

Vitrinite reflectance of carbonaceous materials in cuttings retrieved during the IODP Expedition 348

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Integrated Ocean Drilling Program (IODP) Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) Expedition 348 took place from 13 September 2013 to 29 January 2014. During the Exp. 348, cuttings, core samples, mud gas, and logging data were collected from Holes C0002N and C0002P down to 3058.5 mbsf. Four lithologic units were identified at Site C0002 based on geological and geochemical characteristics of core and cuttings samples: Unit II (475-512.5 mbsf in Hole C0002M), Unit III (875.5-975.5 mbsf in Hole C0002N), Unit IV (975.5-1665.5 mbsf in Hole C0002N), and Unit V (1665.5-2325.5 mbsf in Hole C0002N, and 1965.5-3058.5 mbsf in Hole C0002P)(Tobin et al., 2015).

To evaluate whole thermal structure of the Site C0002, we performed vitrinite reflectance analysis for cuttings samples collected every 100 m of Holes C0002N and C0002P. Vitrinite reflectance (R_o) is an indicator to estimate maximum paleotemperature, which has been widely applied to reveal tectonic evolution of on-land accretionary complex (e.g. Underwood et al., 1992; Sakaguchi, 1996; Ohomori et al., 1997) and thermal anomalies along fault slip zones reflecting frictional heating due to seismic slip (e.g. Sakaguchi et al., 2007; Sakaguchi et al., 2011). This is the first study that applied vitrinite analyses systematically to the entire modern accretionary prisms.

In this presentation, we report preliminary results of vitrinite reflectance analysis. R_o values are 0.15 to 0.20 in Unit III (forearc basin strata), 0.20 to 0.27 in Unit IV (accretionary prism strata), and 0.20 to 0.45 in Unit V (hemipelagic sediment). In general, R_o values tend to be gradually and continuously increasing with depth. Estimated paleotemperatures of Unit IV and V are approximately 40 °C and 90 °C, respectively, which are consistent with estimated modern temperatures (Sugihara et al., 2014).

Keywords: vitrinite reflectance, carbonaceous matter, paleotemperature, accretionary prism