



## **The ICDP Dead Sea Deep Drilling Project: An overview and the potential for high-resolution records of floods and droughts in the Levant**

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High-resolution sedimentary records are essential for a detailed palaeoenvironmental reconstruction of the Levant, which is tightly related to the origin, dispersal and evolution of modern human civilisations. Holocene and late Pleistocene sediments of the Dead Sea are unique archives of the climatic, environmental and tectonic history of the Levant and hence a focus of research. Therefore, during winter of 2010-11 an ICDP-drilling project in the Dead Sea (DSDDP) recovered approximately 720 metres of sediment cores from two deep and several short boreholes with the longest core located in the deepest part of the northern basin reaching 456 m below the lake-floor (at ~710 m below mean lake level). Based on initial geophysical and geochemical analyses of this core, we estimate the record to comprise ca the last 200 ka including the Zeelim (Holocene), Lisan (last Glacial) (Stein, 2001) and Samra (last Interglacial; Waldmann et al., 2009) formations and the later part of the penultimate Glacial (Amora Fm.; Torfstein et al., 2009). Magnetic susceptibility values strongly fluctuate during Interglacial periods, but remain constantly lower in Glacial intervals.

Deposition of sediments in the Dead Sea basin is strongly related to precipitation (Enzel et al., 2008) favouring sedimentation of alternated detrital clay and authigenic aragonite during wetter intervals and evaporites (e.g., halite and gypsum) in times of increased aridity and lower lake stands. Detailed initial facies analyses focused on two intervals in the deep core: 1) the upper Lisan Formation from ca 17 to 15 ka BP, and 2) the upper Zeelim Formation from ca 4 to 2 ka BP. Magnetic susceptibility measurements,  $\mu$ XRF element scanning and thin section microscopy allow high-resolution analyses at sub-annual timescales. These combined micro-facies analyses demonstrate the great potential for depicting small-scale variability of climate and even single droughts or flood events.

Enzel et al., 2008. *Global and Planetary Change* 60, 165-192.

Stein, 2001. *Journal of Paleolimnology* 26, 271-282.

Torfstein et al., 2009. *Geochimica et Cosmochimica Acta* 73, 2603-2630.

Waldmann et al., 2009. *Quaternary Research* 72, 1-15.