



## SALTGIANT ETN – Early Stage Researcher in Isotope Geochemistry of Gypsum Deposits – ESR 6

<b>Title</b>	<b>Hydrology of Mediterranean Marginal basins during the formation of the Mediterranean Salt Giant (MSG)</b>
<b>Duration</b>	36 months
<b>Expected start date</b>	October 2018
<b>Host Institution</b>	Institut de Physique du Globe de Paris, Paris (France) - <a href="http://www.ipgp.fr">www.ipgp.fr</a>
<b>Primary Supervisor(s)</b>	Giovanni Aloisi
<b>Objectives</b>	<p>To reconstruct the hydrology of selected marginal basins of the Mediterranean Sea during the formation of the MSG using stable isotope tracers. Gypsum and carbonate minerals precipitated from the water column of Mediterranean marginal basins during the formation of the MSG record the isotope composition of basin water (<math>\delta^{18}\text{O}_{\text{H}_2\text{O}}</math> and <math>\delta\text{D}_{\text{H}_2\text{O}}</math>) and of the dissolved sulfate (<math>\delta^{34}\text{S}_{\text{SO}_4}</math> and <math>\delta^{18}\text{O}_{\text{SO}_4}</math>) and strontium (<math>^{87}/^{86}\text{Sr}</math>) ions. These isotopes are sensitive to the hydrological exchanges between the ocean and continental runoff, as well as evaporation and precipitation processes (limited to <math>\delta^{18}\text{O}_{\text{H}_2\text{O}}</math> and <math>\delta\text{D}_{\text{H}_2\text{O}}</math>). Ongoing geochemical investigations of Mediterranean marginal basins suggest that some of the gypsum deposits might have formed at salinity lower than modern seawater, under the influence of <math>\text{SO}_4</math>- and/or <math>\text{Ca}^{2+}</math>- rich river runoff and with little exchange with the Mediterranean Sea. This scenario is radically different from the classical view interpreting the evaporites of the Mediterranean marginal basins as formed by evaporation of seawater. ESR 6 will work in tight collaboration with field-based ESRs (ESRs 1, 4, 5, 8), and mining sector partner KNAUF, to carry out a detailed sampling of primary gypsum deposits outcropping on land. The isotope composition of gypsum will be measured at the geochemical facilities of IPGP. In collaboration with ESR 7, ESR 6 will apply simple numerical box models that simulate the isotopic composition of <math>\text{H}_2\text{O}</math> and dissolved <math>\text{SO}_4</math> and Sr in marginal basins. In conjunction with the isotope composition of gypsum, these models will be used to deduce the hydrological cycle that dominated at the time of gypsum deposition in the marginal basins of the Mediterranean Sea, tackling the apparent contradiction of a marine-type evaporitic sequence bearing a continental isotope signal.</p>
<b>Expected results</b>	A Mediterranean basin-wide overview of the hydrological regimes of marginal basins during the formation of the MSG.
<b>Specific requirements</b>	<p>Completed MSc or Diploma degree in Geology, Geochemistry, Earth Sciences or related fields</p> <p>Some numerical modelling experience is not mandatory but welcome</p>
<b>Planned secondments</b>	(1) University of Palermo, Palermo, Italy (Antonio Caruso, for the geographically extensive, high-resolution sampling of Messinian gypsum deposits); (2) KNAUF Gips KG (Germany), field work in Mediterranean area (Matthias Reimann, for access to pristine samples of gypsum from active mines and prospection cores of the Mediterranean region); (3) Utrecht University, Utrecht, The Netherlands (Paul Meijer, for isotopic box modelling of hydrological exchanges in Mediterranean marginal basins).
Provided by SALTGIANT partners to ESRs; duration 1-3 month each	

**Keywords**

Isotope geochemistry, field work, laboratory isotope measurements, modelling

**Application**

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

**For further  
information**

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