

The Geocentric Axial Dipole Hypothesis - Current Status

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The GAD hypothesis has served the paleomagnetic community well over several decades. As more demands are made for greater accuracy in continental reconstructions and for determining second order aspects of the time-averaged field over the past 5 Myr, it has been proposed that significant departures from the GAD field are and have been present at many times in the Earth's history. These proposed departures from the GAD hypothesis are reviewed and placed in an historical context. Many of these supposed departures can be accounted for in a variety of ways as being due to attempts to obtain second order information from poorly constrained data. In particular it has been proposed that significant axial octupole fields have persisted at many times in the past. Unfortunately the nature of paleomagnetic data is such that many data artifacts manifest themselves by producing artificial axial octupole fields. These artifacts arise most often because there are still too few data of high enough quality globally (especially for pre-Mesozoic times). A small but significant axial quadrupole field seems to be clearly established from current paleomagnetic data. However, until more high quality data are obtained at critical times in the Earth's history (e.g. during the Carboniferous-Triassic) the reality of any proposed significant axial octupole field must be viewed with considerable suspicion.

1. Chapman Conference on Timescales of the Geomagnetic Field 2. Invited 3. (a) M W McElhinny, Gondwana Consultants, 31 Laguna Place, Port Macquarie NSW 2444, Australia (b) +61-2-65846483 (c) +61-2-65846483 (d) mikemce@midcoast.com.au 4. No