

North Mediterranean hydroclimate influences on sapropel deposition

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The leading hypothesis for the deposition of organic rich sediments or ‘sapropels’ in the Mediterranean is an intensified north African summer monsoon that disrupted the hydrological budget of the Mediterranean. However, speleothem and palynological studies from the northwestern Mediterranean, regions outside the influence of the African summer monsoon, also show pluvial phases during the recent Holocene sapropel deposition, but direct evidence for rainfall variability during previous interglacials from the marine sediments in the northern Mediterranean is still lacking. Therefore here we present a reconstruction of north-central Mediterranean hydroclimate through terminations II (~130 ka BP) and III (~243 ka BP) from a marine sediment core collected from the Golo river mouth Corsica (Tyrrhenian Sea). High Ba/Ca and low oxygen isotope ratios of planktonic foraminifera reveal high riverine freshwater input synchronous with the existing high eustatic sea level in response to high insolation and precession minima during warm interstadials MISS7c (210 to 220 ka BP) and MIS5e (120 to 125 ka BP), precisely at the time of Sapropel 8 and 5 deposition respectively. Higher riverine discharge during MIS 7c relative to MIS 5e suggests the magnitude of rainfall possibly responded to changes in the eccentricity. These results indicate rainfall over the northern Mediterranean borderland contributed an additional source of freshwater, alongwith from the Nile river discharge, to the Mediterranean basin and in turn led to sapropel deposition via surface buoyancy changes and organic matter input. Orbital forcing exerts a dominant control on the timing and amplitude of north-central Mediterranean rainfall changes through insolation and possibly also changes in the strength of the westerlies.