

3.5.6.6 Special Bureau for the Core

Introduction

Flow in the fluid outer core, and also motion of the inner core with respect to the outer core, can result in various geodetic phenomena observable from the Earth's surface or space. These phenomena include variations in the Earth's rotation and orientation, surface gravity changes, geocenter variations, and surface deformations. Although small, these variations can or could be observed by very precise space geodetic techniques. Observation of these effects yields unique insight into the core, which cannot be observed directly, and the resulting better understanding of the core will lead to improved models and predictions for the geodetic quantities.

Activities

The Special Bureau for the Core is responsible for collecting, archiving, and distributing data related to the core and plays a role in promoting and coordinating research on this topic. In particular, the SBC focuses on theoretical modelling and observations related to core structure and dynamics (including the geodynamo), and on inner core – outer core – mantle interactions. The SBC has about twenty members from the fields of geomagnetism, Earth rotation, geodynamo modelling (numerical and experimental), and gravimetry. The SBC has set up a web site (www.astro.oma.be/SBC/main.html) as the central mechanism for providing services to the geophysical community. Since one of the goals of the SBC is to distribute general information on the core, to make the geophysical community aware of the various geodetic effects that could be linked with the core, and to stimulate, support and facilitate core research, we present on our website concise explanations on topics as core convection, core flow, geomagnetism, core-mantle boundary torques, inner core differential rotation, Earth's rotation changes due to the core, and core composition. Additionally, we have built and continuously update a bibliography of articles relevant to the core that at present contains more than a thousand references.

Data products

The web site presently contains nine different sets of model data on core flow and core angular momentum. The data are based on the observed surface geomagnetism field, and various hypotheses and physical assumptions are used to determine the flow and the angular momentum of the core. The core flows and angular momentum variations are all very similar and agree remarkably well with the observed decadal LOD variations. In addition to the data, a description is given of the relevant theories and of the dynamical assumptions used for constructing the flows.

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