



Heavy metal concentration and ecological risk assessment in surface sediments of Dal Lake, Kashmir Valley, Western Himalaya

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Abstract

Lake systems act as a significant source of freshwater supply for the local population living in the Kashmir Valley. The water level in Kashmir Himalayan lakes is predominantly controlled by melt water generated from seasonal snowmelt and high-altitude glaciers. Heavy metal contamination poses a serious threat of vulnerability to these freshwater ecosystems. To evaluate the heavy metal status and their risk in lake sediments, surface sediment samples collected from Dal Lake located in Kashmir Valley, NW Himalaya were analyzed for spatial variations and estimating pollution levels of selected heavy metals. Geo-accumulation index (Igeo) and enrichment factor (EF) revealed that the sediments were moderately enriched in Cr, Ni, Cu, Zn, Pb, Fe, and Mn. The Pollution Load Index (PLI) indicates progressive lake degradation from margins towards the central parts of the lake. Relatively higher contents of total organic carbon (TOC) and nitrogen indicate eutrophic status of this lake basin. Most of the sediments exhibited C/N ratio of < 4, suggesting large in situ organic matter (OM) production possibly due to high nitrification. The results highlight that the anthropogenic activities had a significant impact in altering the lake environment.

Keywords Dal Lake · Eutrophication · Organic elements · Trace metals · Limnology

Introduction

Lakes in Himalayas are one of the largest fresh water resources after snow and glaciers. The valley of Kashmir perched between the Greater Himalayan range and Pir

Panjal range is known for its vast sources of freshwater lakes, glaciers, ponds, rivers, springs etc. The Kashmir Valley hosts a number of freshwater lakes such as Dal, Manasbal, Wular, and Anchar Lake. These lake systems are important resources in terms of hydrology, socio-economic activities, and as

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