ASSIMILATION OF GEOMAGNETIC OBSERVATIONS IN DYNAMICAL MODELS OF THE SECULAR VARIATION

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Satellite data contribute to a better description of the secular variation of the main geomagnetic field. To make the best use of that (and upcoming) wealth of data, we consider the possibility to resort to data assimilation, as now routinely used in the fields of meteorology and oceanography. Geomagnetic data assimilation aims at identifying the physics of the Earth's core responsible for the secular variation recorded by satellites and in long-lived, ground observatories. Data assimilation should yield a more accurate forecast of the secular variation, and enable the reanalysis of historical observations.
The physics at the heart of our assimilation scheme is based on the assumption that the dynamics responsible for the fast (i.e. interannual) variations of the main magnetic field is quasi-geostrophic. In addition, we describe similarly the magnetic field, in the core interior, using a magnetic flux function, whose dynamics is also two-dimensional. In this presentation, we will focus on the methodological aspects of our assimilation scheme. In particular, we illustrate how the accumulation of successive observations can be used to construct dynamically consistent, time-dependent maps of the magnetic field inside the core.

Dynamics of the core, data assimilation

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