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Discovery of a buried reef belt at the edge of the Israeli continental shelf: oceanographic implications for the Holocene East Mediterranean

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Low sea level characterizing the last glacial maxima (LGM) allowed the establishment of shallow-water reefs at positions currently deeper than 100 m. Some of these reefs, like those of the Gulf of Eilat (Aqaba) and Hawaii, initiated during photic conditions and demised as sea level rose. Others, like in southern Australia, were initiated by changes in the nutrient regime but demised when conditions became unhospitable. Here we present new findings for the establishment of reefs and bioherms prior to the Holocene sea level rise in the Eastern Mediterranean, with implications on post glacial nutrients and turbidity changes in the region.
A detailed Sparker seismic survey off Israel reveals the presence of high amplitude mounded features characterize by a chaotic internal seismic facies, located at depths of 172 to 190 msec (∼130-140 mbsl) below mean sea level. The unit is subsequently buried by a 38 msec (∼29 m) thick finely-layered sedimentary sequence that can be identified along most of the Israeli shelf edge as a discontinuous lineup of elements that range 7 to 50 msec (∼5-40 m) in elevation and widens <1.4 km. Interestingly, the mounded features are situated below a sudden change in the bathymetry in which seafloor angle varies from <0.5° in the east to ∼1.5° towards the west. The base of the mounded features resides on an unconformity surface of an unknown age, yet stratigraphical correlation with previous studies suggest a last glacial maxima age (∼20 Ka).
Cores that penetrate this unit reveal a sequence of mud overlying highly calcareous sediments, with the upper portion composed primarily of tightly packed heterozoan assemblages, most notably serpulids and bryozoans. A sequence of radiocarbon ages recovered along the core reveal that the bioherm and reef biological assemblage were developed ∼8 Ka cal. Based on our chronology, we suggest that the reef prevailed during the post glacial maxima transgression and terminated in conjunction to the development of sapropel S1 in the deep basin. Considering the water depth at the demise of the reef (>80 m) and that the biological assemblage is not solely of phototrophic conditions, we postulate that drowning does not appear to be the most likely cause of the termination of the reef. The transition from a calcareous domain to a silisicalstic one suggests the forcing of an external change in the sediment influx regime to the East Mediterranean through the Nile River.