Abstract Details

<u>AOGS 1st Annual Meeting</u> > <u>Ocean and Atmospheres</u> > Seawater Nd isotopic composition in the northeast Indian Ocean : response on LGM-Holocene climate changes >

Corresponding Author : Ms. vathachira padma (<u>vathachira padma@yahoo.co.in</u>) Organization: National Geophysical Research Institute, Hyderabad, India Category: Ocean and Atmospheres Paper ID: 57-00A-A1691 Title: Seawater Nd isotopic composition in the northeast Indian Ocean : response on LGM-Holocene climate changes **Abstract:** Previous studies have established that seawater neodymium isotopic composition $(\Box Nd)$ is characteristic to major oceans like Pacific, Atlantic and Indian Ocean. Since the residence time of neodymium in seawater is short compared to the mixing time of the oceans, the distribution of Nd in seawater shows regional variations. These variations have resulted from continental weathering and erosion, ocean circulation and mixing of water masses. Old continental crust has less radiogenic $\Box Nd \Box \Box$ while mantlederived volcanic rocks and mid-oceanic ridges have more radiogenic □Nd□□□values. Therefore erosional fluxes bring various isotopic signatures to the oceans. The distribution and isotopic compositions of Nd in sea surface waters thus make it possible to deduce the input sources (fluvial, coastal/eolian etc). Here, we present a seawater Nd isotopic record $(\Box Nd \Box \Box vs Age)$ for the past ~25,000 years, using chemically cleaned species of planktonic formaminifera from an ocean core (SK-72; ~10oN and 90oE) in the Bay of Bengal. The core top values obtained ($\Box Nd = \sim 11.0$) show good agreement with the present day surface seawater Nd isotopic composition of the same area. Our record shows a very sharp change of about 4 epsilon units in the \Box Nd, from the last glacial maximum (LGM) to the Holocene. The shift also shows a remarkable correspondence with the □180 of planktonic foraminifera (G. ruber) of the same core. This suggests a process, that controls the Nd isotopic composition at this site, which responds in phase with the global climatic cycle. The glacial-interglacial variation at this site, we suggest, is the result of changes in Indian summer monsoon intensity / changes in erosional input due to wide spread glaciation. During Holocene, the southwest monsoon was reported to be very active and therefore fresh water inflow was very high from Ganges - Brahmaputra and Irrawaddy. This with an average \Box Nd of ~ -15 when mixed with the Indian ocean water of ~ - 8 \Box Nd can give an average of ~ -11, the present day sea water \Box Nd. However, the glacial period was reported to have a weak summer monsoon and thereby very low input of fresh water. But the wide spread glaciation in the in the uplifted Himalaya-Tibet and Burman ranges would have enhanced glacial weathering as suggested by Armstrong (1971) of young volcanic rocks present in these areas and this erosional flux having higher radiogenic Nd is brought to the northeast Indian ocean. A similar variation is observed in the \Box Nd of host sediments too. The above observations suggest that the Nd isotopic variation recorded by the host sediments which closely follows the variation recorded by planktonic forminfera, reflect local changes in terrigenous input. Our results are consistent with a similar published record from ODP site 758 (5oN and 90oE) although a north-south gradient is observed in the values. This gradient, we suggest could be the result of differential mixing of seawater at the two locations. These results indicate that Nd is strongly influenced by local sources. Other possibilities of glacial-interglacial variations in □Nd are also discussed.

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