Tracing the Himalayan erosion and weathering products in the Equatorial Indian Ocean using sedimentary lead isotopes

N. P. SUKUMARAN*

CSIR-National Geophysical Research Institute, Hyderabad, INDIA- 500 007

*(correspondence: npsukumaran@ngri.res.in)

Our understanding of a Himalayan sourced lead (Pb) to the northern Indian Ocean (north of 20°S) has largely been known from seawater archives of Fe-Mn crusts and nodules, while Pb isotope records of detrital sediments of continental detritus are entirely lacking. I present here the first measurements of high-precision Pb isotopes performed in the pelagic clays of two sediment cores (AAS-40/GC02 and AAS-27/GC01) raised from the Central Indian Basin (CIB). Analyses were performed using $^{205}Tl/^{203}Tl$ spike to correct for internal mass bias on Multiple-collector ICPMS with an external precision better than 200ppm (2σ).

Measured Pb isotopic compositions of the clays span a wide range from 18.10 to 20.08 for $^{206}Pb/^{204}Pb$, 15.61 to 15.98 for $^{207}Pb/^{204}Pb$ and 38.13 to 40.39 for $^{208}Pb/^{204}Pb$. These variations are much larger than the variations that have been recorded in the long-term evolution of Pb isotopes in the Fe-Mn crusts (#SS 663) and the surface scrapings of Mn nodules from the CIB. The presence of more radiogenic signatures reflects a strong continental imprint of erosional sources to the CIB. In both Pb spaces ($^{206}Pb/^{204}Pb$ vs $^{207}Pb/^{204}Pb$ and $^{206}Pb/^{204}Pb$ vs $^{208}Pb/^{204}Pb$), the CIB clays lie along a fairly elongated and positively correlated linear arrays with more radiogenic values similar to the Ganges river sediments of the Himalayas and the unradiogenic to possible magmatic/volcanic source. Simple isotope mass balance calculations based on two end-member mixing reveals that more than 80% of the clays have been sourced from the Himalayas to the CIB.