

CASP Research Award for Geological Fieldwork- 2018 Award Winner

Applicant: Sam Brooke-Barnett, Imperial College.
Project Title: The effects of salt tectonics in the evolution of a fold and thrust belt
Award: £1,678.

Scientific question and rationale: This project aims to investigate the role that salt tectonics has played in the evolution of the Provence fold and thrust belt, southeast France. An increasing interest in salt influenced petroleum plays in recent years has brought with it improved understanding of the underlying mechanisms of salt tectonics. The Provence fold and thrust belt provides an accessible analogue to both observe salt related deformation at scales below seismic resolution, and to address outstanding questions related to the mechanics of salt deformation.

Specific objectives and deliverables: The specific objectives of this project are to identify structural and stratigraphic evidence for salt migration within the field area, and use these data to track the movement of salt, from deposition during Triassic Tethyan rifting, diapiric migration within the Jurassic to Cretaceous Tethys passive margin, and through Alpine compression since the Late Cretaceous. To this end, field data will be used to construct and restore a series of cross sections across the Provence fold and thrust belt. These cross sections will be used in conjunction with seismic interpretation from offshore analogue basins to gain both small and large scale insight into the migration of salt in compressional environments.

Proposed work plan: The project requires an extensive field campaign for two months during the summer of 2018 in Haute-Provence. This will consist of mapping structures and stratigraphy to construct cross-sections across the fold and thrust belt. Using restoration and section-balancing techniques these sections will be restored to allow the deformation to be tracked through time, providing insight into the role the salt plays in deformation. The project will target a series of mini-basins, which serve as onshore analogues to basins observed in seismic data acquired in the Gulf of Mexico. Consequently, cross-referencing structures from field observations with structures from seismic interpretation may shed light on how salt migration affects sedimentation (potential reservoirs) and trap geometry in hydrocarbon bearing basins. A key component of field data collection will be section logging of stratigraphic units across the fold thrust system and the associated mini-basins in order to identify dramatic changes in stratigraphic thickness indicative of subsurface salt migration. Additionally, the overprinting relationships between fracture networks in the host rock can be used to track perturbations in *in situ* stress caused by the migration of salt, and would provide a useful indicator for section restoration.

Proposed expenditure, including details of any other sources of funding:

The project currently benefits from a £2000 contribution provided by the President's Scholarship (included below). The breakdown of expenses for the two month field season in May-July 2018 includes:

<i>Flights from London to Marseille</i>	£250
<i>Car hire for 2 months</i>	£1200
<i>Accommodation (Gite) for 2 months</i>	£1200
<i>Field equipment (iPad)</i>	£778
<i>Geological data (Geological Maps and Topography Maps)</i>	£250
<i>President's Scholarship contribution</i>	£2000
Total: £1678	