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Impact of Agriculture on the Groundwater Quality: Case of the Alluvial Plain of Nil River (North-Eastern Algerian)

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Abstract : The intensive use of the chemical fertilizers and the pesticides in agriculture often produces a contamination of the groundwater by organic pollutants. The irrigation and/or rainwater transport the pollutants towards groundwater or water surface. Among these pollutants, one finds the nitrogen, often observed in the agricultural zones in the nitrate form. In order to understand the form and chemical mobility of nitrogen in groundwater, this study was conducted. A two-monthly monitoring of the parameters physicochemical and chemistry of water of the alluvial plain of Nil river (North-eastern Algerian) were carried out during the period from November 2013 to January 2015 as well as an in-situ investigation of the various chemical products used by the farmers. The results show a raise concentration of nitrates in the wells (depth < 20 m) of the plain, which the concentrations arrive at 50 mg/L (standard of potable water). On the other hand in drillings (depth > 20 m), one observes two behaviors. The first in the upstream part, where the aquifer is unconfined and the medium is oxidizing, one observes the weak nitrate concentrations, indicating its absorption by the ground during the infiltration of water towards the groundwater. The second in the central and downstream parts, where the groundwater is locally confined and the reducing medium, one observes an absence of nitrates and the appearance of nitrites and ammonium, indicating the reduction of nitrates. The projection of the analyses on diagrams Eh-pH of nitrogen has enabled to us to determine the intervals of variation of the nitrogen forms. This study also highlighted the effect of the rains, the pumping and the nature of the geological formations in the form and the mobility of nitrogen in the plain.

Keywords : groundwater, nitrogen, mobility, speciation
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