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New geophysical insights concerning the interfaces between fresh, brackish and saline water in the Ein-Fashkha area at the north-western Dead Sea shore

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The present study was carried out in order to obtain new insights about the supply of the known high discharge freshwater springs in the Ein-Feshka area, about the main groundwater flow paths in that area and about the depth of the freshwater bodies. Furthermore the attention was focused on the detection of brines and saltwater bodies, the estimation of their depth and thickness as well as their interface with the freshwater bodies. Due to the scarcity of boreholes, which could provide this type of information, geophysical methods were applied to get information about these topics. Vertical Electric Soundings (VES) and the method of measurement of the Natural Pulsed Electromagnetic Field of the Earth (NPEMFE) were applied. The electric soundings had to bring information about fresh, brain or saline water bodies in the underground, but also information about the geological structure until 100 m depth. The special electromagnetic measurements were applied to bring direct information about fractures and rupture zones in the underground.

The obtained results by geophysical methods permit the conclusion that in the Ein-Fashka area exist saline intrusions form the Dead Sea toward the west. Until the investigated depth of 100 m, the detected saline intrusion has a horizontal development. The registered resistivities suggest that brackish water exist as well above and below the saline intrusion. The horizontal distribution of fresh water and saline water bodies can be supported by the layered soil distribution within the Quaternary sediments in this area, with an alternation of gravely/sandy and clayey layers. The geophysical

measurements suggest that the flow paths of groundwater seems to be disturbed by transversal faults and limestone blocks enclosed in the Quaternary alluvial sediments. Around the main spring of Ein-Fashka the obtained distribution of the measured resistivities suggest the presence of fresh water until a depth of at least 100 m.