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Category: Ocean and Atmospheres

Paper ID: 57-OOA-A1956

Title: Radiogenic isotopes (Sr, Nd) and clay mineralogical changes of clastic sediments in the Bay of Bengal for the last ~30,000 years

Abstract: RE-SUBMIT Clastic sediments of deep sea cores have different source and transport pathways. These particles are brought to the oceans by various processes such as the wind transport, surface circulation, hemipelagic processes and bottom circulation. Sr and Nd isotopic compositions of these sediments provide useful tool to determine their provenance and transport pathways. Erosional products from Himalayan-Tibetan region are drained into the northeast Indian Ocean through major rivers like Ganges, Brahmaputra, Irrawaddy and Salween. Since large volume of sediments in the Bay of Bengal and Andaman Sea are primarily brought down by these river systems, they preserve imprints of the erosion and weathering history of Himalayan region. On short time scale variability in the erosional products is directly related to the changes in monsoonal precipitation over the mountains Here we present the Sr and Nd isotopic and clay mineralogical compositions of non-carbonate fractions from two deep sea sediment cores from northeast Indian Ocean. Age model for these cores (collected from 12oN and 5oN on 90oE) is based on fifteen radiocarbon dates of the bulk sediment samples. Sedimentation rate in both the cores varies considerably from 2.1 cm/kyr to 7.7 cm/ kyr, with an average rate of 4-5 cm/kyr. Sedimentation rate in the northern core decreased considerably during the last glaciation, whereas no significant change was observed in the southern core. The 87Sr/86Sr, ☐Nd (o) and clay mineralogical compositions show variations during LGM and Holocene times and suggests their relationship with monsoonal regimes. Sr and Nd record of the northern core exhibits more radiogenic Sr and Nd, whereas southern core shows relatively less radiogenic values indicating difference in the source of sediments at these locations. The results clearly indicate that the provenance of sediments at Ninetyeast in the Bay of Bengal is distinctly different from the Fan sediments. Characteristic Nd isotopic signatures in both these cores indicate that ☐Nd is a reliable tracer to identify provenance of sediments. Sediments belonging to the LGM are characterized by increase in 87Sr/86Sr, less negative ☐Nd (o) values and a decrease of kaolinite+smectite/(illite+chlorite) ratios indicating decrease in chemical weathering. 87Sr/86Sr and ☐Nd (o) records of southern core indicate significant changes during the last glacial period. Abrupt changes of less radiogenic Sr correspond to more radiogenic Nd at an interval of 5.4 to 6.8 ka (time interval of North Atlantic Heinrich events). These high-amplitude oscillations in 87Sr/86Sr and ☐Nd (o) suggest that the source of terrigenous supply has varied on sub-Milonkovitch timescale. These oscillations in isotopic compositions are probably related to the monsoon derived fluctuations in the sedimentary input.

Presentation Mode: Oral

Keywords:

Status: Pending.

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