GRIMM-2: A CORE MAGNETIC FIELD MODEL DERIVED UNDER FLOW CONSTRAINTS

VINCENT LESUR, Ingo Wardinski, Mioara Mandea

Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences

When deriving a core field model from satellite and observatory data, some smoothing constraints are usually applied to the model solutions. Such constraints lead to core field model temporal behaviors that are not compatible with the frozen-flux approximation. We derived the GRIMM-2 core field model from eight years of CHAMP satellite and observatory vector data. The data selection technique used is the same as in the previous GRIMM version. The field model is co-estimated together with a model of the flow at the top of the liquid outer core. The smoothing constraints are then applied exclusively on the flow model such that GRIMM-2 is compatible with the frozen-flux approximation. Further hypothesis have been considered as tangential geostrophy or possible horizontal diffusion. The small scale structures of the obtained field model, its secular variation and acceleration, are all reliably resolved. We find that the observed geomagnetic jerks can be well described and that the core field acceleration has to vary rapidly in time in order to obtain an acceptable fit to the data.

Geomagnetic jerks, Core field modeling, Core flow

Vincent Lesur, Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences
lesur@gfz-potsdam.de