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كل الحقوق محفوظة للمدرسة الوطنية العليا للري

Abstract:

The groundwater quality in the Mitidja plain has known an important deterioration during the last decades due to uncontrolled industrial waste discharges, intensive use of chemical fertilizers in agriculture, and an intense exploitation of groundwater resources. In this paper, we are interested in the Eastern part of the Mitidja plain, which covers an area of 495.52 km². This study area is characterized by its industrial and agricultural vocation, thereby the problem of groundwater pollution. The study will focus on the fluctuation of the groundwater table, and the interpretation of the water quality analysis result made by ANRH (National Water Resources Agency), during the period between 2006 and 2016. The last ones have been geostatistically approached. This allowed us to carry out a GIS-assisted mapping of the nitrate concentrations in the aquifer and to draw up an exhaustive report on the current state of the relationship between the fluctuation of water table and the nitrate concentration rates, also the spatial and temporal evolution of the aquifer. As a result, the geostatistical approach gave us the possibility to draw up Kriging maps of the nitrate level spatial distribution for the two field monitoring campaigns: 2006 and 2016 as well as groundwater fluctuation maps for the periods under consideration. The obtained result reveals that 72% of the sample's points have nitrate concentrations higher than 50 mg/l in rainy period in the 2 years 2006 and 2016. As for the dry period, the results show that more than 54% in 2006 and more than 81% in 2016 of the water samples analyzed are contaminated (exceeding the WHO's recommendation). A significant water table drawdown, between 2006 and 2016, is highlighted, which reached an average of around 23 m in low water and 26 m in rainy period (case of drilling *F1003*). This drop in the water table level can be explained by overexploitation of the groundwater caused by intensive pumping for irrigation, industry, and water supply, due essentially to the increasing scarcity of rainfall, which is a consequence of climate change, which has become increasingly prevalent over the last three decades. Given the upward trend in nitrate levels in recent years, there is a

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significant risk that nitrate levels will far exceed the 50 mg/l threshold recommended by the WHO in the next 10 years. It is therefore imperative to remedy this through the control of industrial discharges and the extension at the level of the agricultural community regarding the intensive use of chemical fertilizers and (in particular nitrogen) and groundwater (by controlling the pumping).

Key words: Pollution ; Nitrates ; Piezometric levels ; Aquifer ; Mitidja East ;

Geostatistics ; Kriging

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