

The role of syn-kinematic sedimentation on early salt tectonic processes in the Post-Permian Salt Basin, Southern North Sea

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Project Description:

Salt tectonic deformation processes during regional extension and their interaction with palaeo-depositional systems were a major factor controlling the post-Permian basin history of the southern North Sea. Seismic imaging of Triassic sediments demonstrates very active Triassic-Jurassic salt tectonics and it is clear that Triassic-Jurassic thick- and thin-skinned salt deformation processes controlled the pre-Cretaceous basin architecture. However, due to thermal doming and regional erosion, Triassic-Jurassic depocentres and their related salt structures are only partly preserved. Their reconstruction is important for understanding this early phase of basin history, subsequent Cretaceous-Cenozoic basin evolution, salt tectonic structures and petroleum systems in the post-Permian basin succession.

The main objectives of the research project are the tectono-stratigraphic analysis and simulation of basement-involved and gravity-driven salt deformation processes in the post-Permian salt basin of the southernmost North Sea using 3D seismic interpretation, structural modelling and scaled analogue experiments.

A new generation of basin-scale physical models with 3D strain monitoring will be used to develop a better understanding of the evolution of the Triassic-Jurassic salt basin history in the southern North Sea. Structural and stratigraphic results from 3D regional seismic data provide the setup and parameters (e.g. salt basin geometry, original salt thickness, basement topography, sediment input) for scaled 3D analogue experiments.

The experiment results will provide an in-depth understanding of salt-related deformation from scales of individual structures up to the basin-scale framework. The experiments will provide mechanical concepts for the dynamics of salt structures and related depositional systems as well as constraints for the timing of salt tectonic processes. The integration of these experiment results with the 3D seismic interpretation will enable the kinematic analysis and reconstruction of the early Post-Permian basin history and salt tectonic processes during the Triassic-Jurassic rifting period.

The project will shed new light into the early salt tectonic processes of the southern North Sea basin, especially, how the interaction of thick-skinned salt tectonics and thin-skinned salt tectonics interacted and how they controlled the Triassic-Jurassic basin architecture,

post-Permian depositional systems, and subsequent diapir formation and evolution during multi-stage extensional/contractional tectonic deformation.

The student will receive training in tectonic basin modelling, seismic interpretation, regional tectonic analysis, kinematic & analogue modelling, geomechanics.

Details on how to apply can be found here www.rhul.ac.uk/studyhere/postgraduate/applying

Please contact the Postgraduate Programmes Co-ordinator, if you have additional questions about the department or application procedures (email: pgadmin@es.rhul.ac.uk ; fax: 01784-471780; tel: 01784-443581).

Applicants are requested to send an additional copy of their CV directly to the lead supervisor of the project in which they are interested. Please also contact the supervisor if you have any questions about the project itself