



## SALTGIANT ETN – Early Stage Researcher in Salt Tectonics – ESR 13

<b>Title</b>	<b>Analogue modelling of combined crustal and Messinian salt deformation in Mediterranean</b>
<b>Duration</b>	36 months
<b>Expected start date</b>	October 2018
<b>Host Institution</b>	Laboratoire d'Océanologie et de Géosciences, UMR LOG 8187 CNRS-Lille1-ULCO (France) - <a href="http://log.cnrs.fr">http://log.cnrs.fr</a>
<b>Primary Supervisor(s)</b>	Virginie Gaullier (LOG), Bruno Vendeville (LOG)

**Objectives**

To use an analogue modeling approach combined with an analysis of natural Mediterranean examples to gain insight into the deformation styles of the MSG. ESR13 will consider examples where there is active crustal tectonics and where the sedimentary cover comprises a mobile salt layer. The ESR will test various crustal tectonic settings (convergence, divergence, strike-slip) and observe how these basement movements are passed on at shallower levels (salt and sedimentary overburden). Previous experiments have shown that the resulting shallow deformation can be counterintuitive and quite different of deformation at depth. For example, basement thrusts can be overlain by thin-skinned grabens in the overburden. Experimental results will provide a set of shallow deformation patterns, each one associated with a specific crustal tectonic setting. These results, in return, will be applied to natural examples. This work will shed new light onto key tectonic regions of the MSG, including: regions of divergence (Northwestern Mediterranean basin, Tyrrhenian Sea), young or mature convergence (Algerian and Ligurian Margins, Ionian Sea, Mediterranean Ridge), oblique convergence (Eastern Cyprus Arc), and strike-slip (Levant Basin). Analogue modeling will also help understand the tectonic behavior of the sub-salt. The presence of a salt layer in the sedimentary cover makes the interpretation of the basement structures hard for two reasons. First, salt deteriorates the seismic signal, and subsalt structures are often invisible or poorly imaged. Second, when crustal tectonics generates horizontal and vertical movements in the basement, these movements can trigger a gravitational response in the salt and its overburden, thereby blurring the deeper tectonic signal.

**Expected results**

The modeling results will provide a set of examples of 3D shallow deformation (i.e., in the Messinian salt and Plio-Quaternary series) in response to specific movements in the subsalt basement. These deformation patterns will then be used as symptomatic clues applied to various areas where the presence of salt alters the seismic resolution at depth in order to improve the interpretation of crustal-scale tectonics and its timing.

**Planned secondments**

Provided by SALTGIANT partners to ESRs; duration 1-3 month each

S1 (months 10-12): Université Paul Sabatier (Toulouse, France) (A. Maillard for seismic data in the Balearic domain and Levant Basin: interaction between crustal tectonics and salt deformation (Balearic Promontory)); S2 (months 18-20): MARUM (Bremen, Germany) (K. Huhn for the numerical modelling of the analogue salt deformation experiments).

**Keywords** Salt tectonics, seismic interpretation, analogue modelling

**Application** Send application via : [www.ipgp.fr/saltgiant](http://www.ipgp.fr/saltgiant)

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