



## **Increased magma production and volcanism triggered by the Messinian Salinity Crisis**

Pietro Sternai (1), Luca Caricchi (1), Daniel Garcia-Castellanos (2), and Sebastien Castelltort (1)

(1) Department of Earth Sciences, University of Geneva, Geneva, Switzerland, (2) Instituto de Ciencias de la Tierra Jaume Almera, CSIC, Barcelona, Spain

For more than four decades, large controversies about the causes, effects and timing of the Mediterranean Messinian Salinity Crisis (MSC) have evolved in the light of a continuously growing body of evidences. The igneous response to such extreme event, however, has remained largely unexplored despite known relationships between surface load variations and the production of magma. Here, we compile published geochemical and isotopic data and recognize a two-fold increase of volcanic eruptions from pan-Mediterranean magmatic provinces coinciding with the proposed “shallow-water phase” of the MSC between  $\sim 5.70$ - $5.33$  Ma. Estimates of surface load variations due to the desiccation event corrected for water density change and deposition of salt deposits suggest a net mean lithospheric unloading of up to  $\sim 15$  MPa during the shallow-water phase of the MSC. Because the timescale of interest is too short for changes of the Mediterranean tectonics to significantly affect the bulk of the magma production, we propose that such net surface unloading enhanced the mantle decompression melting and dike formation, in turn causing the observed increase of volcanic events. If correct, the Mediterranean magmatic record provides an independent validation of the “shallow-water” model for the formation of salt deposits and testifies the high sensitivity of the melting of the Earth’s interior to the surface forcing.