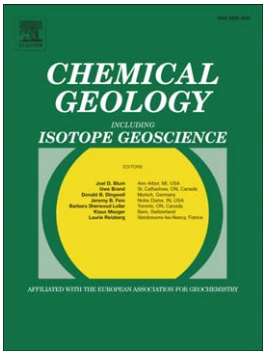

Anoxic development of sapropel S1 in the Nile Fan inferred from redox sensitive proxies, Fe speciation, Fe and Mo isotopes

Alan Matthews, Irit Azrieli-Tal, Ayelet Benkovitz, Miryam Bar-Matthews, Derek Vance, Simon W. Poulton, Nadya Teutsch, Ahuva Almogi-Labin, Corey Archer

PII: S0009-2541(17)30590-9
DOI: doi:10.1016/j.chemgeo.2017.10.028
Reference: CHEMGE 18517

To appear in: *Chemical Geology*

Received date: 6 June 2017
Revised date: 19 October 2017
Accepted date: 21 October 2017

Please cite this article as: Matthews, Alan, Azrieli-Tal, Irit, Benkovitz, Ayelet, Bar-Matthews, Miryam, Vance, Derek, Poulton, Simon W., Teutsch, Nadya, Almogi-Labin, Ahuva, Archer, Corey, Anoxic development of sapropel S1 in the Nile Fan inferred from redox sensitive proxies, Fe speciation, Fe and Mo isotopes, *Chemical Geology* (2017), doi:10.1016/j.chemgeo.2017.10.028

Anoxic development of Sapropel S1 in the Nile Fan inferred from redox sensitive proxies, Fe speciation, Fe and Mo isotopes.

Alan Matthews[1]*, Irit Azrieli-Tal[1], Ayelet Benkovitz[1], Miryam Bar-Matthews[2], Derek Vance[3], Simon W. Poulton[4], Nadya Teutsch[2], Ahuva Almogi-Labin[2], and Corey Archer[3]

[1]Institute of Earth Sciences, Hebrew University of Jerusalem, Edmond Y. Safra Givat Ram Campus, 9190401 Jerusalem, Israel

[2] Geological Survey of Israel, 30 Malkhei Israel Street, Jerusalem 9550161, Israel

[3] Institute for Geochemistry and Petrology, Department of Earth Sciences, ETH Zurich, NW D81.4, Clausiusstrasse 25, 8092 Zurich, Switzerland

[4] School of Earth and Environment, University of Leeds, Leeds LS2 9JT, United Kingdom

* Corresponding author: alan.matthews@mail.huji.ac.il

Abstract

Redox conditions and the mechanisms of redox development are a critical aspect of Eastern Mediterranean sapropels, whose formation in oxygen-depleted waters is closely related to water column stratification at times of global sea level rise and insolation maxima. Sapropels in the Nile Fan formed at relatively shallow water depths under the influence of the monsoon-driven freshwater ouput from the River Nile. This work evaluates the redox evolution of Holocene sapropel S1 in VALPAMED cruise core MD9509, recovered at 880 mbsl in the NE Nile Fan, using a combination of geochemical element proxies, Fe speciation, Fe and Mo isotopes studies. The productivity and redox proxies (Ba/Al, Mo/Al, U/Al, V/Al, Sb/Al) show well-defined enrichments in the sapropel, but with a marked minimum at *ca* 8.2 ka indicative of reventilation corresponding to a well known global cooling event. Peak productivity and reducing signals occur close to the initiation of sapropel formation. The proxy signals in sapropel 9509 are stronger and of longer duration than those of a second sapropel S1, recovered at the same depth, but 380 km to the north (MD9501), supporting the notion (suggested in previous studies) of more reduced conditions in the Nile Fan.

The Mo_{EF} vs U_{EF} enrichment factor variations in core 9509 infer a transition from open marine suboxic conditions in the enclosing non-sapropel sediments to anoxic non-sulphidic water column conditions in the sapropel. Correspondingly, the highly reactive Fe