

A simple classical model of paleosecular variation

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A simple statistical model of paleosecular variation is proposed. The model consists of a single dipole moment, in which random fluctuation is given to not only its magnitude and direction but also its position around the earth's center. Fluctuation in the position, however, is larger along the equatorial plane than along the earth's rotational axis to meet with the larger variation in degree 2 order 1 terms which is necessary to explain the latitude variation of angular dispersion in the paleomagnetic field. This model also explains most of the features of paleosecular variation; larger circular asymmetry in the field directions than in VGPs at low latitude, not necessarily Fisherian distribution of VGP positions and field directions, neither Gaussian nor log-normal distribution for the observed distribution of VDM. These results may indicate that most of paleosecular variation arises from the dipole if its position is allowed to fluctuate. Hence, this model is the most natural to the geocentric axial dipole hypothesis established for the time-averaged paleomagnetic field.