

Trace metal concentrations in stream water draining the lower Lom mining area, eastern Cameroon

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While the Lom Basin is the largest and most important basin in Cameroon in terms of water and mineral resources, investigations on the impacts of the past and ongoing gold mining activities in the area have been limited to water quality in the Mari sub-basin, soils and mine tailings. In the light of planned mining developments and the growing concerns about associated environmental problems with artisanal mining, this study examines the origin and geochemical behaviour of some trace metals in stream water draining the lower Lom Basin. This work involved the sampling of 52 stream water samples which were analyzed for Fe, Mn, V, Cr, Co, Ni, Cu, Zn, As, Cd, Pb and Hg by Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Trace element geochemistry revealed very low concentrations ($<1 \mu\text{g/l}$) of V, Cr, Co, Cu, Zn, Cd and Pb suggesting impoverished parent rocks and leaching into the groundwater. Iron (max $5010 \mu\text{g/l}$) and Mn (max $250 \mu\text{g/l}$) contents exceeded the WHO guideline values for drinking water. The dissolution of sulphide minerals associated with quartz vein gold mineralization is the principal source of Cu, Pb, Cd and Zn in the stream water. Arsenic is believed to be leached from a different mineralization source while gold amalgamation was considered the source of dissolved Hg. Given the very low levels of dissolved trace metals, the area is currently under no risk of contamination by trace metals from artisanal mining. This study provides the geochemical baseline data crucial for the sustainable development of the basin ecosystems. Continuous monitoring of mining activities especially the use of Hg in gold refining in the Lom Basin is highly recommended. Further studies should also include trace metal levels in stream sediments given they are an ultimate sink for trace elements derived from within the catchment.

Keywords: Trace metals, Baseline, Artisanal mining, Lom Basin, Cameroon