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POLLUTION BY HEAVY METALS IN THE YONGJIANG ESTUARY, CHINA AND THEIR RELATIONS TO ENVIRONMENTAL FACTORS

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Abstract

The estuarine zone is closely linked to economic and social development, yet it remains ecologically fragile, necessitating effective environmental protection measures. Heavy metal pollution represents a significant threat to the ecological health of coastal estuaries. This study aimed to explore the relationships between eight heavy metals (Pb, Cd, Mn, Ni, Cr, Fe, Cu, and As) and eleven environmental factors at five sampling sites during both rising and ebbing tides across four seasons in the Yongjiang Estuary, China. The results revealed substantial variability in the concentrations of both heavy metals and environmental factors, exhibiting clear spatial distribution patterns and seasonal dynamics. Spatially, higher concentrations of heavy metals and environmental factors were observed at sites located near industrial zones. Seasonally, the concentrations of Pb, total phosphorus, and ammonia nitrogen peaked during winter. Regarding tidal fluctuations, different variables exhibited distinct responses. Notably, the concentrations of Cd, Ni, and total nitrogen differed significantly between rising and ebbing tides. Moreover, dissolved organic carbon, total nitrogen, salinity, ammonia nitrogen, and chlorophyll-a showed positive correlations with the eight heavy metals. These findings may serve as a valuable reference for strategies aimed at improving water quality and ecological management in estuarine environments.

Key words: environmental factors, heavy metals, tidal effect, Yongjiang Estuary

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