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PII: S0375-6742(18)30134-1
DOI: doi:10.1016/j.gexplo.2018.03.016
Reference: GEXPLO 6129

To appear in: *Journal of Geochemical Exploration*

Received date: 8 June 2016
Revised date: 7 March 2018
Accepted date: 19 March 2018

Please cite this article as: Paula Renata Muniz Araújo, Caroline Miranda Biondi, Fernando Bruno Vieira da Silva, Clístenes Williams Araújo do Nascimento, Valdomiro Severino de Souza-Júnior , Geochemical soil anomalies: Assessment of risk to human health and implications for environmental monitoring. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Gexplo(2017), doi:10.1016/j.gexplo.2018.03.016

GEOCHEMICAL SOIL ANOMALIES: ASSESSMENT OF RISK TO HUMAN HEALTH AND IMPLICATIONS FOR ENVIRONMENTAL MONITORING

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Abstract

Areas with natural geochemical anomalies are not normally included when defining geochemical backgrounds for metals. However, it is important to understand the distribution and extent of anomalous geochemical values when assessing the risks associated with metal contamination to the ecosystem. This study measured the concentrations of Cd, Cr, Cu, Hg, Ni, Pb, and Zn in pedogenetic soil horizons with geochemical anomalies. The factors that control the vertical distribution of these elements (pH, organic carbon, cation exchange capacity, lithogenic metals, granulometry) were also examined. Except to Cd and Hg, the average surface concentrations of the metals studied exceeded the expected background levels for the region. The concentrations of Cr, Cu, and Ni were higher in soils developed from basalt, while Cd, Hg, Pb and Zn exhibited concentrations with no direct relation to the type of parent material. All the metals are of natural origin with the exception of Zn, which was influenced by anthropogenic activities in two soil profiles. With an exception of the Cd and Hg contents that were low for all analyzed soils, samples showed geochemical anomalies for all the metals, in particular Cr, Ni, and Pb, with values high enough to warrant investigation due to the possible impairment of soil functions and potential risks