

Distribution of heavy metals in seawater and surface sediment in coastal area of Tuaran, Sabah

Abstract

Heavy metal concentrations (Cd, Cr, Cu, Pb and Zn) were analyzed in seawater and surface sediment samples in coastal area of Tuaran, Sabah, Malaysia. Metal concentrations of these samples were analyzed using Inductively Coupled Plasma – Optical Emission Spectrometer (ICP-OES). The mean concentration of heavy metals Zn, Cu, Cr, Pb and Cd in surface sediment were 22.03, 6.49, 3.81, 2.63, and 0.40 mg/kg, respectively. The corresponding mean concentration values in seawater were 5.56×10^{-3} , 8.22×10^{-4} , 7.70×10^{-4} , 3.37×10^{-4} mg/L and below detection limit (BDL) for Pb, Zn, Cu, Cd and Cr, respectively. The correlation test ($p < 0.01$) showed that there was a strong correlation among the concentrations of heavy metals in sediment ($r = 0.936 - 0.770$). While in different compartment, significant correlation ($p < 0.01$) was showed only between Pb in seawater with Cr ($r = 0.828$), Cu ($r = 0.756$), Pb ($r = .739$) and Zn ($r = 0.696$) in sediment. According to the Malaysia Marine Water Quality Criteria and Standard (IMWQS) and Interim Sediment Quality guidelines (ISQGs), these heavy metals concentrations are in the range of acceptance limit, except Pb in seawater was considered slightly polluted.