

Characterizing Aquifer Layers of Karstic Springs in Nahavand Plain Using Geoelectrical and Electromagnetic Methods

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Abstract : Geoelectrical method is one of the most effective tools in determining subsurface lithological layers. The electromagnetic method is also a newer method that can play an important role in determining and separating subsurface layers with acceptable accuracy. In the present research, 10 electromagnetic soundings were collected in the upstream of 5 karstic springs of Famaseb, Faresban, Ghale Baroodab, Gian and Gonbad kabood in Nahavand plain of Hamadan province. By using the emerging data, the belectromagnetic logs were prepared at different depths and compared with 5 logs of the geoelectric method. The comparison showed that the value of NRMSE in the geoelectric method for the 5 springs of Famaseb, Faresban, Ghale Baroodab, Gian and Gonbad kabood were 7.11, 7.50, respectively. It is 44.93, 3.99, and 2.99, and in the electromagnetic method, the value of this coefficient for the investigated springs is about 1.4, 1.1, 1.2, 1.5, and 1.3, respectively. In addition to the similarity of the results of the two methods, it is found that, the accuracy of the electromagnetic method based on the NRMSE value is higher than the geoelectric method. The advantage of the electromagnetic method compared to geoelectric is on less time consuming and its cost prohibitive. The depth to water table is the final result of this research work , which showed that in the springs of Famaseb, Faresban, Ghale Baroodab, Gian and Gonbad kabood, having depth of about 6, 20, 10, 2 36 meters respectively. The maximum thickness of the aquifer layer was estimated in Gonbad kabood spring (36 meters) and the lowest in Gian spring (2 meters). These results can be used to identify the water potential of the region in order to better manage water resources.

Keywords : karst spring, geoelectric, aquifer layers, nahavand

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