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Sinkhole process interpretation based on shear wave seismic reflection results at Ghor Al-Haditha, Dead Sea

Since nearly 30 years - apparently contemporaneous to the rapid decrease of the Dead Sea level – ongoing unknown sinkhole processes in the subsurface continuously compromise farming areas, housings, industrial sites, and infrastructure at the investigation site, resulting in massive destructions. Similar processes are observed also at the western border of the Dead Sea. Although many geophysical studies have been carried out at the site since more than 20 years, the subsurface structure and the process itself is quite unknown until yet. In recent years, a massive salt layer at 35-40 m depth was proposed below alluvial fan deposits, which was originally the target of this reflection seismic pilot study. In October 2013 and October 2014, a shear wave reflection seismic study was carried out at the most destructive sinkhole site in Jordan, close to the village of Ghor Al-Haditha at the southeast border of the Dead Sea. Our interpretation, supported by two boreholes, is that sequences of unconsolidated alluvial fan deposits dominate all of the seismic depth sections, starting from the top soil used by farming to a depth of at least 200 m.

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