Geophysical Research Abstracts,
Vol. 11, EGU2009-6307, 2009
EGU General Assembly 2009

Palynological records of climate and oceanic conditions in late Pleistocene and Holocene sediments of the Nile cone, southeastern Mediterranean

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Variations in palynomorph concentrations and relative abundances, including pollen and spores, organic-walled dinoflagellate cysts, and
amorphous organic matter (AOM), were studied in sediment core NC Core 2 from the upper slope (1,030 m water depth) of the Nile Cone,
southeastern Mediterranean, Egypt. Each sample represents palynomorph deposition for intervals of around 500–1,000 years, and this study
provides the first detailed palynological record for the Nile Cone. The dinoflagellate cyst assemblages and AOM production reflect changes
in surface water temperature and river discharge in response to climate forcing as marked by variations in pollen and spore indicators of
semi-desert vegetation and tropical Monsoon intensity. The basal sediments (approximately 14,600–9,500 yr before present [BP]) contain
high concentrations and relative abundances of Polysphaeridium zoharyi, Polysphaeridium spp., Spiniferites elongatus, and Spiniferites
spp. during the transition from postglacial to interglacial conditions. Variations in these taxa and total Impagidinium spp. suggest a gradual
temperature increase, interrupted by a pre-Holocene cool interval around 11,000 yr BP. The high African monsoon index for this pre-
Holocene time corresponds with pollen evidence of relatively high Nile discharge. The organic-rich S1 sapropel sediments, dated as around
9,500–6,270 yr BP, were deposited several thousand years later, during a time of lower Monsoon index, warmer surface water, and increased
dinoflagellate cyst production. This was accompanied by moderate Nile flooding and oxygen-deficient or anoxic bottom water on the upper
Nile Cone, mainly supporting the increased production and carbon import hypothesis for eastern Mediterranean S1 formation.
Dinoflagellate cyst assemblages in the Nile Cone S1 differ from those of the deeper, more northern Levantine and Cretan basins in the near
absence of heterotrophic protoperidinioid cysts, despite the uniformly high organic S1 carbon content. The prevailing climate during the
formation of sapropelic sediments in the southeastern Mediterranean was tropical to subtropical, but was interrupted by an early cooler
interval with reduced humidity, as marked by re-appearance of Spiniferites elongatus and increased Ephedra pollen. The carbonate-rich
surface layers were probably deposited under warm dry climatic conditions with minimum Nile input, but evidence of oxidation prevents
detailed interpretation.