

The “DREAM” IODP project to drill the Mediterranean Salt Giant on the Balearic Promontory

Johanna Lofi (1), Angelo Camerlenghi (2), Giovanni Aloisi (3), Agnès Maillard (4), Daniel Garcia-Castellanos (5), Christian Huebscher (6), Junichiro Kuroda (7), and the the DREAM co-proponents Team

(1) University of Montpellier 2, Géosciences Montpellier, Montpellier, France (lofi@gm.univ-montp2.fr), (2) OGS, Trieste, Italy, (3) UPMC, Paris, France, (4) GET, University of Toulouse, France, (5) ICTJA-CSIC, Barcelona, Spain, (6) CEN, University of Hamburg, Germany, (7) JAMSTEC, Japan

Salt giants preserving kilometer-thick evaporite layers are the sedimentary expression of extreme environmental events of global relevance. Despite their global occurrence and general importance on Earth, there is currently no complete stratigraphic record through an un-deformed salt giant of marine origin. Similarly, there is a significant lack of knowledge about the factors controlling salt giants deposition, their early evolution, the impact they exert on the isostatic response of continental margins and on sub-salt formations, and the unprecedented deep biosphere they may harbor. The Mediterranean Messinian salt giant, which formed ~5.5 Myrs ago, is one of the youngest salt giant on Earth and is currently lying below the Plio-Quaternary cover in a relatively un-deformed state close to its original depositional configuration. This salt giant is thus accessible by drilling and forms an ideal case study that could be used as a reference for older salt giants. However, since its discovery in 1970 during the DSDP Leg XIII, and despite 40 years or multi-disciplinary researches, this salt giant is still not fully understood and remains one of the longest-living controversies in Earth Science.

In this context, the IODP DREAM project aims at exploring the Mediterranean salt giant by drilling with the JOIDES Resolution a transect of 4 sites on the southern margin of the Balearic promontory (Western Mediterranean). We identified this area as likely the only place in the Mediterranean where we could implement a shallow-to-deep transect of non-riser drilling sites. Due to the geological history and pre-structuration of the Promontory, MSC deposits are found preserved in a series of sedimentary basins lying at different water depths between the present-day coastline and the deep central salt basins. DREAM thus offers a unique opportunity to sample several hundred of meters of material forming the Mediterranean salt giant in varied water depths. This unique sedimentary record should allow testing 1) the contradictory emplacement models that explain its genesis and 2) the presence of halophilic micro-organisms it may host/feed.

DREAM is a part of a bigger Multi-phase IODP Drilling Project entitled “Uncovering a Salt Giant” (857-MDP, coord. A. Camerlenghi) born out of a series of workshops and international initiatives carried out since 2014. The DREAM pre-proposal P857B has been accepted by the IODP Science Evaluation Panel in January 2016. The full-proposal will be submitted after the acquisition of complementary Site Survey Data in 2017. The DREAM project is performed in close link with various international initiatives including the COST Action CA15103 and ANR Project MEDSALT (Camerlenghi et al., this congress) and the IMAGE ICDP-IODP amphibious proposal (Flecker et al., this congress).

DREAM co-proponents: J. Anton, M.A. Bassetti, D. Birgel, R. Bourillot, A. Caruso, H. Daigle, G. De-Lange, F. Dela Pierre, R. Flecker, V. Gaullier, D. Hodell, F. Jimenez-Espejo, W. Krijgsman, L. Lourens, S. Lugli, V. Manzi, T. McGenity, J. McKenzie, P. Meijer, H. Moreno, A. Moscariello, P. Munch, N. Ohkouchi, J. Peckmann, P. Pezard, J. Poort, M. Roveri, F. Sierro, K. Takai, T. Treude.