Title
Seismic imaging and geological evolution of Mediterranean salt structures

Duration
36 months

Expected start date
October 2018

Host Institution
Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, OGS, Trieste, Italy - www.inogs.it (doctoral degree to be awarded by the University of Trieste).

Primary Supervisor(s)
Angelo Camerlenghi, OGS; Anna Del Ben, University of Trieste

Objectives
The main aims will be to identify, classify and understand the geological evolution of Messinian salt structures in different depositional and structural environments of the Mediterranean Sea. The study will make use of the available offshore multichannel seismic reflection data, including regional vintage public data, academic data, and industry data. The data analysis will include full processing or reprocessing in time, pre-stack time migration, pre-stack depth migration, tomography of Vp and attenuation, analysis of seismic attributes. Salt deformation structures will be identified and classified through depth imaging in order to reconstruct real geometries in detail. Data interpretation will be performed with Kingdom Suite or Petrel software packages. The geological evolution will be reconstructed with the use of basin modelling software (PetroMod). Different Mediterranean geological environments will be analysed in order to relate the evolution of salt structures to the varying lithology, sedimentary history and structural development of each area. Particular attention will be paid to the Messinian seismic facies and parameters, the development of sub-salt fluid overpressure and its influence on the mechanics of halocinetic phases, including gravitational spreading and gliding.

Expected results
Seismic section in depth, definition and recognition of the salt deformation structures in the entire Mediterranean Sea. Geological models of halocinetic deformation in response to sedimentary load, faults, heat flow, gravity and overpressure.

Planned secondments
S1 (months 10-12): National Oceanography Center (Southampton, UK) (H. Marin-Moreno for mutual exchange of information with ESR 12. ESR 10 provides geometries of salt structures necessary for modelling and learns about constraints and uncertainties in overpressure modelling); S2 (months 18-20): Ente Nazionale Idrocarburi (Milan, Italy) (P. Cibin for seismic imaging in salt and sub-salt formations); S3 (months 27-29): MARUM (Bremen, Germany) (K. Huhn for numerical modeling of salt deformation).

Specific requirements
Completed MSc or Diploma degree in Geophysics, Physics, Geology, Earth Sciences, Geoinformatics, or related fields

Keywords
Geophysics, seismic reflection, pre-stack depth migration, salt structures, halocinetics
Application  
Send application via: www.ipgp.fr/saltgiant

For further information  
Contact primary supervisors: acamerlenghi@inogs.it; delbenan@units.it