Longitudinal asymmetry of the geomagnetic fields

*Ji-Cheng Shao[1] ,Mike Fuller [2],Mike Bevis [2],Fred Duennebier [3]
Yozo Hamano [1]

Faculty of Science, University of Tokyo[1]
Hawaii institute of geophysics an planetology[2]
Geology and Geophysics department , University of Hawaii at Manoa[3]

Analysis of the geomagnetic field on three different time scales has revealed a pattern of longitudinal hemispherical asymmetry. The radial flux appears to be dynamically more active in the hemisphere of the prime meridian than in the Pacific hemisphere. The data analyzed are the International Geomagnetic Reference field (IGRF) from 1900 to 1995, the time-averaged field for the past 5Ma., and the Matuyama-Brunhes reversal. In each case, there are two longitudinal bands of higher radial flux, one at about 50W and the other at about 130E. The fluctuations of the non-axisymmetric part of the field are confined to the hemisphere of the prime meridian on all three time scales. The longitudinal hemispherical asymmetry in the geomagnetic field suggests that the deep structure of the earth departs from spherical symmetry.