



A geomagnetic perspective on core structure and dynamics

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Earth's magnetic field is produced by the motions of liquid metal in the outer core. The morphology of the field and the characteristics of its evolution therefore carry information concerning the structure of the core as well as the dynamics taking place there. In this invited talk I will present examples of geomagnetic field models constructed for interpretation at the core surface, derived from both historical and modern satellite and observatory measurements.

I will illustrate how geomagnetism can be used to probe the core by considering the following questions: Can the influence of the inner core be discerned in the geomagnetic field morphology? Is the observed core surface field evolution compatible with a stably stratified layer adjacent to the core-mantle boundary?

The dynamics of the core must also ultimately produce the observed geomagnetic field variations. I will highlight those features inferred from recent high quality observations that any successful theory of core dynamics should reproduce. Several models of core dynamics (e.g. the quasi-geostrophic approximation, Taylor state models and full numerical dynamo models) are now being investigated. Possible strategies to assess these competing models will be discussed.