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Present and future of European reference frames

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Since 1989, the IAG regional reference frame sub-commission 1.3a EUREF has merged efforts of National Mapping and Cadastral Agencies (NMCA), Universities and Research Institutes to define, realize and maintain the European Terrestrial Reference System 1989 (ETRS89) and the European Vertical Reference System (EVRS). Technical development, new applications and increased accuracy of observations are setting new demands for the realizations of the reference systems.

The EUREF community is providing a large variety of data and data products. The product catalogue covers file-based and real-time GNSS data, position and velocity estimates from multi-year solutions, position time series, zenith path delay estimates, and real-time GNSS corrections.

Crustal deformations and movements deteriorate the accuracy of static reference frames and heights. Monitoring the deformation within EUREF is a necessity for the future, but this alone does not answer the question of future reference frames. It is foreseeable an emerging mass market for centimetre level precise positioning services which very much rely on a technical body with an European dimension such as EUREF for validation and compliance with European regulations, such as the INSPIRE Directive.

We are facing the European-wide question on the future of reference frames and the role of EUREF. The release of the International Terrestrial Reference Frame ITRF2014 raised also the question on needs and ways to renew the realization of the ETRS89 both for practical and scientific purposes. For some years to come we may have a two frame approach where ETRF and ITRF will be used together. Using European-wide 3D deformation models, and a dense network of permanent GNSS stations, we may link these together (semi-kinematic approach). On the gravity related global heights we do not yet have a similar approach, which will take even more time to get adopted. However, on European basis, EUREF keeps very close collaborations with NMCAs with the intent of merging the national high precision levelling data bases and define a European system of gravity related heights with commonly agreed standards.