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ABSTRACT BOOK

879 - THE NATURALLY PROTECTED AQUIFER OF RECIFE (BRAZIL) VERSUS ITS VERY INTENSE EXPLOITATION

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Recife (NE Brazil) is a complex metropolitan area that sets on a coastal multi-layered sedimentary hydrogeological system, subjected to intense urban land uses and extensive drought issues. Additionally, many hydrogeological problems, related to salinization and contamination, could not be correctly addressed because of the lack of appropriate geological information. In this context, this study aimed at evaluating how the sedimentation processes may help in conceptualizing the hydrogeological flow model of the main confined Cabo aquifer system (CAS), which is intensively exploited by more than 6-7 thousand private wells. The investigation shows that continental sediments are dominant in the CAS, whose lithological variability lies with a proximal (Cabo and Suape formations) to distal (Paraíso formation) gradient in the alteration-transport-sedimentation process. In the Cabo and Suape formations (Aptian), interdigitation of sandy and argillaceous materials are predominant, and consistent with subaerial/sublacustrine alluvial fans setting up, and with intermediate and distal sedimentation. In Paraíso formation (Albian), associated with fine sands, a discontinuous clay level is found in a more systematic fashion. Additionally, the Estiva formation (Cenomanian-Turonian) also acts as an aquitard due to low permeability argillaceous limestone. This complex geology comprises two sub-systems recently described as Cabo and Suape confined aquifers and Paraíso and Estiva aquitards that were confirmed by geochemical, lithological and isotopic investigations. Noble gases temperature studies indicates water with at least 15-10kyrs for Cabo and Suape aquifers, compatible with the last glaciation period (recharge temperature <20 °C). This confinement explains why the intense aquifer exploitation that creates potentiometric levels lower than 80m below sea level is not extensively affected by salinization or even contaminated by the shallower unconfined and locally contaminated Boa Viagem aquifer (Cenozoic), which overlies the aquitards, although management measurements should be implemented to protect the CAS in a long term groundwater development.