



Comparison of three applied methods of groundwater vulnerability mapping: application to the coastal aquifer of Chebba–Mellouleche (Tunisia)

Salwa Saidi^{a,b,*}, Salem Bourri^a, Sawsin Hassine^a, Hamed Ben Dhia^a

^aWater, Energy and Environment Laboratory ENI, Sfax, Tunisia

^bDepartment of Geology, University of Sciences, Tunis, El Manar, Tunisia

Tel. +216 97526024; email: salwa_saidi@yahoo.fr

Received 2 December 2012; Accepted 3 October 2013

ABSTRACT

The Chebba–Mellouleche Aquifer situated in the eastern coast of Tunisia is known for population growth and industrial development. These industrial and agricultural developments have led to water resources' degradation. So, cartography of the vulnerability seems to be an efficient tool for water resources management. In order to evaluate the vulnerability of the aquifer to pollution, three methods were used: DRASTIC, GALDIT and AVI based on the geographical information system (GIS) tools. These methods use different parameters which explain the different results in the vulnerability degrees in the Chebba–Mellouleche Aquifer. The vulnerability maps show that the coastal part of the study area is the most vulnerable zone. This explains the high similarity between the vulnerability map using the real weights, calculated by sensitivity analysis, and the nitrate distribution one. This reveals the high importance of sensitivity analysis in the validation of the vulnerability methods and in the choice of the suitable method in the decision-making in water protection and management. Also, when comparing the results, it seems that reducing the number of parameters is unsatisfactory due the variety of geological conditions of the study area. GIS is utilized to manage, manipulate and analyse the necessary geographical data used in the different vulnerability methods.

Keywords: Chebba–Mellouleche Aquifer; Geographical information system; DRASTIC; GALDIT; Aquifer vulnerability index

*Corresponding author.

Presented at the 6th International Conference on Water Resources in Mediterranean Basin (WATMED6), 10–12 October 2012, Sousse, Tunisia