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The terraces of Lake Lisan: a continuous record of the climatic changes during the Late Pleistocene.

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Lake Lisan filled the Dead Sea depression between 63-15 Ka B.P. (Kaufmann et al., 1992; Shramm et al., 2000). The regression of the Lake Lisan to the current Dead Sea led to a sequence of shore terraces that offer excellent possibilities to reconstruct the lake history and correlate it with climatic changes during the Late Pleistocene.

Five cross sections of these terraces were examined by differential GPS altimetry. The terraces were found to be horizontal, undisturbed and characterized by a gentle foreshore with a slope of 3.5-12 degrees and a steep backshore with slope of 12-27 degrees. The terraces range in elevation between -370 and -117 m (i.e. below sea level) that represent the levels of the lake in Late Pleistocene and suggest (a) a much higher stand of Lake Lisan than the previous known level of -150 m (Bowmann and Gross, 1992); (b) a sharp but gradual drop of the lake from a very high level at about -117 to a very low level at about -370 m; (c) substantial climatic changes in the Jordan valley during the Late Pleistocene from initially very wet conditions to extremely dry conditions.

On these terraces - between -370 and -148 m - in-situ precipitated, calcareous stromatolites are preserved. Some form large, laminated, massive, head-like blocks others are finely laminated crusts. Since stromatolites are formed on algal mats, they are indicative of relatively shallow water conditions. Calcareous crusts less clearly laminated and more clotty in structure appear between -148 and -117 m. This may indicate (a) that the lake chemistry at high lake stands was less alkaline due to high fresh water input; or (b) that the wave action was stronger at the steep eastern shore of Lake Lisan, formed by Cambrian sandstones and dolomites. Dating stromatolites with 14C and U/Th and of the terraces sediments by OSL is in progress.