

# Draft roadmap towards European Geokinematics

# The EUREF working group on deformation models

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Thanks for discussions and contributions from members of the TWG and other colleagues



# Outline

- Background to the EUREF working group on deformation models
- Thoughts on roadmap towards models of crustal deformations
- Tasks for the new working group and proposed first deliverables



# Background

- Interplate and intraplate deformations are present within the EUREF area of interest
- knowledge of the crustal deformations within Europe is of interest for geo-sciences in general,
- and it is also of considerable value for the maintenance and the use of national realisations of ETRS89,
- very much efforts are devoted to improved observed velocities at geodetic stations and to extend the density of stations with observed velocities
- this initiative will also consider the situation in between the stations



# Roadmap towards models of geokinematics

- Improved station velocities
- Evaluation of station velocities
- Work towards models of European geo-kinematics Geophysical meaningful models, or models based on interpolation (e.g. collocation/kriging), or combinations Specific areas of interest:
  - Mediterranean area
  - Fennoscandia
  - Iceland Greenland

Not trivial to include earth quake events into a spatial (ex gridded) model of crustal deformations

 Consideration of a geo-kinematic model in maintenance and use of national realizations of ETRS89

### Evaluation of the field of station velocities; Interpolation of Residuals





- Is this the situation? How can we test that?

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# Horizontal velocities of class A sites

#### EPN cumulative solution (C1600) in ETRF2000



Image of the differential residuals in horisontal component



EUREF symposium 2012, Paris, June 6-8

The EPN will be the backbone, but including other efforts may improve the number of observations and contribute to the understanding (e.g. McClusky et al, JGR March 2000)



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# Models of crustal deformations - so what is a model?

a model:

provides explanations to observations, and allows for predictions also where observations are not awailable

in geodesy the model should also include estimated uncertainty of the model



# EUREF WG on deformation models

The WG deals with 3D crustal deformations with focus on the use of GNSS.

Improved station velocities are crucial information for this WG but is covered by other initiatives. This WG will therefore build on the results from those initiatives.

Proposed activities:

- 1. Evaluation of station velocities how well has the signal been sampled?
- 2. Work towards model(s) of crustal deformations in the EUREF area of interest
- 3. Consideration of deformation models in the maintenance and in the use of national realizations of ETRS89



# EUREF WG on deformation models

First steps:

- Inventory of studies of crustal deformations presented at for EUREF symposia (and elsewhere)
- Deliverables (first version):
  - Map showing how well EPN sites sample crustal deformations
  - First version of a gridded 3D model of the crustal deformations within the EUREF area of interest
  - Estimated uncertainty of the gridded model shown as a map

Tectonic events (earth quakes) will not be considered in the first version of the deliverables



# EUREF WG on deformation models

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But Your contributions are very important, so the group is open to scientists interested in this topic! *Contact: martin.lidberg@lm.se, or look at www.euref.eu*