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Northern Indian Ocean bottom water condition for the last glacial-interglacial cycle: Evidence from redox-sensitive elements

NISHA KUMARI[1] AND SUSHANT NAIK[2]

[1]CSIR- National Institute of Oceanograpghy
[2]National Instiute of Oceanography
Presenting Author: nisha.121kumari@gmail.com

The bottom water oxygen condition can be oxic (>2 mL O_2 L^{-1}), suboxic (2.0-0.2 mL O_2 L^{-1}), and anoxic-euxinic conditions (0.2- 0 mL O_2 L^{-1}) based on the presence or absence of oxygen at the sediment-water interface. It is mainly driven by two factors: export productivity and the deep water circulation. In this study we investigate the bottom water oxygenation condition in the northern Indian Ocean for over the last glacial-interglacial cycle using gravity core SSD-044/GC-01(4.99° N; 76.99°E ; 3160 m water depth) collected from the Central Equatorial Indian Ocean. The core is presently bathed by the Upper Circumpolar Deep Water (UCDW), consisting mixture of both North Atlantic Deep Water (NADW) and Antarctic Bottom Water (AABW). Here, the concentration of redox-sensitive elements like V, Cr, Co, U and Th from the sediment is used to decipher the past oxygen conditions at the bottom water. The enrichment of redox sensitive elements during the Last Glacial Maxima (LGM) indicates suboxic condition prevailed at that time. The concentration of the V, Cr, Co and U/Th decreased during the deglaciation suggesting incursion of oxygen-rich northern sourced bottom water. Depletion of concentration of redox elements during the Holocene indicates the bottom water condition at the core site was oxic. These changes in the bottom water oxygenation condition in the northern Indian Ocean is in response to the deep water circulation changes. This redox-elemental data and the previously reported ventilation record for the same core suggests that there has been variations in the contribution of NADW and AABW in the northern Indian Ocean.