

Geomagnetic field intensity during the last 5 Myr deduced by the LTD-DHT Shaw method

Yuhji Yamamoto[1]

[1] Geological Survey of Japan, AIST

The geomagnetic field generated by the geodynamo is one of the most important properties of the Earth. As the intrinsic field can be approximated by a dipolar one with time variation, it is essential to know past geomagnetic dipole moments by measuring absolute paleointensities from volcanic rocks. Since 1970s, the “Thellier-Thellier” and the “Shaw” families of paleointensity methods have been most commonly used. The former method basically utilizes the thermal demagnetization while the latter applies the alternating field (AF) demagnetization. After 1990s, however, most paleomagnetists have considered the Thellier-type method as the most reliable. Recent discussions on the past geomagnetic dipole moments are mostly based on the global palaeointensity data set obtained by the Thellier method with the pTRM check (Thellier & Thellier 1959; Coe et al. 1978).

However, recent studies have revealed that the Thellier method occasionally overestimates palaeointensities by as much as twice the true values (e.g. Yamamoto et al. 2003). Alternatively, the group at Tokyo Institute of Technology, Japan, has developed a significantly improved version of the original Shaw method (Shaw, 1974), i.e. the LTD-DHT Shaw method (Tsunakawa et al. 1997; Yamamoto et al. 2003). This method utilizes individual ARM corrections (Rolph and Shaw, 1985), a double heating test (Tsunakawa and Shaw, 1994), and low temperature demagnetization (LTD). During the past few years, our group has shown successful applications of this method using several historical lava flows (Yamamoto et al., 2003; Mochizuki et al., 2004; Oishi et al., 2005).

In recent years, our group has extended the application to older rocks. I have been particularly working on rocks formed during the last five million years. I will show results of these applications from the Society Islands (0.5-4.6 Ma; Yamamoto and Tsunakawa, 2005) and several Quaternary volcanoes in Japan (0-1 Ma). Based on these data, I will discuss the preliminary statistical property of the recent geomagnetic field.