Hypothesis of the geocentric axial dipole field and apparent paleolatitude

Tadahiro Hatakeyama[1]

[1] IPC, Okayama University of Science

Paleomagnetism has been provided decisive evidences for the plate tectonics and the local geological settings on the Earth's surface for several decades, because the paleolatitude derived from the inclination data is one of the few observations by which the absolute posision on the Earth (laitude) of the outcrop. However, the adequecy of a precondition of calculating paleolatitudes from mean inclination of the paleomagnetic data, the GAD hypothesis, has been quested by many researchers and regarded as an incorrect condition (e.g. Tauxe and Kent, 2002). There are two causes of the discrepancy between actual mean field and the GAD hypothesis. One is the nondipolar component like as the geocentric axial quadrupole (GAQ) component in the time-averaged geomagnetic field (e.g. Wilson, 1970; McElhinny et al., 1996). The other is the apparent effect due to the averaging field component of the paleomagntic direction data (e.g. Kono, 1997; Hatakeyama and Kono, 2001).

In this talk, we provide a formulation of above factors in the time-averaged field (TAF) with paleosecular variation (PSV) as a fluctuating field. We also discuss the implications of the correction of the mean inclinations and paleopoles for the applied studies. The result indicates that the effect of the shift from the GAD hypothesis can be calculated with assumption of TAF and PSV models derived from other analysis, and that the effect should be comsidered when one needs the absolute paleolatitude from the paleomagnetic direction dataset.