

GEOCHEMICAL INVESTIGATIONS ON SOME SEDIMENTS

FROM THE EASTERN INDIAN OCEAN

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ABSTRACT

The geochemistry of sea-bed sediments from the eastern Indian Ocean has been examined to determine their nature, origin and their sedimentary environments. Bulk geochemical analyses were carried out using Inductively Coupled Plasma Atomic Emission Spectrometry. The different phases of the sediments (including mineralogy) were investigated using X-ray diffractometry, chemical partition studies and multivariate statistical analysis.

The chemical analyses revealed that terrigenous sediments in the eastern Indian Ocean have relatively high concentrations of Li, K, Be, Mg, Al, Ti, V, Cr and Fe compared to the average for all the sediments, and occur mainly in the Bay of Bengal and adjacent areas. They are mainly enriched in detrital phases and clay minerals. Relatively high amounts of Be, Mg, Al, Ti, V, Cr, Fe and smectite are identified in sediments derived from the crystalline rocks of peninsula India, compared to sediments carried into the Bay of Bengal from the Himalayan sedimentary rocks. This shows the strong influence of parent material on the composition of the sediments. A high per cent of smectite in sediments from the Java Trench and off the Indian Sub-continent indicates a volcanic precursor for those sediments. The sediments in the Andaman Sea are mainly terrigenous. However, the presence of volcanic glass in the Andaman Sea suggests the local supply of volcanic material. The predominantly terrigenous sediments of the Nicobar Fan between the Bay of Bengal and the pelagic Wharton Basin contain

substantial amounts of Mn, Ni and Co in authigenic phases, showing a strong hydrogenous component in these transitional sediments.

In pelagic sediments predominantly in the south and south west of the study region, the background concentrations of most elements appear to be housed in terrigenous phases of one form or another and superimposed on these are enrichments in authigenic (mainly Mn, Ni and Co) and carbonate (mainly Ca and Sr) phases.