

Reconstruction of Quaternary Indian monsoon variability by geochemical analyses of marine sediments of the Gulf of Aden

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The most characteristic climate system in NW Arabian Sea is monsoon circulation. In Arabian monsoon, there are two seasonal winds, the southwest monsoon (SW monsoon) which blows in summer and the northeast monsoon (NE monsoon) which blow in winter. In general, these monsoon circulations are known to be controlled by insolation which reflects the earth's orbital condition.

In this study, we used two marine sediment cores from Gulf of Aden (KH00-05 Cruise), GOA4 (western part of Gulf of Aden) and GOA6 (boundary of Gulf of Aden and Arabian Sea). By analyzing the organic carbon content and its stable isotope ratios, CaCO₃ content, major elements, trace elements and REEs, we reconstructed the Quaternary monsoon variability in the NW Arabian Sea. The result, SW monsoon is dominant around the eastern part of the Gulf of Aden, however, its effect is rather low in the western part of the Arabian Sea. Thus, the western part of Arabian Sea is under more complex environments than eastern part because NE monsoon and NW wind from Arabian Peninsula are more effective there. Although the strength of monsoon system is correlated with mainly glacial-interglacial cycles, they also have rapid, short-term variations. Especially, there were especially rapid changes of monsoon circulation in 135 ka (deglaciation from MIS 6 to MIS 5) and 22 ka (deglaciation from MIS 2 to MIS 1), and this suggest that NW Arabian Sea was in very similar climatic condition during these deglaciations. These rapid changes which follow no glacial-interglacial cycles might be the results of the interaction between atmosphere, ocean systems and monsoon.