Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01215, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01215
EGU General Assembly 2008
© Author(s) 2008

Core magnetic field models under flow constraints

V. Lesur, S. Asari, I. Wardinski and M. Mandea
GeoForschungsZentrum Potsdam (lesur@gfz-potsdam.de)

Two recent magnetic field models, GRIMM and xCHAOS, present similar acceleration energy up to Spherical Harmonic (SH) degree 5. However, the power spectra of their accelerations differ significantly at higher degrees, which in turn has strong implication on the interpretation of the secular variation of these models. These differences are due to different approaches in smoothing rapid time variations of the internal field, the amount of smoothing being left to the choice of the modeler. We should therefore look for new, physically meaningful ways of regularizing core magnetic field models. We propose here to constrain field models to be consistent with the frozen flux induction equation. We further request that the liquid outer core flows to have a smooth space and time behavior at the core-mantel boundary. We describe the implementation of such constraints. In particular, for this first approach, we minimize the norm of the first derivative in time of the flow model vector. Preliminary results show that such a constrain has strong effect on the time variation of the core magnetic field models. This constraint also leads to an unique flow model, and effectively regularizes the magnetic field acceleration model for SH degree above 5.