High-resolution XRF core scanner analysis of the Japan Sea sediments (IODP U1425) and its paleoceanographic implication

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Quaternary hemipelagic sediments of the Japan Sea have distinct dark and light layers, and these layers are correlated with Dansgaard-Oeschgar cycles (Tada et al., 1999). Previous studies revealed that these dark and light layers are characterized by variations of organic content and C/S ratio, the latter reflecting sea floor redox state, calcareous and siliceous production rates (Tada et al., 1999), and aolian dust and terrigenous fluxes (Irino and Tada, 2000; 2002) for last 200kyr. In the summer of 2013, IODP Exp. 346 drilled hemipelagic sediments of the Japan Sea, and revealed that these dark and light layers became distinct around 1.5 Ma (Tada et al., 2015). However, variability of these dark and light layers and other paleoclimate proxies with respects to their periodicities and amplitudes in association with Glacial-Interglacial cycles are not well studied because high-resolution quantitative analyses of thousands of samples generally require significant time and efforts. High-resolution and high-speed analytical methods are necessary with this regard so as to reveal millennial-scale variability of paleoclimate proxies during last 2.6Myr, entire Quaternary.
In this study, we conduct high-resolution, high-speed analysis of chemical composition using XRF core scanner (ITRAX) in CMCR (Center for Advanced Marine Core Research), Kochi University, to examine elemental variability in association with dark and light layers in the hemipelagic sediments of the Japan Sea. We used sediments recovered from Site U1425 located on Yamato Rise. We analyzed top ~100m of the sediments with 2mm resolution, and obtained elemental variability of entire Quaternary with 20 to 200 years resolution. In this presentation, we will show high-resolution reconstruction of burial rates of biogenic silica and carbonate, bottom redox state, aolian dust and terrigenous fluxes at the site during the entire Quaternary.

Keywords: XRF core scanner, Quaternary, dust, dark and light layer, redox, IODP Exp. 346

