



## Biostratigraphy Team achievements

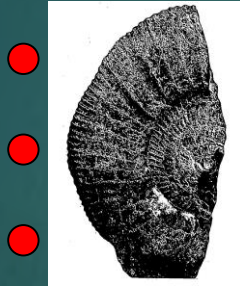
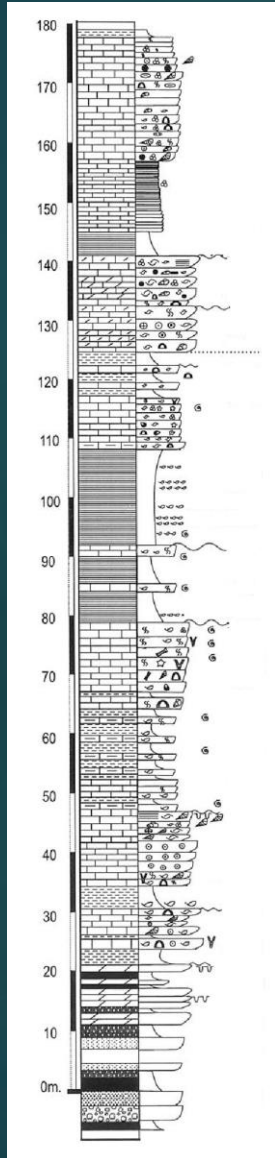
Integrated stratigraphy of the Aptian of Morocco is completed and published in Cretaceous Research.

Integrated stratigraphy of the Middle Jurassic of Sidi Ifni is completed. Paper is to be submitted as soon as possible.

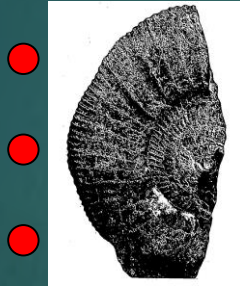
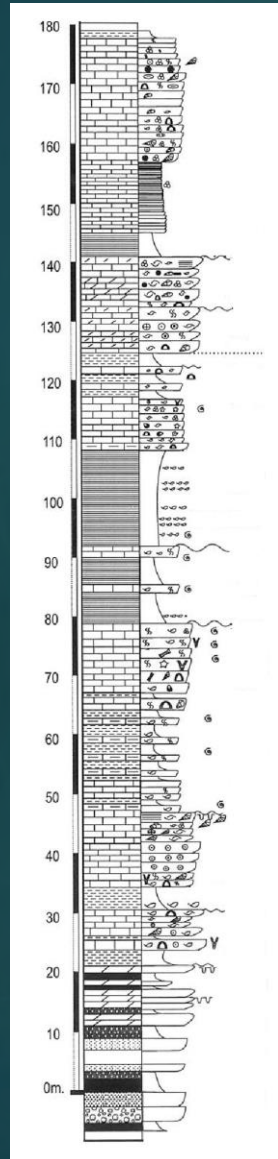
Re-evaluation of integrated ammonite – planctonic foraminifera biostratigraphy vs. C13 across C/T boundary completed for Errachidia, Agadir and Tarfaya.

Callovian/Oxfordian biostratigraphic framework completed. Poster was presented at the Palaeontological Association annual meeting in December 2017 (London).

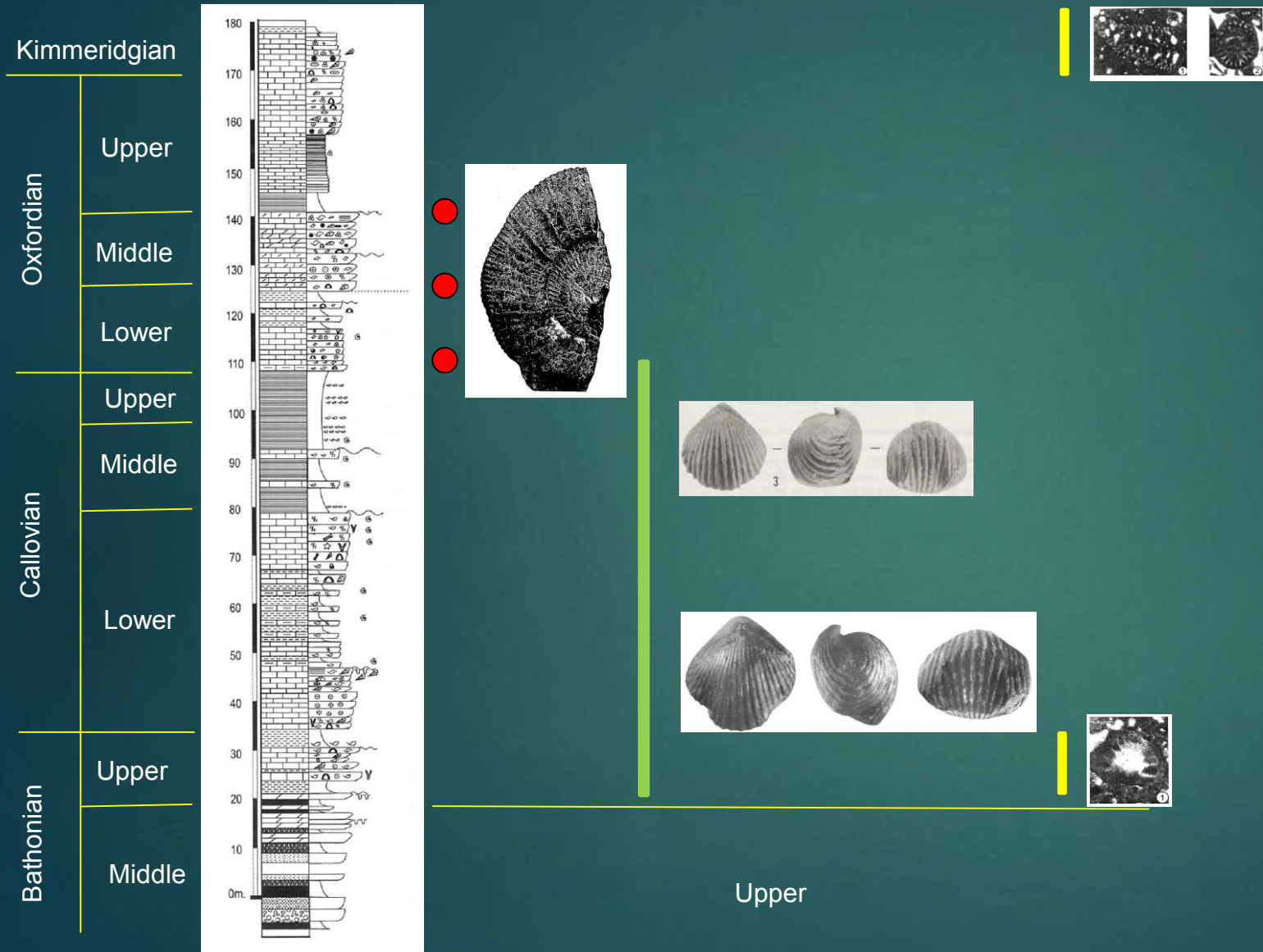


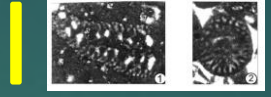
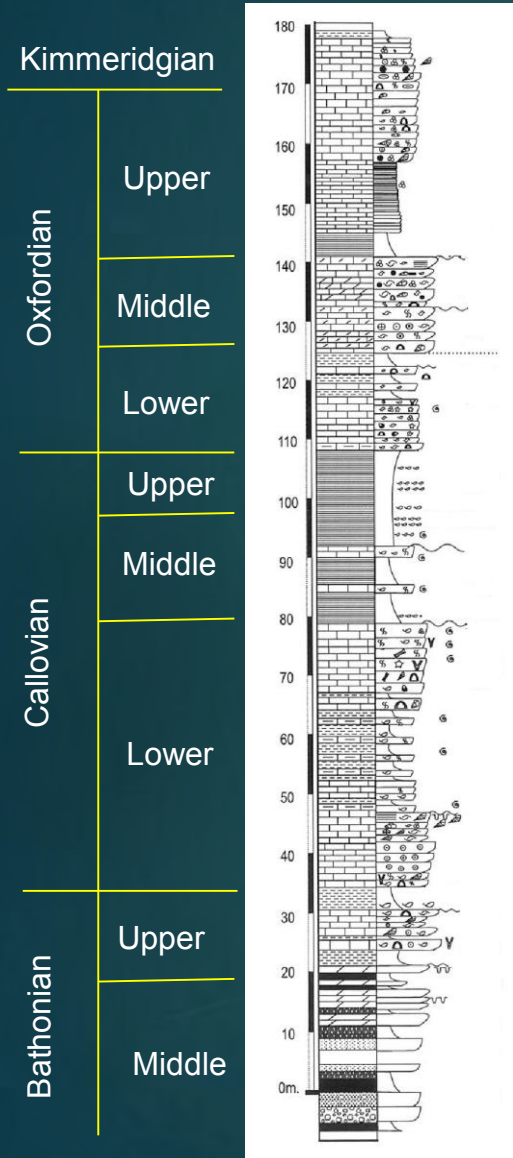


Pseudaspidoceras

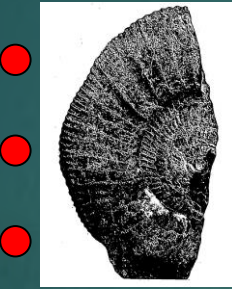


Duval-Arnoud et al. in prep. Middle to Upper Jurassic passive-margin stratigraphic evolution of the Agadir-Essaouira Basin, Morocco





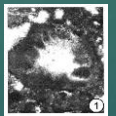
Poorly calibrated markers



Misinterpreted data from the literature !!!!!



Underestimated stratigraphic range !!!!!

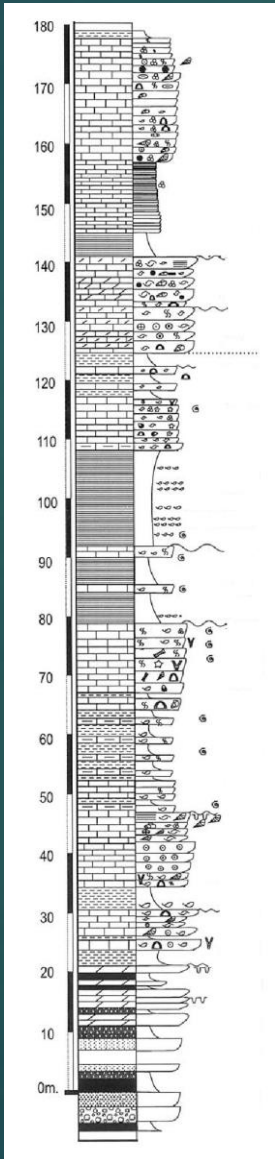


Poorly calibrated markers

Barren Interval



Kimmeridgian	? Kimmeridgian	Oxfordian	?	?
			Upper	Upper
			Middle	?
Lower	Middle			
	Upper		Upper	
			Middle	
Callovian	Callovian	Middle		
		Lower	Lower	
Bathonian	? Bath.		?	
		?	?	



- Subdiscosphinctes*
- Pseudopeltoceras*
- Subgrossouvria aberrans*
- Erymnoceras baylei*
- Reineckeia anceps*
- Indosphinctes patina*
- Reineckeia turgida*



*Kutchirhynchia* assemblage



*Somalirhynchia* assemblage

Barren Interval



## Jurassic whats next...

Evaluate the duration of condensation and suspected hiatus at the Callovian/Oxfordian transition

Precise the age of the onset of the Callovian transgression (older than the Patina ammonite subzone?)

Confirm the occurrence of Bathonian larger benthic foraminifera

Calibrate larger benthic foraminifera ranges to ammonite zones

Establish correlation value of the MCBT “middle Callovian brachiopod turnover” at the scale of North Africa

# Integrated biostratigraphic framework of the Mesozoic of the Moroccan Atlantic margin

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Oryn Bryers PhD started in July 2018

The aim is to study the evolution the Berriasian to Lower Barremian depositional system along the Atlantic margin of Morocco north of Agadir.

In terms of biostratigraphy, the objectives are:

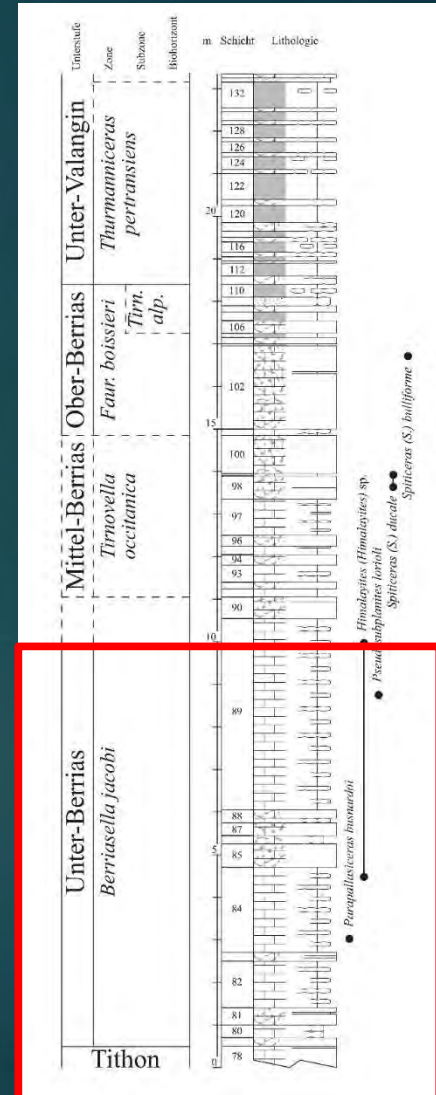
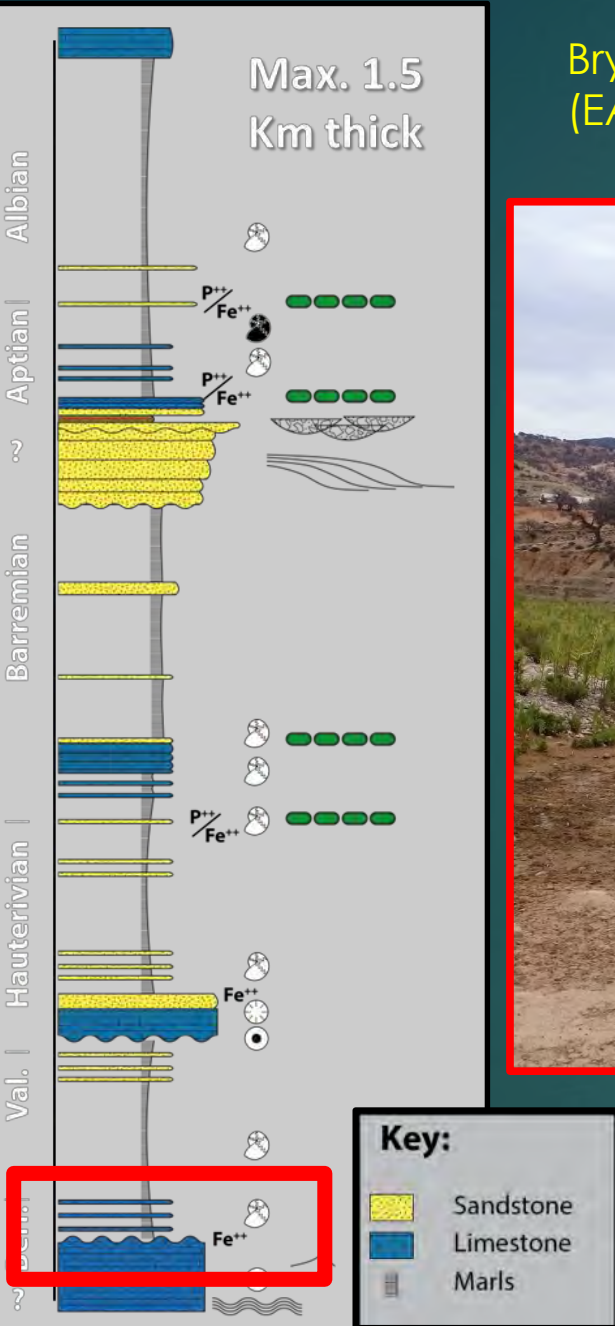
to define a composite reference section, integrating ammonite, calpionellid, calcareous nannofossil and benthic foraminifera biostratigraphy, with C13/O18 isotope stratigraphy and sequence stratigraphic interpretation.

to study the Hauterivian coral buildups of the Tamanar Fm. by improving age constraint, map their geometry and assess their potential impact on post Hauterivian palaeogeography and palaeotopography.



Val. | Hauterivian | Barremian | Aptian | Albian

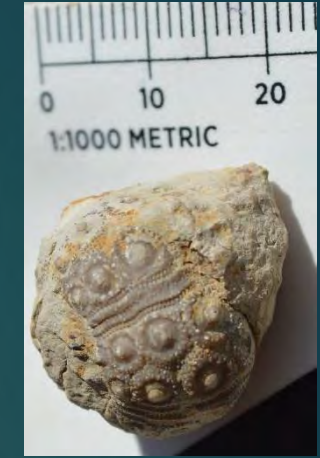
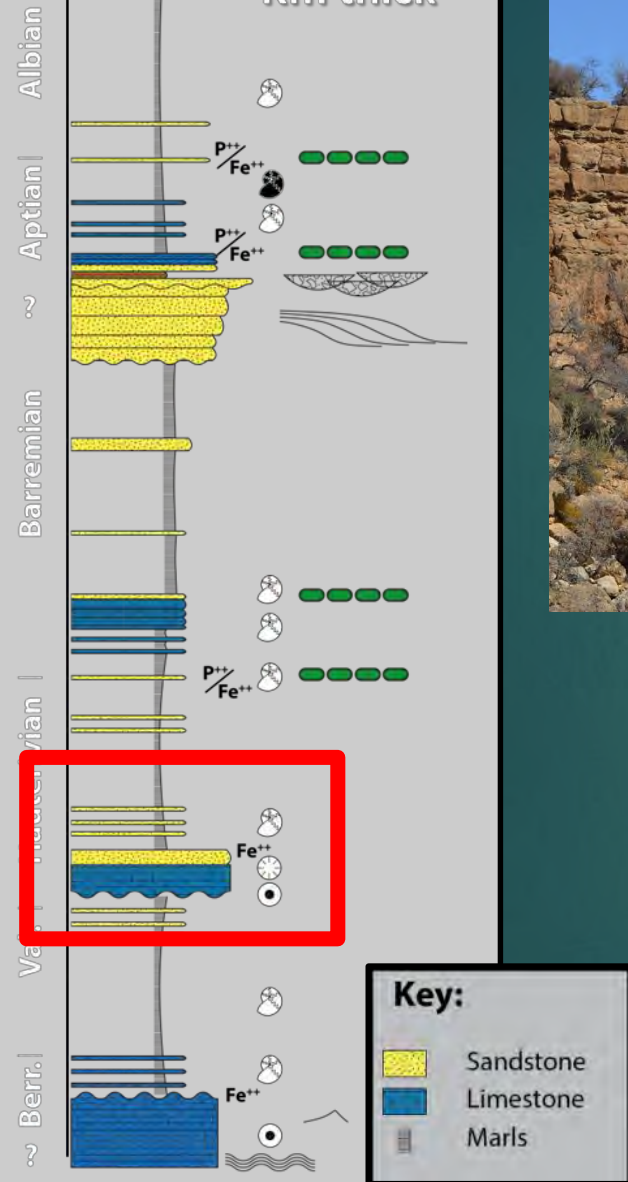
Max. 1.5 Km thick



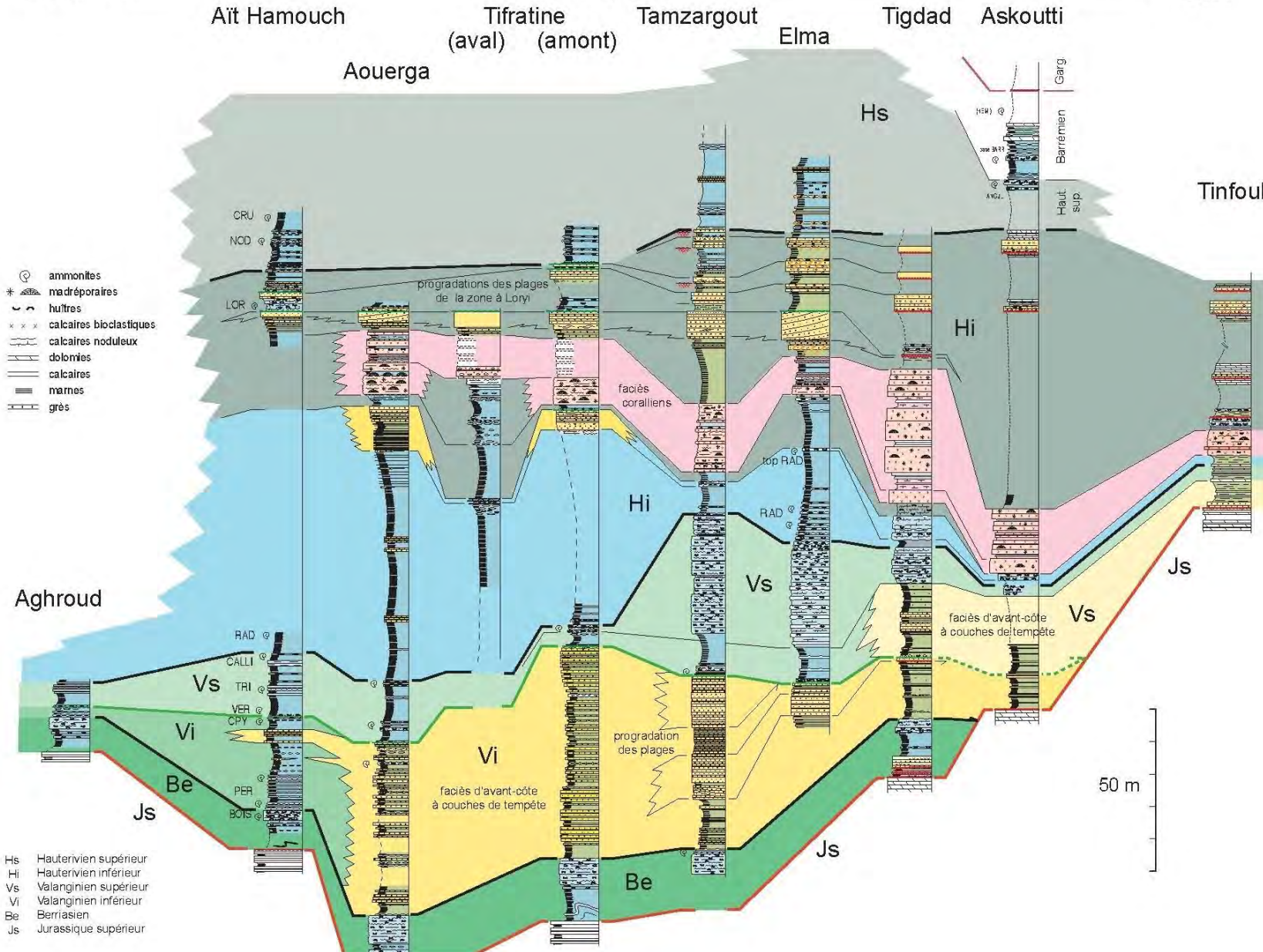
# TAMANAR FM. at « PALM RIVER »



Max. 1.5 Km thick



West ← ≈ 40 km → East



Literature reveals a very heterogeneous biostratigraphic data set...

Dr. Luc G.  
Bulot

Lead Biostratigraphy Team – NARG – University of Manchester, UK  
Senior CNRS Researcher – Cerege – Aix-Marseille Université, France

North Africa Research Group

[www.narg.org.uk](http://www.narg.org.uk)



## Strengthening the ties with Moroccan Universities

Dr. Moussa Masrour (Agadir) – Echinoids and regional geology

Dr. Mohcine Ettachfini (Marrakech) – Ammonites and regional geology

Dr. Mohamed Aoutem (Agadir) – Brachiopods and regional geology



Update on biostratigraphy and establishing a type section for the Early Cretaceous



## New collaborations in Europe

Dr. Christina Ifrim (Heidelberg) – Late Cretaceous biostratigraphy

Dr. Alain Bonnot (Dijon) – Upper Callovian and Oxfordian ammonites

Dr. Alexis Rojas-Briceno (Umeå university, Sweden) – Palaeobiogeography modelisation

## Extending collaboration with Interdisciplinary Centre of Ancient Life in Manchester

4th year Palaeontology Project – Meghan Jenkinson

Co-supervision with Dr. Robert Sampson – Phylogeny and Cladistic analysis



## Publication in progress...

Cenomanian-Turonian ammonites of Tarfaya basin (with Christina Ifrim, University Heidelberg): preparation of material completed, photography in progress. Full description of fauna in progress.

Aptian Morocco. Description of a biostratigraphic significant new genus will be submitted for publication by end September (PGA). Includes correlations with Gulf of Mexico.

Douvilleiceratidae from the Albian of Sinai (Egypt). New collaboration with University of Cairo.

## Prospective...

Manchester 4<sup>th</sup> years student will work on evolution of ammonite faunas across the Aptian-Albian boundary (material Tim Luber). Objective: better appreciation of Aptian palaeobiogeography and inter-regional correlations in North Africa (Algeria, Tunisia and Egypt).

Cladistic analysis of middle Aptian ammonites of Atlantic Morocco vs. southern Margin of Tethys and GOM with ICAL colleague Robert Sampson. Objective: impact of T/R cycles on necto-benthic ammonite evolution in shelf environments... implications for inter-regional correlations.

Modelising the palaeobiogeographic distribution of Ammonoidea during Aptian time (collaboration with

Revision of the historical collections of ammonites from Maio (University of Tübingen).



# Thank you for your attention and support...



## I shall now try to answer your questions (if I know the answer)...

### Special Thanks

