

Environmental changes prior to the Messinian Salinity Crisis

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The Messinian Salinity Crisis (MSC) is an extreme event which occurred in the Mediterranean Basin at the end of the Miocene (5.97 to 5.33 Ma) resulting in thick evaporites deposits. There is evidence of restriction of the Atlantic-Mediterranean corridor several million years before the first evaporites. These pre-MSC successions are dominated by precession-controlled lithological variations which are responses to changing fluvial runoff. Runoff into the Eastern Mediterranean is influenced by monsoonal precipitation from the North African continent illustrated by a suite of 22 climate simulations throughout one entire precession cycle. The Sorbas Basin in SW Spain and the Pissouri Section on Cyprus both contain pre-MSC successions from the margins of the Mediterranean Basin. We analysed biomarkers in conjunction with the existing faunal records to understand the terrestrial sources of organic matter. This multi-proxy dataset allows us to compare the environmental evolution of the western vs. eastern basins prior to the MSC and allows us to evaluate the controls on and characteristics of environmental evolution. Pronounced orbital changes in faunal assemblages in the Sorbas Basin reflect Mediterranean influences into the local Sorbas system.

Changes in apparent soil pH inferred from the distribution of GDGTs in the Sorbas Basin along with terrigenous inputs deduced from the amount of BrGDGT and *n*-alkanes, indicate variations in the terrigenous sources both on an orbital and over timescales of the entire section (ca 1 Ma). These data contrast with the pronounced precessional signal seen in the microfossil data from Sorbas. This reflects the complex interaction of progressive isolation of the Sorbas Basin from the Mediterranean with precession-driven variations in precipitation and associated runoff.

The Pissouri Basin also shows strong variability in its biomarker content, but the long-chain *n*-alkanes are significantly less abundant by comparison with Sorbas. This implies less input from terrestrial sources, and provides a more prominent Mediterranean signal in the lead up to the MSC.