

Long Term Monitoring of Heavy Metal Pollutants in Sediment of Southern Iraq

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Abstract: The levels of seven heavy metals (Cd, Co, Cu, Fe, Ni, Pb and Zn) were determined in the sediment samples from different water bodies southern Iraq. Distribution of these heavy metals in sediment showed variations in concentration with sampling site, it was undetectable for Cd and Pb for all sites, while the highest concentration was 2.207 $\mu\text{g/g}$ for Ni in the upper and the middle part of Shatt Al-Arab River. Co, Cu, Fe, Ni and Zn ranged from 0.083, 0.402, 1.829, 0.214 and 0.307 $\mu\text{g/g}$, respectively in Al-Chibayish Marsh to 0.486, 0.863, 2.186, 2.207 and 1.343 $\mu\text{g/g}$, respectively in the middle part of Shatt Al-Arab River. The geoaccumulation Index (Igeo) was calculated for the metals in the sediment of this study and for all other findings since 2001, to evaluate the levels of sediment pollution with heavy metals. The values of Igeo indicated that the sediment of southern Iraq were mostly unpolluted with heavy metals, except for Cd which was the polluting element in almost all of the previous studies.

Keywords: Heavy metals, Igeo, Marsh, Sediment, Shatt Al-Arab River, Southern Iraq

Introduction

All environments, such as freshwater or marine ecosystem, have a low concentration of most of the heavy metals that naturally occurred in the Earth's crust or come from dust storms (Jassim et al., 2021) in addition to those come from different sources of pollution in the area (Issa et al., 2020). Sediment act as a sink for heavy metals that makes it a possible source for water pollution in case of any changes in environmental conditions (Al-Hejuje, 2014; Al-Edresy et al., 2019; Cui et al., 2019).

Heavy metals occur in the aquatic environment either in water, suspended load, or in deposited sediment. However, measuring their concentrations in water for a short period does not give accurate results on the extent of pollution due to heterogeneity in water discharges, as well as the irregularity of topical releases of these pollutants. So, there were a focus on the sediment as it act as a recipient of all kinds of pollutants and organic matter that fall from the water column above, because they reflect more stable indicators about the degree of heavy element pollution of water environment (Al-Sayegh & Taka, 2002). Sediment is also a good