

Decay of natural remanent magnetization of oceanic basalt on the back-arc spreading axis in the southern Mariana

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Magnetic anomaly high on a spreading axis has been a well-known character of the magnetic anomalies in the ocean, which is mainly related to magnetization intensity reduction of oceanic basalt due to alteration (low-temperature oxidation of titanomagnetite). For a better understanding of natural remanent magnetization (NRM) of oceanic basalt, we studied NRMs of basaltic rocks in the back-arc spreading axis in the southern Mariana. One to four meter cores were drilled from the seafloor by using a BMS in the cruise of TAIGA project (Taiga10M). Block samples were also collected during the dives of SHINKAI6500 in the cruise YK10-11. NRM intensities of these samples show a clear decrease within 2 km from the ridge axis. This value is consistent with a reported value in East Pacific Rise. These data suggest that the alteration has completed within 2 km distance from the ridge axis. Consistent scales from different ridges suggest that the NRM intensity reduction, which can be also observed as magnetic anomaly variation, may be related to the structure of ridge axis, for example, active hydrothermal circulation zone. Discussions of previous studies assume that the alteration process of ocean basalt is associated with age.

Keywords: oceanic basalt, natural remanent magnetization, magnetic anomaly, Mariana, hydrothermal circulation, TAIGA project