



Combining nutation and surface gravity observations to estimate the Earth's core and inner core resonant frequencies

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Nutation time series derived from very long baseline interferometry (VLBI) and time varying surface gravity data recorded by superconducting gravimeters (SG) have long been used separately to assess the Earth's interior via the estimation of the free core and inner core resonance effects on nutation or tidal gravity. The results obtained from these two techniques have been shown recently to be consistent, making relevant the combination of VLBI and SG observables and the estimation of Earth's interior parameters in a single inversion. We present here the intermediate results of the ongoing project of combining nutation and surface gravity time series to improve estimates of the Earth's core and inner core resonant frequencies.

We use VLBI nutation time series spanning 1984-2016 derived by the International VLBI Service for geodesy and astrometry (IVS) as the result of a combination of inputs from various IVS analysis centers, and surface gravity data from about 15 SG stations. We address here the resonance model used for describing the Earth's interior response to tidal excitation, the data preparation consisting of the error recalibration and amplitude fitting for nutation data, and processing of SG time-varying gravity to remove any gaps, spikes, steps and other disturbances, followed by the tidal analysis with the ETERNA 3.4 software package, the preliminary estimates of the resonant periods, and the correlations between parameters.