Geophysical Research Abstracts, Vol. 9, 07480, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07480

Bayesian estimation of the FCN parameters from Superconducting Gravimeters data of the GGP network using a mean ocean tide model

S. Rosat (1), B. Ducarme (2) and N. Florsch (2)

(1) Royal Observatory of Belgium, Brussels, Belgium (2) Univ. Paris VI – Sysiphe, Paris, France.

(Severine.Rosat@oma.be / Phone: (+32)2-373-6753)

The existence of a liquid core inside the Earth is at the origin of the Free Core Nutation (FCN) with a period almost diurnal in the solid Earth reference frame. As the tidal potential has some diurnal components, a resonance due to the FCN occurs in the diurnal frequency band. This resonance effect can be detected and analyzed with time-varying gravity data recorded on the Earth's surface by Superconducting Gravimeters (SGs) of the Global Geodynamics Project (GGP) network. The precise determination of the FCN parameters (period, damping, resonance strength) is important as they strongly depend on the coupling mechanism at the core-mantle boundary (flattening, topography, electro-magnetic coupling. . .). Based on the Bayesian inversion approach proposed by Florsch and Hinderer (2000), we determine the FCN parameters from 24 datasets of 19 SG sites. The main source of errors in the estimation of the FCN parameters is the oceanic loading effect which is imperfectly modelled. Sun et al. (2002) have shown that no ocean tide model is decisively better than the others and that a mean tidal loading vector gives the most stable solution to study the FCN resonance. In this work, we propose a solution obtained from the Bayesian inversion of the corrected gravimetric factors for the diurnal waves using a mean ocean tide model, as in Ducarme et al. (2006). A solution for a subset of European SG sites, where the ocean loading effect is weak and stable, is also proposed.

Quoted references

Ducarme, B., Sun, H.-P., Xu, J.-Q., 2006. Determination of the free core nutation pe-

riod from tidal gravity observations of the GGP superconducting gravimeter network, *J. Geodesy*, DOI: 10.1007/s00190-006-0098-9.

Florsch, N. and Hinderer, J., 2000. Bayesian estimation of the free core nutation parameters from the analysis of precise tidal gravity data, *Phys. Earth Planet Int.*, **117**, 21-35.

Sun, H.-P., Ducarme, B., Xu, J.-Q., 2002. Preliminary results of the free core nutation eigenperiod obtained by stacking SG observations at GGP, in : Proceedings of the GGP Workshop, Jena, March 11-15, 2002. *Bull. Inf. Marées Terrestres*, 136, 10725-10728.