

Paleoceanographic changes in the continental slope in the Central Basin of the Ross Sea since the last glacial

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Abstract

We present the preliminary data on sediment gravity core (KI-13-GC2) and box core (KI-13-BC3) collected in the continental slope (71°52.5'S, 177°48.1'E, 1,800 m deep) of the Central Basin located at the mouth of the Joides Basin in the Ross Sea (Antarctica) during the KOPRI ANA03B cruise onboard the IBRV ARAON in February 2013 through a joint project between Korea and Italy. Comparison of downcore sediment properties between gravity core (KI-13-GC2) and box core (KI-13-BC3) revealed that a slight portion (about 3~4 cm thick) was lost from the core-top of gravity core, confirming that box core (KI-13-BC3) preserves the Holocene interval. Several important events were observed clearly from the downcore variation (KI-13-GC3) of sediment properties represented by sedimentological, clay mineral and geochemical data. Degree of MS is closely related to the amount of sand fraction, supporting the dominant sediment supply by the glacial activity. High biogenic opal intervals coincide with high total organic carbon (TOC) intervals, indicating the increase of diatom productivity under the open ocean condition. However, high biogenic opal layer without high TOC content may be a result that sediments were transported from the erosion of the continental shelf sediments. A upper high TOC interval corresponds to high CaCO₃ interval, whereas the lower high TOC interval shows poor CaCO₃ content, indicating the different preservation of biogenic carbonate presumably by the bottom water property. Otherwise, the carbonate production was enhanced. High smectite intervals may be attributed to the sediment provenance change, indicating sediments originated from the dominant volcanic rocks in the hinterland. Despite poor chronology, core KI-13-GC2 delivers several paleoceanographic changes in the continental slope of the Central Basin in the Ross Sea.

Keywords: paleoceanography, sediment properties, Ross Sea