Hydrochemical characterization of surface water in the Timgad watershed, East Algeria

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ABSTRACT

Multivariate statistical methods, i.e. cluster analysis (CA) and analysis of variance (ANOVA), were used to assess spatio-temporal variation of the surface water quality of the Timgad, East Algeria. Two major hydrochemical facies were identified using Piper diagram. $MgHCO_3$ for the first and the second station, and $MgSO_4$ for the last station. The ANOVA results indicate that all parameters are significant except for Na, K, and HCO_3 in the first station and EC in the second, also pH and NO_3 in the last station. Cluster analyses were applied to 42 data points from the three stations after the data had been log-transformed and standardized for homogeneity. The application of hierarchical CA, based on all possible combinations of classification method, showed two main groups at each station. The major ion chemistry (Mg, Ca, HCO_3, and SO_4) in the three stations are derived from the anthropogenic sources and the water–rock interaction.

Keywords: Hydrochemistry; Cluster analysis; Analysis of variance; Surface water; Timgad watershed; East Algeria

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