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Emiliania huxleyi coccolith d18O during the deposition of sapropel S1 in the Aegean Sea

M.V. Triantaphyllou (1), P. Ziveri (2,3), V. Lianou (1), P.G. Mortyn (2), G. Katsouras (4,5), A. Gogou (4), I. Bouloubassi (6), K.-C. Emeis (7), and V. Lykousis (4)

(1) University of Athens, Faculty of Geology & Geoenvironment, Dept. of Hist. Geology-Paleontology, Panepistimiopolis 15784, Athens, Greece (mtriant@geol.uoa.gr), (2) ICTA Autonomous University of Barcelona (UAB) Edifici Cno-Campus UAB, 08193, Bellaterra, Spain, (3) Department of Paleoclimatology and Geomorphology, Faculty of Earth and Life Sciences, Vrije Universiteit Amsterdam, De Boelelaan 1085 1081 HV Amsterdam, The Netherlands, (4) Hellenic Centre for Marine Research, Inst. of Oceanography, 19013 Anavyssos, Greece, (5) University of the Aegean, Department of Marine Sciences, 81100 Lesvos, Greece, (6) Locean - IPSL Université P. et M. Curie C 4, Place Jussieu, 75252 Paris Cedex 05, France, (7) University of Hamburg, Institut für Biogeochemie und Meereschemie, D-20146 Hamburg, Germany

Much interest has been concentrated recently on the Aegean Sea, an eastern Mediterranean basin situated within a climatic transition zone which represents an important source area of new deep water for the entire eastern Mediterranean. Recent paleoceanographic research has shown that the Aegean Sea sediment record, although featuring organic-rich sapropel layers that demonstrated periodically different productivity, circulation and preservation conditions in the past, provides a direct link to the high-latitude Holocene climate influences.
This is superimposed on the underlying subtropical/tropical control on the eastern Mediterranean Sea hydrography and ecosystem, suggesting that paloclimatic conditions that accompanied sapropel deposition were not always uniform.

This research uses the inorganic and organic chemistry of coccolithophores to monitor changes in sea water chemistry and ecology during the sapropel S1 deposition in the Aegean Sea. In particular d18O on coccoliths of Emiliania huxleyi has been analyzed from a number of samples spanning S1 from the SE Aegean core NS-14 and the North Aegean core 152SL. Age model, marine biogeochemical conditions and SSTs derived from alkenones, are well determined in both cores. The calculated d18Ow variability is related to both changes in freshwater input and carbonate ion concentration. d18Ow decreases (approx. 0.6 o/oo) before S1 deposition, demonstrating fresher conditions and a possible runoff source for nutrient delivery.

Here we will present various lines of coccolithophore evidence in support of this conclusion, as well as corroborating planktonic foraminiferal d18O data from the surface-dwelling species, Globigerinoides ruber.