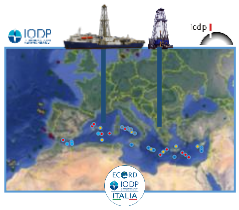

Workshop IODP-Italia "Lo stato delle proposte di perforazione nell'area mediterranea"
Scientific Drilling in the Mediterranean Sea
Roma, 15-16 gennaio 2018

Abstract
Nuove idee per la perforazione scientifica

Coring Late Miocene deep-sea Mediterranean deposits: Implication of a novel tool for correlation of margin to deep-sea MSC deposits

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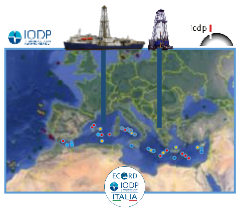
Key words: (Messinian Salinity Crisis, biostratigraphy, lipid biomarkers, magnetostratigraphy, basin to margin correlation,)

Abstract

The Messinian Salinity Crisis (MSC) is a paleoceanographic event that occurred between 5.97 and 5.33 Ma ago in the Mediterranean; this event has been investigated by means of biostratigraphy, cyclostratigraphy, geochemistry, isotope stratigraphy and geomicrobiology. A general stratigraphic framework is already agreed by the scientific community, mostly based on data collected in peripheral basins. Apart from seismic lines and ODP Hole 654 in the Thyrrenian sea (Roveri et al., 2014), little is known about the successions of the central part of the Mediterranean sub basins. One of the most debated subject is the correlation between marginal and deep sea records, which has challenged the scientific community for more than forty years. This correlation is of paramount importance if we aim at understanding the progression of the crisis at different depths, from the margins to the open sea. At present, an astronomically tuned, bed by bed correlation has been achieved in marginal successions from Spain (west) to Cyprus (east), some of which were deposited under a relatively deeper water column (in the Northern Apennine or Sicily). This correlation mainly relay on the occurrence of the Primary Lower Gypsum unit (PLG) cycles and on the disappearance of calcareous microfossils just at the beginning of the crisis. Moreover, the base of the reversal magnetochron C3r occurs four precessional cycles below the onset of the MSC. Recently, the identification of the MSC onset has been enhanced by the discovery of a sequence of calcareous nannofossil bioevents in sedimentary sequences devoid of gypsum in levels that correspond to the first PLG cycle. These bioevents could represent the best correlation tool in deep sea sequences, where PLG gypsum is not expected to form. Whether the deep drilling will recover gypsum-free sediments or not, the nannofossil events, comprising the peaks of *Sphenolithus abies*, *Helicosphaera carteri* and *Umbilicosphaera rotula,* will allow to place a very reliable timeline useful for margin (outcrop) to deep basin (deep sea cores) correlation.



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Besides accurate stratigraphic correlation, the integration of the classical micropaleontological tools with novel geomicrobiology study could help better understanding the paleoceanographic evolution towards and during the MSC. In particular, the study of lipid biomarkers sourced by prokaryotes (e.g. Archaea) which are potentially able to tolerate harsh conditions (e.g. high salinites) offers a unique opportunity to trace the paleoecological and paleoclimatic changes in the course of the MSC, when the environmental conditions became critical for the calcareous plankton. A suitable core recovery from both the eastern and western Mediterranean will help understanding to which extent the climatic forcing (e.g. monsoon derived riverine runoff ? Vs Northern Glacial influences) has contributed to the start and development of the crisis. Suitable site could be located in the deepest part of selected sub-basins both in the Eastern and Western Mediterranean. Among these, one good candidate is the Balearic basin where Site 372 was drilled during DSDP Leg 42, whose very low recovery rate could be improved by recent technical achievement of the new drilling bits.