MODELING OF A CONFINED AQUIFER : THE SAIS BASIN OF (MEKNES-FES BASIN, MOROCCO)

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Abstract

The Fez-Meknes region in northern Morocco is characterised by a Mediterranean climate. The deep aquifer in this region supplies agricultural activities and domestic water.

The information on this aquifer is still fragmentary and not sufficient, due to its large extent and important depth. In order to improve the knowledge of this aquifer, a 3D geological model was developed in this study. It was constructed from information supplied by seven geological maps, a digital terrain model and more than 100 boreholes. After processing, the data were processed by a Geographic Information System (GIS) and the compiled boreholes were analysed, encoded and integrated into the Groundwater Modeling System (GMS) software. For this, four lithostratigraphic sets were considered: the Paleozoic, Triassic, Jurassic, Miocene and Plio-Quaternary. The model developed allows us to visualise the general geometry of the basin and more particularly that of the Jurassic aquifer, which is gradually sinking towards the north.

The model allowed us to approach the depth of the deep aquifer at any point in the study area and to follow its evolution in depth under the Miocene cover.

The present study has therefore allowed us to develop a conceptual model that is very useful in the reinterpretation of existing geophysical data, to have an extension of the aquifer with a higher degree of certitude, the aim of which is essential for the development of a hydrogeological model; in order to represent the hydrodynamic functioning of the aquifer and to simulate different scenarios in order to evaluate the effects of climatic variability and exploitation.

Keywords: 3D modeling, GMS, GIS, Sais basin, hydrogeology, geometry, Morocco.