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Detection of Aquifer Boundaries by Geo-Electrical Survey In Hamzakoy (Gelibolu Peninsula-Northwestern Turkey)

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This study reports a result of the hydrogeophysical survey conducted in the site of Hamzakoy (Gelibolu Peninsula-Northwestern Turkey) by using direct current resistivity method. The aim of the study is to detect aquifer boundaries of Upper Pleistocene aged shallow marine carbonates of Dardanelles Group not outcropping in the site but exposing in the surrounding of it. The modeled geo-electrical section is also examined about why the aquifer consisting of the carbonate rock formation do not outcrop and is overlaid by clastic deposits in the survey site. This allows us further and detailed hydrogeophysical surveys to detect aquifer boundaries in a more extend than the site in the view of regional geology and tectonic activity. The site is situated in the northern part of the Gelibolu Peninsula. The peninsula is covered by the sedimentary sequence of Eocene – Oligocene aged and the unconformably overlaying sedimentary sequence of Upper Miocene – Quaternary aged. The surface geology of the site and its surrounding include the sedimentary sequence of Upper Pleistocene belonging to Dardanelles Group. From bottom to top it has fluvial deposits, shallow marine carbonate and clastic deposits. The direct current resistivity method with independent soundings along a profile revealed the geo-electrical model. Evaluation of both geo-electrical model sections and the surface geology reveal a proposed geological section and the aquifer boundaries. The model indicates that: (1) the clastic deposits overlie the aquifer of shallow marine carbonate deposits as wedge shaped in the survey site, (2) the shallow marine carbonate deposits are just visualized approximately 55 m into the land regarding to the evaluation of the hydrogeophysical model, (3) a wetness front is evaluated which imply that the clastic deposits reveal perched aquifer conditions. Moreover, the shallow marine carbonate deposits outcrop in the surrounding of the survey site as marine terraces due to the regional tectonic activity and bound the survey site morphologically. This situation gives opportunities for conducting further hydrogeophysical surveys on the selected locations of the vicinity of the site to reveal what the subsurface continuity of the aquifer is in the context of the regional geology and tectonic activity.