



NARG Update: October 2016

Overview:

- Statoil have agreed to join NARG and contacts have been finalized.
- Discussions are also being held with Woodside and Nexen about membership.
- The new PhD, "*Provenance Study of the Early Cretaceous, Essaouira Basin*" (as part of regional source to sink study, has been advertised. 18 candidates have applied, and a shortlist of 4 has been drawn up, with interviews scheduled for November 2nd. The start date is set for January 2017.

- Progress is being made to initiate new studies in Senegal and along the MSG margin in early 2017.
 - Initial contact has been made with Petrosen after a meeting with the General Manager and Senegal Minister of Oil at the UK Foreign office.
 - A joint meeting was held in Manchester in September with TGS and Fortesa to discuss research proposals and obtain access to data onshore and offshore Senegal and initiate a series of regional projects.
 - TGS have agreed access to their regional MSGBC seismic grid for PhD projects, and confidentiality agreements have been signed.
 - Three new PhD proposals have been prepared and are distributed with this update. We are discussing with Fortesa what data we can access (wells, samples etc. onshore and seismic offshore).
 - Prof Redfern has been invited as a speaker at the MSGBC Conference in Senegal in November, presenting a joint paper with Mads Huuse and Ben Sayers of TGS (abstract attached). This will also be an opportunity to build links with Petrosen and local Universities.

- Autumn field season in Morocco underway, working on the Jurassic in Essaouira Basin, Early Cretaceous in Tarfaya and the Cen-Tur source rock intervals.
 - Aude Duval (Jurassic), supported by Dr Stefan Schroder, Dr Luc Bulot, (plus field assistant and ONHYM geologist)
 - Nawwar Al Sinawi we undertake work on the diagenesis and dolimitisation of the Jurassic sections, supported by Dr Cathy Hollis
 - Angel Arantegui (Cret), supported by Dr Rhodri Jerrett and Dr Luc Bulot to complete sedimentological logging of Tarfaya E. Cret sections and also attempt to improve age dating.

- Jianpeng Wang, examining the Tarfaya Cenomanian – Turonian sections, supported by Dr Luc Bulot and field assistant.
- ONHYM have, as usual been, very supportive, providing permits, sample export documentation and much of the fieldwork will involve collaboration with ONHYM staff, both as expert advisors and in some cases we are assisting with training of more junior staff.
- In total 4 papers from Kara English now accepted for publication. She will defend her thesis in November, with Tony Dore as external examiner.
- 1 paper on the Triassic of Essaouira Basin (Mader and Redfern) has been submitted to JAES, reviewed and accepted with minor corrections, which are now being made.
- Modelling of the salt tectonics offshore Morocco by Leonardo is progressing well, with some interesting results on the impact of sediment loading on salt remobilization, using the discrete-element modeling code developed at Manchester by Dr Emma Finch.
- Dr Mike Simmons is supporting a number of PhDs by assisting in dating of sections. He will be in Manchester next week to work with Jianpeng on the Cen/Tur section and with Tim and Angel on their sections.
- The NARG GIS database is being established to collate all collected data, analysis and research output. Design is being undertaken in ARC GIS by Carmen Fiedler, who we have supported to develop a robust template for all future PhDs/Postdocs research output. The first data is being populated. We will then start the process of inputting all historical data from previous research.
- We are in discussion with Grant Wach, Ricardo da Silva (Dalhousie University – Halifax, Nova Scotia) and David Brown / Mark Deptuk (CNSOPB) about holding a joint workshop in early 2017 to integrate research across the conjugate margin (Nova Scotia – Morocco), and build strong links. Further information to follow. All companies and any government bodies (ONHYM etc) will be invited to attend with other parties working in the area. This will be designed as a working workshop rather than a conference.

Recent Publications:

English, K.L., English, J.M., Bonnell, L., Lander, R.H., Hollis, C., Redfern, J., Guirdham, C., Garnham, J., and Yahia Cherif, R., (accepted). Controls on reservoir quality in exhumed basins - an example from the Ordovician sandstones, Illizi basin, Algeria; *Marine and Petroleum Geology*.

English, K.L., English, J.M., Redfern, J., Hollis, C., Corcoran, D.V., Oxtoby, N., and

Yahia Cherif, R., 2016. Remobilization of deep basin brine during exhumation of the Illizi Basin, Algeria. *Marine and Petroleum Geology*.

English, K.L., Redfern, J., Bertotti, G., English, J.M., and Yahia Cherif, R., 2016. Intraplate uplift: New constraints on the Hoggar dome from the Illizi basin (Algeria). *Basin Research*, published online ahead of print.

English, K.L., Redfern, J., Corcoran, D.V., English, J.M., and Yahia Cherif, R., 2016. Constraining burial history and petroleum charge in exhumed basins: New insights from the Illizi Basin, Algeria; *AAPG Bulletin*, v. 100, p. 623-655.

(These papers are available on secure site in draft pre-publication versions)

Papers in preparation:

Luber et al: Ammonoid biostratigraphy of the Aptian in the Agadir Essaouira Basin, Morocco. (*Cretaceous Research*, submission late 2016)

Mader and Redfern: New insights into Triassic facies and reservoir distribution across the Essaouira Basin, Morocco, during the Carnian Pluvial Event. (*JAES*, accepted with minor corrections, now being made)

Papers also in preparation by Angel Arantegui, Remi Charton and Richard Newport, Leonardo Muniz-Pichel.

Developing our Biostratigraphy Capability / Links:

We are continuing on building our biostratigraphic capability. Luc Bulot is leading this and developing a team to help us date the sections we are working on. This will result in new type section for NW Africa for the E Cretaceous (Aptian) and the first integrated study to link the full range of species and isotope analysis. We are also working on enhancing dating of the Jurassic section.

Dr. Luc Bulot (Aix Marseille Université, CNRS, IRD, Coll France, CEREGE) - Ammonites

Dr. Mike Simmons - Forams

Dr. Jason Jeremiah - Calcareous Nannofossil

Dr. Stephane Bodin (Associate Professor Aarhus University, Sweden) - C13, O18 analysis

Camile Frau (PhD Student) (Groupement d'Intérêt Paléontologique, Toulon, France) - Specimen identification, preparation and correlation to Tethyan realm

Prof. Moussa Masrour (Université Ibn Zohr, Agadir, Morocco) - Ammonites

Update on current data collection:

Currently in the field: Aude Duval-Arnaud (PhD) and Moussa Masrour (our echinoderm expert from Agadir University).



From left to right - Lahcene Aabi (ONHYM), Aude Duval-Arnaud, Luc Bulot, Moussa Masrour (Agadir University) Stefan Schroeder, in the field this week.

Main objectives from the ongoing Jurassic biostratigraphic fieldwork include a large bed by bed collection of brachiopods, ammonoids and echinids from the ? Upper Bathonian to ? Lower Oxfordian that will be studied by Luc Bulot in collaboration with Moussa Masrour (Agadir University), Howard Feldman (American Museum of Natural History) and Barbara and Vladan Radulović (Faculty of Mining and Geology, Belgrad University, Serbia).

New sampling in the Agadir area also includes large molluscs (Nerineids) from the late Jurassic reefs that will be studied by Alexander Nützel (Ludwig-Maximilian-Universität München, Germany) and Joachim Gründel (Freie Universität Berlin, Germany) . This will complement a similar study on the distribution and palaeoecology of gastropods from the Sidi Ifni area that are one of the targets of the next field trip of Angel Arantegui and Luc Bulot.

Finally the ongoing fieldwork will include a new detailed sampling for the integrated stratigraphy (bio- and chemo-) of the Cenomanian/Turonian boundary interval of the Tarfaya Basin with Jianpeng Wang. This study will also integrate unpublished data by Luc Bulot and Christina Ifrim (Heidelberg University, Germany).