



Multivariate analysis of heavy metal contamination using river sediment cores of Nankan River, northern Taiwan

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Through the geology and climate characteristic in Taiwan, generally rivers carry a lot of suspended particles. After these particles settled, they become sediments which are good sorbent for heavy metals in river system. Consequently, sediments can be found recording contamination footprint at low flow energy region, such as estuary. Seven sediment cores were collected along Nankan River, northern Taiwan, which is seriously contaminated by factory, household and agriculture input. Physico-chemical properties of these cores were derived from Itrax-XRF Core Scanner and grain size analysis. In order to interpret these complex data matrices, the multivariate statistical techniques (cluster analysis, factor analysis and discriminant analysis) were introduced to this study. Through the statistical determination, the result indicates four types of sediment. One of them represents contamination event which shows high concentration of Cu, Zn, Pb, Ni and Fe, and low concentration of Si and Zr. Furthermore, three possible contamination sources of this type of sediment were revealed by Factor Analysis. The combination of sediment analysis and multivariate statistical techniques used provides new insights into the contamination depositional history of Nankan River and could be similarly applied to other river systems to determine the scale of anthropogenic contamination.