Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04274, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04274
EGU General Assembly 2008

A series of five criteria to test the validity of the Geocentric Axial Dipole (GAD) hypothesis in paleomagnetism

K. Korhonen (1), **L.J. Pesonen** (2), D. Evans (3) and A.N. Smirnov (4)

(1) Geological Survey of Finland, PO Box 96, FI-02151 Espoo, Finland, (2) Laboratory of Solid Earth Geophysics, PO Box 64, FI-00014 University of Helsinki, Finland, (3) Department of Geology and Geophysics, Yale University, New Haven, CT, USA, (4) Michigan Technological University, Houghton, MI, USA

The Geocentric Axial Dipole Hypothesis (GAD) is fundamental in assembling the continental blocks back in time using paleomagnetic techniques. Generally, the hypothesis is accepted without testing it. Even if tested, only one method (e.g., inclination distribution) is commonly used. However, the GAD hypothesis can be put into a series of tests using existing high-quality global paleomagnetic data (Pesonen et al., 2003). Here we present a series of five tests using various types of criteria to determine if the GAD hypothesis is valid. The aim is to look whether the GAD field can be distinguished from a prescribed total field (dipole+non-dipole) according to various datasets. The possible criteria are: (1) Observed inclination and intensity curves as a function of latitude are compared with the ones provided by the GAD (thus testing the classical dipole equations). This will be done for both polarities. (2) The latitudinally dependent secular variation VGP scatter curves (PSV) are compared with Model G for both polarities and hemispheres (Smirnov and Tarduno, 2004). (3) The observations provide a way to test paleoclimate latitude indicators such as coral reefs (shallow latitudes), evaporites (shallow to moderate latitudes) and glaciogenic rocks (high latitudes) (Evans, 2006). (4) Reversal simulations may also provide a way to identify strong persistent non-dipole fields. (5) Finally, we can calculate the inclinations to be observed along a trans-continental paleomagnetic sampling, for example data provided by the huge MacKenzie dyke swarm passing almost through the entire North

America (Schmidt, 2001).