Past 5 Ma geomagnetic field intensities inferred from the paleomagnetism of the Society Islands, French Polynesia

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The paleointensity of the geomagnetic field is able to characterize the ancient geodynamo as well as the polarity reversal. It has been believed that the time-averaged virtual dipole moment (VDM) and virtual axial dipole moment (VADM) for the last few million years are almost the same as the present geomagnetic dipole moment (nearly 8*10^22 Am^2) on the basis of the volcanic paleointensity database (e.g. Kono and Tanaka, 1995). This estimation is, however, questionable because a large number of the less reliable paleointensities are involved in the database (e.g. Juarez and Tauxe, 2000).

Therefore, we have applied the double heating technique of the Shaw method combined with the low temperature demagnetization (LTD-DHT Shaw method) to volcanic rocks from the Society Islands, French Polynesia, in order to extract the reliable geomagnetic dipole moments. According to our K-Ar dating on the selected samples from 52 sites, they range from 0.5 to 4.6 Ma. If we consider the previously reported paleomagnetic polarities (Yamamoto et al., 200), the resultant magnetostratigraphy agrees well with the geomagnetic polarity time scale by Cande and Kent (1995). The LTD-DHT Shaw method provided 179 successful paleointensities. After applying further strict selection criteria, they gave 24 reliable site-mean paleointensities with a mean VDM of 3.58+/-1.97*10^22 Am^2 and a mean VADM of 3.70+/-1.95*10^22 Am^2. They are about 50% lower than the previous estimation, indicating that the present-day field is very intensive and thus it may not be representative of the geomagnetic field.