



Early Holocene Cold Spells in the Northern Aegean Sea (Mediterranean Sea)

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It has become widely established that Holocene climate has undergone a number of climatic oscillations from its mean state. These fluctuations are witnessed by a large number of records from different archives recovered at different latitudes across the world. Nevertheless, the magnitude, timing, nature and causes of these events remain debated. Due to their abrupt nature there is a need for (a) high resolved records from basins with a direct rather than a lagged response to climatic forcing, (b) proxies extremely sensitive to changing environmental conditions. The Aegean Sea, a marginal basin of the Eastern Mediterranean, does fit such requirements, while the presence of early Holocene anoxic deposits (sapropels), which lack bioturbation, allows for high sampling resolution (continuous 0.5 cm intervals). Here we present dinoflagellate cyst abundance data from a core site (SL-21) in the north-eastern Aegean Sea. The relatively high sedimentation rate (6.8 cm kyr^{-1}) and continuous sampling allow a sub-centennial resolution.

Autotrophic dinoflagellates dwell in the uppermost part of the water column and some produce organic walled cysts (dinocysts). Previous studies emphasize the sensitivity of some cyst-forming dinoflagellates to sea surface parameters. We use abundance variations of selected temperature sensitive dinocysts as qualitative sea surface temperature (SST) proxy. The cold temperate autotrophic dinocyst *Spiniferites elongatus* generally occurs in low percentages in the Holocene records of the Eastern Mediterranean. Sharp diversions in the relative abundances of *S. elongatus* from their background values ($\sim 1\%$) in core SL-21 highlight distinct cold episodes (cold spells) (e.g. $\sim 8.3 \text{ kyr BP}$) that abruptly punctuated the generally warm early Holocene record. Dinocysts

are compared with oxygen isotopes and planktic foraminiferal abundances from the same core, and from nearby core LC-21, to portray the main climate/oceanographic changes in the Aegean Sea during the early Holocene. Analogies and differences between North and South Aegean Sea conditions are also discussed.