

Groundwater geochemistry and environmental isotopes of the Hodna area, Southeastern Algeria

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ABSTRACT

The intensive exploitation of groundwater resources in the region of Hodna (Southeastern Algeria) has greatly influenced the hydrochemical functioning of the shallow aquifer. This resulted in a significant decline in the piezometric level of the aquifer. In terms of hydrochemical facies, water is Ca-HCO₃ type in the Northern part of the plain due to limestone formations and SO₄-Cl-Na type in the South, because of the closeness of a salt lake. Eighteen groundwater samples were sampled and analyzed, in order to highlight the groundwater hydrochemical processes. Multivariate statistical techniques were applied to the obtained analyses on groundwater quality, with the purpose of defining the main controlling factors affecting the Hodna plain hydrochemistry. The statistical analysis reveals the presence of three groups, presenting an increased potential of salt proportionally to groundwater flow direction. Initially, in the aquifer boundaries and in the infiltration areas the facies result as bicarbonate. In the southern part of the plain, groundwater becomes SO₄-Cl rich, because of the dissolution of salt formations and the presence of the Hodna salt lake. Nitrate concentrations could be related to agricultural activities in the plain. Isotopic analyzes showed that the aquifer recharge is very quick and its groundwater have undergone high evaporation at the salt lake.

Keywords: Algeria; Hodna; Aquifer; Hydrochemistry; Isotopes; Multivariate statistical

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