North Africa Research Group

Steering Meeting – MSGBC Studies

18th September 2019

Max Casson, Prof. Jonathan Redfern, Dr. Luc Bulot
Jason Jeremiah, Dr. Gérôme Calvès, Ian Mounteney

MANCHESTER 1824
The University of Manchester

Agenda

1. Maio, Cape Verde overview
2. seismic geomorphology, offshore The Gambia
3. tectono-stratigraphic framework update
4. provenance study (Ian Mounteney, 2nd Year MPhil)

Maio, Cape Verde Overview

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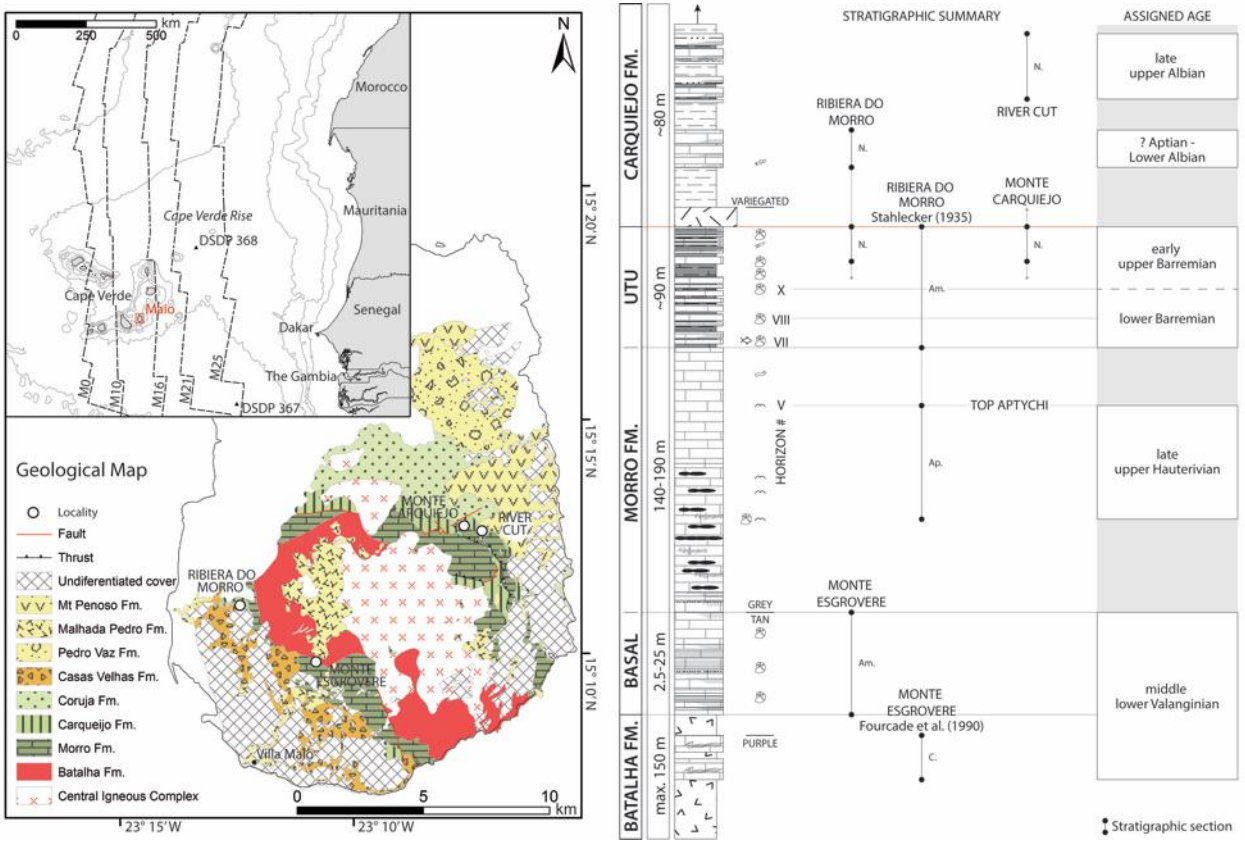
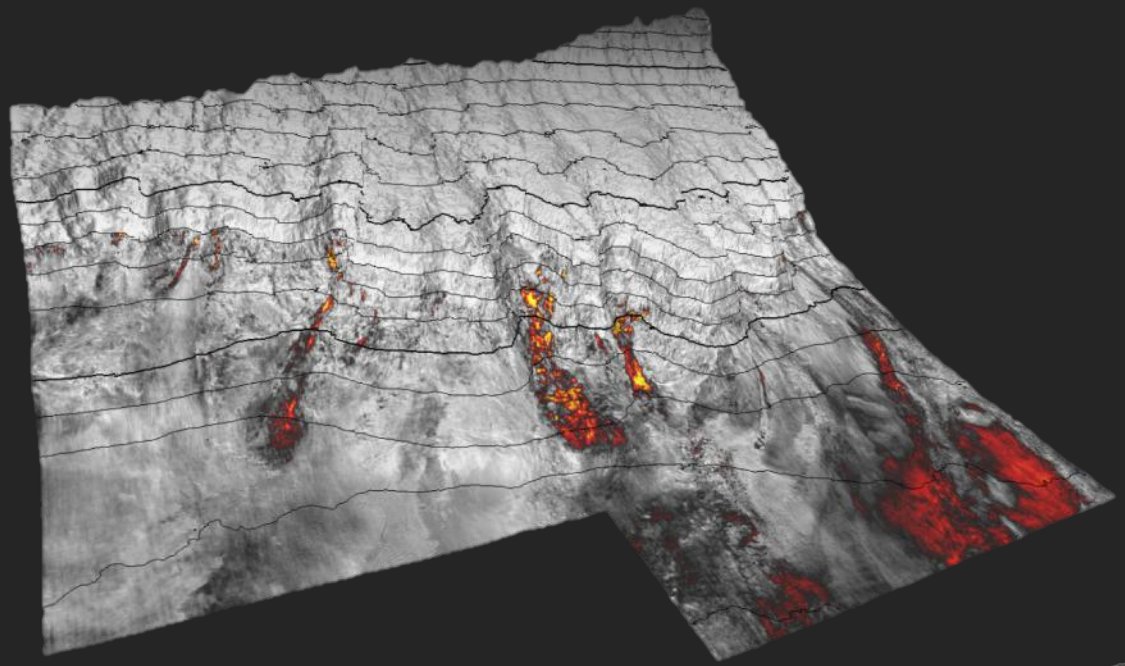
Casson, M.A., Bulot, L., Jeremiah, J., Redfern, J. (2019) Deep sea rock record exhumed on oceanic volcanic islands: the Cretaceous sediments of Maio, Cape Verde *Accepted in Gondwana Research



KEY OUTCOMES revised distal domain stratigraphy; no Jurassic-aged sediments; paleo-environmental change at Morro-Carquiejo Fm.

Seismic geomorphology, offshore The Gambia



'Cretaceous submarine canyon inception, slope processes and seascape evolution from quantitative seismic geomorphology, offshore NW Africa'

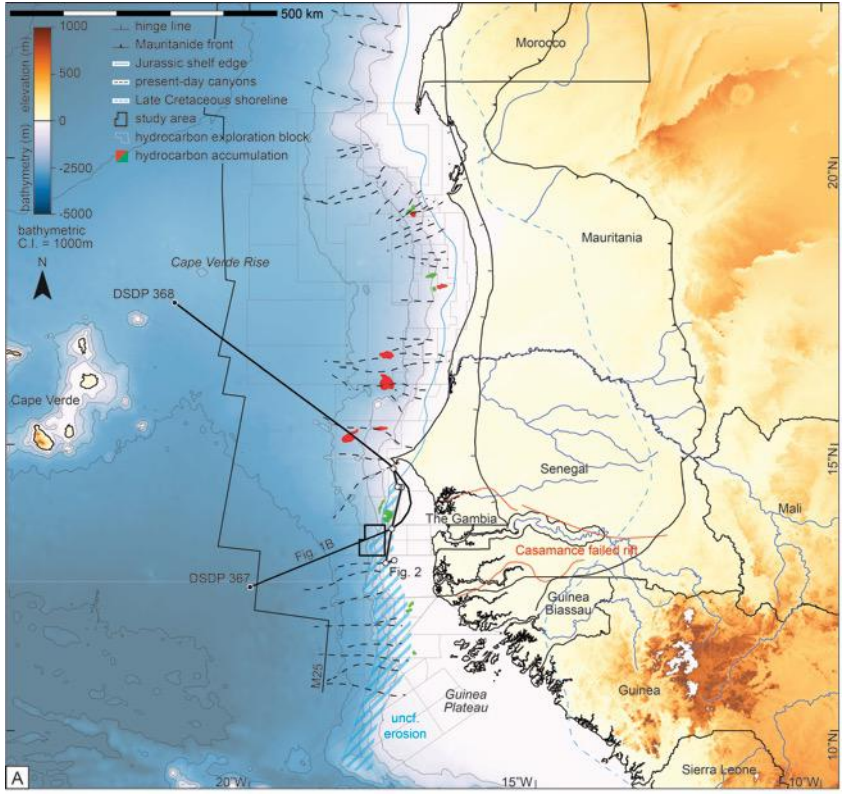
PRESENTATIONS:

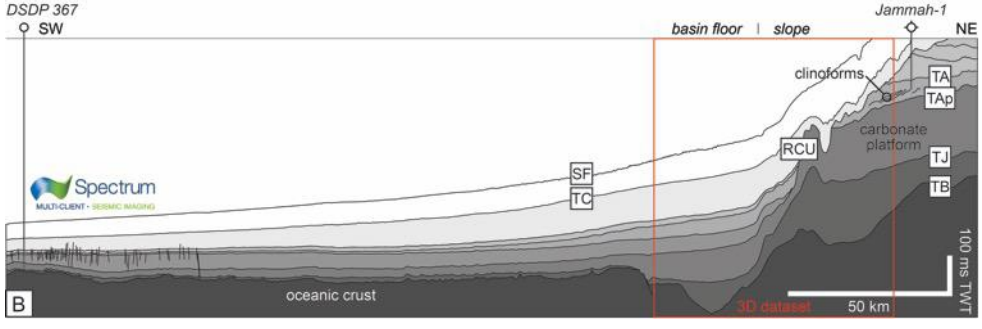
TGS

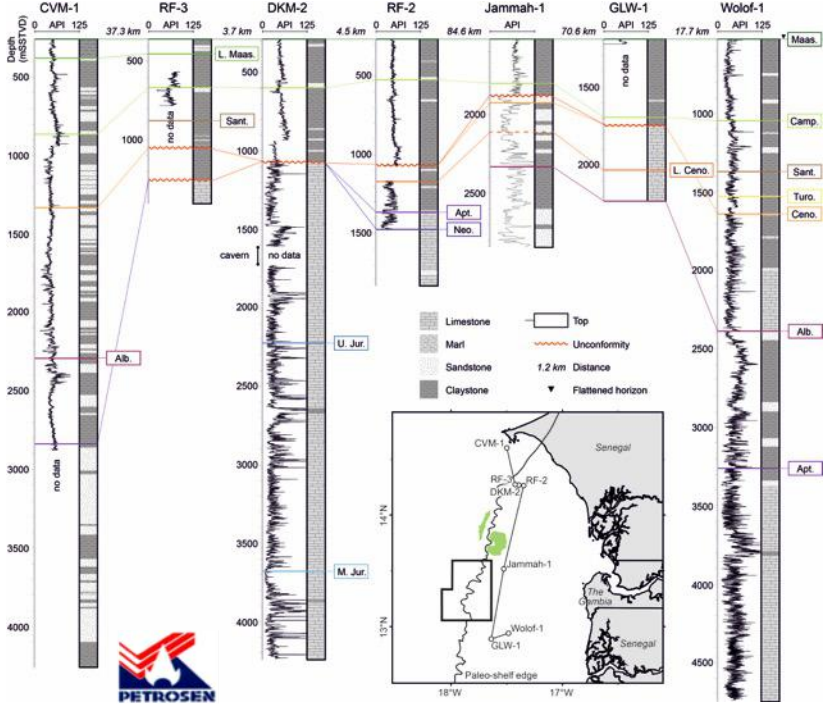
AGU100 ADVANCING EARTH AND SPACE SCIENCE

AFRICAN E&P Conference

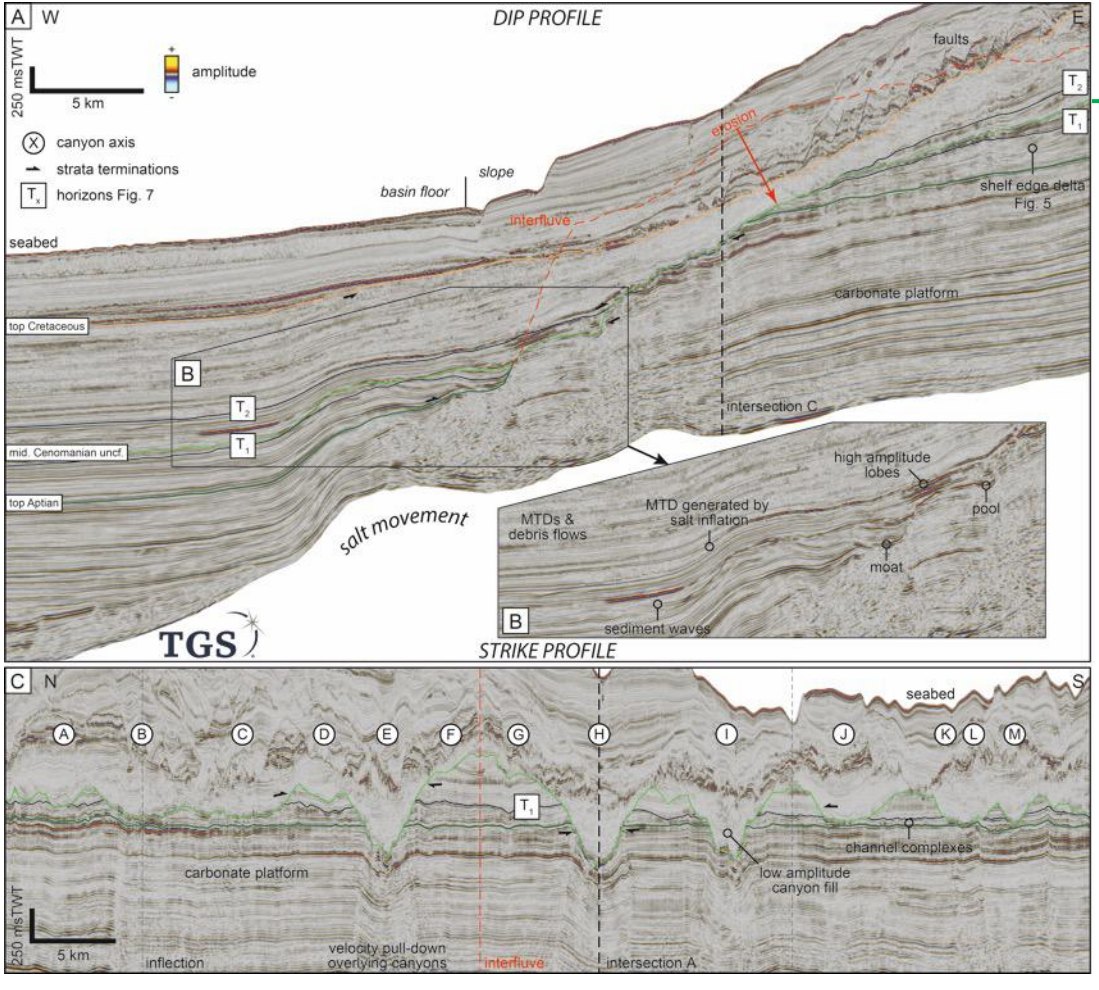
Case Study: Offshore The Gambia



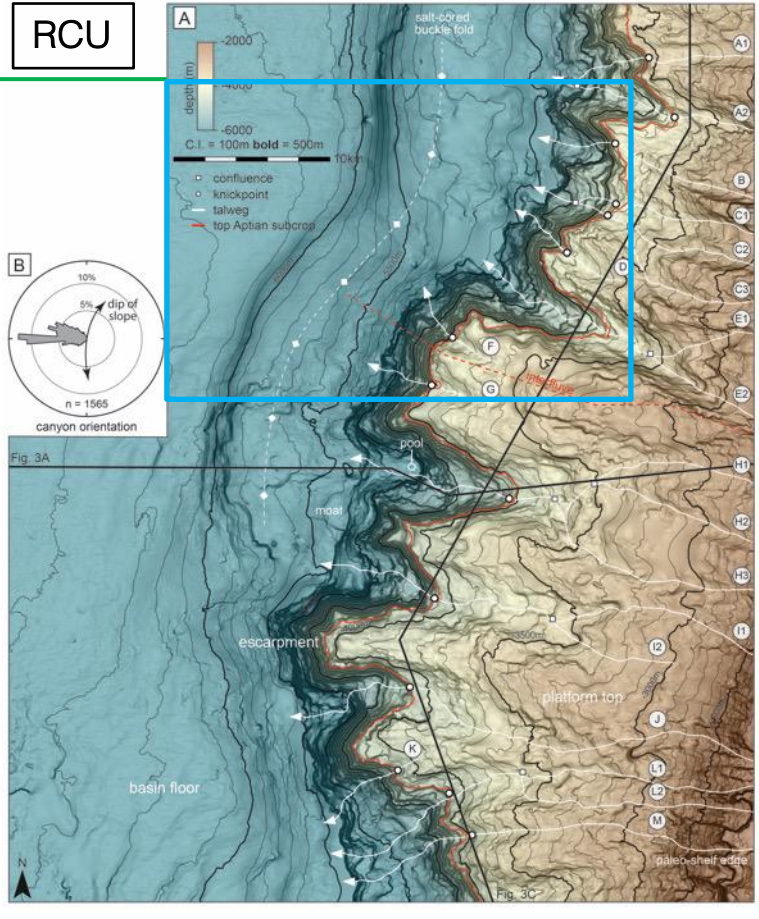




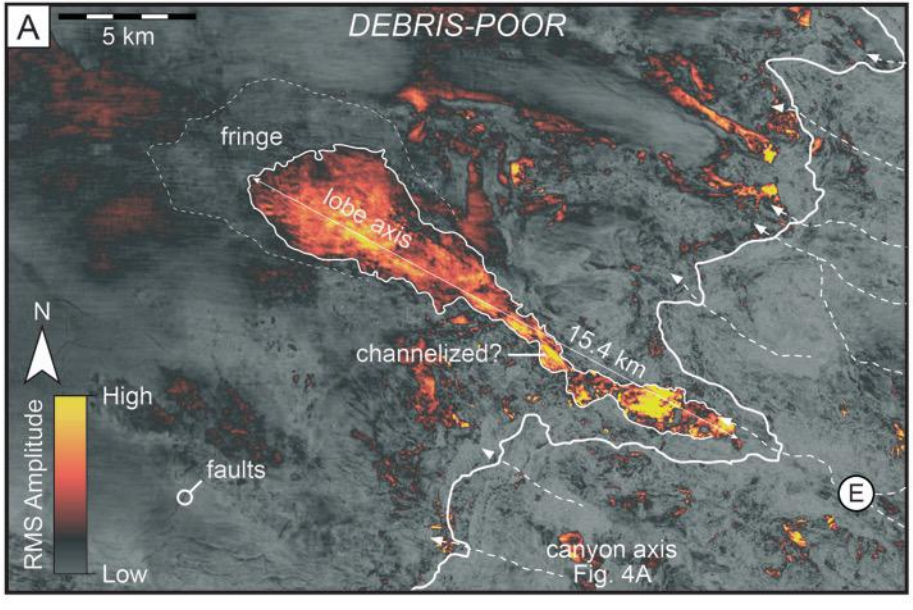
Regional Composite Unconformity

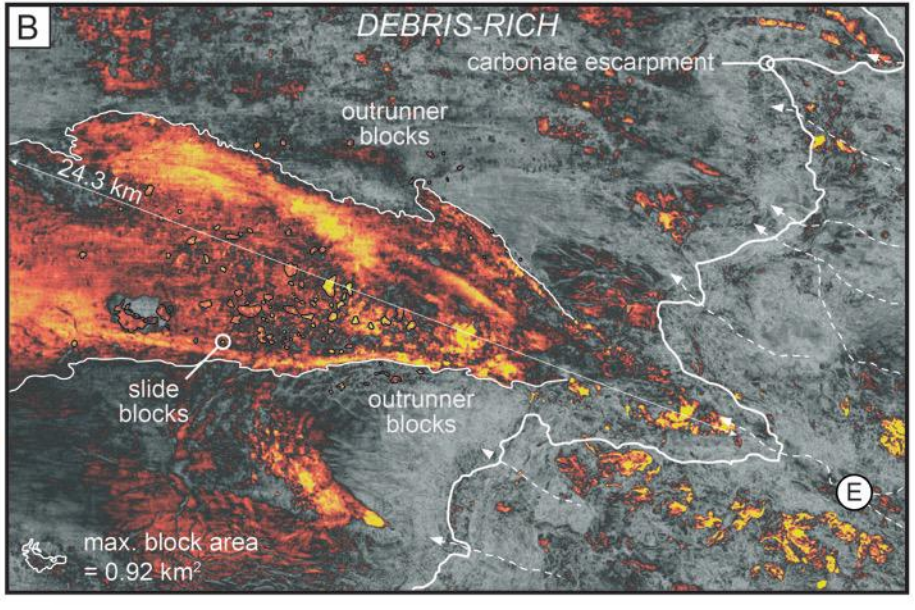


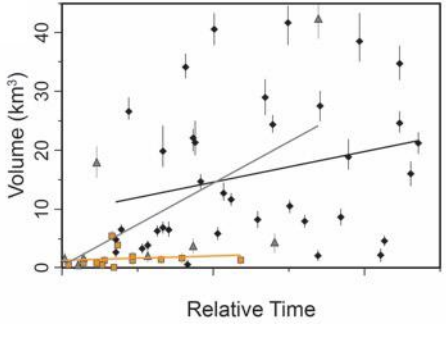
RCU

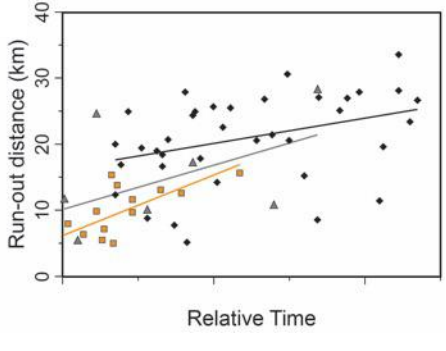


Base-of-Slope Seismic Facies



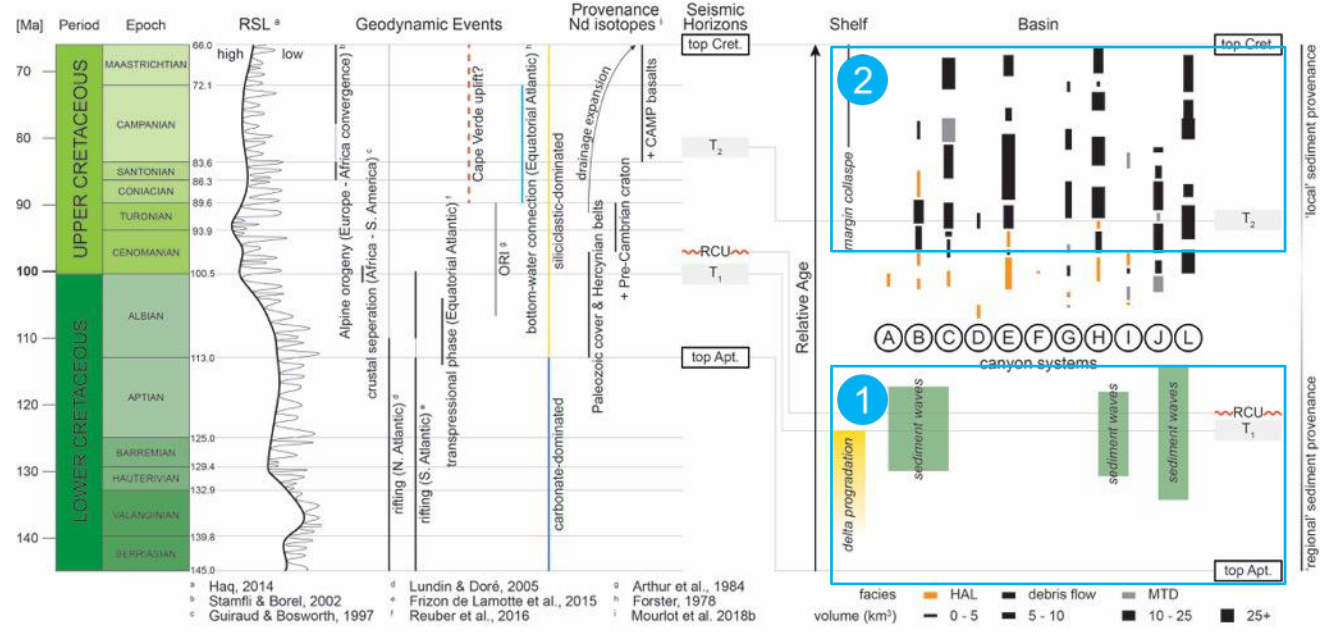


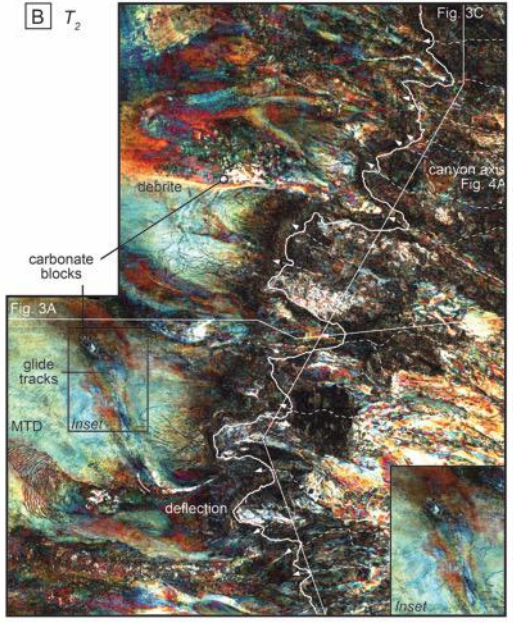




- debris-poor lobes
- debris-rich lobes
- MTD

Tectono-Stratigraphic Evolution





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Central Atlantic

Tectono-Stratigraphic Framework

- super-regional re-evaluation of scientific & exploration wells
- integrated biostratigraphy – NEW DATA
- plus sedimentology & organic geochemistry

The Central Atlantic

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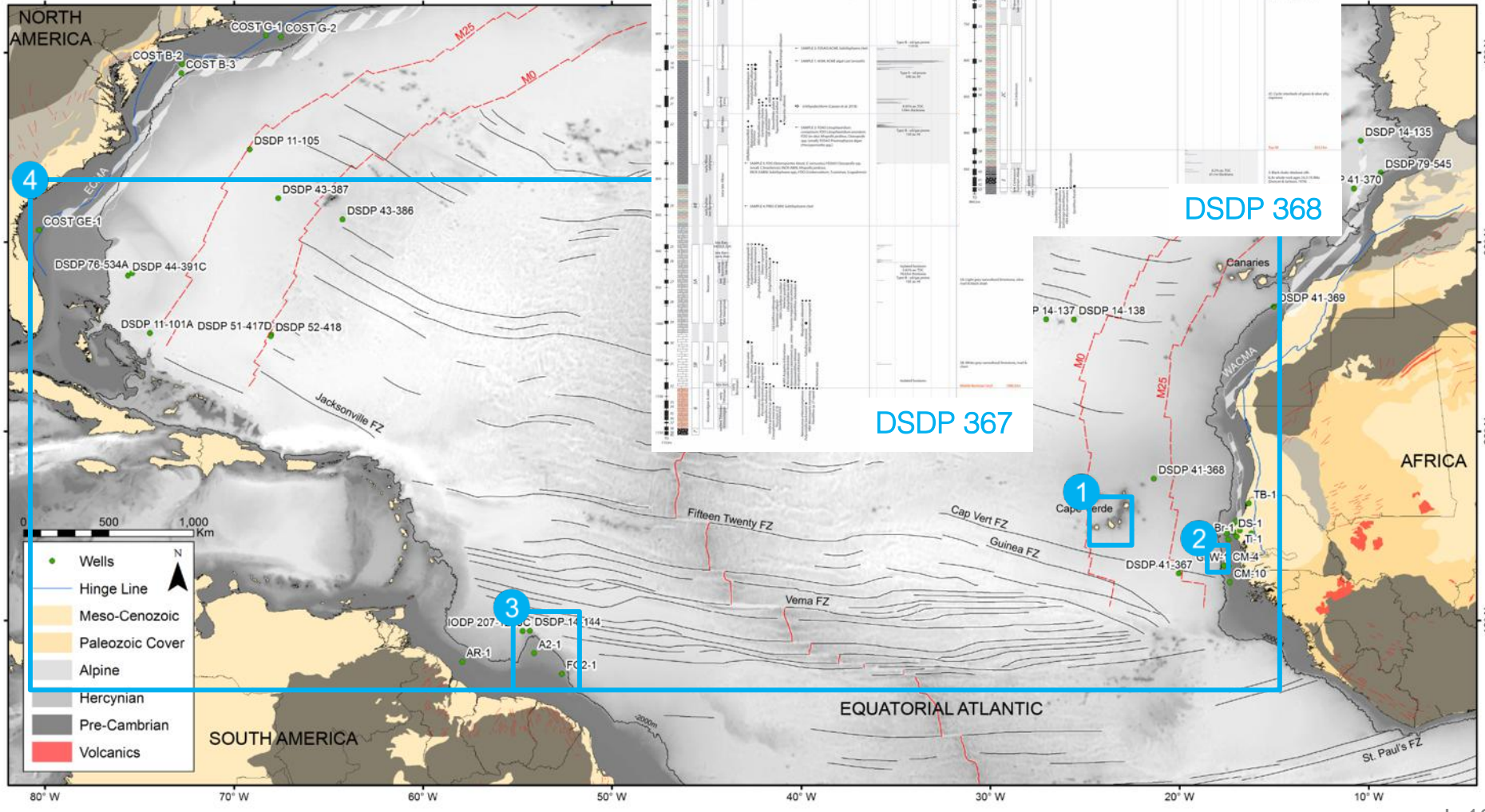
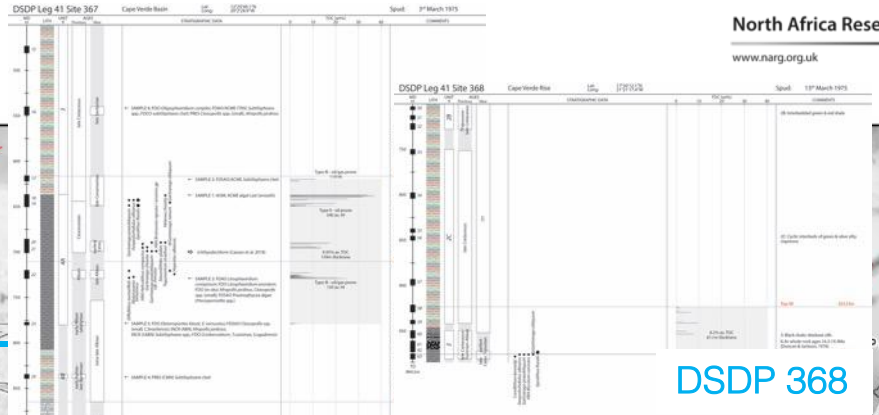
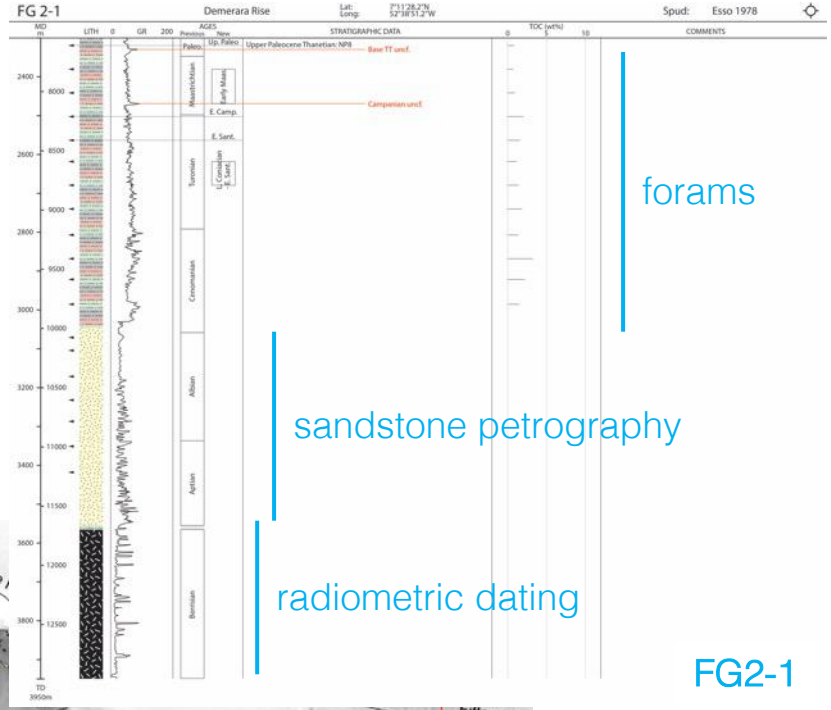
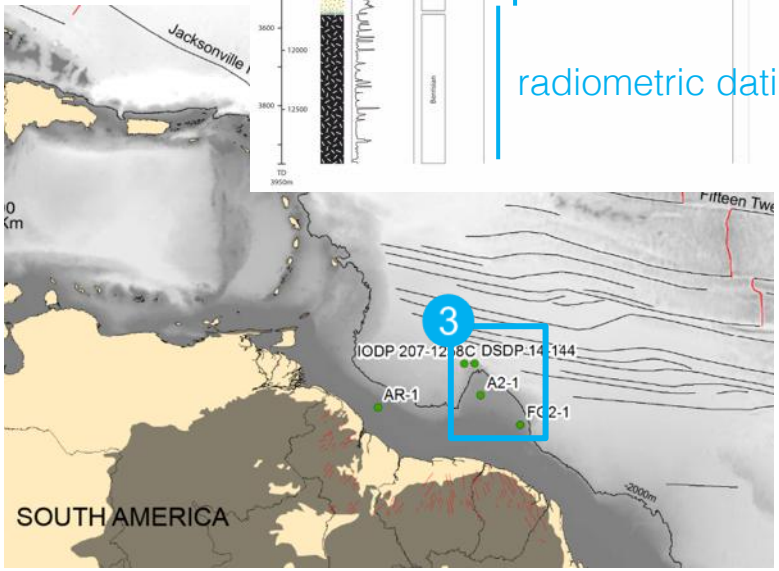
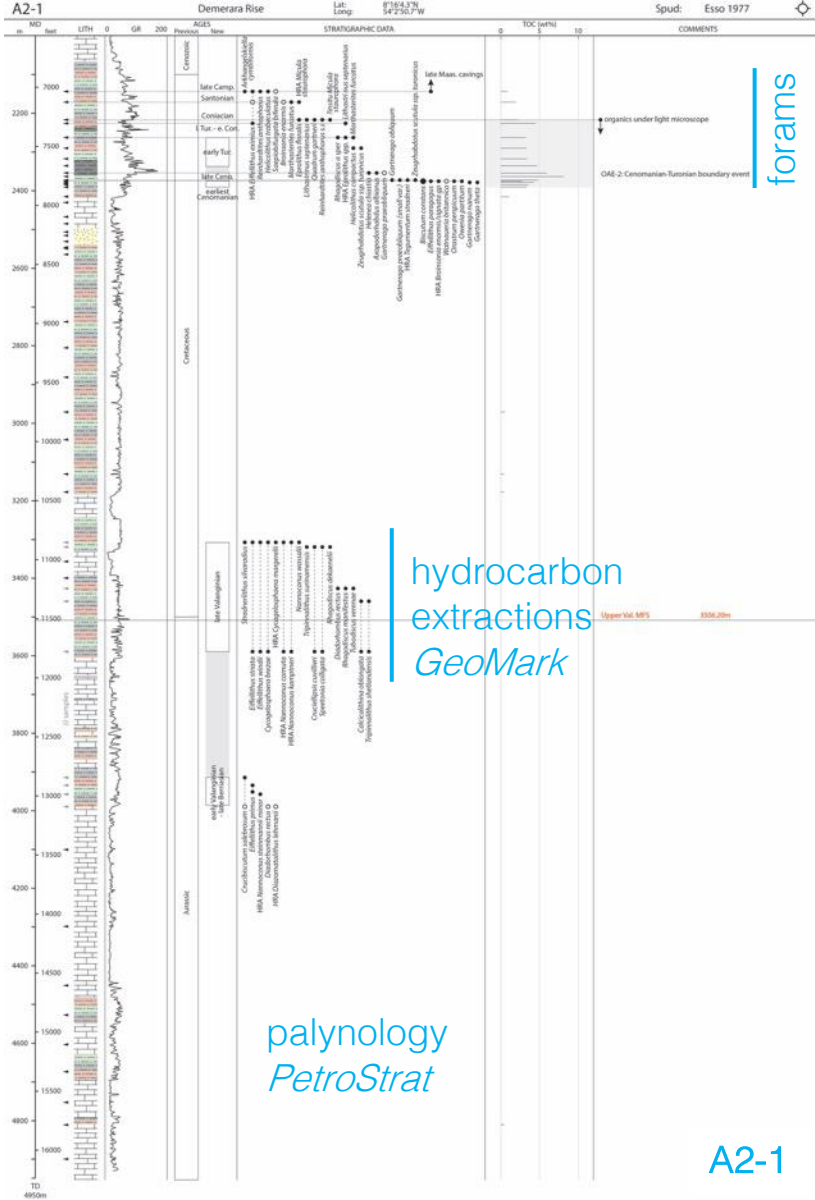




Demerara Rise







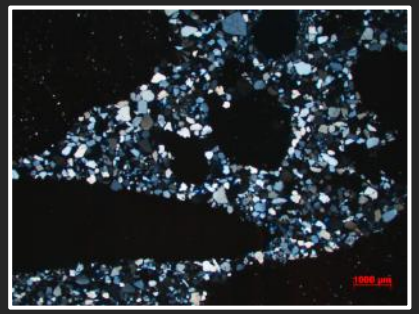
Ian Mounteney MPhil

Provenance Study

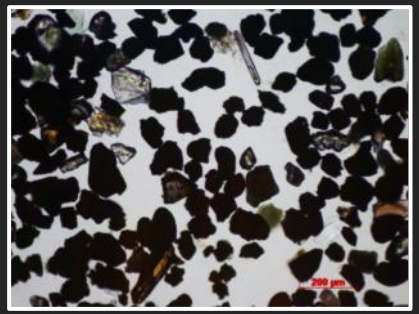
- Phase I – modern-day rivers of NW Africa
- Phase II – subsurface Phanerozoic sands

Methods

Petrography (QFL) tbc

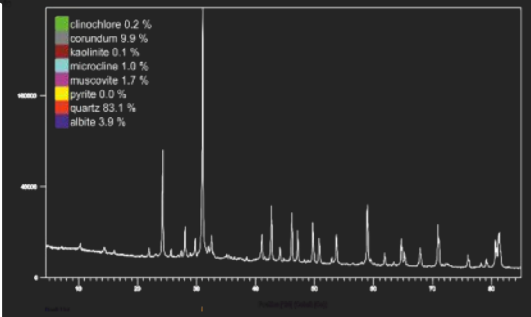


Heavy mineral analysis

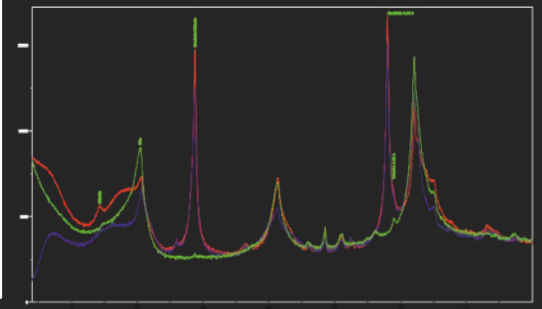


C-T scan

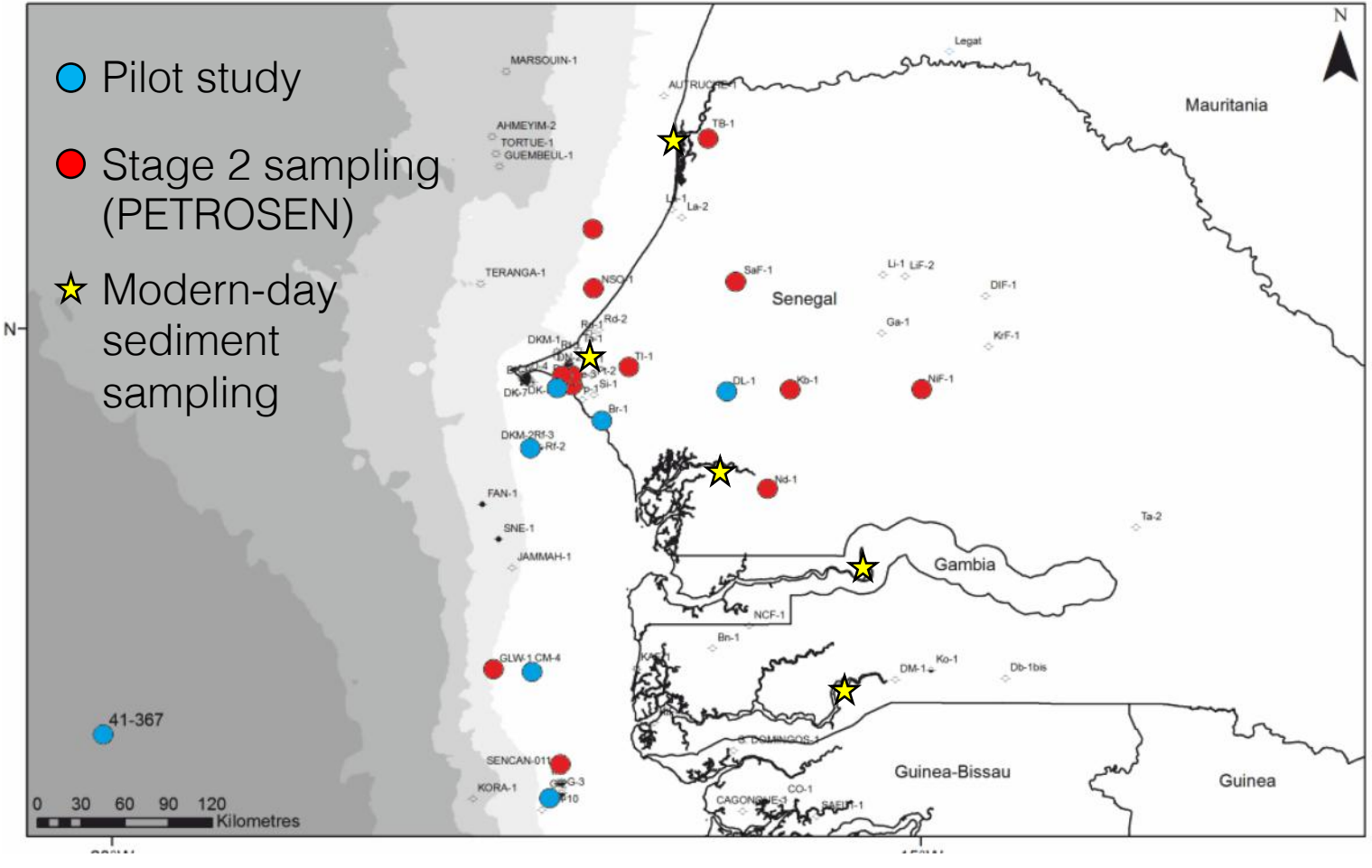
Bulk-rock mineralogy



Clay mineralogy

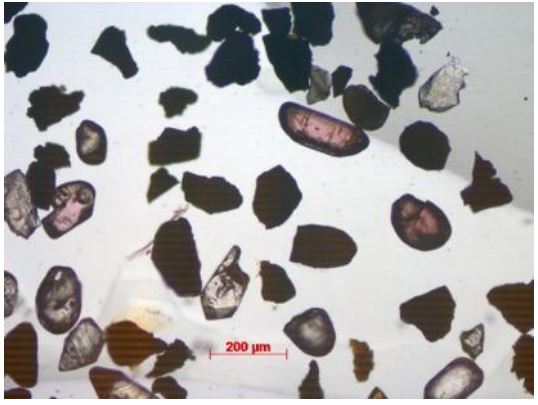


Sampling Status

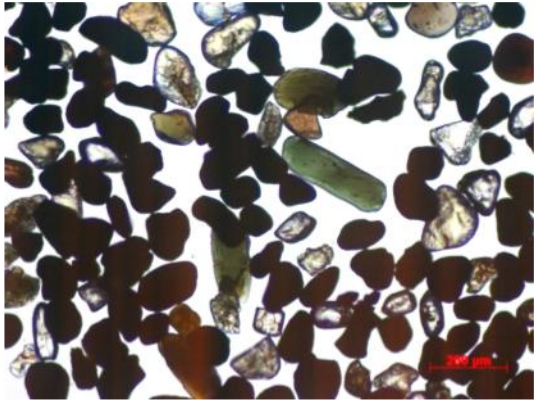


New Data

- Core/cuttings courtesy of PETROSEN — 135 samples
- Modern day rivers — 9 samples
- Quarries/pits — 21 samples
- Cliff exposures — 8 samples



- 145 samples yielded sufficient heavy mineral data.
- 178,804 heavy minerals observed.
- 40,198 transparent detrital heavy minerals counted!



Sampling Modern-Day River Systems

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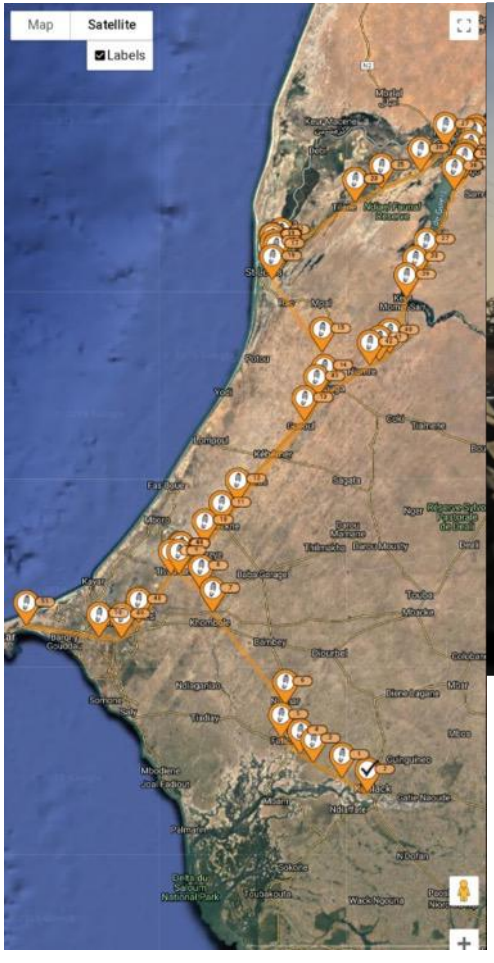

Left to right: Max Casson (University of Manchester), Ndiaye Dethie (University Dakar), Ian Mounteney (BGS, University of Manchester) and our fearless driver Mamadou Diallo.

bp

Financial support

Major River Systems of NW Africa

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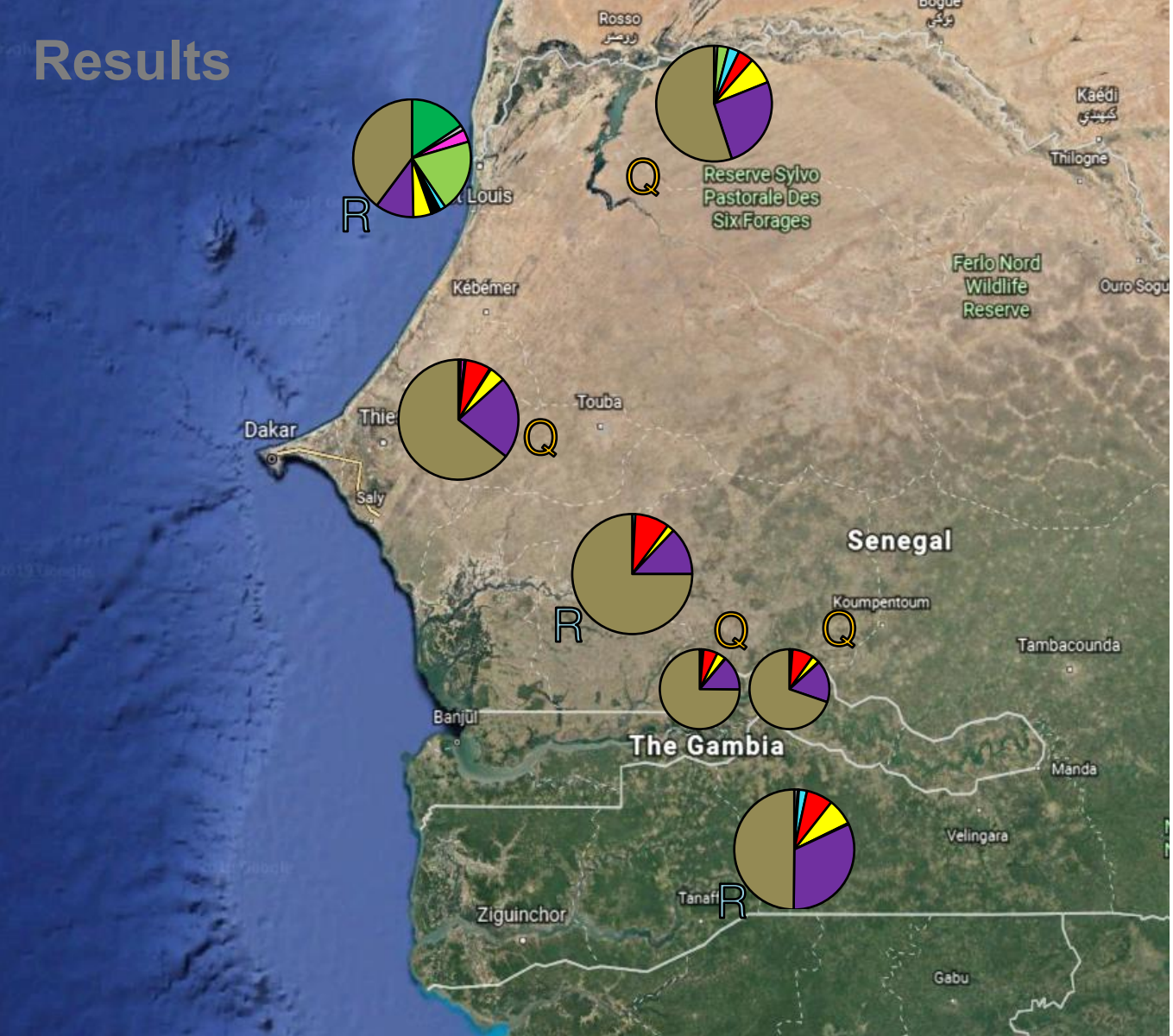
Quarry Sampling

Quaternary Age

Results



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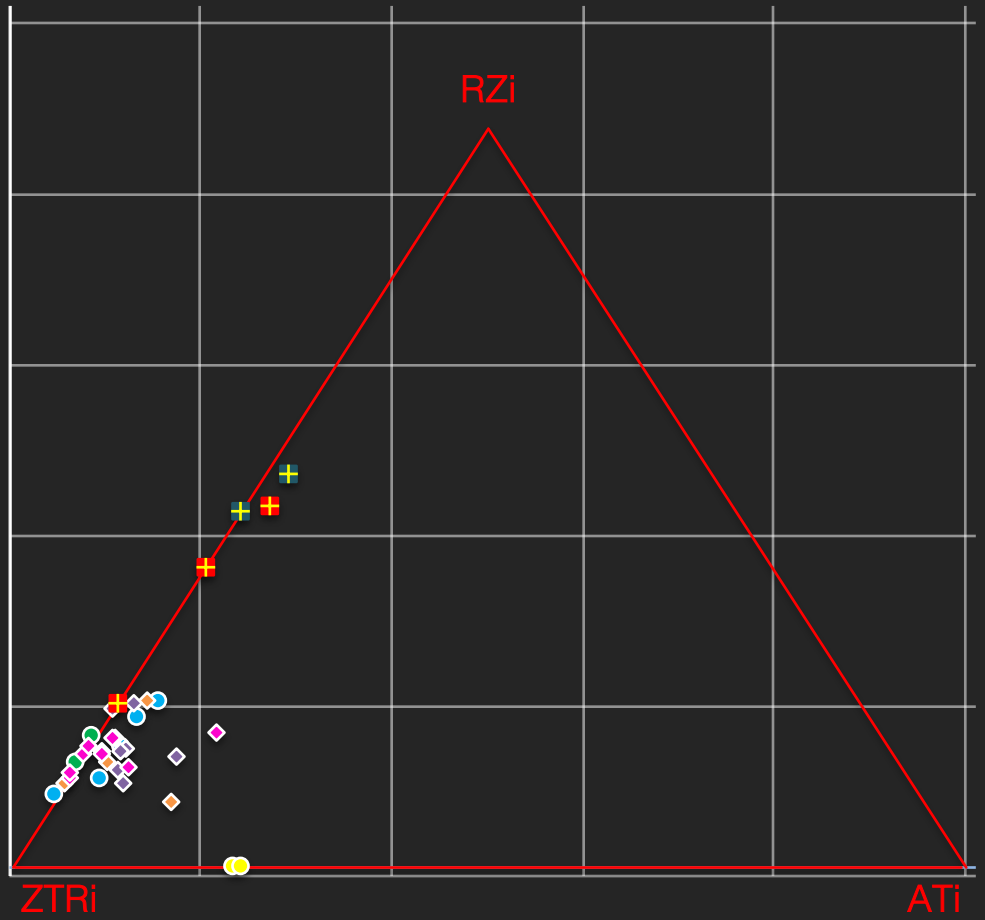
- Amphibole
- Anatase
- Apatite
- Brookite
- Baryte
- Clinopyroxene
- Epidote
- Garnet
- Kyanite
- Rutile
- Sillimanite
- Staurolite
- Titanite
- Tourmaline
- Zircon

Early Results – Modern-Day River Systems

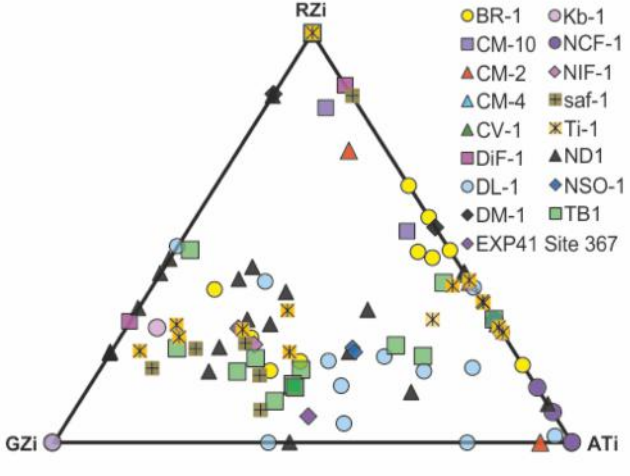


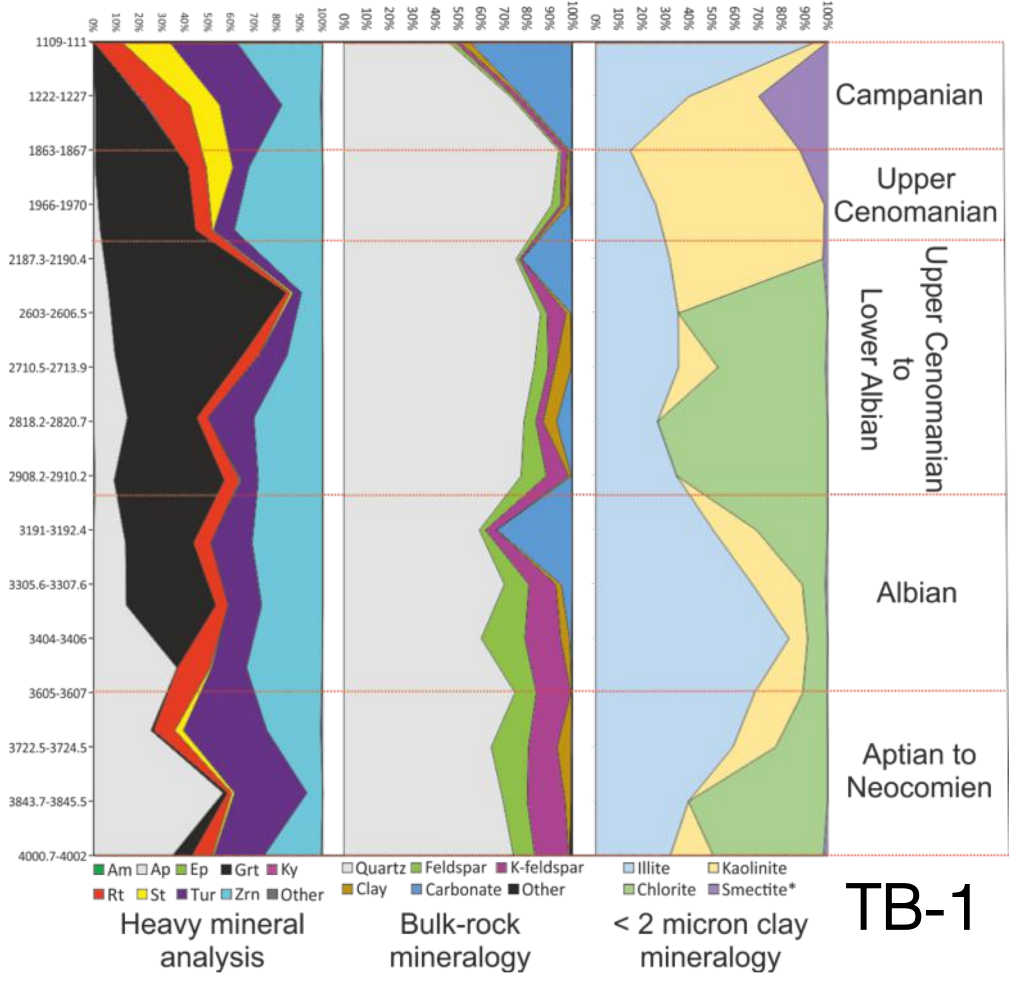
- River Senegal
- River Saloum
- River Casamance
- Tivaouane Quarry
- Thiago Quarry
- Gambia pits
- Cap de Naze
- Cap Rouge

RZi = Rutile Zircon index
ATi = Apatite Tourmaline index
ZTRi = Zircon Tourmaline Rutile (maturity index)

Future Work

- QFL petrography
- Zircon dating? NIGL Grant
- Garnet speciation?





Deliverables

/ Ian – Phase I modern-day rivers	DECEMBER
/ stratigraphic framework	JAN
/ Ian – Phase II subsurface	*ongoing*
/ submit PhD	SEPTEMBER 2020

WITH THANKS

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