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Abstract: This paper aims to spatially characterize the marine intrusion in the case of the Bouteldja main aquifer using the GALDIT method coupled with a geostatistical approach. The latter was used to compensate the weakness of GALDIT method for not considering the spatial variability of the studied variables. Using a field data set of the Bouteldja aquifer, the semi-variograms of four continuous important variables (hydraulic conductivity A, groundwater level L, thickness T and sea water intrusion I) were studied and modeled. The obtained structures were mainly composed of spherical models with a small nugget effect, except the I variable which has shown a perfectly continuous Gaussian model with zero nugget effect, arguing that the marine intrusion is seriously present and continuous. These individual results were also mapped by kriging and the intrusion easily shown on the field. However, the GALDIT computation and mapping did not confirm the found intrusion. It has merely shown a medium to low vulnerability in narrow and parallel bands close to the shore area. This work has shown that the GALDIT method used solely, without a geostatistical approach, would lead to a misinterpretation of the vulnerability of a main aquifer to saline intrusion.

Key words: GALDIT ; Shore aquifer ; Bouteldja ; Vulnerability ; Sea water intrusion ; Pollution ; Salinity

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