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3D reflection on the edge of a sinkhole: Evidence from the western Dead Sea shore.

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The formation of sinkholes along the Dead Sea is caused by the rapid decline of the Dead Sea level, as a possible result of human extensive activity. According to one of the geological models the sinkholes in several sites are clustered along a narrow coastal strip developing along lineaments representing faults in NNW direction. In order to understand the relationship between a developing sinkhole and its tectonic environment, a high-resolution (HR) three dimensional (3D) seismic reflection survey was carried out at the western shoreline of the Dead Sea. The purpose of this survey was to estimate future developing sinkhole revealed from south. The survey was conducted at the Mineral Beach located between the Dead Sea shoreline and Route #90, where sinkholes develop in alluvial fan. The field acquisition covers 120m by 60m using 288 shots with 96 channels in 2.5m interval per shot. For energy source we used truck mounted accelerated weight ("Digipulse") and single 10Hz geophone per station. In order to image the new developing fault in details the survey was designed with a full azimuth cover for offsets less than 30m. Preliminary results from processed 3D time volume show sub- horizontal coherent reflectors at approximate depth of 50-80m which incline on closer location to the exposed sinkhole. In addition, a fault with vertical displacement of 10m appears at NNW direction to the exposed sinkhole. The character of the reflectors southward is varies rapidly, suggesting also a presence of horizontal displacement of the fault. This study provides the first 3D HR imaging on the edge of a sinkhole and a nearby fault seen from seismic interpretation and field observations. The results of the seismic interpretation suggest a possible linkage between revealed fault and the sinkholes, field observation and 3D HR imaging.

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