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Episodes of last interglacial aridity of Mediterranean coastal sites: a contrast to freshwater discharge hypothesis?

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Current understanding of sapropel formation in the Eastern Mediterranean (EMed) basins combines the anoxia hypothesis with enhanced primary productivity. The anoxia hypothesis is supported by the pronounced decrease in [U+F064]18O of EMed sea water which was likely caused by increased freshwater input and this input is in turn supported by hydrogen isotope values confirming a substantial drop of the sea surface salinity (SSS). Enhanced freshwater discharge would most likely originate from the Nile river and from wadis draining large Saharan lakes. The increased hydrological budget of the North African lacustrine and fluvial systems is interpreted to result from a northward shift of the African summer Monsoon (AM) domain as a response to the northward move of the ITCZ during the boreal summer insolation anomaly. So far, however, neither the geochemical signature of the Nile sediments nor enhanced lake drainage into the EMed have been conclusively identified in terrestrial or marine sediments associated with the three sapropels (S5, S4, S3) formed during the last interglacial.
Here, we address the freshwater discharge hypothesis by studying the last interglacial (MIS 5, ca 140 75 ka) sediment-soil sequences at tectonically stable coasts of Israel, Egypt, Tunisia and SE Spain using conventional field and laboratory sedimentological techniques alongside micropalaeontological investigations, soil analysis and optical dating.
Everywhere on the southern Mediterranean coasts between the Levant and Spain last interglacial (sensu largo) coastal sequences are composed of shallow marine bioclastic and oolitic carbonate sediments; only in the east these sequences contain red Mediterranean palaeosols. From modern analogues it is deduced that the oolitic sediments represent an arid climate period that was recorded at ∼109 ka on the Levant coast, at ∼83 ka on the Tunisian coast, and at ∼ 94 ka on the southeast Spanish coast when the local sea level was high. The carbonate production is sensitive to sea-surface temperature and would have ceased under large-scale freshwater input into the coastal water. In the east, the arid period was followed by a soil forming humid phase from ∼90 80 ka in agreement with the speleothem record which indicates enhanced (E-Mediterranean derived) rainfall during formation of S3 whereas no evidence for humid climate was found in the west. This shows that the southern Mediterranean is more likely to be responsive to external forcing exerted by the Atlantic meridional circulation than to patterns of fluvial discharge due to intensification and northward shift of the African monsoon.