



The Tiberias Basin salt deposits and their effects on lake salinity

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Abstract

Lake Tiberias is situated in one of the pull-apart basins comprising the Dead Sea transform. The Tiberias basin extends along the northern boundary of the Lower Jordan Rift Valley (LJRV) which is known for its massive salt deposits, mostly at its southern end, at the Dead Sea basin. Nevertheless, prior to the drilling of Zemah-1 wildcat, drilled close to the southern shores of Lake Tiberias, the Tiberias Basin was considered rather shallow and free of salt deposits (Starinsky, 1974). In 1983, Zemah-1 wildcat penetrated 2.8 km thick sequence of sedimentary and magmatic rocks of which 980m are salt deposits (Marcus et al., 1984). Recent studies, including the presented geophysical investigations, lay out the mechanisms of salt deposition in the Tiberias basin and estimate its abundance. Supported by seismic data, our interpreted cross-sections display relatively thick salt deposits distributed over the entire basin.

Since early days of hydrological research in the area, saline springs are known to exist at Lake Tiberias' surroundings. Water temperatures in some of the springs indicate their origin to be at depths of 2-3 km (Simon and Mero, 1992). In the last decade, several studies suggested that the salinity of springs may be attributed, at least partially, to the Zemah-1 salt deposits. Chemical justification was attributed to post-halite minerals which were thought to be present among those deposits. This hypothesis was never verified. Moreover, Möller et al. (2011) presented a calculation contradicting this theory.

In addition to the geophysical investigations, numerical models of thermally driven flow, examine the possible fluid dynamics developing near salt deposits below the lake and their interactions with springs along the lakeshore (Magri et al., 2015). It is shown that leached halite is too heavy to reach the surface. However, salt diffusing from shallow salt crest may locally reach the western side of the lakeshore.

References

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