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Coastal Environmental Change  
During Sea-Level Highstands:  
A Global Synthesis with implications  
for management of future coastal change

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Quaternary coastal morphology and sea level changes



Project 437

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# The sea level curve of the Israeli coast over the last 8,000 years

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## Abstract

The sea level curve deduced for the Israeli coast for the last 8,000 years is based mainly on archaeological data. The land and underwater observations are compared to hydro-isostatic models. Differences, if significant, between the observed and predicted change are interpreted as being of tectonic origin. The archaeological data used to bracket palaeo sea levels includes coastal waterfront manmade structures and living floors on land, underwater sites that provide upper and lower constraints for past sea levels, ancient land and underwater wells which also provide upper and lower constraints, and wreckage that approximates the palaeo coastline. The isostatic model includes the contribution arising from the increase in ocean volumes due to residual melting of ice sheets, the effect of the changing shape of the ocean basin, the time dependence of shorelines as sea level changes and the changing surface area occupied by ice sheets.

The archaeological observations and the model sea-level curve along the Mediterranean coast of Israel were found to be generally consistent and any discrepancies lie within the uncertainties of both values.

The sea level at the present Israel coastline in 8000 BP was at about  $-13.5 \pm 2$  m, according to the model prediction, whereas the archaeological data place it at  $-16.5 \pm 1$  m. By 7000 BP the predicted level had risen to about  $-7 \pm 1$  m, which is consistent with the archaeological evidence. According to both observations and predictions sea level was still lower than  $-3$  to  $-4.5$  m at 6000 BP and remained below its present level until about 2000 BP (Sivan et al., 2001). From 2000 BP (1<sup>st</sup> century AD – the Early Roman period) to about 700 BP (12<sup>th</sup> to 13<sup>th</sup> century AD – the Crusader period) sea level ranged between 50 cm higher than today at the Byzantine period (4<sup>th</sup> to 7<sup>th</sup> century AD), to 20 cm lower at the Crusader period. The accuracy of this sea level reconstruction is  $\pm 10$ -20 cm (Sivan et al., in preparation). The agreement between the model sea-level curve and the archaeological observations also leads to the conclusion that the average rate of vertical tectonic movement for the last 8000 years has been less than 0.2 mm/y, at least along the northern Israeli coast.



