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Determination of regional Euler pole parameters for Eastern Austria

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The horizontal motion of lithospheric plates can be described as rotations around a rotation axes through the Earth's center. The two possible points where this axes intersects the surface of the Earth are called Euler poles. The rotation is expressed by the Euler parameters in terms of angular velocities together with the latitude and longitude of the Euler pole.

Euler parameters were calculated from GPS data for a study area in Eastern Austria. The observation network is located along the Mur-Mürz Valley and the Vienna Basin. This zone is part of the Vienna Transfer Fault, which is the major fault system between the Eastern Alps and the Carpathians. The project ALPAACT (seismological and geodetic monitoring of ALpine-PAnnonian ACtive Tectonics) investigated intra plate tectonic movements within the Austrian part in order to estimate the seismic hazard.

Precise site coordinate time series established from processing 5 years of GPS observations are available for the regional network spanning the years from 2010.0 to 2015.0. Station velocities with respect to the global reference frame ITRF2008 have been computed for 23 sites. The common Euler vector was estimated on base of a subset of reliable site velocities, for stations directly located within the area of interest.

In a further step a geokinematic interpretation shall be carried out. Therefore site motions with respect to the Eurasian Plate are requested. To obtain this motion field different variants are conceivable. In a simple approach the mean ITRF2008 velocity of IGS site GRAZ can be adopted as Eurasian rotational velocity. An improved alternative is to calculate site-specific velocity differences between the Euler rotation and the individual site velocities.
In this poster presentation the Euler parameters, the residual motion field as well as first geokinematic interpretation results are presented.