Project Plan

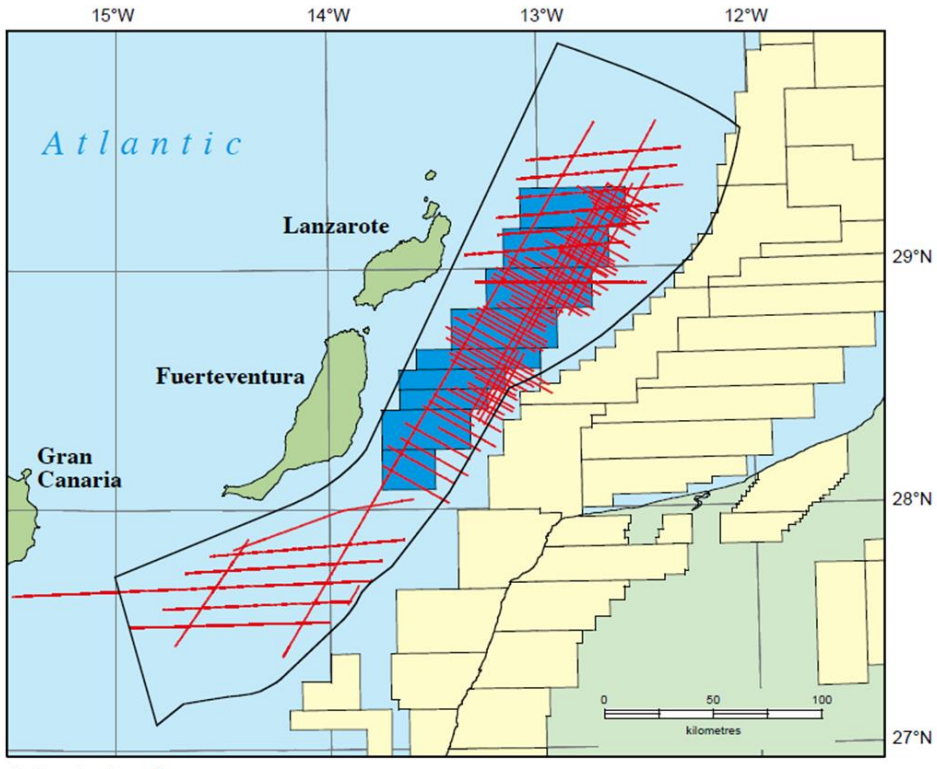
Regional Geology and Petroleum Prospectivity of the Eastern Canary Islands

Background

In c. 2013, ERCL proposed to undertake a new multi-client study in the Eastern Canary Islands region.

The objective was to undertake a comprehensive regional study on the geology and petroleum potential of the eastern Canary Islands (offshore Lanzarote and Fuerteventura), encompassing the Atlantic continental margin of Morocco and the continent-ocean transition (COB). This region forms part of the Tarfaya-Ifni (salt) Basin and straddles the critical 'COTL' (continent-ocean tectonic link) zone between the Atlassic uplift and the deformation zone of Mesozoic sediments 'windowed' on Fuerteventura.

The study was based on some 10,000 kms of poststack reprocessed seismic data that have been released by the authorities in Spain. The seismic data have been loaded and interpreted, and are available in workstation format (Kingdom / Petrel).



Seismic database

In addition to the seismic interpretation work, ERCL has undertaken fieldwork and sampling (in association with IGI Ltd). The purpose of the fieldwork was twofold:

1. to corroborate previous interpretations of the stratigraphy and structure; and

2. to 'see through' all the post depositional effects, including Mesozoic burial, Late Cretaceous?/Early Tertiary uplift and Late Tertiary intrusive contact metamorphism, in order to evaluate the original petroleum potential of the sequence.

A fieldwork report on the results of this work has been prepared by IGI Limited, with input from ERCL and is available to license from IGI. This report includes analytical results - source rock geochemistry supported by fission track measurements (AFTA and ZFTA) and optical petrography on reservoir samples - and basin modelling results.

In this way the original quality and character of source rocks and reservoir horizons in the sequence has been evaluated. In turn we have used this assessment to define a new petroleum systems framework applicable to the deep-water plays of the Moroccan Atlantic margin.

Scope of Work

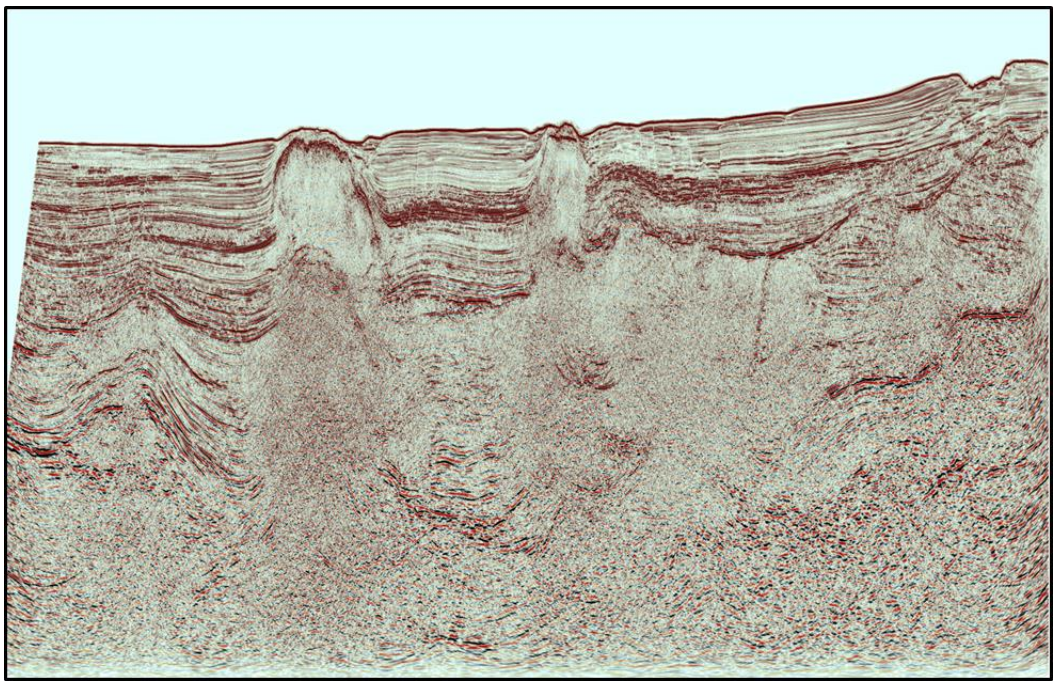
ERCL will prepare a Multi-Client Report entitled "Regional Geology and Petroleum Prospectivity of the Eastern Canary Islands" to integrate the studies undertaken previously (but not formally reported) as described above. This will include regional background from the Getech *Globe*^{TM} model.

Using the information from Globe, the report will be illustrated with

- Regional Gravity data
- Regional Magnetic data
- Derivatives of the regional G&M grids
- Depth-to-basement (based on global-scale studies)
- Suite of palaeogeography snapshots at significant geological times, and
- Fully attributed structural layer

The basis of the study is formed by the interpretation of 10,000 kms of 2D seismic data extending over offshore eastern Lanzarote and Fuerteventura. This will include:

- Seismic interpretation and mapping of key seismic horizons.
- Stratigraphic correlation with Moroccan margin and ties with DSDP drilling.
- Recognition of source rock and reservoir target levels in the seismic-stratigraphy.
- Mapping and definition of prospective areas.

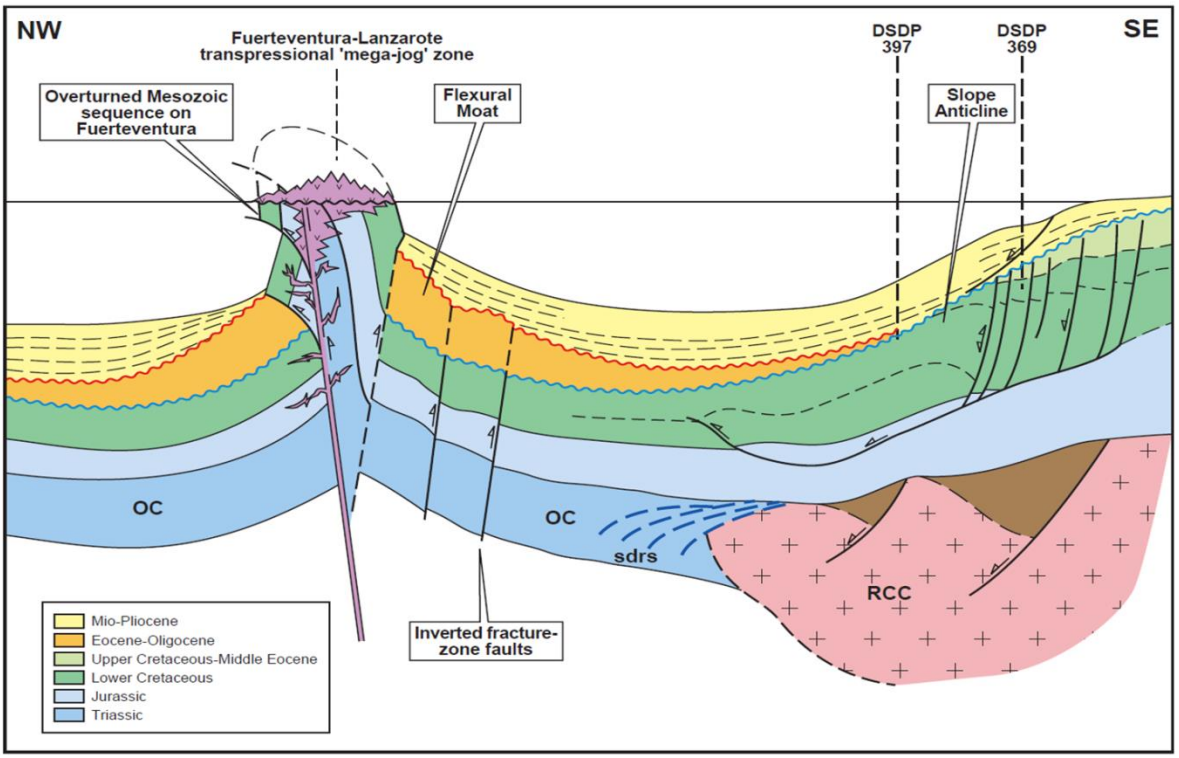


Another important part of the study will be formed by geological examination and sample analysis of the uplifted and deformed Mesozoic sequence exposed as part of the Basal Complex on Fuerteventura. This Jurassic (?Toarcian) to Late Cretaceous (?Campanian) sequence lies on oceanic crust and was uplifted and deformed prior to multi-phase intrusive activity associated with the Miocene volcanic foundation of the island.

The sequence contains black shales and thick turbidite sands and thus forms a key window to the petroleum geology of the deepwater Mesozoic sediments of the Atlantic margin. The analyses being carried out by ERCL to assess this potential includes organic geochemistry, petrography, biostratigraphy, and apatite fission track analysis. In addition, sedimentological and structural observations made on the Mesozoic section of Fuerteventura will be integrated into the geological assessment.

The integration of these two main elements of the study will enable ERCL to answer the key questions bearing on the hydrocarbon potential of the offshore Canary Islands and the deepwater Moroccan margin:

- What was the original source potential of the Jurassic and Lower Cretaceous sediments.
- What was the original reservoir potential of the Jurassic and Lower Cretaceous sediments.
- What is the nature of the link between the uplift and deformation of the Atlas and Fuerteventura.
- What is this telling us about Atlassic ('far-field') deformational affects along the south-western Moroccan Atlantic margin.



The report will present the results of the seismic interpretation and will be illustrated with map enclosures for interpreted horizons. ERCL will include regional 2D modelling of selected gravity-seismic.

A literature review will be undertaken to highlight the recent exploration and drilling activities offshore Morocco.

IGI Limited has prepared a separate, companion study, "Field study of the Mesozoic Basal Complex of Fuerteventura – a window on the petroleum potential of the deep-water southern Moroccan margin", and ERCL will summarise the key findings of this work in a new assessment of the petroleum systems of the study area.

Deliverables

ERCL will prepare a fully illustrated and integrated report on the 'Geology and Petroleum Potential of the eastern Canary Islands (Lanzarote and Fuerteventura)'. The report will be delivered with an accompanying ArcGIS project incorporating mapping work undertaken, with hyperlinks to key sections and figures.

ERCL obtained the seismic data from Ministerio de Industria, Energia y Turismo (MITYC) / Institutio Geologico y Minero de Espana (IGME) and ERCL can deliver a Kingdom project with ERCL interpretation work plus high quality SEGY in WGS 84 UTM 28N projection.

Timescales

The Report will be completed and made available to license by end February 2016.

Cost to License Report

The report will be available to license from ERCL-Getech for the cost of £25,000 (partner escalation rates would apply).