Geophysical Research Abstracts
Vol. 16, EGU2014-277, 2014
EGU General Assembly 2014

A high-resolution Holocene sapropel record from the Ionian Sea, eastern Mediterranean: detrital input and paleoclimate conditions

Jiawang Wu (1), Gert De Lange (1), Katharina Pahnke (2), and Philipp Böning (2)

(1) Department of Earth Sciences - Geochemistry, Faculty of Geosciences, Utrecht University, P.O. Box 80.021, 3508 TA Utrecht, The Netherlands (j.w.wu@uu.nl), (2) Max Planck Research Group for Marine Isotope Geochemistry, University of Oldenburg, Carl-von-Ossietzky-Str. 9-11, 26129 Oldenburg, Germany

Organic-rich sedimentary units called sapropels have formed episodically in the eastern Mediterranean, at an astronomically determined cyclicity. The deposition of the most recent sapropel S1 has been reported to be synchronous basin-wide (De Lange et al., 2008). Climate conditions during sapropel formation were relatively humid, which is associated to precessional minima, in contrast to more arid conditions otherwise. Such humid conditions must have resulted in enhanced riverine fluxes relative to reduced dust fluxes. A significant change in the composition and quantity of detrital input is therefore expected. Previous studies have shown this general pattern and determined paleoclimatic signals of riverine and eolian contributions by major elements (e.g. Wehausen & Brumsack, 2000) as well as Nd and Sr isotopes (e.g. Weldeab et al., 2002; Box et al., 2011). However, up to now studies characterizing sapropel versus non-sapropel deposition were done with rather limited time-resolution.

Here, we present a high-resolution geochemical record of detrital input from a well-dated boxcore. Core CP10BC (N34°33', E16°34'; ~1500 m water depth) was collected in the western Ionian Sea, where prominent effects of African monsoon controlled Saharan dust and Nile sediment, and of northern borderlands climate controlled deep-water formation and riverine inputs can be detected. The core was sampled with an average age resolution of ~65 yr, having age control with 4 AMS radiocarbon dates.

Similar to other reported Holocene eastern Mediterranean sediments, the S1 is clearly identified by its enhanced Ba/Al and the manganese Marker Bed that marks the end of S1 deposition. The sediment accumulation rate in core CP10BC is higher than usually found in deep Mediterranean deposits (5 vs. 2.5 cm/kyr). This may explain the advanced variability observed within the S1-sediments suggesting that climate and oceanography during that period was not as stable as is commonly anticipated. Such changes may be associated to variability in the N. African monsoon or northern borderland climate systems. With elemental and isotopic proxies for riverine- and dust-related fluxes, we demonstrate that detrital fluxes and variability therein are predominantly influenced by Saharan dust but with a noticeable influence of another as yet not fully identified detrital input. The latter is thought to contain components related to riverine input of northern borderlands and potential of the Nile or another N. African river system. The 8.2 kyr cooling event that is clearly represented in our core will be used as an example to illustrate climatic perturbation and the related change in amount and composition thus origin of detrital inputs during the period of S1 deposition.