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# Core dynamics and the nutations of the Earth

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We here present an overview of the recent activities within the project RotaNut – Rotation and Nutation of a Wobbly Earth, an ERC Advanced Grant funding from the European Research Council. We have recomputed the Basic Earth Parameters from recent VLBI series and we interpret them in terms of physics of the Earth's deep interior. This includes updates of the nutational constraints on Earth's internal magnetic field and inner core viscosity, as well as of the coupling constants at the core-mantle boundary (CMB) and inner core boundary (ICB). We have explored on simplified Earth models the interactions between rotational and inertial modes. With the help of numerical simulations, we have also addressed the coupling between the global rotation and the inertial waves in the fluid core through parametric instabilities. Special interests have been given to the influence of the inner core onto the stability properties of the liquid core and the large scale formation in the turbulent flow through inverse cascade of energy. The role of precession and nutation forcing for the liquid core is characterized as well as the interaction between the Free Core Nutation (known as the spin-over mode in the fluid core community) and inertial waves. This research represents the first steps in the project RotaNut financed by the European Research Council under ERC Advanced Grant 670874 for 2015-2020.