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A multi decennial-scale marine and terrestrial palynological record of eastern Mediterranean sapropel S1 in proximity of Nile River outflow

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Eastern Mediterranean sediments are characterized by the cyclic occurrence of organic-rich layers, sapropels. Sapropel deposition is dominantly controlled by variations in precession, which drive the Northern Hemisphere seasonal contrast and the African monsoon intensity. During precession minima increased freshwater input (e.g., Nile runoff) weakened the prevailing anti-estuarine circulation. This ultimately led to widespread seafloor anoxia, promoting enhanced preservation of organic material. Increased nutrient-rich freshwater input may have additionally boosted productivity in surface waters enhancing organic matter flux to the seafloor. The relative contributions of productivity and preservation in sapropel formation is still highly debated.
Here we present a marine and terrestrial palynological study (i.e. dinoflagelattes, pollen and spores) of sapropel S1 ($\sim$10-6 kyr BP) from core PS009PC, retrieved from offshore Israel, a location extremely sensitive to changes in the Nile outflow. High sediment accumulation rates of the core enable an unique high-resolution study. Our results clearly reflect the changes that occurred in the marine and terrestrial realms prior to and during sapropel deposition, its termination and the temporary interruption at $\sim$8.2 kyr. Our data, in combination with available geochemical data, show that productivity was elevated before sapropel deposition already, while sudden stratification seems to have been critical for sapropel formation.