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The signature of Sapropel S3 in a core offshore the Nile: a marine and terrestrial palynological approach

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Numerous organic-rich layers can be identified in Eastern Mediterranean sediment records. These layers, named sapropels, have been repeatedly deposited since the late Neogene during minima in Earth's precession. Enhanced monsoon activity increased precipitation over the North African continent fuelling rivers, which drain into the Eastern Mediterranean, resulting in stratification of the water column. Reduced vertical mixing led to the widespread occurrence of bottom water dysoxia/anoxia, and eventually to a higher preservation of organic material. Whether river runoff boosted productivity or the high levels of organic carbon in the sapropels are mostly the results of increased preservation remains matter of debate.

Here we present a first detailed marine (dinoflagellate cysts) and terrestrial (pollen, spores) palynological study of sapropel S3 deposited ∼80 kyr BP. This allows integrating changes occurred in the marine and terrestrial environment. Dinocysts, pollen and spore assemblages were studied from a core (MS21PC) located ∼150 km offshore the Nile river. Due to its location, our record clearly picks up the enhanced input of freshwater and increased productivity prior to and during sapropel formation. Interestingly, the climatic signal seems to lead the lithological signal of sapropel S3 implying that productivity was the triggering mechanism in sapropel formation.