

## **Scientific Drilling in the Mediterranean Sea : Where and Why ?**

**Marina Rabineau<sup>1</sup>, Angelo Camerlenghi<sup>2</sup>, and the GOLD and DREAM scientific teams**

<sup>1</sup>Institut Universitaire Européen de la Mer, UMR6538, Domaines Océaniques, CNRS, 1 Place Nicolas Copernic, Plouzané, France

<sup>2</sup>OGS, Trieste, Italy

### **ABSTRACT**

In the recent years the Mediterranean Sea has become a unique natural laboratory to study both the evolution and interaction of deep processes and surficial processes. Moreover, about 6 million years ago the Mediterranean Sea was transformed into a giant saline basin, one of the largest in the Earth's history and surely the youngest. This event, commonly referred to as the Messinian Salinity Crisis (MSC), changed the chemistry of the global ocean and had a permanent impact on both the terrestrial and marine ecosystems but also on the vertical evolution of the margins related to widespread deposition of basinal and marginal evaporites and erosion of the surrounding margins.

An almost complete record of this episode, the events leading to it as well as its consequences, is preserved in the deep eastern and deep western Mediterranean. Some key issues and scientific questions remain hidden in these pre-salt series. A large scientific community is taking action in order to submit scientific proposals to IODP (International Ocean Discovery Program) in order to use the riser-drilling vessel Chikyu (JAMESTEC) in the Mediterranean Sea. The Western Mediterranean Sea is characterized by an oceanic crust and conjugate passive margins system which took place during the Cenozoic. Drilling at the foot of the continental slope (GOLD site) (2400 m water depth) would enable to reconstruct the complete paleoclimatological and geodynamical high-resolution history of the last 30 Ma recorded in some 6 km of sedimentary archive, including the entire Messinian sequence, and to reach an area with undetermined crust which is essential for the understanding of margin formation and its consequences on margin evolution. The drilling will also represent a first-class opportunity to study the microbial communities and processes in extremely deep marine sediments. Complementary multiple-site drilling (DREAM sites) are also envisioned in the Mediterranean (e.g. Levant margin) to fully resolve several open questions about the causes, processes, timing and consequence at local and planetary scale of the outstanding MSC case of natural environmental change.

Deep drilling through the complete series of sediments in Western and Eastern Mediterranean Sea is the only way to give answers to these crucial questions, this is the aim of the GOLD and DREAM initiatives.