Implementation of the kinematical NNR condition for the terrestrial reference frame

H. Drewes

(1) Deutsches Geodaetisches Forschungsinstitut, Muenchen, Germany

The kinematic datum of station velocities of the International Terrestrial Reference Frame (ITRF) is defined as a "no net rotation" (NNR) system, i.e., there shall be no common rotation of all points of the Earth surface. The realization of this condition requires the integration of point velocities all over the globe, the square sum of velocities to become a minimum. As the geodetically observed velocities are available in discrete points only (the observation stations), the integral has to be replaced by the numerical sum of finite elements. The elements are designed by the lithospheric plates, which are assumed as undeformable, and by deformation zones between the plates. The geometry of these elements is taken from the geophysical plate and deformation model PB2002 (Bird 2003). The kinematics is estimated from the space geodetic observations submitted for the ITRF2005. The resulting Actual Plate Kinematic and deformation Model (APKIM2005) provides the NNR plate rotation vectors and continuous inter-plate deformation models. It is proposed to use the derived station velocities from this model as constraints for the ITRF2005 kinematic datum.