



Estimation of the Free Core Nutation period and quality factor from tidal gravity measurements at Jozefoslaw, Poland

M. Rajner (1) and A. Brzezinski (1,2)

(1) Department of Geodesy and Geodetic Astronomy, Warsaw University of Technology, Warsaw, Poland
(m.rajner@gik.pw.edu.pl), (2) Space Research Centre, Polish Academy of Sciences, Warsaw, Poland

We investigate determination of the Free Core Nutation (FCN) period and quality factor Q from gravity measurements. The study is based on a 3.5-year gravity record collected with use of the LaCoste&Romberg Earth Tide gravimeter no.26 located in Jozefoslaw Observatory near Warsaw, Poland. Our investigation is focused on diurnal tidal gravity constituents which are affected by the fluid core resonance. The FCN eigenperiod was inferred from the resonant enhancement of gravimetric factor and phase. Its estimated value equal to 430 sidereal days is in good agreement with previous determinations based on both tidal gravity and VLBI nutation data. This value confirms the discrepancy of the dynamic flattening of the outer core from its theoretical value predicted under the assumption of hydrostatic equilibrium. The value of the quality factor Q estimated from our analysis, ca. 1300, is considerably smaller than the value derived from VLBI nutation data, ca. 20000. That lead us to already reported conclusion that gravity measurements are more sensitive than VLBI observations to the site-dependent phenomena like atmospheric and indirect ocean tidal effects. For better understanding of the role of local phenomena, we also investigate the importance of environmental corrections of gravity measurements and their influence on the estimated FCN parameters.