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Combination of geological and geophysical data for the determination of aquifer geometry in a complex hydrosystem. Application to Plio-Quaternary aquifer Dradere Soueire basin (Moulay Bousselham Region - North Western Morocco).



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This work focuses on the determination of the Plio-Quaternary aquifers deep geometry in Dradere Soueire basin, and, also, the vertical boundaries between them in a complex geological context. Dradere Soueire Basin, covers an area of 630 km², it is located along the Atlantic Ocean and separated from Rharb Basin, South and South-East by Lalla Zohra's and Lalla Mimouna's hills.

We adopt a methodology which; a geological and geophysical data including 72 hydrogeological drilling with 62 lithologic sections and 29 well log records, 44 electric 2D imaging profiles (Tomography) and 11 industrial seismic profiles, are combined in a GIS,

The use of borehole data has generated a three-dimensional stratigraphic model of Mio- Plio-Quaternary series, this one is confronted with the results of the seismic mapping. The results obtained show that the Mio- Plio-Quaternary age depressions are related with a structures post- Miocene layer and filling the depressions led to the establishment of a semi-artesian aquifer in central basin with bedrock as the Miocene marl and clay as plastic roof Villafranchian. Furthermore, sequence analysis of the logging records has shown that the filling of the basin was created by three Mesosequences, negative - positive -negative, giving several levels aquifers predominantly occupying the base of the second mesosequence. The correlation of these units on cross sections and the adaptation of these sequences to the activity of faults, helped establish the lateral extent of aquifers and their distribution in the basin. The profiles of electrical tomography on the coastal strip of the basin, allow to determine precisely the boundary between the groundwater and the Atlantic Ocean, and to make a map with possible extension of saline intrusion, the latter was set obviously in the South of the lagoon gutter of Moulay Bousselham.

This study has identified the physical model of the complex geometry of aquifers in Dradere Soueire basin, it allowed us to specify different limits of these aquifers and their spatial distribution patterns. The results represent an important step to establish a numerical modeling of these aquifers.

