

Geochemical Characterization of Groundwater from the Bonikro Gold Mine in the Sub-Prefecture of Hiré (Centre-West of Côte d'Ivoire)

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ABSTRACT

The groundwater resources of the Bonikro gold zone have variable levels of metallic trace elements. The aim of this study is to determine the origin of the high levels of metallic trace elements in ground water. to ensure sustainable management of the mine's groundwater resources. Water samples were taken from 17 observation points located within the mine for geochemical analyses. The data were processed using geochemical methods for determining the typology of water, calculating Metal Contamination Indices (ICM) and Principal Component Analysis (PCA) for identifying the origin of groundwater mineralization. The results show that the Bonikro gold mine groundwater is acidic, with an average pH of 6.01. They are moderately mineralized, with an average conductivity of 308.81 $\mu\text{S}/\text{cm}$. The levels of ETM (Pb, As, Fe and Mn) are high and are above the WHO guide values, ($2.5 < \text{Pb} < 67.9 \mu\text{g}/\text{l}$), ($2.5 < \text{As} < 18 \mu\text{g}/\text{l}$), ($8.5 < \text{Fe} < 7030 \mu\text{g}/\text{l}$), ($2.6 < \text{Mn} < 1650 \mu\text{g}/\text{l}$). The mineralization of the waters of the Bonikro gold mine is essentially linked to the geological nature by the water-rock contact.

Keywords: Groundwater, Mineralization, ETM, Mines, Ivory Coast

