



LONG TERM CHANGES IN THE EARTH'S DIPOLE MOMENT: RECOGNITION AND IMPLICATIONS

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Invited talk

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Variations in the Earth's (axial) dipole moment on time scale of tens of millions of years and longer have the potential to constrain core and mantle evolution but are not easy to ascertain. Firstly, there is the issue of data quality – which measurements are sufficiently reliable to tell us anything? Here, a recently-proposed set of criteria for palaeointensity measurements will be presented and discussed. These take their lead from the widely-used Q criteria proposed by Rob van der Voo more than 20 years ago and have already been applied to 643 site mean palaeointensity estimates in the PINT database (<http://earth.liv.ac.uk/pint/>). Secondly, there is the issue of obtaining a representative time average of the dipole moment – how can we be sure that observed variations are not just artefacts of under-sampling in time and/or space? To gain insight into, and solutions for, this problem it is useful to combine results from both records and models of geomagnetic behaviour. Bringing these two approaches together, the evidence for long-term changes in the Earth's dipole moment will be assessed. Finally, the potential implications of such changes for hypotheses concerning mantle-forcing of the geodynamo, and Earth's thermal evolution, including the age of inner core nucleation, will be discussed.

Keywords: Earth Magnetic Field, Dipole Moment, Paleointensity, Geodynamo