Investigating the effects of high temperature and a deep SMTZ on rock magnetic properties at Site C0023, IODP Expedition 370

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In 2016, International Ocean Discovery Program (IODP) Expedition 370 drilled Site C0023 in the Nankai Trough, off Cape Muroto (Shikoku Island, Japan, NW Pacific Ocean) [1]. The aim of this expedition was to explore the limits of life in the deep subseafloor sediments in a high temperature environment (up to 120°C), and to investigate, among other objectives, the processes at the biotic-abiotic transition. A deep sulfate-methane transition zone (SMTZ) was identified between 630 and 750 meters below sea floor (mbsf). Based on the magnetic data profiles and results from previous ODP expeditions in the area, four magnetic zones were defined mostly reflecting changes in detrital supply and alteration/diagenetic features.

Here, a rock magnetic study is conducted in order to document the downhole changes in magnetic properties and magnetic mineralogy (content, grain size and composition of the magnetic mineral assemblage) related to post-depositional diagenetic processes from 200 to 1100 mbsf, with a focus on the deep SMTZ. Natural remanent magnetization and its alternating-field demagnetization, magnetic susceptibility and acquisition of isothermal remanent magnetization are measured on 225 discrete samples for concentration and composition of the magnetic assemblage. Hysteresis properties and first order reversal curves are measured on respective dry powders for magnetic grain size study and composition of the magnetic assemblage. The preliminary rock magnetic results are presented and discussed based on the shipboard inorganic geochemical data. They will be compared to another identified deep SMTZ at IODP Expedition 350 Site U1437 in the Izu Bonin rear arc (NW Pacific Ocean).

[1] Heuer, V. *et al.* (2017) Expedition 370 Preliminary Report. *International Ocean Discovery Program*. http://dx.doi.org/10.14379/iodp.pr.370.2017