ETRS89 WG status report
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LANTMÄTERIET

Propose to study

- When do computed/observed station velocities represent crustal motions (so it is not dominated by e.g. local deformations or monument instability)?

- i.e. criterion for when do we have sampled the crustal deformations sufficiently well?

- Models for intraplate deformations!

Conclusions from the discussions so far

Important purpose behind ETRS89 is to have a coordinates that are stable in time. The problems with ETRS89 have been:

- Coordinate jumps due to new ITRF's
- Crustal deformations

The first is considered solved (or much reduced) by introducing ETRF2000 as conventional frame for ETRS89

So, crustal deformations remains!

- But NMAs and Inspire community request coordinates that do not change in time. Also, these communities are important user groups for ETRS89!
- And EUREF as an IAG body, shall always provide "best" possible solution and realization from a scientific point of view!
- Purpose is to help countries in zones with large deformations to generate from the standard ETRS89 coordinates, coordinates that are more stable in time (e.g "NMA applications").

Draft sketch for a working procedure towards handling intraplate deformations

Observed velocities at GNSS stations (sampling the motions):

- EUREF/EPN work on position and velocity on the EPN stations
- Other groups studying regional deformations analyze their networks (compute daily and weekly GNSS solutions) and submit the results to EUREF
- EPN combine this to an extended solution including "EPN + regional networks" where positions and velocities are produced.

Model for the deformations

Mathematical (collocation, interpolation etc) or geophysical based (explaining the phenomenon)

One common European, or several with special focus on specific regions

From the symposium in Gävle

Resolution no. 2

The IAG Reference Frame Sub-commission for Europe (EUREF)

Considering the TWG recommendation of adopting the ETRF2000 as a conventional terrestrial reference frameof the realisation of ETRS89

Noting the great benefit of harmonising the ETRS89 realisations at the national level of the European countries and consequently minimizing possible discrepancies in geo-referencing applications through Europe

Recommends that the NMCAs adopt the ETRF2000 as the basis for future national implementations of ETRS89

From the symposium in Gävle

Resolution no. 4

The IAG Reference Frame Sub-commission for Europe (EUREF)

Noting that the European contribution to the IAG WG on Regional Dense Velocity Fields is coordinated by EUREF

Considering that there are permanent tracking stations, not included in the EPN, but are of scientific importance

Encourages analysis of the data following the guidelines for EUREF densifications and transmission of weekly SINEX solutions to EUREF

Something on pieces in place…

At the symposium in Gävle, Ambrus presented his work on including regional/national analysis from EuPos into the weekly combinations

EPN weekly and EPN re-processing project highly important to achieve reliable time series and velocities at GNSS stations.

Station velocities today

D:\MINA-DOC\EUREF\TWG\TWG_2010_Lissabon\etrs89_wg\ETRF2000_C1570_solnr1_linear.pdf

… now example/case study on effect from introducing ETRF2000, and testing model for crustal deformation…

From the Nordic area (sorry about that..)

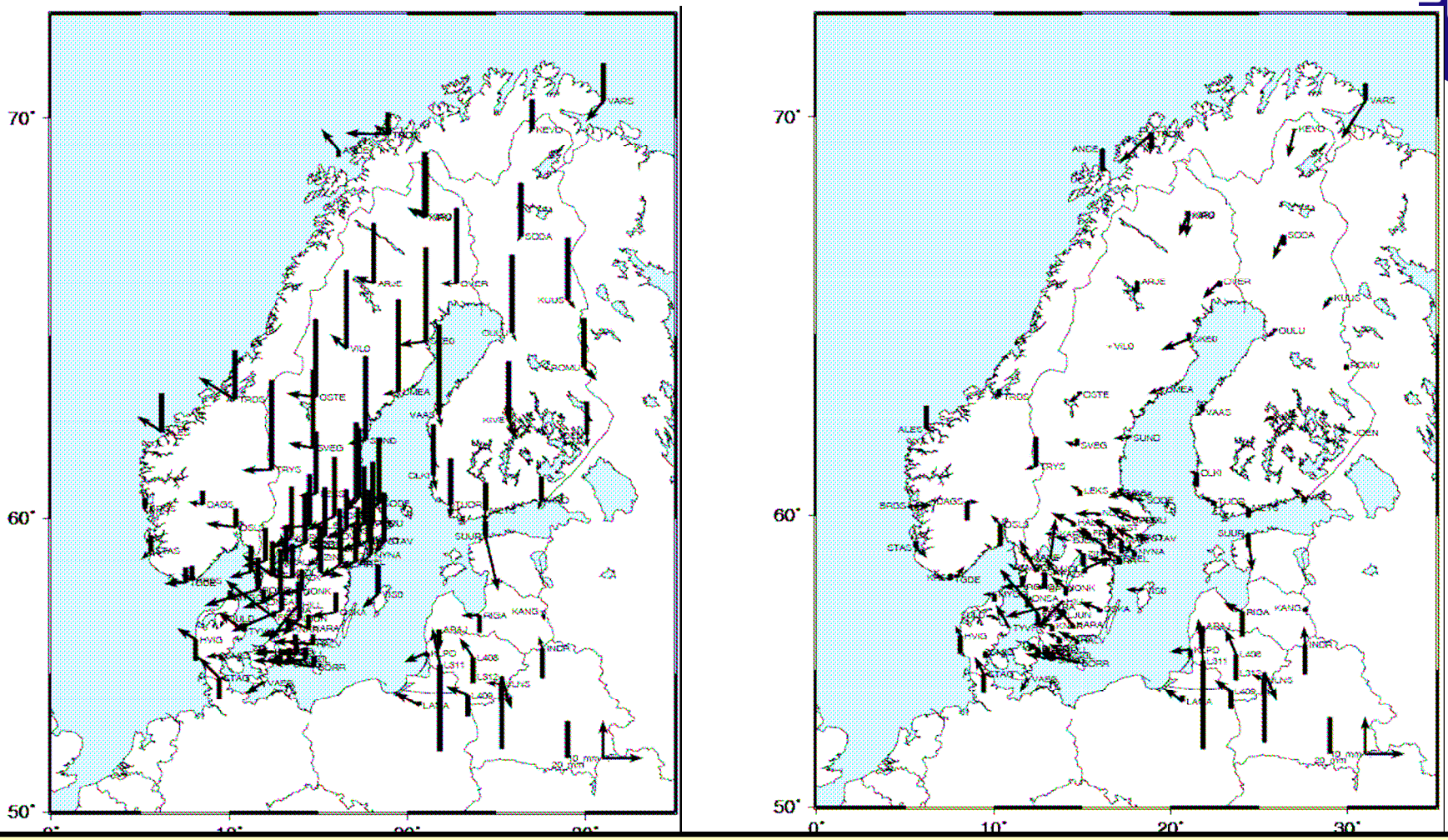
Two GPS campaigns:

2003: Based on ITRF2000. Global reference frame realization (mean of GIPSY and GAMIT)

2008: Based on ITRF2005. "Regional" reference frame realization (Bernese and EPN products – the 15th week pos&vel)

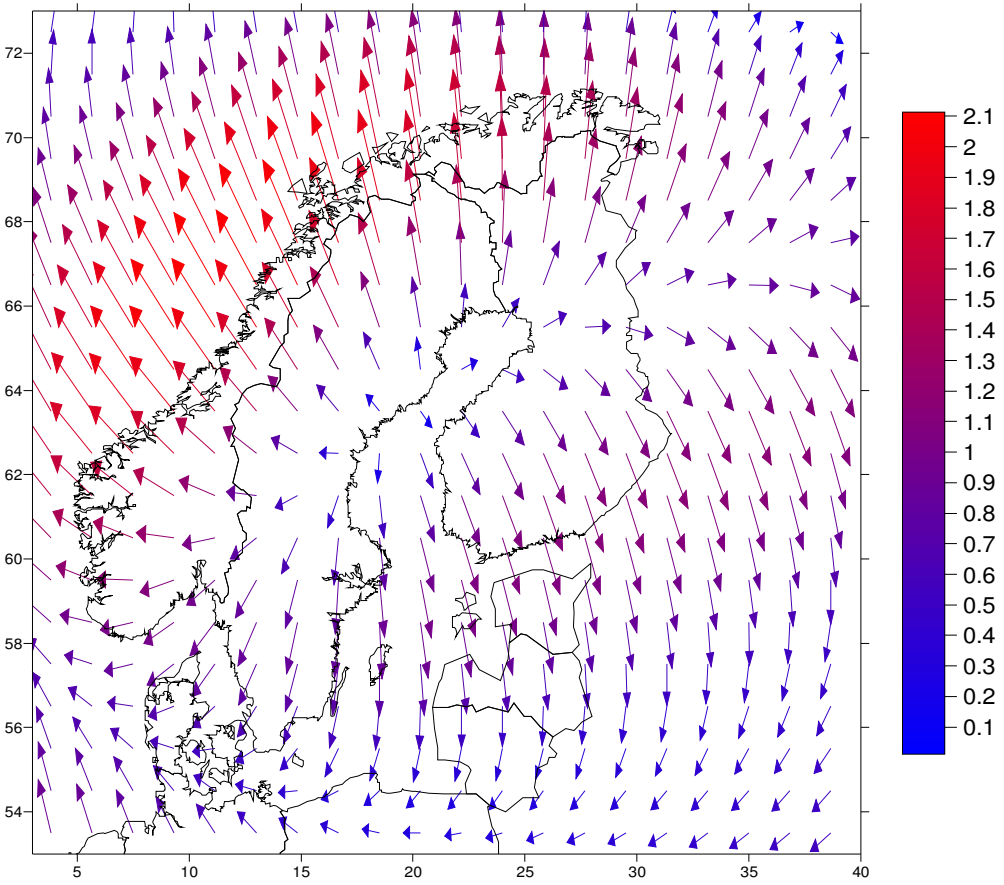
… preliminary results …

Diff= NKG2008 – NKG2003

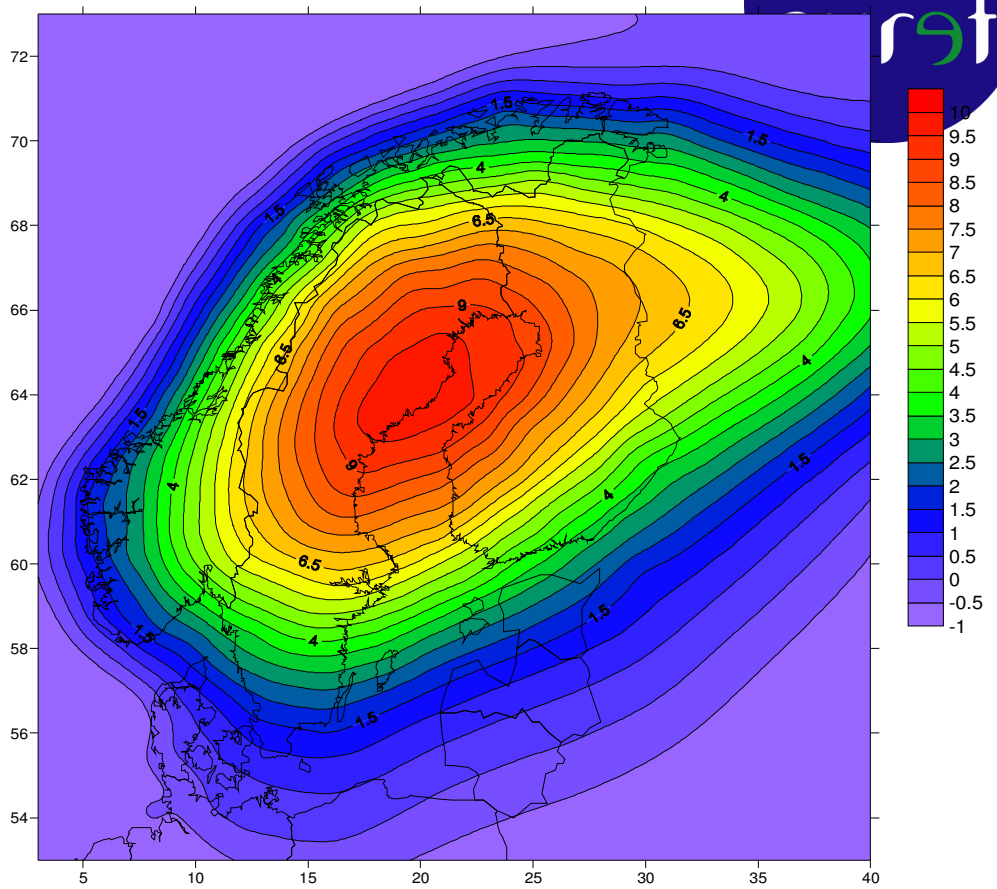


Residuals, RMS/mean (mm), left @2008.75, right @2003.75			
north	4 / -5		4 / 0
east	5 / -4		4 / -3
up	24 / 16		8 / -3

The NKG_RF2003_vel velocity model



Horizontal (0 to 2 mm/yr):
The GIA model transformed to the GPS-velocities.



Vertical (-1 to 10 mm/yr):
The NKG2005LU(ABS) model
Based on: TG, repeated levelling, and GPS.

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  (Note that the phenomenon is of different kind in Fennoscandia compared to areas more subjected to seismic activities)