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Influence of geometrical settings like flattening and topography of the core-mantle and inner-core boundaries on the gravitational core-mantle coupling

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Different processes influence the variation of the Earth's rotation on decadal time scale. The consideration of surface processes, like the exchange of angular momentum of the fluid sub-systems of atmosphere and ocean, and coupling processes at the core-mantle boundary like electromagnetic and topographic coupling torques, lead still to significant differences between observed and modelled Earth rotation parameters (ERP).
For the modelled ERP, we consider the electromagnetic (EM) and topographic (TOP) core-mantle coupling torques and compute equivalent excitation functions, which are combined with atmospheric (AAM) and oceanic (OAM) angular momentum functions.
Our investigation is focused on an additional core-mantle coupling process, the gravitational coupling, which should partly explain the remaining differences between modelled and observed ERP. The influence of assumed geometrical settings, like flattening and topography of the core-mantle (CMB) and inner-core (ICB) boundary on the gravitational coupling torque are studied systematically. First, simplified geometrical settings are applied, where the CMB and ICB are represented by two-axial ellipsoids. In a second step, published CMB topographies based on seismic tomography are considered and the resulting torques are compared with the simplified case. Results from this study will be used for the further extension of our core-mantle coupling model by the gravitational core-mantle coupling.