EPN Analysis Improvements

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Motivation

- Do we need any changes in the EPN analysis for the future?

Introduction

- Datum Definition of weekly EPN solutions
- Combination of Daily SINEX Files
- ETRS time series
- EUREF contribution to ECGN
- Receiver and satellite antenna PCV
- Introduction of GLONASS
- New EPN Analysis Centers, e.g. Bucharest
- Analysis Options Update

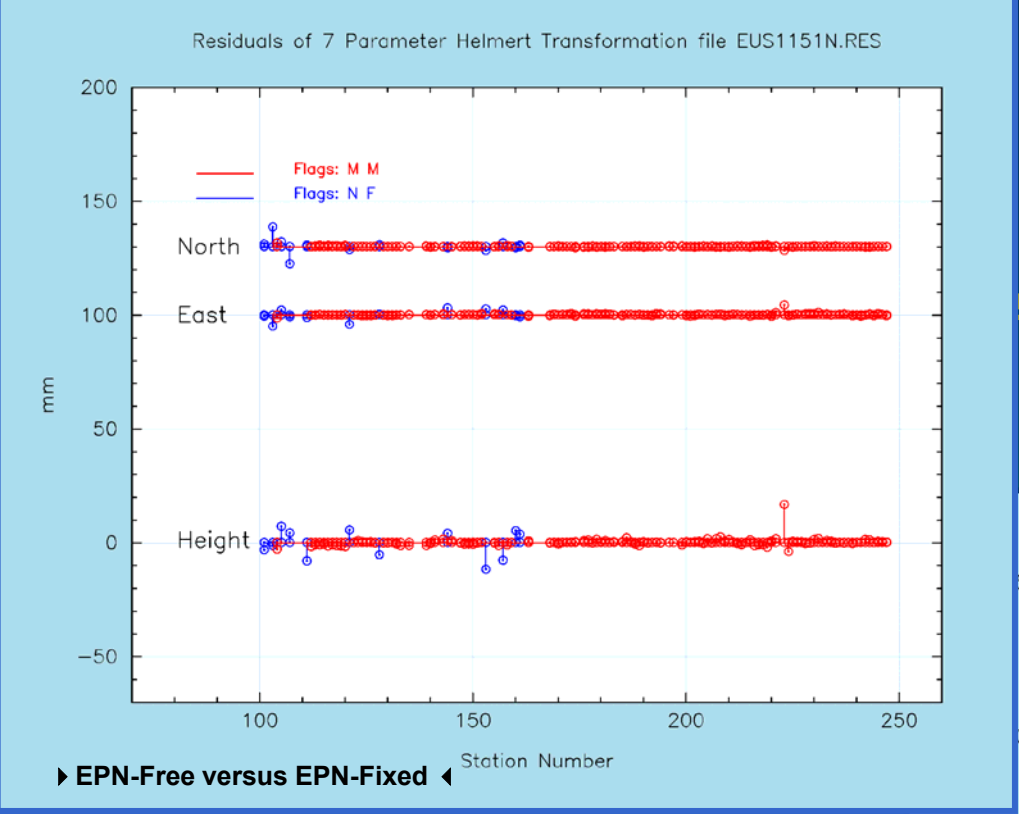
Datum Definition of EPN Solution

Motivation:

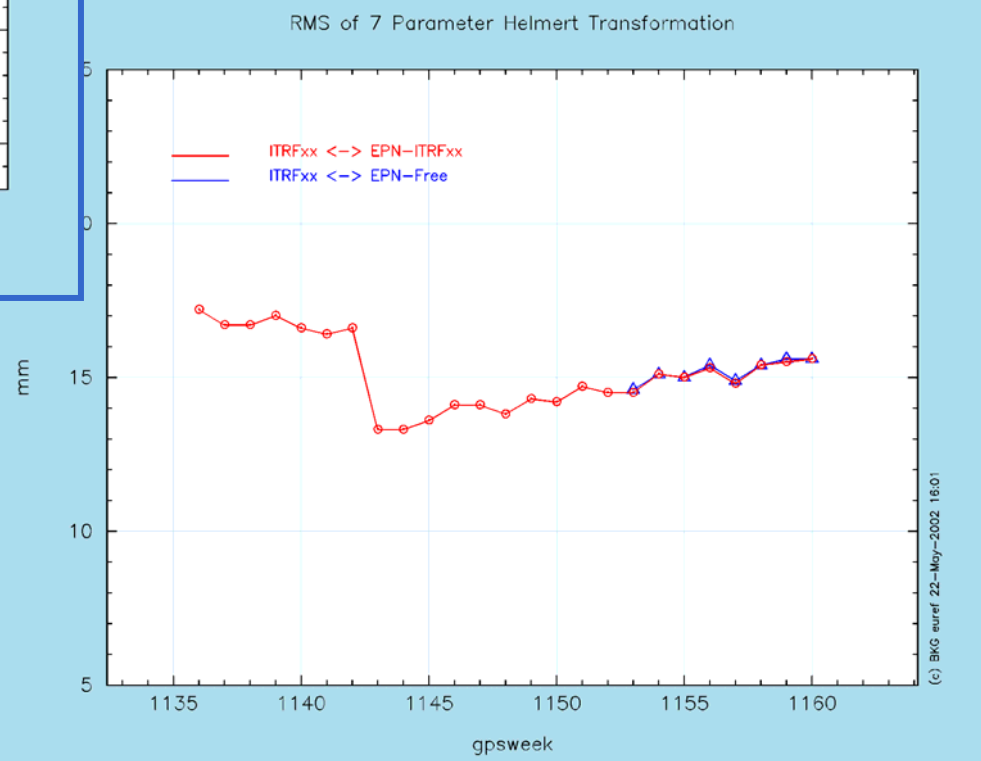
- "Fixed reference stations" could be replaced by "minimum constrained condition"
- Less sensitive to errors of reference stations

Questions:

- Bernese V 4.2 could not generate SINEX from "minimum constrained solutions". Alternatives?
- Is it an issue for the workshop to decide on a change of the weekly combined SINEX files?



EPN-Free versus EPN-Fixed



Combination of Daily SINEX Files

Motivation:

- Contribution to study of short periodic effects in coordinate time series

Action:

- Additional submission of daily SINEX files by LACs
- Daily combination of SINEX files
- Keep coordinates and trop. parameters in SINEX

Questions:

- Is this effort worthwhile?

ETRS89 Time Series

Motivation:

- Weekly realizations of ETRS89 available since the beginning of EPN
- Only a few information about usage of such solutions
- Rotation since usage of ITRF2000

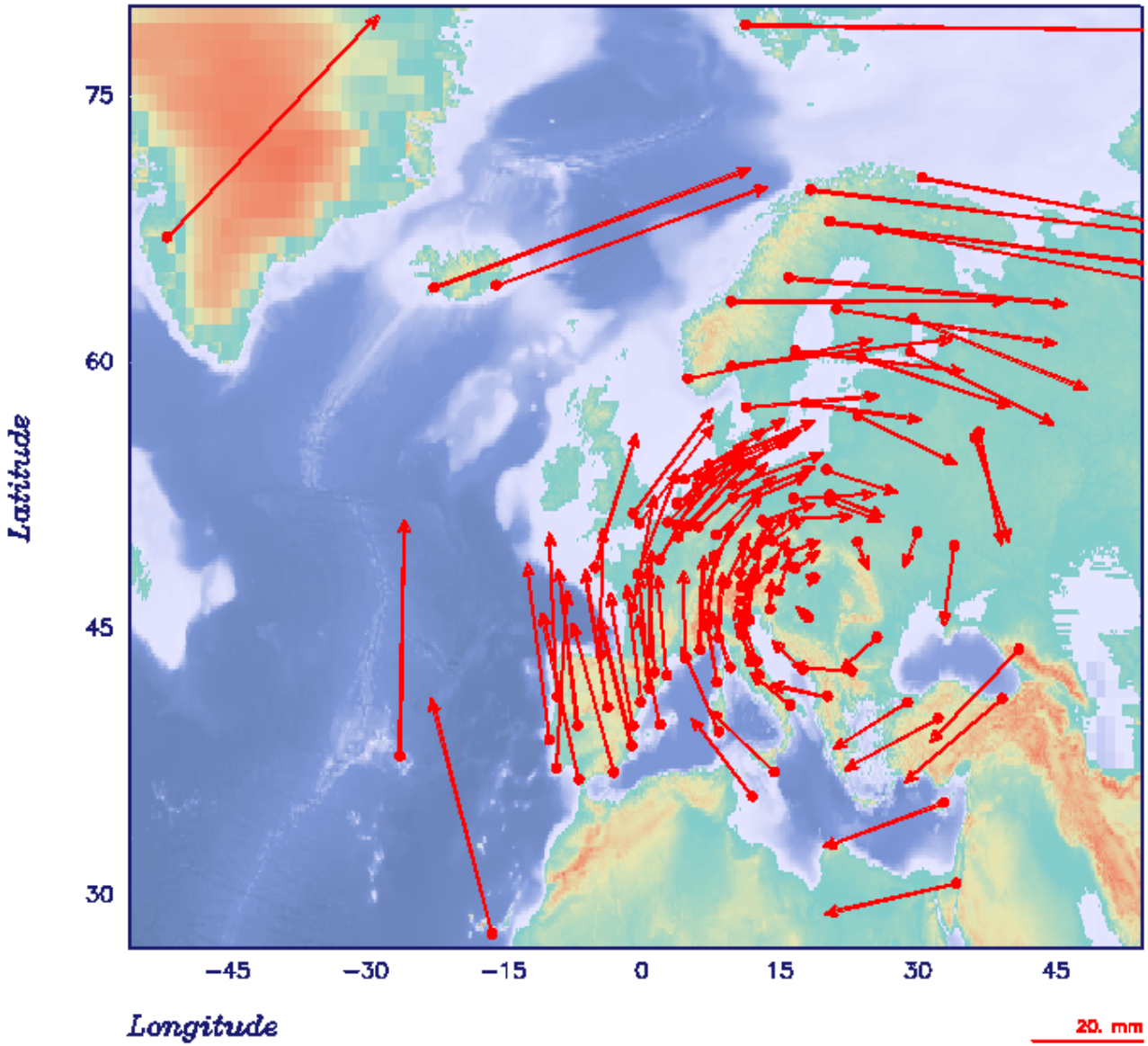
Questions:

- How could we get more information about the usage of weekly ETRS89 solutions?
- Should we recommend a pre-transformation from ITRFxx to ITRF2000 before the transformation to ETRS89 to prevent the rotation?

ETRS89 Time Series

- Rotation was discussed at TWG Meeting in Toledo, June 2003
- Z. Altamimi was asked to write a „Tutorial for users“ explaining the ETRS89 time series
- Z. Altamimi is also working on an “European Velocity Field”, objectives
  - Development of a cinematic Model for Europe
  - Determination of intra-plate velocities
  - Consideration of non-linear motions

ETRS89 Displacement: Week 1143 minus 1142 (ITRF2000 Introduction)



EPN Contribution to ECGN

Motivation:

- Establishment of a European Combined Geodetic Network (ECGN) to combine the spatial and the height reference system with earth gravity field parameter estimation.
- EPN supports ECGN with ellipsoidal heights

Question:

- Are there alternatives to improve the height component of EPN to better support ECGN?
- (also important for TIGA-PP and ESEAS)

Receiver and Satellite Antenna PCV

Motivation:

- Test set of absolute Antenna PCV, see IGSMAIL 4324, Markus Rothacher and Ralf Schmid
- EPN sub-network of EPN processed with various PCVs by Peter Franke for week 1214
- Introduction of both, receiver and satellite antenna PCVs, shows negligible displacement for horizontal and up 30 mm for vertical coordinate components

Questions:

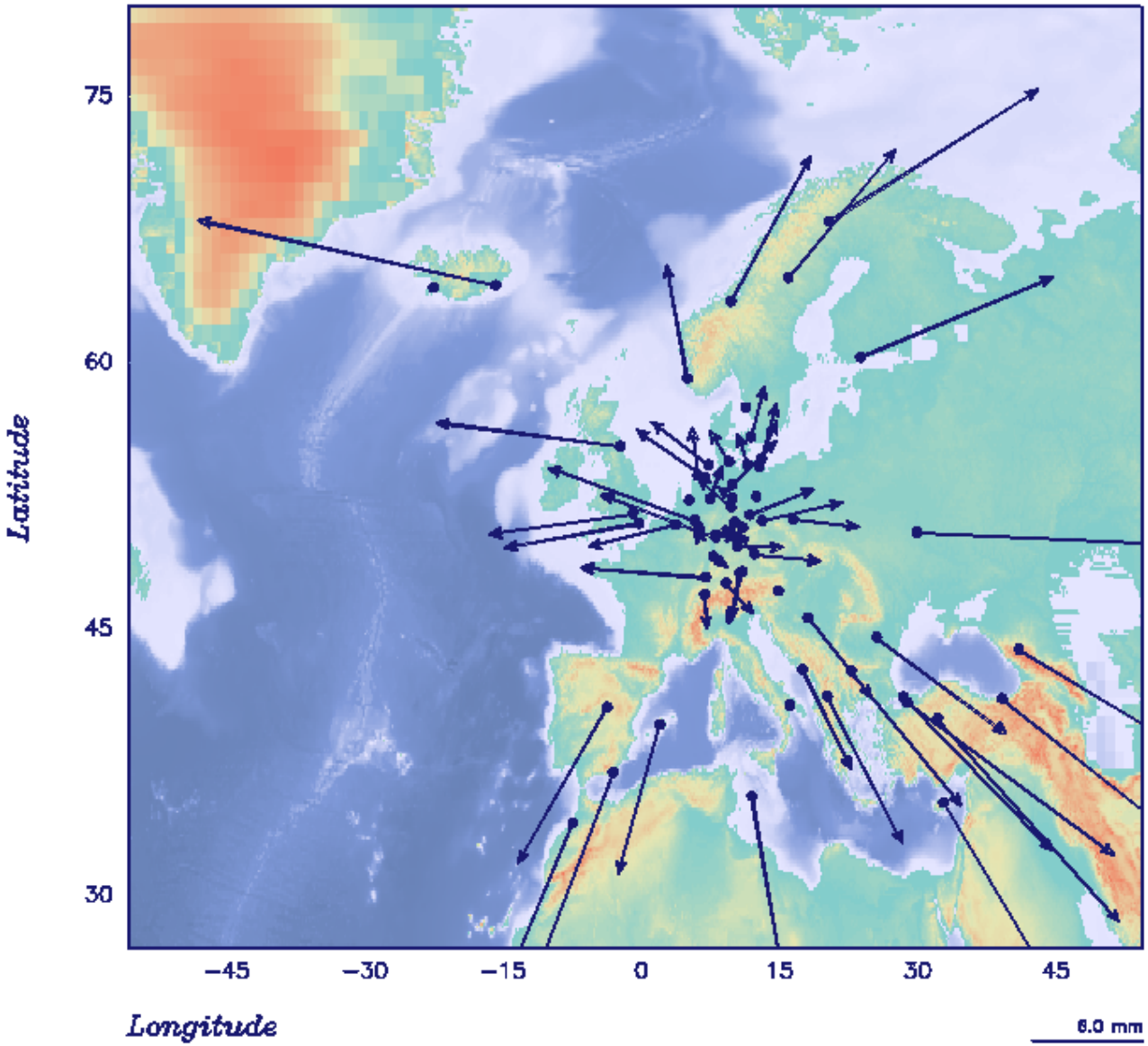
- Is it a topic for EPN?
- Which analysis software can apply satellite PCVs?

Receiver and Satellite Antenna PCV

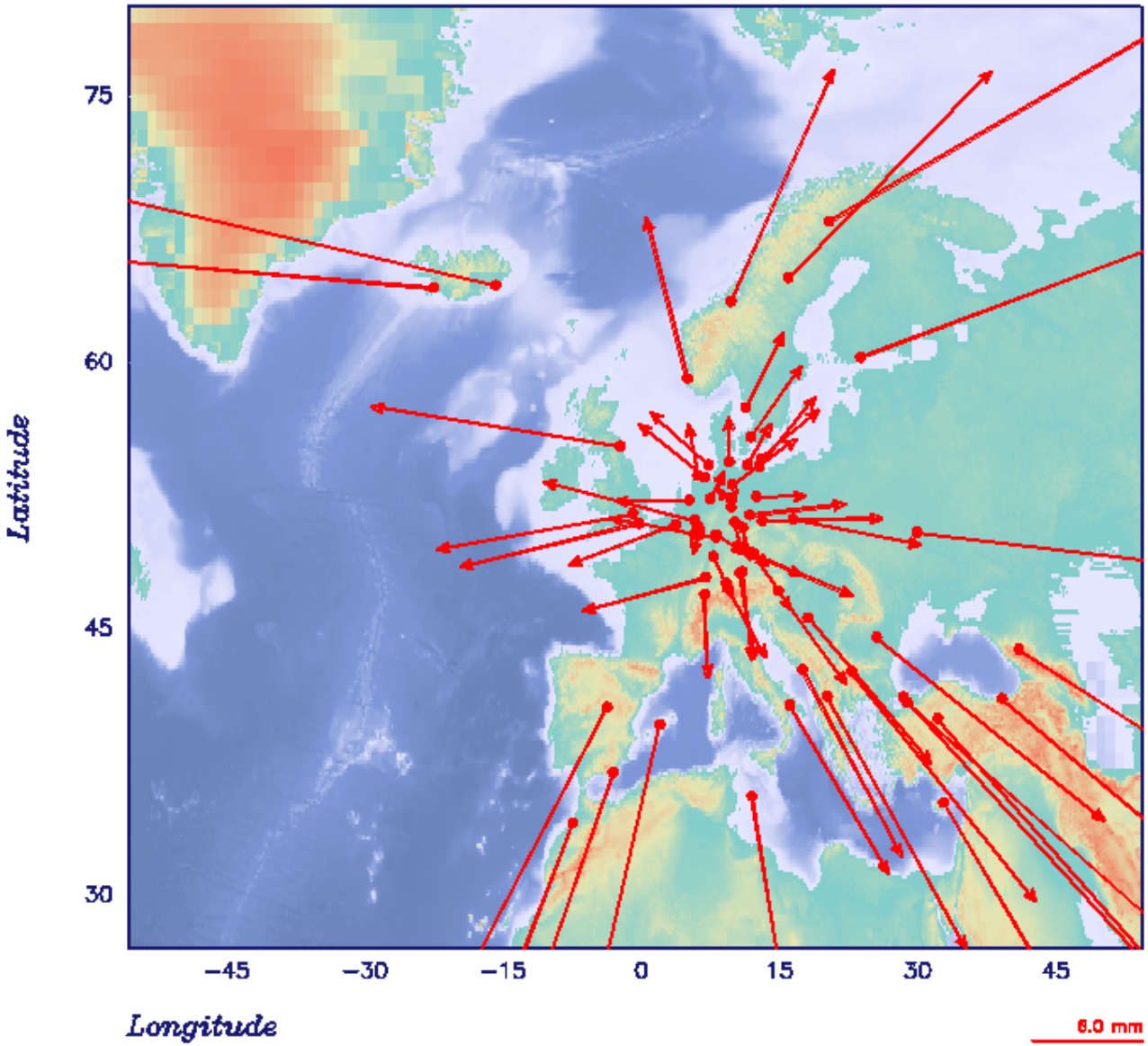
Presentation on EUREF 2002 Symposium in Toledo:

- Changes are mainly absorbed by datum definition strategy
- Comparison of most minimum-constrained solution most reasonable

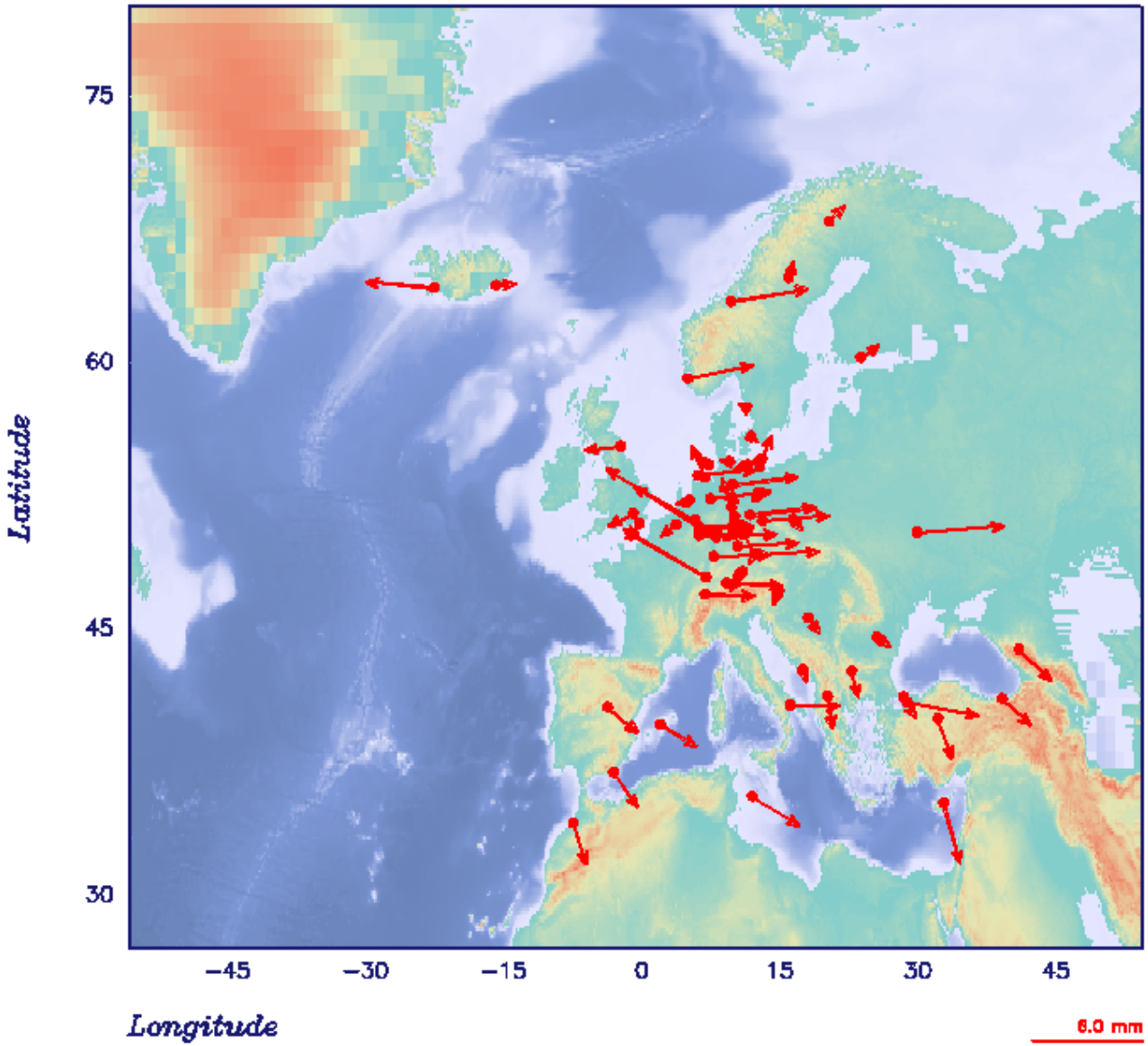
Fixed Solution: Absolute Receiver PCV minus Standard



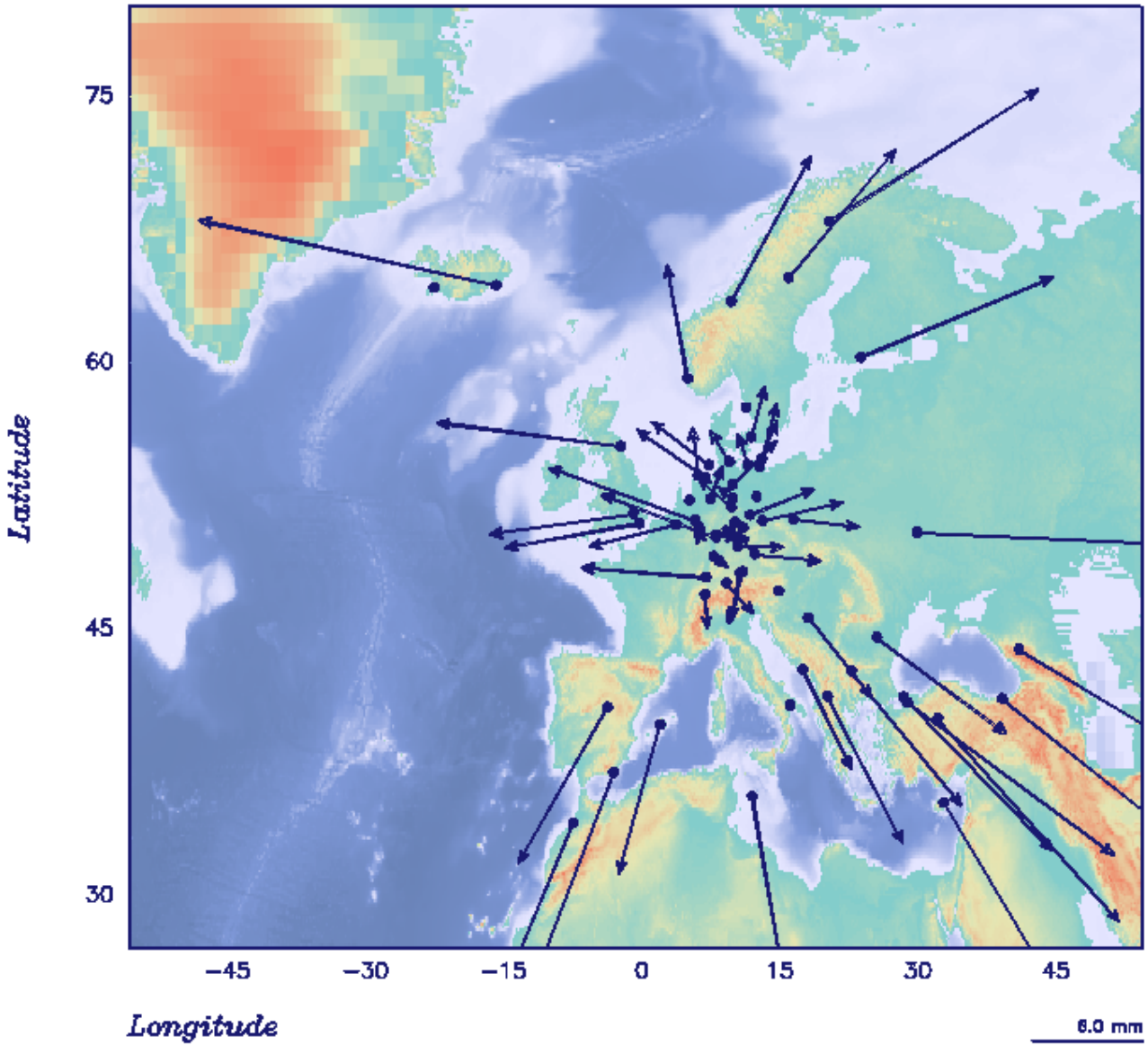
Minimum-Constrained Solution: Absolute Receiver PCV minus Standard



Minimum-Constrained Solution: Absolute Receiver PCV + **SatOFF** minus Standard



Comparison: Fixed *versus* Minimum-Constrained Solution



Antenna PCV Results

- The introduction of both receiver and satellite antenna PCVs shows negligible displacement for horizontal and up 30 mm for vertical coordinate components
- Some un-modeled receiver PCV are obviously remaining

GLONASS Observations

Motivation:

- GLONASS observations are now part of the IGS and EUREF data centers
- Precise GLONASS orbits and analysis software is available
- Study of GNSS combination to be prepared for GALILEO

Questions:

- Do we allow to introduce GLONASS observations in EPN sub-network solutions?

New Local Analysis Centers

Motivation:

- There are already 16 LACs active
- University in Bucharest shows interest to become an analysis center
- But: There is a demand for special studies (e.g., height component) and for tests within EPN

Questions:

- Should we limit the number of LACs?
- Should we define a new type of LACs for special studies?

Analysis Options Update

Alternatives:

- Allow troposphere gradients (NKG already solves for gradients for test purposes?)
- New release of Bernese GPS Software
- Weighting scheme for combination
- Introduction of satellite specific weights, e.g., accuracy codes as given in the IGS orbits
- Reprocessing of complete EPN, is that an issue (elimination of irregularity, e.g., equipment changes)?

Thank you!