

Zink of surface sediment in rural river basin as a potential priority to diffuse pollutants

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ABSTRACT

This study provides a baseline for the assessment of heavy metal contamination, especially zinc (Zn) contamination, in the sediments of Pyeongchang River in Korea. The zinc evaluation, along with that of other contaminants, for 20 study areas was done with respect to metal pollution load, ecological risk, enrichment of metal concentration, and geoaccumulated risk. Based upon the stated indices, a priority index (P_{index}) was proposed to rank the most contaminated sites. As expected, the values of pollution load, ecological risk, simplified enrichment factor, and simplified geoaccumulation risk index demonstrated lower zinc (and other heavy metal) contamination in upstream areas compared to areas downstream. Sediments were unpolluted to slightly polluted according to pollution load index, while high to extremely high ecological risks were observed in several sediment samples. The average quality of sediment indicated metal enrichment from point or non-point pollution sources to extremely high pollution. Further more, all the samples were uncontaminated as per geoaccumulation index. After simplification of enrichment factors and ecological risk indices, the P_{index} showed the most contaminated sediments with a value of 3.038, with a significant contribution from zinc. Notably, protective measures should be taken in highly contaminated areas prioritized by the P_{index} .

Keywords: Diffuse pollution; Heavy metal; Monitoring; Priority index; Surface sediment

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