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Occurrence and levels of potentially harmful elements (PHEs) in natural waters of the gold mining areas of the Kette-Batouri Region of Eastern Cameroon

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This study was designed to determine the extent to which alluvial and bedrock gold mining activities in the Kette-Batouri region of Eastern Cameroon is responsible for the discharge of potentially harmful elements (PHEs) into natural water bodies. This is considered to be of great public concern, since elevated levels of PHEs in these water bodies, which are widely used for domestic purposes, could have adverse health and environmental effects on the population and nearby ecosystems. The investigation into the levels of PHEs in natural water bodies of this area was conducted to ascertain the toxicity posed by mine waste stockpiles as data from the literature on this subject are scarce. Forty two water samples from the region were analyzed for some 60 PHEs by ICP-OES, of which 22 that were not below the detection limit were considered for further data analysis. Maximum total concentrations in water of As, Cr, Pb and V and Zn are above the World Health Organization (WHO) maximum allowable concentrations (MAC) levels and are as follows ($\mu\text{g l}^{-1}$): As (21.90-50.9); Cr (1.80-57.30); Pb (0.50-34.70) V (24.70-77.20) and Zn (3.10-481.70). This information is consistent with our recent research efforts which have indicated moderate pollution by heavy metals in the soils with a slight deterioration of site quality in this region. The data generated from this investigation is important in the formulation of water management strategies and recommendations for remediation of water bodies at abandoned mine sites for meeting water quality standards.

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