



Palynological land-sea correlation in the Postglacial of the Aegean Sea: A terrestrial view on sapropel formation

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Sapropel S1 (S1) was deposited in the Mediterranean Sea between ~ 9.5 and ~ 6 kyr BP. Its formation is ascribed to increased runoff notably through the Nile river, resulting from enhanced monsoonal activity over equatorial Africa. While the link between S1 formation and African climate is firmly established, the climate dynamics in the northern borderlands of the Mediterranean Sea during S1 formation are less well understood. We have therefore analyzed terrestrial palynomorphs in a marine core recovered from the Mount Athos Basin (Northern Aegean Sea) that comprises the interval of S1 deposition. Here, high sedimentation rates allow the detailed analysis of the timing between S1 formation and terrestrial ecosystem change in the northern borderlands of the Aegean Sea (NBAS) and warrant a good preservation of palynomorphs. Our data reveal strong terrestrial vegetation changes in the NBAS associated with the deposition of S1. Reforestation was only completed at ~ 9.7 kyr BP, thus slightly pre-dating the onset of S1 formation. Quantitative pollen-based climate reconstructions indicate that reforestation was connected to a $\sim 30\%$ increase in winter precipitation and a $\sim 10\%$ increase in winter temperature. This suggests that increased runoff from the NBAS significantly contributed to the freshwater excess in the Aegean Sea during S1 formation. The well-known interruption of S1 is reflected by a gentle, yet steady decline of arboreal vegetation starting at 8.5 kyr BP and exhibiting a pronounced drop at 8.2 kyr BP. This drop is connected to a 1.5°C drop in winter temperature. The termi-

nation of S1 is expressed in an arboreal vegetation decline connected to a pronounced ($>2^{\circ}\text{C}$) reduction in winter temperature, whereas winter precipitation remained nearly constant. This indicates that significantly lower winter temperatures played a leading role in the processes responsible for the resumption of deep-water ventilation in the Aegean Sea.