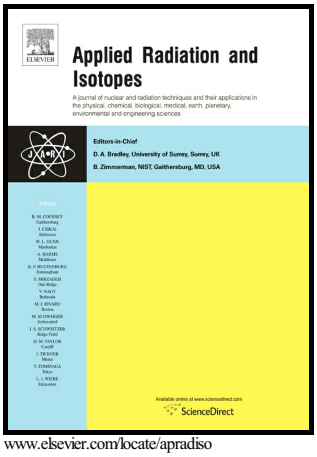

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Distribution of Trace Elements in Core Marine Sediments of Coastal East Malaysia by Instrumental Neutron Activation Analysis

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Abstract: A study was carried out on the distribution and enrichment of trace elements in the core marine sediments of East Malaysia from three stations at South China Sea and one station each at Sulu Sea and Sulawesi Sea. Five stations of sediment cores were recovered and the vertical concentration profiles of six elements namely Br, Cs, Hf, Rb, Ta, and V were determined using the instrumental neutron activation analysis. The enrichment factor, geoaccumulation index and the modified degree of contamination were used to calculate the anthropogenic and pollution status of the elements in the samples. Except for Cs and Hf, which by the enrichment factor are categorized from minimum enrichment to moderate enrichment in all stations and for V and Rb in Sulu Sea and Sulawesi Sea, which are categorized minimum enrichment, other elements are found to be no enrichment at all stations. The geoaccumulation index of Hf in one station shows moderately polluted and for other elements are unpolluted. However, the modified degree values of all samples are less than 1, suggesting very low contamination of elements found in all the stations.

Keywords: INAA; trace elements; enrichment factor; geoaccumulation index; modified degree of contamination; core marine sediments; East Malaysia

1. Introduction

Trace element accumulation in aquatic consumers is of interest to environmental scientists concerned with the fate and effects of contaminants as well as ecologists interested in food web dynamics and trace element biogeochemical cycles (Reinfelder et al., 1998). Sediments are important carriers of trace metals in the hydrological cycle and because metals are partitioned with the surrounding waters, they reflect the quality of an aquatic system. Coastal and estuarine regions are the important sinks for many persistent pollutants and they accumulate in organisms and bottom sediments (Szefer et al., 1995).

Sediments play a major role in determining pollution pattern of aquatic systems (Casas et al., 2003), reflecting the history of pollutants deposition (Singh et al., 2005), and providing a record of catchment inputs into aquatic ecosystems (Mwamburi, 2003).

Sources of metals in aquatic sediments are natural or anthropogenic sources (Khaled et al., 2006; Singh et al., 2005). Main natural sources are weathering of soils and rocks and atmospheric deposition. Discharging agricultural, municipal, residential or industrial waste products into water bodies are anthropogenic sources (Demirak et al., 2006).