Draft

Controls on the evolution of Early Cretaceous Depositional Systems along the West Africa Margin: Senegal

Fully funded PhD studentship as part of the *North Africa Research Group*
Host University: University of Manchester
Supervisors: Prof Jonathan Redfern, Prof Giovanni Berttoti, Prof Luc Bulot
Data Sponsors: Fortesa and TGS (Petrosen) with others

A fully funded PhD studentship to start in January 2017 to examine the evolution of Early Cretaceous depositional systems along the Atlantic margin of Senegal. The study will focus on refining our understanding of the stratigraphic architecture, age relationships, palaeogeography and facies trends across the margin. The work will integrate data from existing wells (cuttings data and wireline log data), limited outcrop studies and analysis of onshore / offshore seismic and gravity / magnetic data to define stratal relationships and seismic facies. Comparison will be made with work being undertaken in Morocco, to examine the relationships of the Cretaceous depositional tends along the margin.

Key areas for study include: the temporal / spatial evolution of the Early Cretaceous fluvio-delatic to deepwater sequence along the Senegal passive margin; assessing the relative control of basin tectonics and climate on the development of the depositional system; assessing the stratigraphy and dating, regional tectonic control on potential provenance areas of the main clastic units; mapping key facies associations across the margin; characterize the main lithofacies / reservoir units; assess the diagenetic evolution of the sandstones; assess the implications for reservoir and source rock distribution and characterization across the basin, onshore and offshore.

The North Africa Research Group (NARG) is an integrated research group combining the strengths of the Universities of Manchester, Heriot Watt and Delft, funded by a large consortium of industry companies. The group is undertaking extensive projects across North Africa, and have recently embarked on a major series of studies examining Mesozoic depositional systems on/offshore western Morocco along the Atlantic seaboard. Morocco, together with the conjugate margin in Nova Scotia, is an area of active oil and gas exploration, and the results from this study will have an important input to understanding the petroleum system and development of the passive margin.

We seek a highly motivated candidate with the following skills:

- 1st , high 2.1 or masters in geology / petroleum geoscience
- good background in sedimentology and stratigraphic principles, ideally having conducted similar projects at undergraduate or master level
- knowledge of carbonate depositional systems
- Independent worker with good organizational skills
- team working skills, with ability to integrate with other team members and industry partners

- knowledge of French is an advantage

The Basin Studies and Petroleum Geoscience Group at Manchester has 12 academic staff and over 35 PhDs, and offers access to world-leading facilities and research expertise for stratigraphic and sedimentological studies. Training is offered through specialist seminars within the group and the opportunity to take selected masters courses from the Petroleum Geoscience MSc. The successful candidate will also have opportunities to interact with and present results to industry partners, and will typically undertake a 3-month internship with one of our sponsor companies

We have extensive facilities, as may be expected in a world leading University, including SEM, cathode luminescence, x-ray tomography and an industry standard petrophysical laboratory,. The student will also access leading facilities for quantitative outcrop data collection, including LiDAR, a photogrammetry drone, and a full suite of software available to the group ; Polyworks ™, Petrel™ , ArcInfo™ Geoteric™ among others. The student will also utilise our in-house software Virtual Reality Geological Studio (VRGS), which enable rapid integration and interpretation of acquired digital outcrop data, and transfer to Petrel or similar software for mapping and interpretation.

Full scholarship: 3.5 years funding, includes all fees, living allowance and field expenses.

Application: please apply online at: http://www.manchester.ac.uk/study/postgraduate/how-to-apply/ quoting this PhD advert and the lead supervisor Prof Jonathan Redfern. For additional details please email stefan.schroeder@manchester.ac.uk

Application should be submitted by December 1st 2016 Selected candidates will be called for interview in early January.

Data Package Required:

1. Regional well data coverage
    i. Well reports
    ii. Composite Log
    iii. Full suite of available wireline logs in LAS format
    iv. Access to intervals of cuttings / core for petrographic analysis
        1. Reservoir petrography for characterisation
        2. Porosity / permeability
        3. Provenance analysis (populations) and if samples available heavily miner or feldspar analysis for source provenance systems
    v. Other interpreted data and reports at the discretion of the data sponsors.

2. Regional seismic coverage
    i. A regional 2D seismic grid (onshore and offshore) to tie wells, map key surfaces and generate interval isopach maps
    ii. Access to 3D is available to attempt some attribute analysis

3. Outcrop
    i. Outcrops are believed to be limited, but some sampling will be attempted where possible, to add to the existing dataset

Confidentiality:

- Data will be held by the university of Manchester under strict confidentiality. No data will be transferred or show to any third part.
- Data access will be strictly for academics and students working on the project and the data sponsors.
- A confidentiality agreement will be agreed and signed before data is transferred.
- All original data to be returned at the end of the study.
- Permission will not be unreasonably withheld for interpreted data (maps, cross sections without original data, petrographic slides, analytical results generated through the study) to be presented at scientific meetings/ workshops and publication within the PhD thesis and in research papers. Prior approval will be sought before publication.
- All results (interpretations and analytical results) will be made available to the data sponsors at no charge.
- Results will also be presented to the data sponsors at regular update meetings.
- Data sponsors will be accredited (unless not required) in all presentations and publications