



The Messinian Salinity Crisis: what can we expect from drilling the perched basins from the Balearic Promontory?

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In spite of 40 years of multi-disciplinary research conducted on the Messinian Salinity Crisis (MSC) event, modalities, timing, causes, chronology and consequence at local and planetary scale of this event are still not yet fully understood, and the MSC event remains one of the longest-living controversies in Earth Science. A key factor for the controversy is certainly the lack of a complete record of the MSC deposits preserved in the deepest Mediterranean basins. Anywhere else, on the continental shelves and slopes, the MSC mostly generated a sedimentary/time lag corresponding to a widespread erosional surface. Correlations with the depositional units locally preserved onshore are thus complex, preventing the construction of a coherent scenario linking the outcropping MSC evaporites, the erosion on the margins, and the deposition of clastics and evaporites in the abyssal plains.

Recent works based on seismic profile interpretations and conducted on the Balearic promontory allowed to evidence a series of small perched basins presently lying in different water depths stepped from the coast line down to the deep basin. These topographic lows trapped sedimentary series up to 500m thick, interpreted as MSC in age (Maillard et al., 2014; Mocnik et al., 2014; Driussi et al., in press). In the most proximal basins, these deposits have been drilled and logged for industrial purposes and consist of gypsum beds interbedded with marls. Ochoa et al. (submitted) demonstrated that these MSC deposits correlate with the Primary Lower Gypsum sequence deposited in marginal settings before the drawdown phase (Lugli et al., 2010) and that are now observed onshore in tectonically active areas. The basins located in more distal locations also contain MSC deposits (including <200m thick salt layers) but these have not been drilled. The relative age and chronology of the MSC deposits from one basin to another thus still need to be defined.

The Balearic Promontory is probably the only place in the Mediterranean area potentially bearing some records of the MSC event that have been accumulated and preserved at various water depths in which post/Messinian tectonic deformation is low. A complete shallow-to-deep transect of sites across these stepped basins, provides a unique opportunity to quantify the amplitude of the Messinian draw-down and to test the hypotheses of a stratified water column and of a diachronous/synchronous onset and end of the salinity crisis.

In order to address these persistent open questions, we propose to drill, core and log a shallow-to-deep transect on the Balearic Promontory as part of a daughter proposal (DREAM proposal) of a Multi-phase IODP Drilling Project entitled "Uncovering A Salt Giant" (857-MDP, coord. A. Camerlenghi).

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