

Assessing heavy metal pollution hazard in sediments of Lake Mariout, Egypt

Abu El-Magd, SA; Taha, TH; Pienaar, Harrison H; Breil, P; Amer, RA, Namour, PH

**Abstract:**

The Cd, Cr, Cu, Ni, and Pb concentrations in the sediments of Lake Mariout were measured and estimated by statistical approaches using the contamination factor (CF), pollution load index (PLI), geo-accumulation index (Igeo), Nemerow index (I<sub>in</sub>), ecological hazard index, and potential ecological hazard index (RI). The aim of the present work was to assess the current situation of Lake Mariout compared with other Egyptian lakes regarding heavy metal pollution in the sediment and to identify the putative sources. The measured concentration levels of heavy metals in Lake Mariout sediments were higher than the geochemical background reference condition by a factor of two to three, except for sediment sampled near the Umoum drain, where metal concentrations were close to the geochemical background reference condition. The PLI ranged from moderately to heavily polluted classes. The Igeo ranged from uncontaminated to moderately contaminated classes, where the RI indicates a low hazard. The comparison of Lake Mariout with other lakes indicates that all heavy metal concentrations except for Cd in Lake Mariout were higher than the average concentrations in Edku Lake. However, the average concentrations of Cd and Ni in Burullus Lake were higher than those found in the current study. For Manzala Lake, the Cd, Cu, and Pb concentrations were higher than the measured concentrations in Lake Mariout. The environmental hazard assessments of heavy metal concentrations in the Lake Mariout sediment determined the prevalence of possible anthropogenic pollution sources near the East and West Wastewater Treatment Plants and the El-Max pumping station.