Temporal and spatial variability of heavy metals in Marudu Bay, Malaysia

Abstract

The current study was conducted to estimate the baseline concentration of heavy metals in the surface sediment of Marudu Bay. Environmental parameters were measured at the seafloor and samples of the surface sediment were collected at monthly intervals for the period of 12 months. The organic content, total N, total P and concentration of 16 trace metals in the surface sediment were analyzed. The baseline concentration of metals was estimated by geochemical normalization. Anthropogenic inputs of metals were then estimated by calculating the enrichment factor for each element. The result demonstrated that the C/N ratio of sediment at Marudu Bay varies from 15 to 342, which indicates the dominance of terrestrial organic matter. The baseline concentration of V, Fe, Mn, Zn, Ti, Rb and Sr were 26.74 mg kg^{-1}, 1.04%, 205.31 mg kg^{-1}, 34.09 mg kg^{-1}, 507.61 mg kg^{-1}, 93.25 mg kg^{-1}, 37.56 mg kg^{-1}, respectively. The concentration of most metals was comparable to the baseline, except Mn and Zn which showed higher concentrations in most parts of Marudu Bay. In conclusion, the metal concentration in Marudu Bay is still within the permissible levels and should not cause any threats to public health.