Geochemical assessment of heavy metal contamination in marine sediment cores from Usukan coastal beach, Kota Belud, Sabah

ABSTRACT

Coastal beach near the marine ecosystem faces potential pollution threats due to heavy metal contamination from natural and anthropogenic inputs. Several geochemical parameters are measured from 2 sediment profiles, 10 sediment cores and 2 mud soil samples to determine the geochemical distribution of heavy metal contamination. The physico-chemical properties show that the beach sediment changes from acidic to alkaline when heading to seaward direction, with average pH 5.6-8.5. The sediment profile has the lowest average moisture content and organic matter with 4.9-5.8% and 0.30-0.32% respectively; followed by sediment cores with 15.3-27.9% and 0.12-1.78% respectively; and the highest in mud soil with 35.4-48.8% and 4.66-6.73% respectively. The beach sediment has sandy texture whilst mud soil has sandy loam and sandy clay loam texture. The hierarchical average metal concentration is Fe (4476-29829 ppm) > Al (5803-8524 ppm) > Mn (103-504 ppm). Calcite, quartz, kaolinite and aragonite are the dominating minerals, indicating that the source rocks are carbonate sedimentary rocks where the background values are used for sediment quality assessment of Al and Mn metals. The sediment quality indices for geoaccumulation index (Igeo) and contamination ry low to moderate contamination level, while the pollution load index ($0<PLI<1$) shows minor Al pollution in the study area.