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ASSESSMENT OF POLLUTANTS INPUT OF ACID MINE DRAINAGE AND DOMESTIC ACTIVITIES IN ARIES RIVER WATER, ROMANIA – A CHEMOMETRIC APPROACH

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Abstract

To assess the pollutants input of acid mine drainage (AMD) and domestic activities in Aries River, the water was monitored monthly, during one year, in 15 sampling points along the River. The dissolved metals (Ca, Mg, Na, K, Fe, Cu, Zn, Mn), anions (SO_4^{2-} , NO_3^- and Cl^-), pH and electrical conductivity were analyzed. The obtained data were assessed against the water quality standards, Principal Component Analysis (PCA) and Hierarchical Cluster Analysis. The results revealed the water contamination mainly with Fe, Mn and Cu. The PCA showed a high variability of the system and revealed the anthropogenic origin of Zn, Mn, Fe and SO_4^{2-} associated with AMD, of NO_3^- and Cl^- associated with domestic activities but also the autochthonous origin of alkaline, alkaline-earth elements, Mn and SO_4^{2-} associated with dissolution of minerals in the river bed. The cluster analysis highlighted the grouping of pollutants according to their sources and the grouping of samples according to locations of ore processing centers. Although most of the mining and ores processing activities in the area have been closed, the Aries River continues to be subjected to pollution with metals coming mostly from waste dumps.

Key words: Aries River, Acid mine drainage, domestic activities, multivariate statistics

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