

Latitude dependent ASD of VGP and an eccentric dipole

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Shape of distribution of paleodirections from volcanic rocks was analyzed by Bingham statistics for the last 5 my. Significant elongation was observed in field directions from Hawaii while VGP was almost circular. This is considered to support the long disputed "Pacific Dipole Window" hypothesis. When analysis was made for the global data along latitudinal bands, more elongation was observed in field directions than VGPs for low latitude. This confirms the dipole nature of the paleomagnetic field. On the other hand, dominance of a dipole field does not show the latitude dependent ASD of VGP which is larger for higher latitude. To comprise these two features, latitude dependency of ASD was examined for a model in which an eccentric dipole fluctuates around the center of the earth.

Shape of distribution of paleodirections and VGPs from volcanic rocks was analyzed by Bingham statistics for the last 5 my. Significant elongation along the meridian plane was observed in field directions from Hawaii while VGP was almost circular. The elongated distribution of paleomagnetic field indicates that the fluctuation in the field is caused from a Fisherian dipole wobble. Hence this is considered to support the long disputed "Pacific Dipole Window" hypothesis. When analysis was made for the global data along latitudinal bands with band width of 15 or 20 degrees and combined for northern and southern hemispheres, more elongation was observed in field directions than VGPs for low latitude bands. This confirms the dipole nature of the paleomagnetic field.

On the other hand, dominance of a dipole field does not show the well established latitude dependent ASD; the higher the latitude the smaller and the larger for field and VGP, respectively. To explain the latitude dependency of ASD while basic nature of dipole field is remained, variations in field and VGP were examined for a model in which an eccentric dipole with random variation in magnitude and direction also fluctuates around the center of the earth.