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Sediment composition analysis and FT dating of the Shikoku Basin sediments drilled in the IODP Exp.322

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Sedimentary rocks in the Shikoku Basin had been drilled and recovered at Sites C0011 and C0012 during the IODP Exp.322 in the NANTROSEIZE project by the drilling vessel "Chikyu". The recovered sedimentary rocks spanned from 20 to 5 Ma and include following six lithologic units above basaltic basement; Unit I: Late Miocene to Holocene hemipelagic mud intercalated by volcanic ash layers, Unit II: Late Miocene tuffaceous sandstone interbedded with hemipelagic mudstone, Unit III: Middle to Late Miocene hemipelagic mudstone, Unit IV: Middle Miocene turbidite sandstone and mudstone interbedded with hemipelagic mudstone, Unit V: Early to Middle Miocene hemipelagic mudstone interbedded with tuff beds and volcanoclastic turbidites, Unit VI: Early Miocene pelagic mudstone. This study attempts to provide some implications for the tectonic, volcanic and climatic evolution of Southwest Japan based on sandstone petrography, palynological analysis, organic carbon analysis, tephra analysis and fission-track dating of the lithologic units I to V.

Four fission-track ages of 15.1 ± 0.5 Ma, 16.1 ± 1.2 Ma, 15.8 ± 0.5 Ma, 14.7 ± 0.9 Ma were dated from tuff beds in the Unit V at Site C0011. A fission-track age of 13.2 ± 0.7 Ma was dated from volcanoclastic sandstone in the Unit V at Site C0012. Both turbidite sandstone in the Unit IV at Site C0011 and volcanoclastic sandstone in the Unit V at Site C0012 contain biotite, garnet, zircon and apatite. Refractive indices of plagioclase in these sandstones indicate that they have characteristics of the Type I composition of Yamashita et al. (2007). Mineral assemblages of sandstone and fission-track ages of the Unit IV and V indicate that origin of sandstone might have been the Kumano Acidic Rocks in the Kii Peninsula. Uplift of the Kii Peninsula at around 15 Ma (Hasebe et al. 1993) may have caused erosion and transportation of abundant acidic rock grains from the Kii Peninsula.

Tuffaceous sandstones in the upper part of Unit II yield characteristic mineral assemblages, which consist of pumice, volcanic glasses (<30%), opx, cpx and hornblend. These tuffaceous sandstones might have been derived from the Izu-Bonin back arc felsic volcanoes in Late Miocene or from other origins.

Four palynological zones I to IV in descending order have been identified within hemipelagic mudstone intervals in the Unit I to V at Site C0012. The palynological zones I - III, equivalent of the Unit V - III in Middle Miocene to early Late Miocene, had characteristic taxa in warm climate. A genus *Tsuga* had increased within the palynological zone IV, equivalent of the Unit II and I. This indicates cooling in climate in Late Miocene. The pollen assemblages lack both tropical and subtropical elements and are consistent with those derived from lowlands to lower slopes in Southwest Japan. However, abundance of fossil pollen was one order or more less than that reported from land sections and wells in Japan. These characteristics in pollen assemblages might provide significant implications for the paleo-position of the drilled sites as well as paleoclimate reconstruction of Southwest Japan.

Keywords: IODP, Shikoku Basin, turbidites, composition, Fission-Track dating