Revision of the Alboran sea Tortonian-Pliocene record: possible new insights on Mediterranean-Atlantic connectivity during the Messinian Salinity Crises

Francesca Bulian and Francisco J. Sierro
University of Salamanca, Area of paleontology, Department of Geology, Spain (fra.bulian@usal.es)

In August of 1970, during Mediterranean Sea Leg 13, when the Glomar challenger ventured Mediterranean waters, nobody was expecting to run into one of the most exiting scientific discoveries regarding the Mediterranean Sea evolution. Cores and seismic surveys made possible the discovery of a basin-wide Messinian evaporitic deposit buried beneath the deep-sea Pliocene sediments which was attributed to the Messinian Salinity Crises (MSC) already known and studied in onshore outcrops in the Apennines. Now, 50 years later the debate regarding the conditions and timing of the deposition of this salt giant is still ongoing as many theories are still open and in search for validating proof.

One of the main open questions certainly regards the base level drop during the MSC and the location, efficiency and dynamics of the Mediterranean – Atlantic connectivity. The Mediterranean level is thought to have dropped somewhere between a moderate 200 m up to an extreme high amplitude oscillation of 1500 m while according to different schools of thought the watergate to the Atlantic is considered as completely closed, intermittently open or to have been always open during the MSC. Gibraltar strait is the main candidate for a possible gateway during this time interval (5.96-5.33 Ma) as well as the leading cause of the re-establishment of open marine conditions in the Mediterranean. Consequently, understanding its evolution and opening is fundamental to endorse any of the MSC theories and a thorough investigation of the Messinian and early Pliocene sedimentological record of basins in its proximity is highly needed.

In this optic, the Alboran Sea is the place where many of those answers lie and its worth of further exploration. In the hope of a new oceanographic expedition in the near future, an effort should be made towards gathering and re-interpreting all the available data. We propose a refined planktonic foraminifer chronology of the Alboran DSDP and ODP sites 976B, 121 and 978A with a careful characterization of the main MSC facies that will clarify to a certain extent the MSC expression and the degree of Atlantic water influence in the Alboran basin.