

East Asian winter monsoon fluctuation revealed by ice-rafted debris occurrence in the northern Japan Sea

*Ken Ikehara¹

1. Institute of Geology and Geoinformation, National Institute of Advanced Industrial Science and Technology

Asian monsoon is composed of summer and winter monsoons. The East Asian winter monsoon (EAWM) over the Japan Sea is typically characterized by cold, dry northwesterlies from the Siberian High. These cold winds cool the surface water along the far eastern coast of Russia and promote the formation of a young deep-water mass (Japan Sea Proper Water: JSPW). According to modern global warming, the formation of JSPW has been deduced, and oxygen concentration of the JSPW was reported to be reduced. Therefore, it is very important to understand the fluctuation of EAWM on glacial-interglacial and millennial time-scales. Previous studies on modern- and paleo-oceanography indicated that surface water temperature in the northeastern Japan Sea and sea-ice condition (ice-rafted debris (IRD) occurrence) in the northern Japan Sea are good proxies of the EAWM. Previous studies, however, reconstructed the EAWM fluctuation only for the past 160 ka. Thus, IRD counting is applied for the sediment cores of MIS 6 to MIS 12 at IODP Exp. 346 site U1422 in the northern Japan Sea. The result indicates clear fluctuation with much IRDs during MIS 6, late MIS 7, MIS 8 and early MIS 10, and low IRDs during mid MIS 7, MIS 9 to mid MIS 10 and MIS 11-12. There are fluctuation in much finer time-scale suggesting the presence of millennial time-scale fluctuation of the EAWM.

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