GEOPHYSICAL MODELS OF THE SURFACE GLOBAL VORTICITY VECTOR

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ABSTRACT. Within the framework of Newtonian kinematics the local vorticity vector is introduced and averaged with respect to global earth geometry, namely the ellipsoid of revolution. For a deformable body like the earth the global vorticity vector is defined as *the* earth rotation. A decomposition of the Lagrangean displacement and of the Lagrangean vorticity vector into *vector* spherical harmonics, namely into spheroidal and toroidal parts, proves that the global vorticity vector only contains toroidal coefficients of degree and order one *(polar motion)* and toroidal coefficients of degree one and order zero *(length of the day)* in the case of an ellipsoidal earth. Once we assume an earth model of type ellipsoid of revolution *the* earth rotation is also slightly dependent on the ellipsoidal flattening and the radial derivative of the spheroidal coefficients of degree two and order one.

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DISCUSSION

Dehant: I generalized Love numbers by using the concept of transfer function, in the case of an elliptical, uniformly rotating Earth, as you mentioned. One must not forget that John Wahr has already generalized these numbers. They are different from mine because he supposes that the users refer to the Cartwright–Tayler potential.

A. K. Babcock and G. A. Wilkins (eds.), The Earth's Rotation and Reference Frames for Geodesy and Geodynamics, 411.