Explicit application of the No-Net-Rotation Condition over an interpolated ITRF2005 velocity field using least squares collocation method

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In order to apply directly the No Net Rotation Condition on ITRF2005, we aim at computing regularly spaced velocity field and its covariance matrix. As the sites of the ITRF2005 are scattered, we interpolate the ITRF2005 horizontal velocity field to the nodes of a regular grid. The method takes into account the spatial correlation among the velocities, allows to interpolate velocities to regular spaced points and provides as well an estimation of the covariance matrix of the interpolated velocities. Moreover, the retained approach is valid all over the earth and not only locally. We use a least-squares collocation method on the sphere. A mean rigid body rotation is removed from the velocities prior to interpolation. The interpolation is applied over the angular velocity field, rather than over the horizontal velocity field itself. This allows : (1) to preserve the spherical motion characteristic of the velocity field and (2) to define a covariance model which is independent from the coordinate system and then remain valid on large areas. A covariogram is computed for plates that provide enough sites such as Eurasia and North America to define an isotropic covariance function, giving the necessary spatial correlation between velocities. This method is applied to the interpolation of the ITRF2005 horizontal velocity field on every plate where it's possible. Then, the No Net Rotation Condition is applied over the ITRF2005 interpolated horizontal velocity field. Pertinent intermediate results of this study will be presented. Estimated rotation rate parameters between our NNR model and ITRF2005, as well as other existing model will be discussed.