Provenance changes of dust in the sediments of the Japan Sea associated with westerly jet shifts since 5 Ma.

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The uplift of Himalaya and Tibetan Plateau (HTP) exerted a great impact on the establishment and intensification of East Asian monsoon (EAM). Land-Ocean linkages over orbital and millennial timescales under the influence of the EAM also attract our attention. According to Janecek and Rea (1983) and Rea et al. (1998), North Pacific dust flux increased gradually between 25 and 3.6 Ma and then increased rapidly at 3.6 Ma. Previous studies on the Japan Sea sediments revealed that onset of millennial-scale variability of East Asian summer monsoon (EASM) at 2.7 Ma, and amplification of millennial-scale variability of EASM at 1.5 Ma (Tada, 2005; Tada et al., 2018). EASM shows distinct millennial-scale variations, which has been associated with changes in the dust provenance probably reflecting changes in Westerly Jet (WJ) path (Nagashima et al., 2007, 2011).

Here we report provenance changes of quartz in the fine silt fraction (4-32 μm) of the Japan Sea sediments, which is basically composed of the aeolian dust, at IODP Site U1425 during the last 5 Ma using electron spin resonance (ESR) intensity and Crystallinity Index (CI) of quartz to specify the dust sources and changes in their relative contributions. Our result suggests that North (larger contribution of dust from the Taklimakan Desert)-South (larger contribution of dust from Mongolian Gobi) shifts of westerly jet seems to be paced by 405-kyr-long eccentricity cycles. We also analyzed grain size and clay mineral composition of the fine silt fraction to further characterize the dust sources. Combined with linear sedimentation rate (LSR), Dry bulk density (DBD), and XRF core scanner (ITRAX) data, we intend to reconstruct dust fluxes from individual sources and their temporal changes during the last 5 Ma.

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