

ABSTRACT

Identification and quantification of Trace Metals in the Caroni Arena Watershed,
Trinidad: A Chemical and Spatial Approach

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Trace metals Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni and Zn in water, sediments and soils of the Caroni Arena Watershed were analyzed by Flame Atomic Absorption Spectroscopy (FAAS). Antimony was determined in sediment and soil only. Physical parameter measurements of conductivity, redox, dissolved oxygen and temperature assisted in the understanding of chemical data.

Statistical treatment consisted of the general linear models for seasonal data, Pearson correlation for the interrelationships between metals, organic matter and physical parameters, cluster and principal component analysis for the explaining the grouping and variability of metals. A comparison of logarithmic and Box-Cox methods for the baseline (pseudo) concentrations of trace metals showed that for some metals, the Box-Cox values were closer to the expected value. Enrichment values for metals in sediment and soils were found.

Predictive models were created with Geographic Information Systems (GIS) and validated for water, sediment and soil. Validation of models for

Cd, Cr, Fe, Pb, Mn and Ni were found to be in agreement of predicted values. Validated concentrations for Cu, Pb and Zn models were in the range predicted for the metals with few exceptions at some stations.

Keywords: Dalip Chandrabhose Ramsingh; Trace metals, water, sediment, soil; GIS; regression equations