

Provenance change in around 3Ma at IODP Site C0011, off Nankai Trough

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Sr-Nd-Pb isotope ratios and chemistry of silicate portion of hemipelagic mud taken from IODP site C0011 suggest that Asian dust flux had rapidly decreased since 3 Ma. Asian dust is known to originate from soils of inland China, which are characterized by much higher Sr, Pb and much lower Nd isotope ratios than those of Japanese rocks and sediments. Results of isotopic analysis of silicate portion show that the isotope ratios of Sr and Pb decrease, and that of Nd increases upward rapidly across the horizon corresponding to 3Ma in age. This indicates the rational decrease of Asian dust particles in the sediments since 3Ma. Because the paleomagnetostratigraphy of C0011 shows that the sedimentary rate had rapidly decreased since 3 Ma (Expedition 333 Scientists, 2011), the rational decrease of Asian dust in the sediments means the decrease of its flux to this site at that time. Decrease of biogenic flux of silica or carbonates cannot explain the slowed depositional rate considering the fact that there is no increase in bulk Al_2O_3/SiO_2 at around 3 Ma, and that bulk CaO and content of calcium carbonate had rather increased since 3Ma. Because there is no period of significant decrease in Asian dust flux to the North Pacific since its rapid increase at 3.6 Ma (Rea, 1994), the decrease of the flux at Site C0011 may reflect some local events around Shikoku Basin. Such events considerable include cutoff of the dust path to Shikoku Basin by the uplifted Japan island arc and the entrainment of surficial suspended particles by the Kuroshio current, which is estimated to have started to influence the sea surface of site C0011 around 3 Ma due to the plate motion.

Keywords: Nankai Trough, Shikoku Basin, Hemipelagite, Sr-Nd-Pb isotopes, Asian dust