Geophysical Research Abstracts,
Vol. 11, EGU2009-8511-2, 2009
EGU General Assembly 2009

The eastern Mediterranean response to climate forcing: comparison between the two most recent interglacial maxima

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The sensitivity of the Mediterranean marine system to climate forcing is still a matter of debate. Here we investigate the long-term sensitivity of the eastern Mediterranean water mass circulation to orbital insolation forcing during the last two interglacial maxima. Both intervals witnessed a considerable increase of monsoon-fuelled river discharge along the North African margin, with extensive hydrographic changes that led to the widespread deposition of organic-rich sediments (sapropels). To quantify the environmental changes in response to different levels of insolation forcing, we present a set of highly-resolved paleoceanographic proxy records, which are analyzed within one and the same sediment archive (south-eastern Aegean core LC21) through sapropels S5 and S1 from the last and current (Holocene) interglacial maxima, respectively. Oxygen (δ^{18}O) and carbon (δ^{13}C) isotope ratios for surface water (*Globigerinoides ruber*) and sub-thermocline dwelling (*Neogloboquadrina pachyderma*) planktonic foraminifera, and total organic carbon data (C_{org} wt%), are used to reconstruct water-mass dynamics and the magnitude of C_{org} burial. We find overall more pronounced environmental changes in the last interglacial records than in those for the Holocene. Specifically, C_{org} mass accumulation rates (MAR) reached ~3 g C m^{-2} yr^{-1} during deposition of S5, which is an order of magnitude higher than the highest C_{org} MAR for S1 at the same site. In addition, there is a negative δ^{18}O shift in the record of the summer mixed-layer dwelling planktonic foraminifer *Globigerinoides ruber* at the onset of S5 deposition, which is twice as large as the analogous shift at the onset of S1. The surface-to-intermediate water δ^{13}C gradient in S5 is of the same magnitude as the total surface-to-deep water δ^{13}C gradient within S1. This suggests that intermediate waters during S5 may have been as poorly ventilated (thus strongly isolated) as the deep waters during S1. Taken together, the datasets suggest that the stronger insolation forcing of the last interglacial maximum (S5), relative to the Holocene maximum (S1), promoted: **(a)** more dramatic monsoon-fuelled freshwater flooding into the eastern Mediterranean; **(b)** stronger water mass stratification, and **(c)** higher C_{org} MARs. We discuss these findings within the context of other paleoclimate records from the wider tropical/subtropical belt in the Northern Hemisphere