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Assessing water quality and pollution origin of the Bou-Areg aquifer (north east Morocco)

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This study aims to evaluate the quality of the groundwater and the sources of pollution of the Bou-Areg aquifer, situated in the Oriental region, in the northeast part of Morocco. We first elaborated the aquifer pollution risk map by crossing a vulnerability map, principally based on the physical characteristics of the area, with a pressures map based on the soil occupation. The resulting map showed that the aquifer is subjected to a medium to high risk for at least half of the total aquifer area. Subsequently, we elaborated a detailed sampling campaign in order to measure the basic physico-chemical composition and isotopic condition of 15N-NO3 and 18O-NO3 abondance of the aquifer. Data analysis showed a high mineralization degree of the aquifer, probably due to the marine origin of water but also due to an actual marine intrusion. High nitrate concentrations were also found with nearby half of the samples showing concentrations being higher than the 50 mg/l WHO threshold. According to the analysis, domestic wastewater is suspected to be the principle responsible for the nitrate concentration, followed by the ammonium-based fertilizers, the manure and the soil nitrogen. This analysis suggests that a better management of the wastewater in the domestic sector and nutrient management in the agricultural sector is needed to preserve water quality of the Bou-Areg aquifer.