Title of Article in Conference Proceedings: Development and Evaluation of New Indices for Sediment-associated Contaminants.

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Outlet: Proceedings of the 8th International Conference on Environmental Science and Technology. In: Sorial, G. and Hong, J.: *Environmental Science and Technology 2016* Vol. 2, pp. 174, American Science Press, Houston, USA, ISBN 978-1-5323-2260-0, June 6-10, 2016, Houston, Texas, USA.

Abstract: New indices (modified hazard quotient, *m*HQ and ecological contamination index, ECI) are developed for evaluating sediment-associated heavy metals contamination. In evaluating the proposed indices, the concentration and chemical fractionation of five heavy metals (Cd, Cr, Cu, Ni and Pb) determined in benthic sediments from five tropical ecosystems off the Bight of Bonny were used to assess the degree of contamination and estimate the extent of anthropogenic inputs from industrial activities into these ecosystems. The analysis shows that the mean concentrations (mg/kg, dw) of Cd, Cr, Cu, Ni and Pb vary from 4.33 – 5.67, 11.12 – 28.52, 30.26 – 43.72, 2.02 – 2.60 and 162.0 – 190.37, respectively. An important observation is that the mean metal levels during the wet and dry seasons did not show significant variability at all sites. The spatial distribution and severity of sediment-associated contamination by heavy metals based on the developed indices (*m*HQ and ECI) are in the descending sequence: Cd>Pb>Cu>Cr>Ni. Hence, the observed trend is in good agreement with existing pollution indices. Contamination severity index, mean hazard quotients and modified risk assessment code are also used to identify the pollution hotspots, which reflect medium risk contamination ecological systems. Aquatic pollution indicators (potential contamination index, ECI, hazard quotients, and *m*HQ) reveal significant anthropogenic contamination of Cd and Pb in the sediments, while Cr, Cu and Ni show relatively low degree of contamination. PCI generally follows the sequence Cd>Pb>Cu>Cr>Ni. Principal component analysis (PCA) and factor analysis indicate that heavy metals in the benthic sediments originate mostly from anthropogenic sources.