



GIS Database

Release of V1.1

With access to over 1850 industry drilled wells

Over 5600 data points from previous NARG Studies

New Projects

Characterization and controls on the development of megasequences and unconformities along the Central Atlantic conjugate margins during the Jurassic and Cretaceous.

Tectono-stratigraphic evolution of the West Africa Margin: Mauritania-Senegal-Guinea Bissau

NEW STARTS



Darragh O'Connor



Selin Coskun

Extending NARG focus to the Scotian Shelf

Darragh O'Connor is a new PhD to NARG in 2020 who has previously researched at Dalhousie University on the late Triassic synrift succession along the Canadian Margin.

Deepening NARG knowledge of the MSGBC

Selin Coskun is a new PhD student in NARG starting in 2020. She has a MSc from the University of Houston and Dokuz Eylul University. She has previously researched at Dokuz Eylul University and held several positions at Turkish Petroleum Company before joining us at NARG.

Celebrating
20
Years of NARG

In 2020

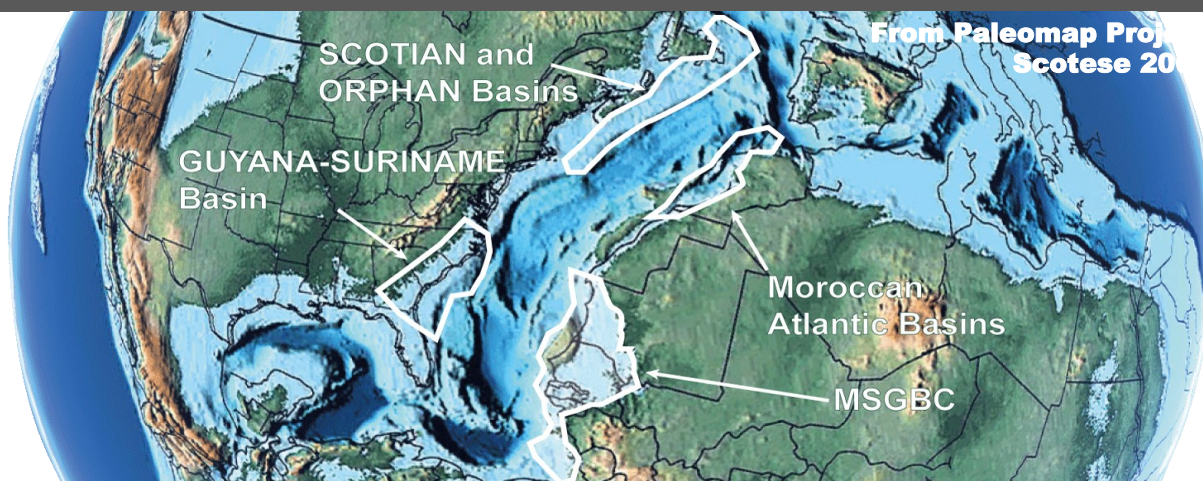
Highlights:

Conjugate Margins
MSGBC Basin
Source-to-Sink
Jurassic Morocco
Triassic Provenance
Fractures in Tunisia
Biostratigraphy
GIS Database
Student Spotlight

OVERVIEW

- 20 years experience of working across North Africa
- Over 20 academic members including: 8 PhDs, 12 staff, 3 post docs.
- 10 industry sponsors
- Progression towards conjugate margin research
- Active projects in Morocco, Senegal, Mauritania, Tunisia, Egypt, Central Atlantic Conjugate Margin, Canada.
- Projects covering all aspects of the petroleum system, including depositional systems, reservoir quality, source to sink, sedimentology, biostratigraphy, geochemistry and diagenesis

CONJUGATE MARGINS



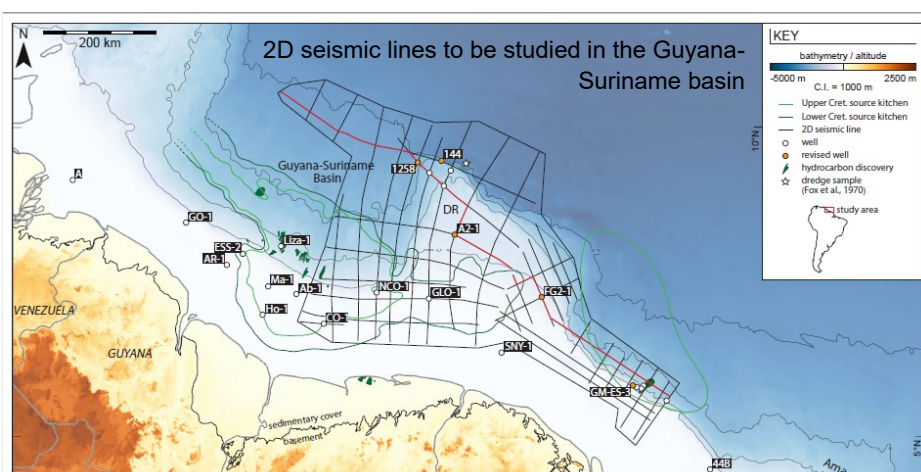
Max Casson

GUYANA-SURINAME



Progressing on from NW Africa, research has migrated to the conjugate margin of South America. Max is currently working on the tectono-stratigraphic evolution of the continental margin from re-evaluated exploration wells and regional 2D seismic. This study will bring new understandings on the stratigraphic framework from integrated biostratigraphy and similarities with NW Africa.

The goal is to re-evaluate the DSDP boreholes, and link previously published work to deliver a Central Atlantic framework for our new PhD researchers project to use as basis for further investigation.



SCOTIAN SHELF

Following 15 years of NARG projects on the Moroccan Atlantic

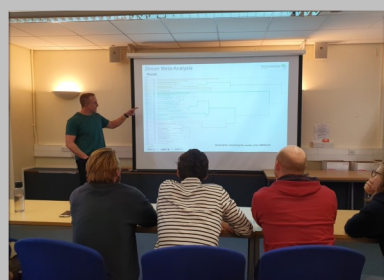


Margin, a new study of the Scotian Basin began in February 2020. Darragh O'Connor, our new PhD student will be undertaking this project in which he will be comparing both margins, using available seismic, well logs and core data to better assess the Scotian Shelf petroleum potential.

Previous NARG PhDs on Morocco:

Lubersteder, 2005; Mader, 2008; Fabuel Perez, 2009; Luber, 2017; Arantegui, 2018; Charton, 2018; Muniz-Pichel, 2018; Wang, 2018; Duval-Arnould, 2019

NARG IN THE DEPARTMENTAL SEMINAR SERIES



James and Luc presenting an update on their projects



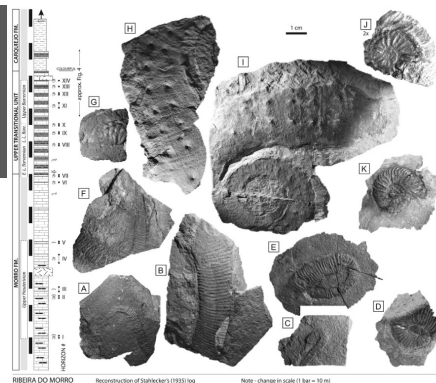
MSGBC BASIN

INITIAL STUDY

Key ammonites from the
Ribeira do Morro Section

Max Casson is currently finishing his PhD focused on the MSGBC Basin. He studied cuttings and core data from exploration and IODP wells, together with his newly collected data from field localities in Senegal and Cap Verde. His second paper has just been published and presents a revised stratigraphic framework for the Central Atlantic resulting from new data on dating (first collection of lower Valanginian ammonites).

Max also undertook a geomorphological study of the shelf margin of offshore Gambia using 3D seismic donated by TGS. Focus was particularly on Cretaceous canyons incisions and base-slope seismic facies. He identified two types of deep-water deposits: debris-poor elongated lobes and wider debris-rich lobes, characterized by the presence of km wide carbonates blocks.



TECTONOSTRATIGRAPHY



Selin Coskun joined NARG in January to build upon the initial study and to further examine the tectonostratigraphic evolution of the MSGBC Basin along the Atlantic margin of Senegal and The Gambia. Her study will focus on interpretation of an extensive seismic database donated by TGS, PGS and Spectrum, together with data supplied by Petrosen. The aim is to refine our understanding of the structure, stratigraphic architecture, subsidence history, palaeogeography and facies trends across the margin. The work will integrate seismic with data from DSDP and ODP boreholes, exploration wells (cuttings data and wireline log data), limited outcrop studies and analysis of onshore / offshore seismic and gravity / magnetic data to define structural and stratal relationships and sedimentary facies. Comparisons will be made with work being undertaken in Morocco, and studies already ongoing in Senegal to examine the relationships of the Jurassic and Cretaceous depositional trends along the NW Africa margin and the conjugate margin offshore USA / Canada.

Recent NARG publications

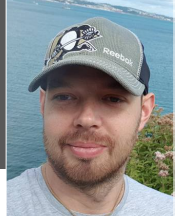
Gouiza, M., Bertotti, G., Charton, R., Haimoudane, K., Dunkl, I. and Anczkiewicz, A.A., 2019. New Evidence of 'Anomalous' Vertical Movements along the Hinterland of the Atlantic NW African Margin. *Journal of Geophysical Research: Solid Earth*. 124, pp. 13,333-13,353.

Casson, M., Bulot, L.G., Jeremiah, J. and Redfern, J., 2020. Deep sea rock record exhumed on oceanic volcanic islands: the Cretaceous sediments of Maio, Cape Verde. *Gondwana Research*, 81, pp.252-264.

Casson, M.A., Calvès, G., Redfern, J., Huuse, M., Sayers, B., 2020. Cretaceous submarine canyon inception, slope processes and seascape evolution from quantitative seismic geomorphology offshore NW Africa. *Basin Research* (submitted).

Newport, R., Segura, M. and Hollis, C. 2020. The interaction of tectonics, climate and eustasy in controlling dolomitization: A case study of Cenomanian–Turonian, shallow marine carbonates of the Iberian Basin. *Sedimentology* (Accepted).

Charton, R., Bertotti, G., Duval-Arnould, A., Storms, J.E. and Redfern, J., 2019. Converting time-temperature modelling into exhumation rates, eroded material fluxes and source-and-sink maps: A semi-quantitative analysis of vertical movements in Morocco and surroundings. *Basin Research*. (Accepted)



SOURCE-TO-SINK - SENEGAL



Clay samples

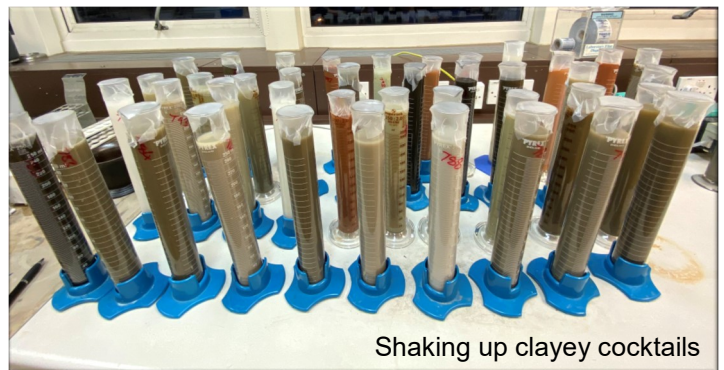
To identify potential shifts in provenance of Cretaceous sands from the MSGBC Basin, samples have been collected from several onshore and offshore wells, as a joint project with PETROSEN, Senegal. Initial analysis has been completed on modern river systems, including detrital heavy mineral analysis and bulk/clay X-ray diffraction. The study will focus on the Cretaceous source-to-sink systems in Senegal, undertaking petrography, single-mineral geochemistry and U-Pb zircon/rutile dating.

This research is the first provenance study of onshore Senegal. The aim is to present an

integrated

mineralogical assessment of modern-day river sediments and Quaternary sandstones, from the four major river systems of Senegal and Gambia. The

results from this project can be used as a control to understand Cretaceous paleo-river drainage of NW Africa and further refine sand delivery into onshore and offshore basins.



Shaking up clayey cocktails

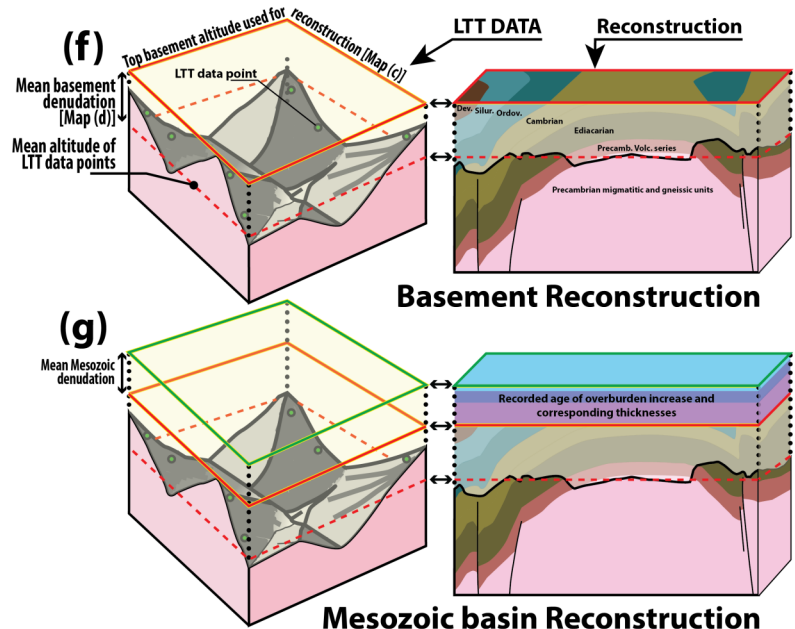


SOURCE-TO-SINK - MOROCCO

Emmanuel Roquette

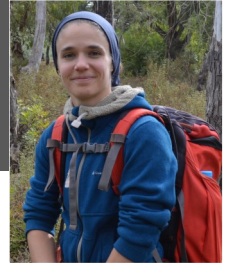


Reconstructing drainage systems in Morocco during the Mesozoic is challenging as the modern surface geology, created during the Alpine Orogeny, is thought to be vastly different from the one exposed at the time of sedimentation. An assessment of the hinterland evolution was carried out combining GIS modelling and denudation rates extracted from LTT data. This allowed assessment of the exposed geology during periods of interest and to draw source-sink correlations. This builds on work of Luber's to develop drainage models for the Cretaceous. For Jurassic systems, the framework was built on Duval-Arnauld's work. The study incorporates the low temperature geochronology exhumation models developed by Charton at TuDelft, to generate information on potential source areas. This project applies sandstone petrography and geochemistry (including heavy minerals and zircon geochronology) to trace provenance and establish source-to-sink models.



MOROCCO JURASSIC

Aude Duval-Arnould



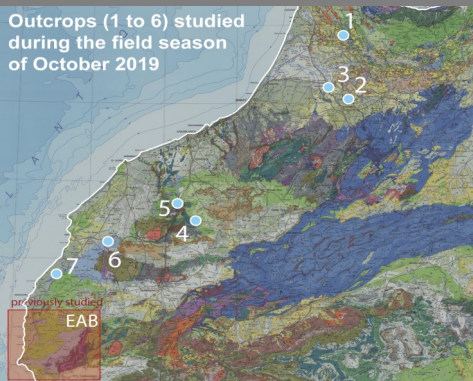
FIELDWORK

Fieldwork was undertaken in October 2019 with PhD student Orrin Bryers, studying the interplay between the Upper Jurassic siliciclastics and the carbonate platform in the Rif, Gharb, Doukkala and Essaouira Basins.

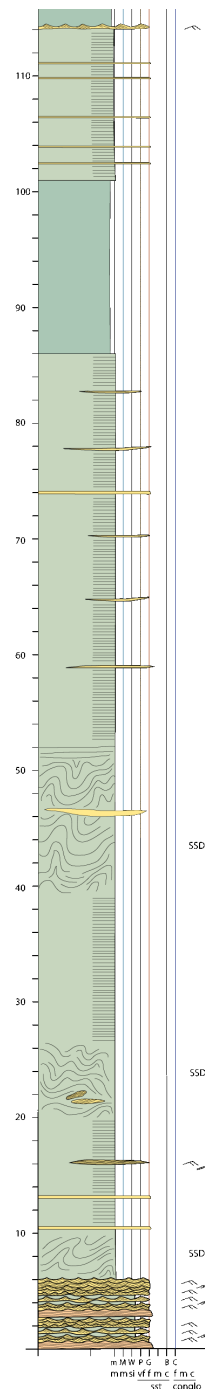
Seven new outcrops were logged, these were located in the Rif Basin (1), the Prerif Ridges (2, 3), the Doukkala (4, 5), the Abda (6) and the Essaouira (7) Basins.

In the Doukkala and Abda basins, the Upper Jurassic carbonates overlay a red continental unit which rests directly on the Palaeozoic basement. In the Prerif Ridges, pulses of siliciclastics were identified in the carbonate-dominated succession. In the Rif Basin, a (>200m) turbiditic succession was identified and described in two different locations.

Outcrops (1 to 6) studied during the field season of October 2019



UPPER JURASSIC



Aude is researching into the origin and extent of the Upper Jurassic siliciclastics along the Moroccan Atlantic Margin.

The appearance of siliciclastic deposits in this carbonate-dominated setting is thought to be strongly related to movements of the hinterland (Charton, 2018). The Rehamna, Jebilets and Central massifs would be considered as potential source for the Oxfordian and Kimmeridgian siliciclastic sediments.

Identifying periods of siliciclastic influx and regional variations in deposits along the margin is an important pre-requisite to better assess the volumes and geometries of potential siliciclastic deposits present offshore.

SOURCE-SINK WORKSHOP

Join us on our 7 day workshop 28th May-4th June 2020.

The week will include a 1 day workshop focusing on the methodologies for source-to-sink studies, followed by a 6 day field workshop in Morocco, examining the entire Central Atlantic Margin sequence. The workshop studies from the Palaeozoic basement, Triassic continental rift sequences to Jurassic passive margin carbonates and Early Cretaceous paralic deposits.

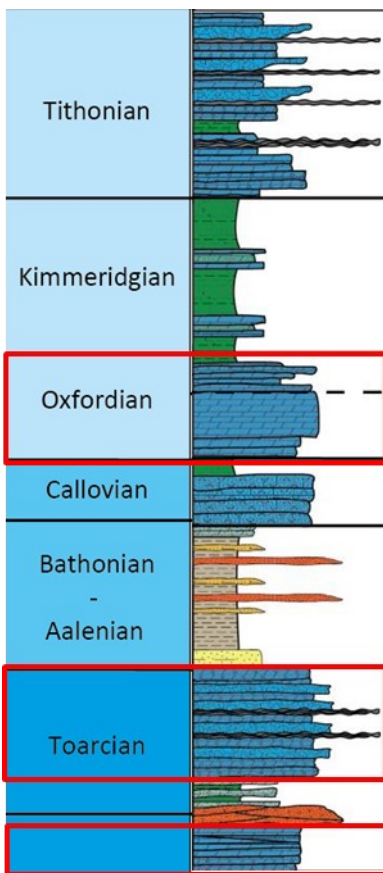
Lower part of the Birkcha turbidites succession and associated log (here above). Upper Jurassic, Rif.



JURASSIC RESERVOIR CHARACTERISATION

Nawwar Al-Sinawi

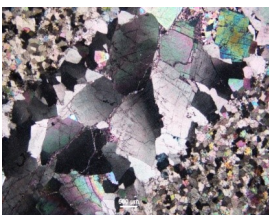
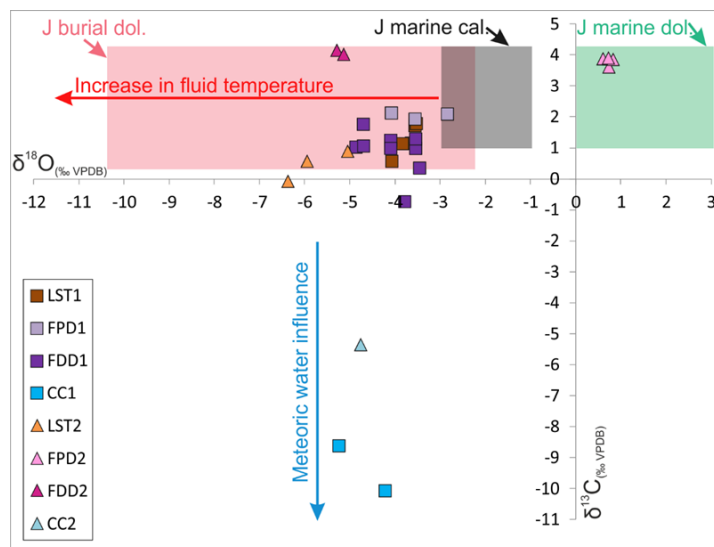
Examining how Moroccan carbonates are dolomitised has required a study of the distribution, controls and origin of the dolomite in Jurassic carbonates. In the EAB, two partially dolomitized carbonate platforms were studied in the Lower Jurassic: (i) The Upper Sinemurian- Lower Pliensbachian Arich Ouzla Formation and (ii) The Toarcian Tamarout Formation.



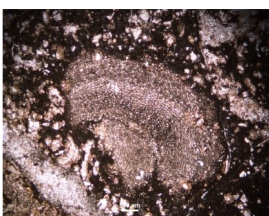
Field analysis indicates that the Arich Ouzla Formation dolostones have a tabular geometry, with oolitic-ooloidal packstone-grainstones and bioclastic wackestone-packstone facies showing diffuse lateral terminations with the host limestones. The Tamarout Formation exhibit stratabound dolostones bodies where the facies associations are dominated by alteration of oolitic-peloidal packstone-grainstone, stromatolites, breccias and evaporites. The Upper Jurassic dolostones of Lalla Oujja Formation have a complex tabular, massive and lens shaped geometry associated with the organization of coral-rich boundstones, floatstones and rudstones. The thickness of the dolomitized bodies can reach up to tens of meters thick and hundreds to several kilometres in width.

Based on the results obtained, dolomitization of the Jurassic Carbonate platforms experienced two main dolomitization stages: (i) initiated by seawater proposed by the FP dolomites, and followed by (ii) hydrothermal dolomitization controlled by fractures, characterized by the FD dolomites. The most likely source of Mg responsible for the FD dolomites is Triassic salt. The later calcite cement is proposed to have originated from meteoric water when the basin was uplifted and exposed during the Alpine Orogeny.

A cross-plot of $\delta^{13}\text{C}$ against $\delta^{18}\text{O}$ for Arich Ouzla and Tamarout Formations limestones (LST1 and LST2), dolomites (FPD1, FDD1 and FPD2, FDD2) and calcite cements (CC1 and CC2).



A



B

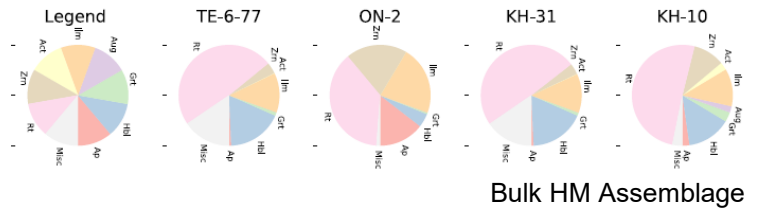
Tabular dolostones (A) and limestone (B) of the Lalla Oujja Formation. A: Bioclastic rich rudstone replaced by (FD) anhedral dolomites and cross-cut by saddle dolomite; B: Bioclastic floatstone where the matrix is partially replaced by FP dolomites in the locality of Tizgui N' Chorfa.

PROVENANCE ANALYSIS - NW AFRICA



James Lovell-Kennedy

Following on from a statistical review of all previous studies from North-West Africa which highlighted the limitations of



single proxy provenance studies (The limitations of detrital zircons as a provenance tracer – a case study from the North Gondwana margin. In prep.), a multi-proxy dataset is currently being acquired in order to best trace shifts in provenance across multiple scales. This dataset will comprise primarily on petrographic and heavy mineral datasets from across Morocco as these are more likely to capture changes in provenance than detrital zircon alone.

The provenance dataset will attempt to correlate shifts in facies with provenance shifts within both the Oukaimeden and Kerrouchen Basins and then use this to predict the distribution of reservoir quality facies within the Tendrara Field, High Plateaux. As part of this study, fieldwork within the Kerrouchen Basin is planned for April-May and September-October this year, to generate high resolution logs of key sections identified from previous field seasons.

Orrin Bryers



FIELD WORK IN MOROCCO



Well preserved tabular scleractinian coral (East of Tamri).

A productive field season studying the sedimentology of the lower Cretaceous coral outcrops in the EAB has resulted in the recognition of low-relief coral development in the mixed carbonate-clastic shelf of the Lower Cretaceous successions, NW Africa. The field season involved high-resolution sedimentary logging and sampling between Cap Ghir and Jbel Amsittene to understand the depositional evolution of the corals and their stratigraphic architecture across the margin



PALEOZOIC-JURASSIC SYSTEMS OF TUNISIA

Pierre-Olivier Bruna



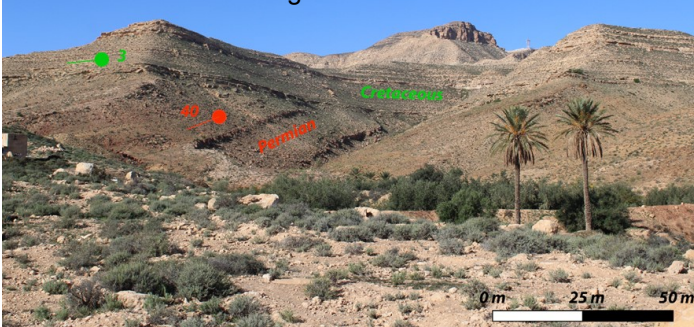
An integrated characterisation of the Paleozoic to Jurassic systems in Tunisia was investigated by Pierre-Olivier Bruna during his post-doctoral research which

started in May 2019. Over the past few months Pierre-Olivier worked with MSc student Ruaridh Smith on the creation of a series of discrete fracture network (DFN) models in Ordovician units of a small portion of the Zaafrane block in the Southern Chotts basin. The present models are intended to be tested in the coming weeks with real production data in collaboration with reservoir engineers from Mazarine Energy.



Interpretation and detail of fractures (Shear fracture to the right) in an outcrop pavement from the region of Kirchaou

Hercynian Unconformity between the Permian and the Cretaceous in the Tebaga de Medenine



Pierre-Olivier, Ruaridh and Giovanni Bertotti along with a team composed of geologists from Mazarine Energy, ETAP, ONM and the University of Tunis-El Manar, spent 10 days in the areas of the Tebaga de Medenine and Kirchaou in the Tunisian Jeffara escarpment. The fieldwork allowed us to gather important structural data to interpret the geological history of the area during the Paleozoic and the Mesozoic. Preliminary results show that events of shortening are controlling the architecture of Triassic deposits and also properties (incl. fracture distributions) in the Permian.

During fieldwork, samples were collected to run basic petrophysical analyses and to make thin sections. On top of this, five samples from the Permian and the Triassic were sent to Geneva University for low-temperature geochronology analyses.

Pierre-Olivier also worked with MSc student Jos Kwakman on the re-interpretation of Mazarine Energy's 3D and 2D seismic data. The goal of this study to better characterise the geometry of the Hercynian Unconformity and to identify possible intra-Mesozoic unconformities. This work is the base for Jos and Pierre-Olivier to build a series of 3D structural models at various scales in the area of the Southern Chotts and Jeffara basins. This model will be used to make geomechanical calculations (e.g. stress models) at the regional scale that may help to improve the results of the DFN.

The geologists' team after fieldwork



BIOSTRATIGRAPHY

Luc Bulot working
with Moussa Masrour



NEW PROJECT

DAFCOAE (Dynamics of Ammonoid Faunas during Cretaceous Oceanic Anoxic Events)

Leader: Dr. Luc Georges BULOT

External collaborators: Prof. Mohamed Fouad ALY (Cairo University, Egypt), Prof. Jens LEHMANN (University of Bremen, Germany), Dr. Fares KHEMIRI (ETAP, Tunisia), Dr. Ezzedine SAÏDI (ETAP, Tunisia), Dr. Nejib BAHROUNI (ONM, Tunisia), Prof. Moussa MASROUR (University of Agadir), Dr. Amin NAVIDTALAB (Damghan University).

Studied areas. Morocco, Egypt, Tunisia, Iran.

The aim of the project is to compare the local expressions of faunal dynamics under the influence of palaeogeographic and palaeo-oceanographic changes related to the establishment of successive stages of Cretaceous Oceanic Anoxic Events (Barremian to Turonian).

Olcostephanus guebhardi lateumbilicatus
- late early Valanginian Morocco



Lower Aptian Cheloniceratinae
- Sinai Egypt



Acanthodiscus sp. - Morocco
(base Hauterivian marker)

Results are coming in for the NARG biostratigraphy team

- Characterisation of the Middle Berriasian Unconformity in the EAB.
- Estimations on the duration and origin of hard grounds and hiatuses in the Valanginian successions of EAB.
- Establishing integrated stratigraphic framework to the Berriasian – Valanginian – Hauterivian interval.
- Integration of the EAB framework with DSD/ODP logs

NEW FOSSILS

Identification of two new genera and 4 new species of ammonites from the Lower Cretaceous of Morocco are soon to be formally published.

CAJG CONFERENCE

Luc has been appointed Associate editor Arabian Journal of Geosciences. Position offered at 2nd Conference of the Arabian Journal of Geosciences (Sousse, Tunisia).

IUGS STRATOTYPE SECTION

On December, the 16th 2019 Luc received the official letter informing him that the IUGS Executive Committee has voted unanimously to ratify the GSSP proposal for the Hauterivian Stage at La Charce (Drôme, France) as approved by the International Commission on Stratigraphy and by the Subcommission on Cretaceous Stratigraphy.

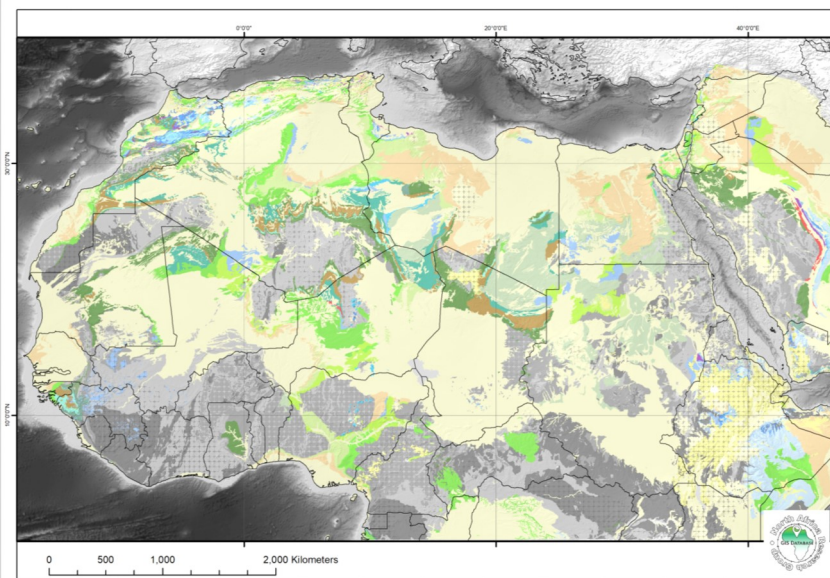
Bulot, L.G., Mutterlose, J., Rawson, P.F., Reboulet, S., coordinators. 2019. Formal proposal for the Global Boundary Stratotype Section and Point (GSSP) of the Hauterivian stage at La Charce (southeast France), with contributions by B. Aguirre-Urreta, F. Baudin, L. Emmanuel, S. Gardin, M. Martinez, L. O'Dogherty, I. Premoli-Silva, M. Renard. Hauterivian Working Group, SCS/ICS, IUGS, 42pp.

GIS DATABASE



NEW VERSION RELEASE V1.1

Completed geological map of North Africa



- Brand new interface for better previewing and downloading data
- Version 1.1 updates:
 - Complete digitised geological map
 - NARG well database
 - Recently completed NARG studies
 - Scanned thin-sections
 - Photograph and weight of samples
 - Improved resolution of thumbnails
 - Structural features layer

Aims for V1.2

- Completed samples layer
- Completed basins layer
- Continually add completed studies
- Complete seismic layers

Future work - Beta V2.0

- Obtain UAV images to create a 3D model of the outcrops studied to visualise within GIS.
- Create a predictive spatial map of lithology combining well and research data.

Contact ginny-marie.bradley@manchester.ac.uk with any GIS database queries.

Version 1.1 will be online by the end of March 2020

- a notification will be forwarded

CONFERENCES ATTENDED

AAPG ACE San Antonio May 2019

PESGB Africa conference: 1st-2nd October 2019. A stand, 9 posters and a talk. Including a prize for best poster.

CAJG conference in Sousse Tunisia: 25th-28th November 2019. Special Session on Petroleum Systems in North Africa by North Africa Research Group (NARG) of Manchester University.

NERC CDT 2019 In Edinburgh - poster presented

MSGBC
Congratulations to Max Casson for best poster at PESGB Africa.



STUDENT SPOTLIGHTS



Orrin Bryers - 2nd year PhD student

"Following my seismic-based MSc project at the University of Manchester, I was looking for a new challenge and wanted to get back to the roots of geology with a field-work

based research study. I successfully gained a spot on the NARG team in 2018, taking on a project that aims to better understand the lower Cretaceous stratigraphic evolution along the SW Moroccan Atlantic Margin using an integration of biostratigraphy, sequence stratigraphy and subsurface data. NARG has allowed me to make very close friends and strong academic and industrial connections whilst simultaneously giving me the opportunity to travel all over the world. I have also been given a great amount of freedom with the direction of my project and feel fully supported by my supervisors and colleagues".



James Lovell-Kennedy - 2nd year PhD Student

"I joined NARG as it would allow me to apply cutting edge geoscience techniques to answer key questions and solve real world problems.

Since joining in 2017 to do an

MSc by research, I have had an amazing experience. I have had the opportunity to do fieldwork in Morocco and travel to Europe and the USA to present my research. These great experiences have been made better by the friendliness and kindness of the other students and staff who have supported me every step of the way. "

NEW STAFF MEMBER



Dr. Ginny-Marie Bradley

After completing her PhD at the University of Manchester, Ginny has come to join NARG as GIS specialist and Technical Support .

She is responsible for the upkeep and data entry for the GIS database, NARG website, data compilation and archiving, as well as NARG digital data capture using UAV technology.

SPONSORS FIELD COURSE - 2019



A 7 day field workshop, hosted by NARG in collaboration with ONHYM, examined the Palaeozoic and Triassic deposits exposed in eastern Morocco. From basement, Ordovician glaciogenic facies, Silurian carbonates and black shales, to Devonian mixed carbonate/clastics to Triassic fluvial red beds. The workshop discussed the geology of the Palaeozoic Petroleum System which is prolific across North Africa.

Attendance from 15 industry and academic partners came together in the field to discuss the petroleum plays, reservoirs, structural evolution and the potential for exploration within these systems.

RECENTLY COMPLETED STUDIES

Meghan Jenkinson MSc 2019. The late Aptian adaptive radiation of the Acanthohoplitidae in the Essaouira-Agadir Basin of Morocco.

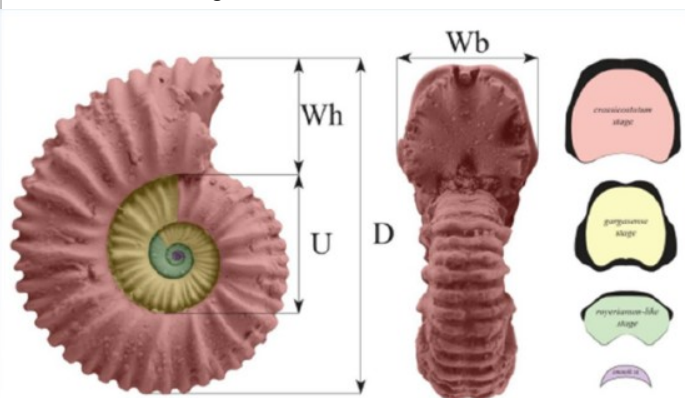


Fig. 1: *Coloniceras crassicosatum* ontogeny after Frau et al., (2019, in press).

FUTURE PUBLICATIONS

PUBLICATIONS SUBMITTED

- Lehmann, J., Seibertz, E., Spaeth, C., Bulot, L.G., 2020, in press. Ammonite stratigraphy and the belemnite genus *Hibolithes* in the higher Serdj Formation (Aptian/Albian boundary interval) in north central Tunisia. *Zeitschrift der Deutschen Gesellschaft für Geowissenschaften*.
- Bulot, L.G., Aly, M.F., Casson, M., submitted. First unequivocal occurrence of the genus *Douvilleiceras* (*Douvilleiceratoidea*, *Ancyloceratina*) in the Albian of Sinai (Egypt). *Arabian Journal of Geosciences*.
- Wang, J., Bulot, L.G., Redfern, J., Taylor, K.G., submitted. Controls and timing of Cenomanian-Turonian organic-enrichment in the Pre-African Basin, Morocco: relationship to the OAE2. *Marine and Petroleum Geology*.
- Bulot, L.G., Lubert, T.L., Masrour, M., Dempsey, M., Atterby, J., Jenkinson, M., Redfern, J. submitted July 2019. *Frauella* gen. nov., a new endemic *Cheloniceratinae* (*Douvilleiceratoidea*, *Ancyloceratina*) from the Aptian of Morocco.



Congratulations to Luc Bulot wins 300 Euro prize for best paper/talk at CAJG conference

Congratulations to who Emmanuel Roquette won second place for best oral presentation at DEES PGRC.

PUBLICATIONS IN PREPARATION

- Lovell-Kennedy *et al.* The limitations of detrital zircons as a provenance tracer – a case study from the North Gondwana margin. In prep.
- Bryers *et al.* Low-relief coral development in a mixed carbonate-clastic shelf; a case study from the Lower Cretaceous of NW Africa. In prep.
- Charton *et al.* Syn-sedimentary growth of salt-cored anticlines in a fossil transitional domain of Morocco: Relations with Mesozoic source-to-sink systems. In prep.
- Charton *et al.* Potential insights into past source-to-sink systems from low-temperature thermochronology paired with landscape evolution modelling: an example from Morocco. In prep.
- Roquette *et al.* A new method for source to sink studies: Low-Temperature Thermochronology modeling of palaeogeological maps. In prep.
- Duval-Arnould *et al.*, Early post-rift depositional systems of the Central Atlantic: Lower and Middle Jurassic of the Essaouira-Agadir Basin, Morocco. In prep.

DATES FOR YOUR DIARY

- 3rd School of Heavy Mineral Analysis - Milan, Italy
- AAPG ICE September 2020 - Madrid
- 7th Conjugate Margin Conference October 2020 - Marrakech, Morocco—Deadline 31st May
- HGS-PESGB Africa conference September 2020—deadline April
- PETEX London 2020.—Deadline 25th May
- NAC2020, Utrecht
- BSRG 2020

GROUND BREAKING RESEARCH

Manchester

Academic staff:

Prof. Jonathan Redfern
Dr Stefan Schroeder
Prof. Mads Huuse
Prof. Kevin Taylor
Prof. Cathy Hollis
Dr David Hodgetts
Dr Luc Bulot

Computing:

Dr Kofi Owusu
Dr Ginny-Marie Bradley

Post Doc:

Dr Aude Duval-Arnold

PhDs:

Nawwar Al-Sinawi
Emmanuel Roquette
Max Casson
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We thank the continued support of staff in Onhym, both technical (Mr Nahim, Mr Jabour and Mr Ait Salem, and in the field, with Mohamed Taki, Yousfi Zakaria, Lahsen Aabi, Walid Kassoui

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