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Pb Isotope Data from Deep-Sea Sediments from the Southwestern Indian Ocean and the Southeastern Arabian Sea

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Ferromanganese nodules have been shown to preserve records of seawater Pb and Nd which are recoverable on the million year timescale (up to and beyond 20 Ma) and whose changes are related to palaegeographic changes and tectonic events (e.g. Abouchami and Goldstein, 1995; V. Blanckenburg et al., 1996; Frank et al., 1999; Abouchami et al. 1999). By comparison sediment samples have not been the case of attraction so far. The target of this project is to find out whether or not sediments are also suitable for using radiogenic isotope data as indicator for changes in past ocean circulation. The advantage of using pelagic sediments is to have a high-resolution record on the timescale of 10 to 100 kyr which identify recent climatic changes in contrast to ferromanganese nodules operating on the timescale of million of years. A disadvantage of deep-sea sediments is the possibility of mixing of different Pb signals deriving from the detrital and authigenic phase. In this context Pb isotope measurements of bulk and leached sediment samples of core MD96-2077 (Natal Margin, Southwest Indian Ocean, 33^0 $10^{1,}$ S, 31^0 $14^{1,}$ E; 3781 m) have been undertaken to separate the different imprints of the sources of Pb. As there is no reliable chronology available at present for this core, samples were chosen on the basis of the chronology of the SST based on $U_{K'}37$ index alkenones (pers. com. Sonzogni and Bard, 2000). The obtained sample data show two distinguishable Pb signatures: total and leached sediments exhibit a $_{206}Pb/_{204}Pb$ ratio of 18.94 to 19.08 (10 samples) and 18.99 to 19.16 (13 samples), respectively within the period of 10 to 500 kyr. This Pb signature is within error in the range of Pb data obtained for ferromanganese crusts in the Southern Indian Ocean (e.g. Abouchami and Goldstein, 1995). By contrast the Pb isotope signature of the residual phase displays a less radiogenic Pb component of 18.27 to 18.79 (12 samples) for the same time slice. In order to reveal if the observed signals reflect rather a global or a regional feature Pb isotope data of core MD90-0963 (Southeastern Arabian Sea 05^0 $04^{1,}$ S, 73^0 $53^{1,}$ E; 2450 m) are in progress. For core MD90-0963 a $\delta_{18}O$ chronology is available for the last million years. The TOC and the C37-alkenone records are strongly correlated with each other and are dominated by a clear 22 kyr cyclicity, with high concentrations during glacial oxygen isotopic stages and lowest values during interglacial stages. Also the redox sensitive trace metals in the same sediment are characterized by a 22 kyr cyclicity. Pb isotopes may reveal whether these changes in productivity were also associated with changes in water masses and aeolian circulations.

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