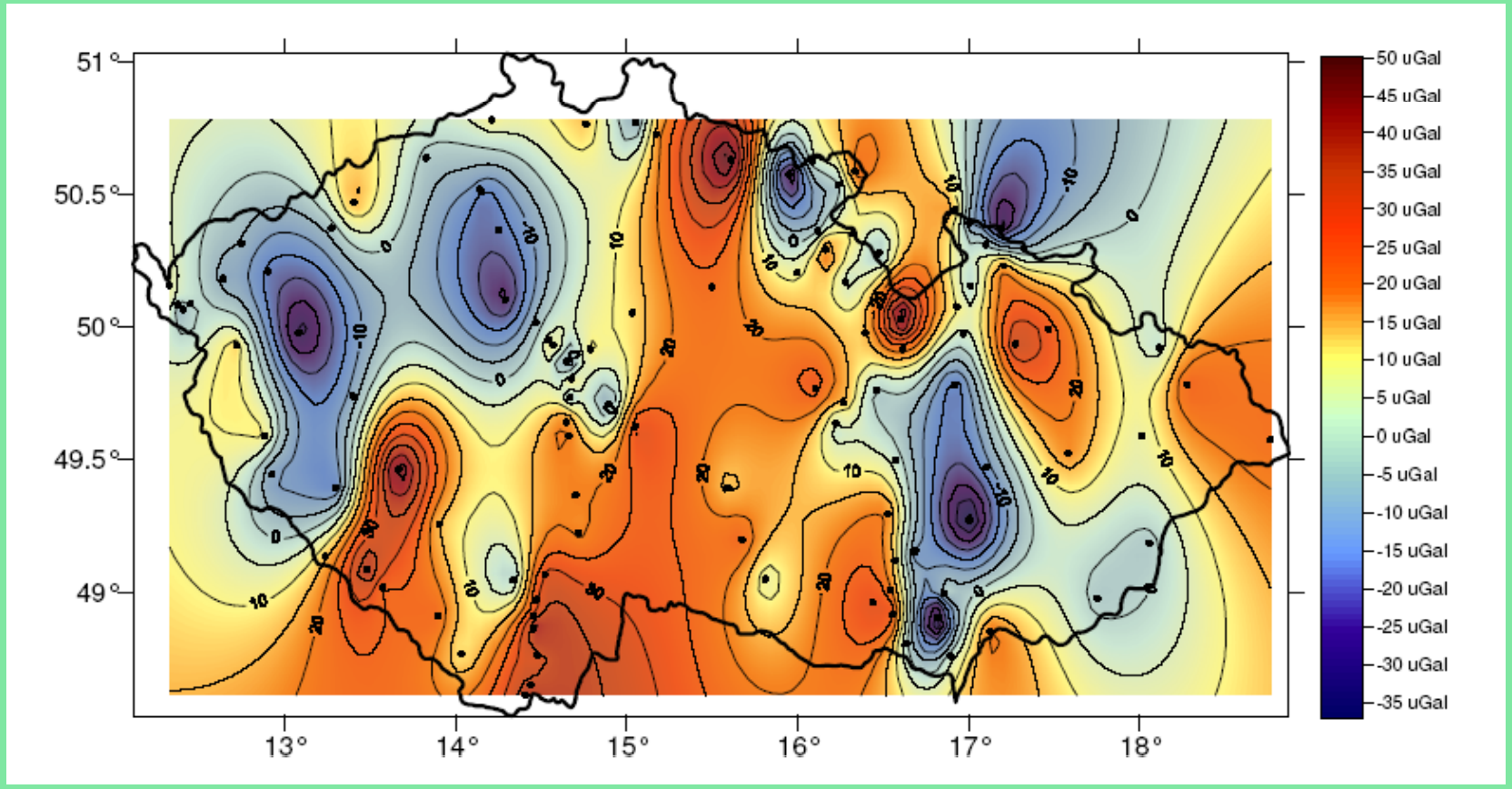
Height system, gravity, geodynamics

- Differences between EVRF07 and Bpv range between 100 - 160 mm
- improvement of the national gravity system
- superconducting and absolute gravimetry at GOP, environmental effects on gravity
- fundamental geodynamical network in the CR - combines GNSS, gravity and precise levelling (incl. EUVN_DA)

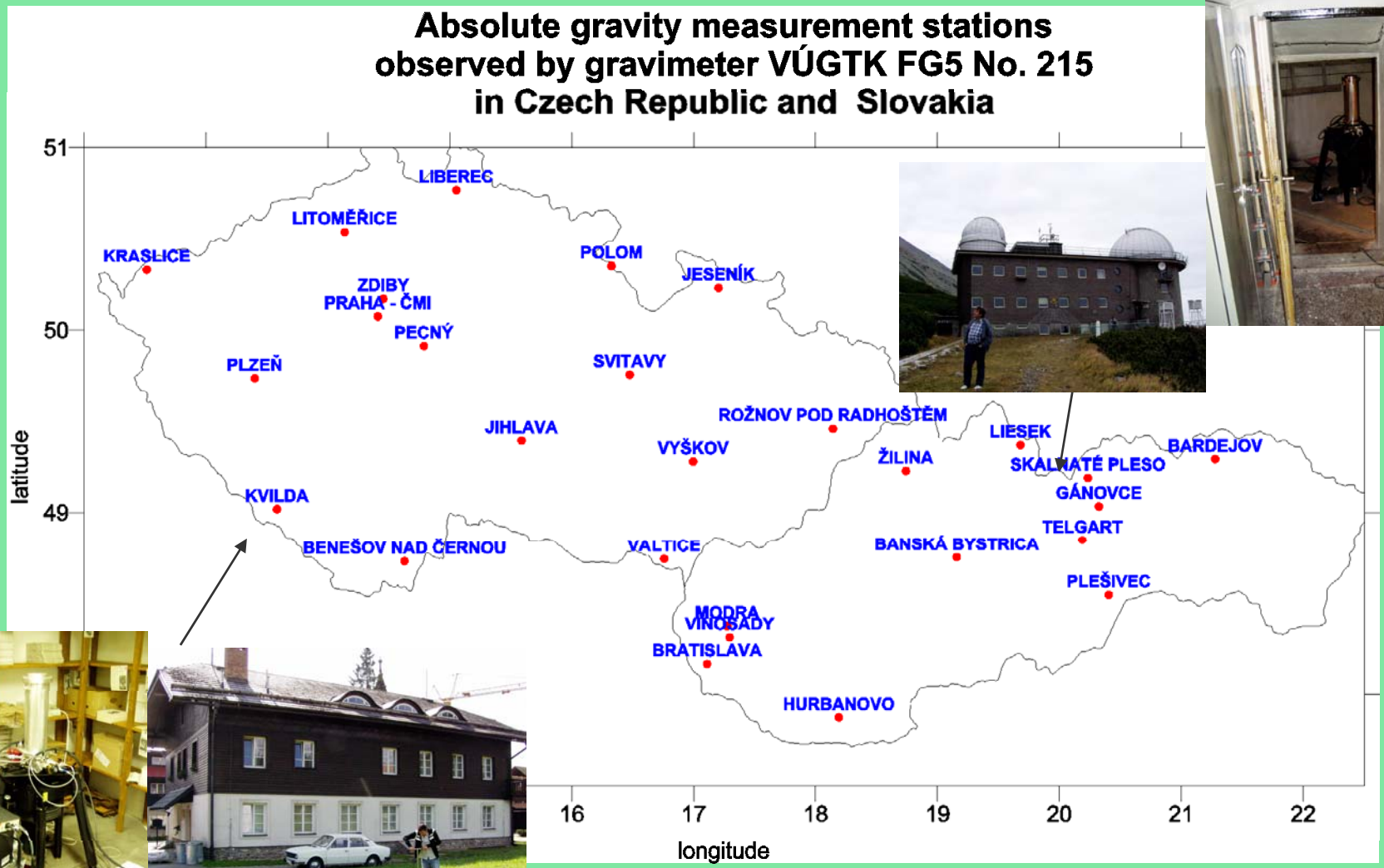
Geodynamical network of the Czech Republic



Development of a new national gravity system differences between UEGN02 and S-Gr95



Absolute gravity networks in CR and Slovakia measured by RIGTC-GOP with FG5 No 215

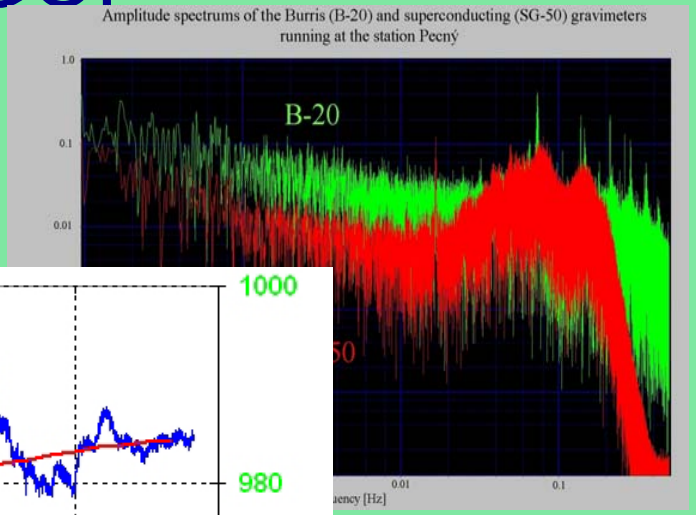


Tidal Gravimetry at GO Pecný and Environmental Effects

- gravity time series by GWR OSG-050, Askania Gs15 No. 228 and by LCR 137
- calibration by FG5 No. 215 absolute gravimeter
- climatological station
- meteorological parameters
- soil moisture
- ground water level

Superconducting gravimeter GWR OSG-050 at GOP

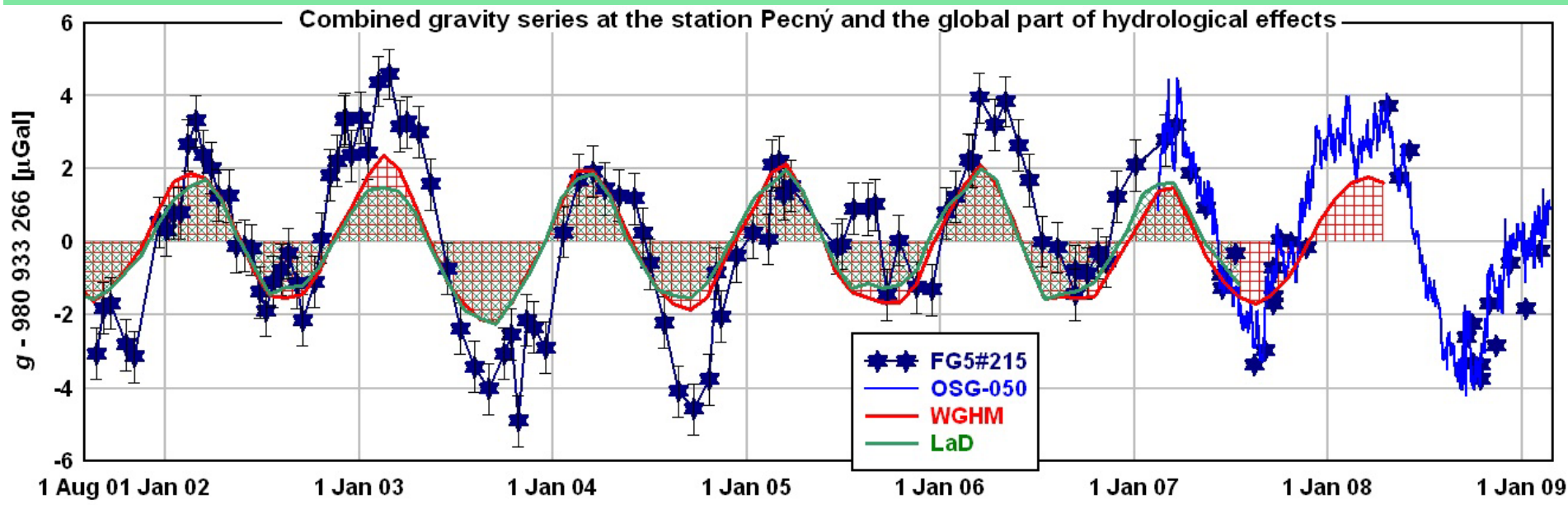
Corrected for synthetic earth tides and atmospheric pressure effects using single admittance factor (0.3 μGal/hPa).



Absolute gravity series at GOP

FG5#215 since August 2001 and OSG-050 since February 2007.

Results were corrected for: ● synthetic earth tides ● air pressure variations using the coefficient -0.3 μGal/hPa ● polar motion using IERS data ● drift of the SG (2.2 μGal/year).



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