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Hydrodynamic Modeling of the Albian Aquifer of the Plain of Ain Oussera (Semi-Arid Area, Algeria).

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Abstr²act

The Ain Oussera plain, a semi-arid zone in the central part of northern Algeria, has developed significantly since the early 2000 years when a number of agricultural development programs were launched. The increase in irrigated areas has led to a significant increase in water needs and consequently an overexploitation of the aquifer that has been observed over more than 30 years (1985). A significant decrease in its piezometric level caused its deterioration in the chemical quality of its water.

This paper is a contribution about the effective management of groundwater in the area of study, using a mathematical model of the water potential and its quality preservation. In this regard, we have established a conceptual model using the MODFLOW computer program to provide us with a deterministic and twodimensional numerical simulation, in steady and transient state, of the studied aquifer groundwater flow. The main results allowed us to develop a better view of the different scenarios underlying the piezometric fluctuations. The predictions show that the water table is in an alarming state which requires integrated management of its underground resources in order to guarantee sustainable development.

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Keywords: Modeling ; MODFLOW ; Albian ; Groundwater ; Plain of Ain Oussera.

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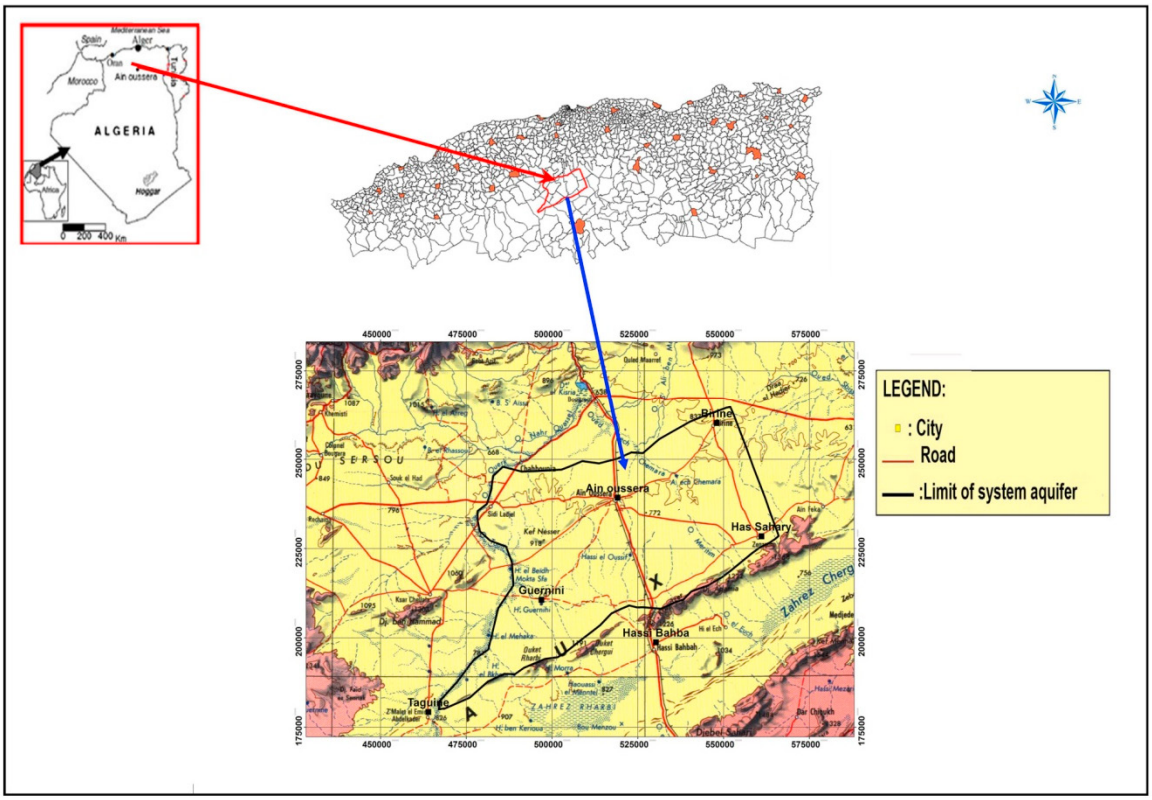
1. Introduction

The plain of Ain Oussera is part of a steppe area in the central part of northern Algeria in the Wilaya of Djelfa, between the Tellian Atlas in the north and the Saharian Atlas in the south. It is situated about 200 km south of Algiers, the capital of Algeria. The plain stretches for 105 km along an NE - SW axis and for 30 km along a perpendicular axis (Fig.1). Its surface is about 3790 km². The aquifer of the Albian sandstone has to serve the region's water needs including the supply of drinking water to its population. The groundwater of the alluvial deposits of Wadi Touil and the Plio-Quaternaire constitutes minor and secondary aquifer exploited by traditional wells.

The plain of Ain Oussera has grown considerably since the early 2000s with the launch of the national agricultural development and investment programs. The increase in irrigated areas has led to a lot of demand for the aquifer which, over more than thirty years since the year1985, has led to a significant decrease in the water level of



the water table and the deterioration in the chemical quality of the water.

It is therefore necessary to point out: Geographical, climatic, geological and hydrogeological context of the studied area, in order to begin the hydrodynamic modeling of the albian aquifer of the Ain Ouessera plain.

Fig.1. Map of Location of the Study Area.