



"Gheorghe Asachi" Technical University of Iasi, Romania



ASSESSMENT OF DISTRIBUTION CHARACTERISTICS AND CONTAMINATION WITH HEAVY METALS IN SURFACE SEDIMENTS OF LAKE CHAOHU, CHINA

**Shouliang Huo¹, Beidou Xi^{1*}, Fengyu Zan^{1,2}, Xiujuan Yu^{1,2},
Guangchao Zhao², Jing Su¹, Kevin M. Yeager³**

¹Chinese Research Academy of Environmental Science, State Key Laboratory of Environmental Criteria and Risk Assessment,
100012 Beijing, China

²Anhui Normal University, College of Environmental Science and Engineering, Wuhu, 241000 Anhui, China

³University of Kentucky, Department Earth and Environmental Sciences, Lexington, 40506 KY

Abstract

The distribution and fractionation of nine heavy metals (Cr, Co, Ni, Cu, Cd, Zn, V, Pb and As) in the sediments of Lake Chaohu, a shallow eutrophic lake, were investigated using the BCR sequential extraction procedure. The level of pollution attributed to these nine heavy metals was evaluated employing the potential ecological risk index (RI) and geoaccumulation index (I_{geo}). Metal concentrations in sediments ranged from 65.00~104.00 for Cr, 14.50~21.70 for Co, 28.50~50.90 for Ni, 25.40~51.30 for Cu, 0.30~1.27 for Cd, 96.80~436.00 for Zn, 89.00~126.00 for V, 37.80~102.00 for Pb and 9.63~16.61 for As. Cr, As, Ni, V and Cu were present mainly in the residual fraction, with proportions of 73.75%, 73.54%, 67.80%, 73.24% and 59.46%, respectively, while Co, Pb, Zn and Cd were associated with the non-residual fractions (soluble, reducible and oxidizable fractions) dominantly, with total non-residual fraction proportions of 56.54%, 70.97%, 65.55% and 91.6%, respectively. The results of correlations analysis between different heavy metals showed that the heavy metals studied have different origins and distributions, which were divided into five categories: (1) Cu, Zn and Ni, (2) Co and V, (3) Pb and Cd, (4) Cr and (5) As. The rank order of potential ecological risk indices for these heavy metals was $Cd > As > Pb > Co > Cu > Ni > Zn > V > Cr$. Cd had high potential ecological risk and contributed the most to the potential ecological risk index as compared to the other heavy metals. The I_{geo} values suggested "unpolluted" levels for Cr, V, As and Ni (mean $I_{geo} < 0$), "unpolluted to moderately polluted" levels for Co, Cu, Zn and Pb ($0 < \text{mean } I_{geo} < 1$), and "moderately polluted" levels for Cd ($1 < \text{mean } I_{geo} < 2$).

Key words: contamination assessment, fraction analysis, heavy metals, Lake Chaohu, surface sediment

Received: March, 2012; Revised final: July, 2012; Accepted: August, 2012

* Author to whom all correspondence should be addressed: E-mail: huoshouliang@126.com