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Extreme Dead Sea drying event during the last interglacial from the ICDP Dead Sea Deep Drill Core

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The ICDP funded Dead Sea Deep Drilling Project (DSDDP) recovered the longest and most complete paleo-environmental record in the Middle East, drilling holes in a deep and a shallow site extending to ∼450 meters. The Dead Sea expands during the glacials and contracts during interglacials, and the sediments are an archive of the evolving climatic conditions.

During glacials the sediments comprise intervals of marl (aragonite, gypsum and detritus) and during interglacials they are salts and marls. We estimate that the deep site core spans ∼200 kyr (to early MIS 7). A dramatic discovery is a ∼40 cm interval of rounded pebbles at ∼235 m below the lake floor, the only clean pebbly unit in the entire core. It appears to be a beach layer, near the deepest part of the Dead Sea, lying above ∼35 meters of mainly salt. If it is a beach layer, it implies an almost complete dry-down of the paleo-Dead Sea.

The pebble layer lies within the last interglacial interval. Our initial attempt to estimate the age of the possible dry down shows an intriguing correlation between the salt-mud stratigraphy of the Dead Sea core and the oxygen isotope record of Soreq Cave, whereby excursions to light oxygen in the speleothems correspond to periods of salt deposition. Through this comparison, we estimate that the dry down occurred during MIS 5e.

The occurrence of ∼35 meters of mainly salt along with the pebble layer demonstrates a severe dry interval during MIS 5. This observation has implications for the Middle East today, where the Dead Sea level is dropping as all the countries in the area use the runoff. GCM models indicate a more arid future in the region. The core shows that the runoff nearly stopped during a past warm period without human intervention.