

Spatio-temporal Variations in Heavy Metal Concentrations in Sediment of Qua Iboe River Estuary, Nigeria

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Abstract : The concentrations of heavy metals in sediments of Qua Iboe River Estuary (QIRE) were monitored at four different sampling locations in wet and dry seasons. A preliminary survey to determine the four sampling stations along the river continuum showed that the area spanned between < 0.1% salinity at the control station and 21.5‰ at the fourth station along the river continuum. A preliminary survey to determine the four sampling locations along the river estuary showed variations in salinity and other physicochemical parameters. The estuary was found to be polluted with heavy metals from point and nonpoint sources at varying degrees. Mean values of 7.80 mg/kg, 4.97 mg/kg and 2.80 mg/kg of nickel were obtained for sediment samples from Douglas creek, Qua Iboe and Atlantic sampling locations, respectively in the dry season. The wet season nickel concentrations were however lower. The entire study area was grossly contaminated by iron. At Douglas creek, the concentration of iron in sediment was 9274 ± 9.54 mg/kg while copper, nickel, lead and vanadium were <0.5 mg/kg each as compared to iron. Bioaccumulation was therefore suspected within the study area as values of 31.00 ± 0.79 , 36.00 ± 0.10 and 55.00 ± 0.05 mg/kg of zinc were recorded in sediment at Douglas creek, Atlantic and the control sampling locations. The results from this study showed that the source of these heavy metals were from point sources like the corrosion of metal steel pipes from old bridges as well as oily sludge wastes from the Qua Iboe Terminal / tank farm located within the vicinity of the study area.

Keywords : heavy metal, Qua Iboe River estuary, seasonal variations, Sediment

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