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Impact of the Earth's core on Earth's rotation

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The core-mantle interaction was included in a numerical, non-linear three-layered model of the Earth's rotation, based on the angular momentum balance. We investigated the dynamical behavior of a fluid outer core and a solid inner core inside the Earth, related to the mantle by inertial coupling torques. The comparison of model results for the Free Core Nutation, the Free Inner Core Nutation and the Chandler Wobble with the observed and expected rotation parameters of the Earth gives new insights on the core-mantle and inner-core coupling torques as well as on damping properties due to rotational deformation. The model also allows a detailed investigation of the dynamic motion of the solid inner core inside the liquid outer core. We present results obtained for various forcing and damping conditions including rotational deformation.