

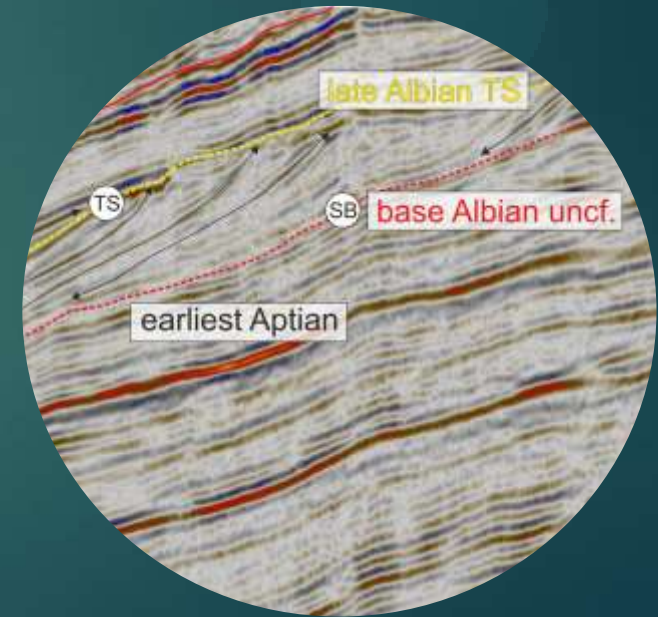


MAX CASSON

Ph.D: Tectono-Stratigraphic Evolution of the North West African Atlantic Margin

Supervisors: Prof. Jonathan Redfern, Prof. Mads Huuse, Dr. Luc Bulot

Collaborator: Jason Jeremiah

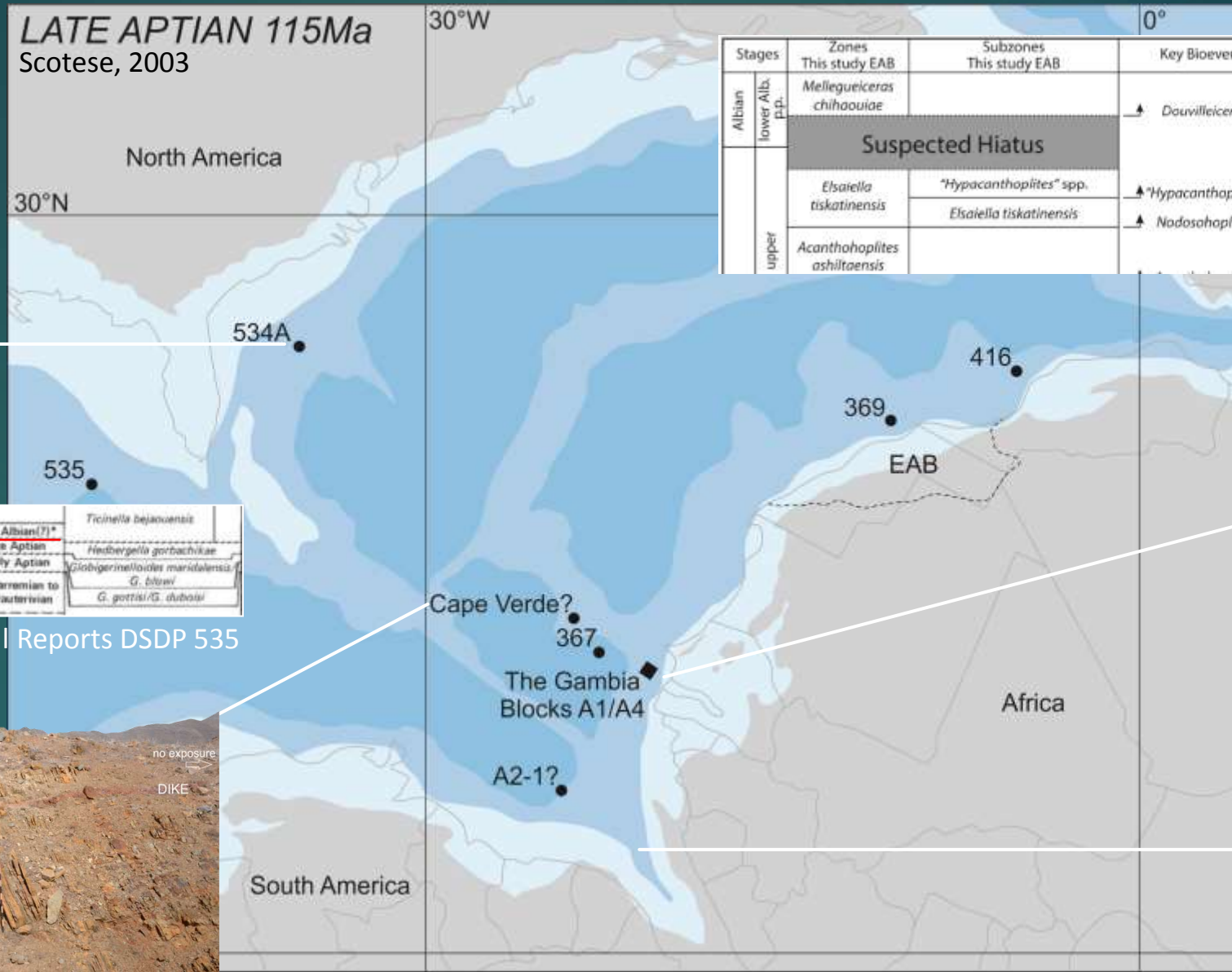
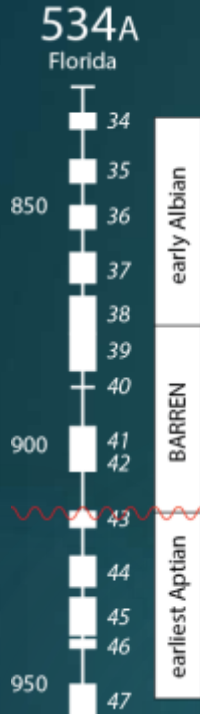




Theme 1: Regional expression of the base Albian unconformity

- Central Atlantic presence
- Observations
- Albian reservoir in Senegal

Central Atlantic - BAU Presence

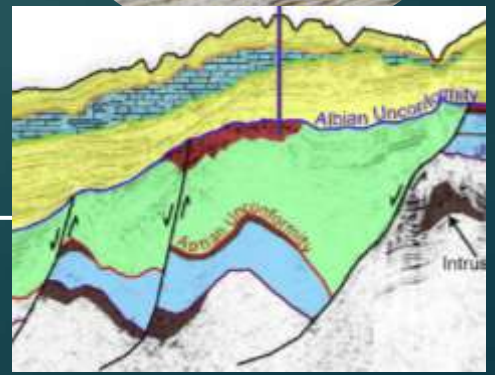
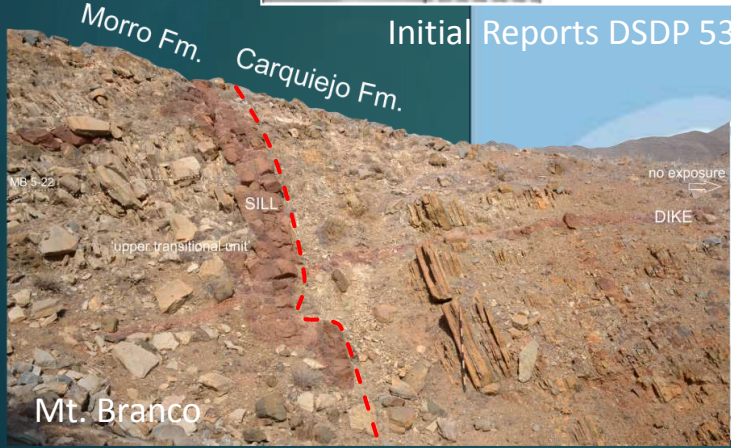
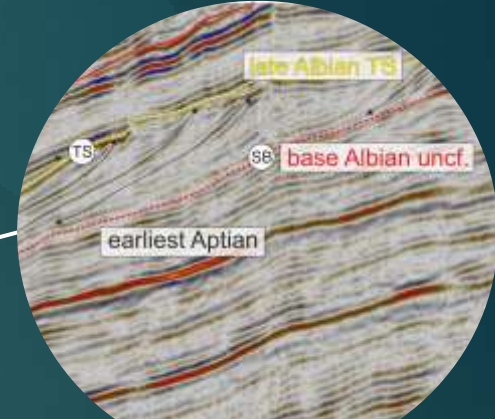


Stages		Zones	Subzones	Key Bioevents	Subzones	Zones	Stages
Albian	lower Alb. p.p.	<i>Mellegueiceras chihaoui</i>	Suspected Hiatus	↑ <i>Dauvilleiceras</i> ↑		<i>Leymeriella tardefurcata</i>	lower Alb. p.p.
upper		<i>Elsaiella tiskatinensis</i>	<i>"Hypacanthoplites" spp.</i>	↑ <i>"Hypacanthoplites"</i> ↑	<i>Diadochoceras nodosocostatum</i>	<i>Acanthoplites nolani</i>	
		<i>Acanthoplites ashiltaensis</i>		↑ <i>Nodosoplites</i> ↑		<i>Parahoplites melchioris</i>	upper

Initial Reports DSDP 535

<i>Parahoplites angustus</i>	late Albian(?)*	<i>Ticinella bejaouensis</i>
<i>Chierovygus litranus</i>	late Aptian	<i>Hedbergella gorbachikae</i>
?	early Aptian	<i>Globigerinelloides maridalensis</i>
<i>Lithrapholites bailli</i>	†. Barremian to L. Hauterivian	<i>G. blewi</i>
		<i>G. gottisi/G. dubosi</i>

EAB - Luber et al. 2017

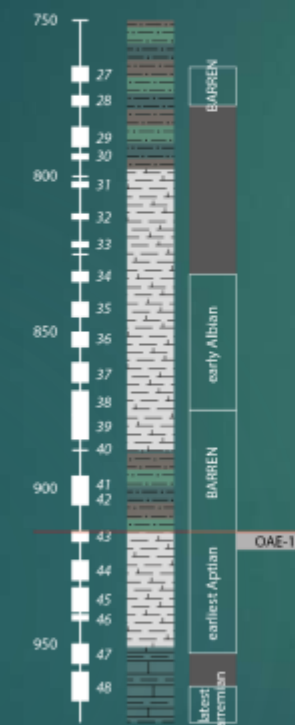


C. Atlantic DSDP



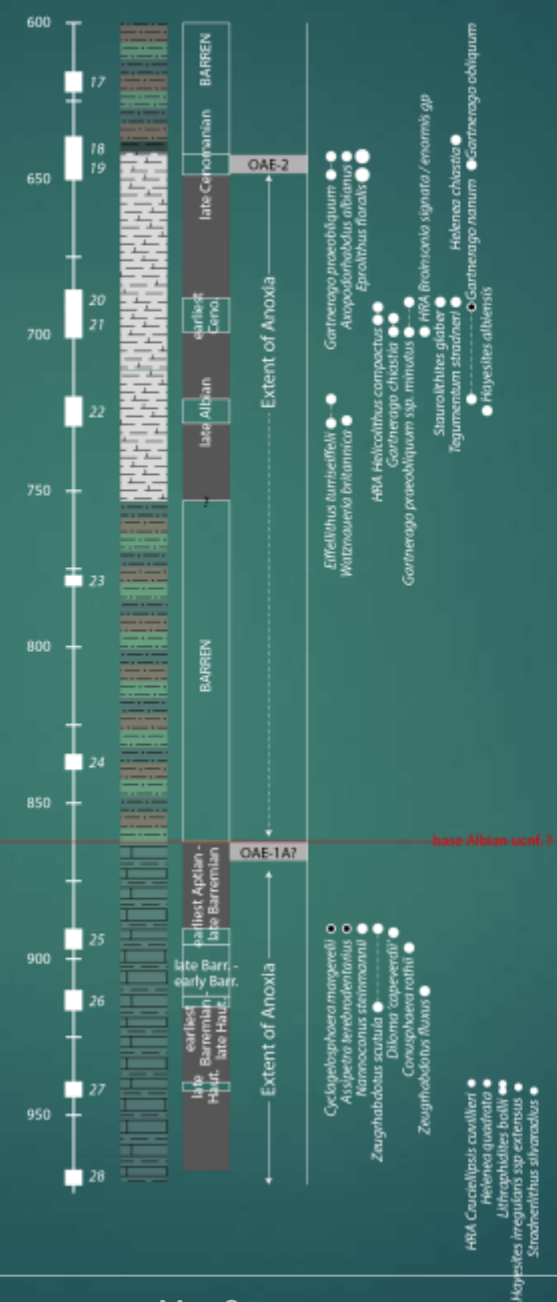
DSDP Leg 76 Site 534A

Blake-Bahama Basin



DSDP Leg 41 Site 367

Cape Verde Basin



Lithology Key

- red limestone and marls
- laminated black shale
- 'paper shale' & carbonaceous claystone
- grey limestone & 'paper shale'
- white limestone w. low shale content
- variegated plant debris claystone
- basaltic basement

Nanno-Fossil Event Key

- FAD
- LAD
- range
- presence
- infuse



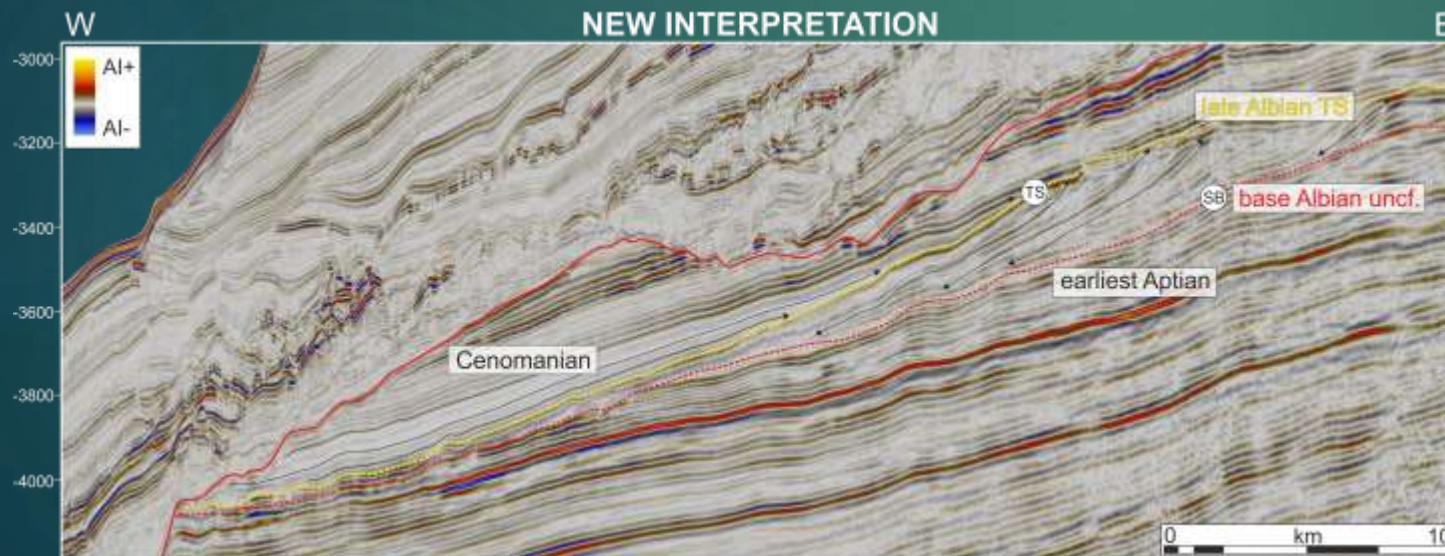
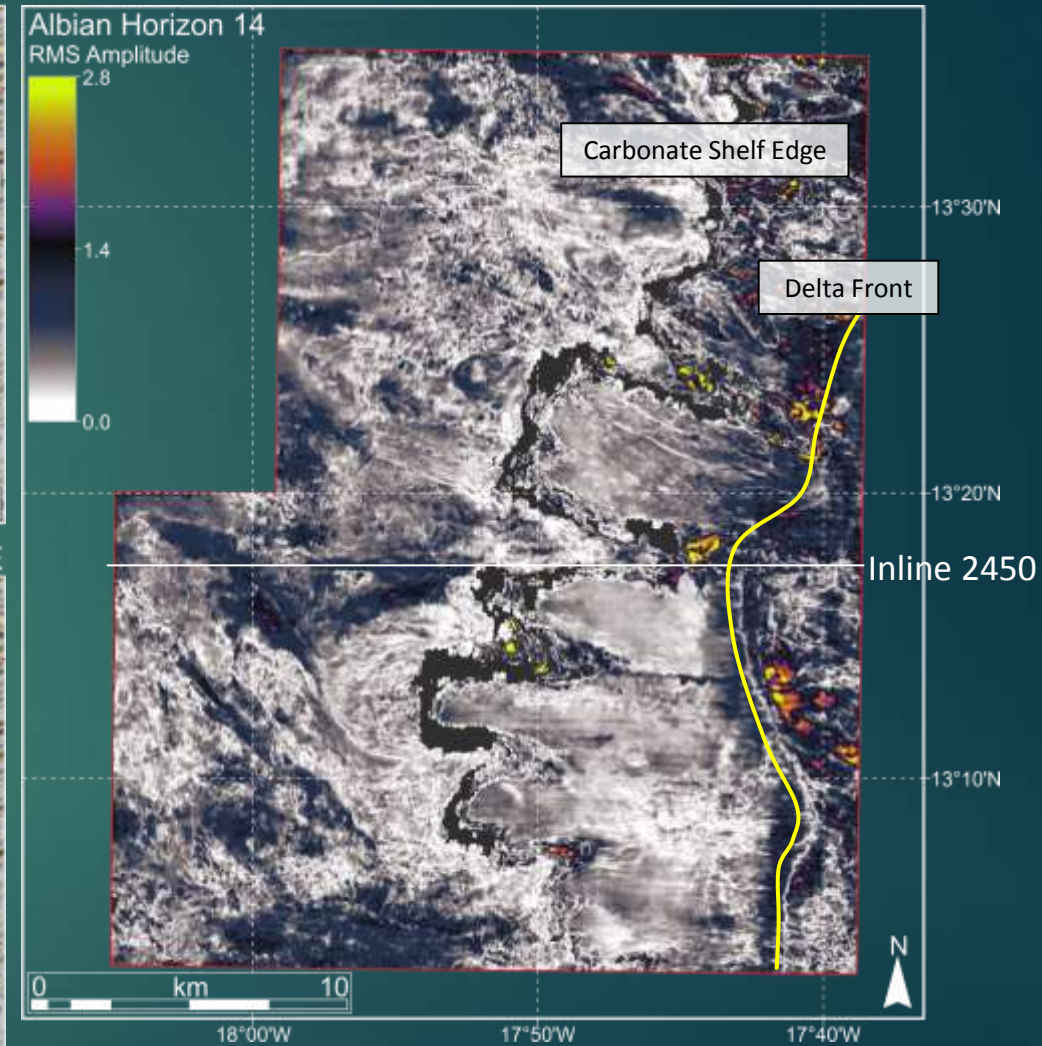
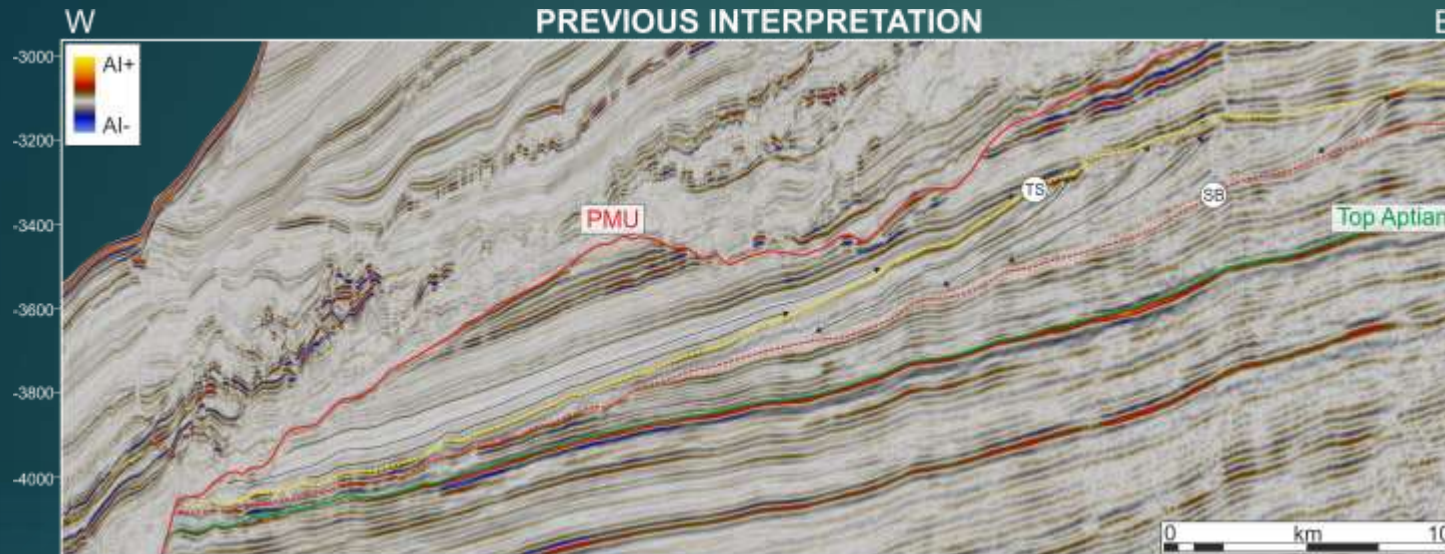
Morro-Carquiejo Fm. Boundary, Maio



- no angular unconformity – contact obscured by sill
- separates calcareous & non-calcareous systems

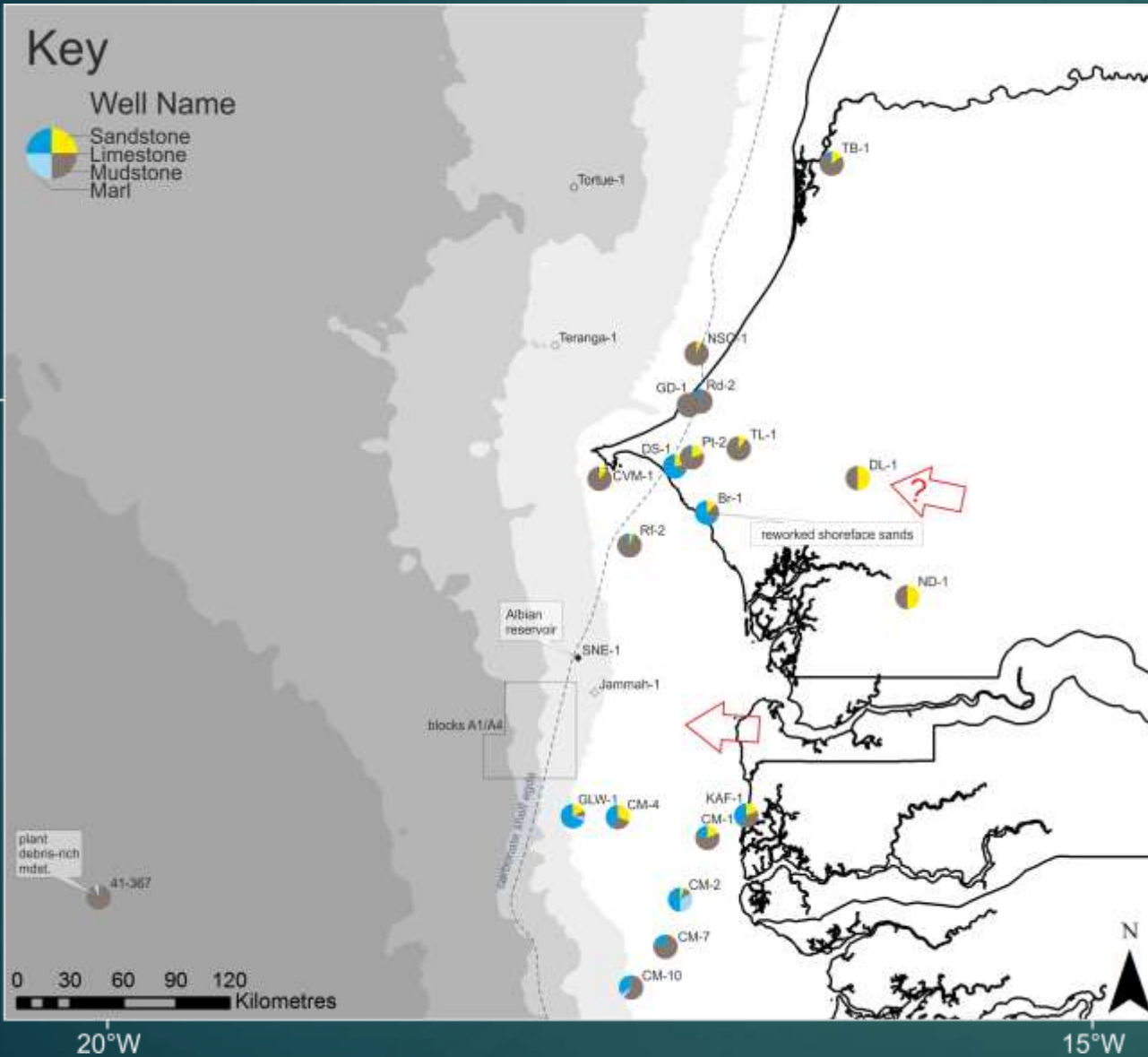


Seismic: Albian Delta Evolution, The Gambia



TGS The Gambia Blocks A1/A4 – Inline 2450

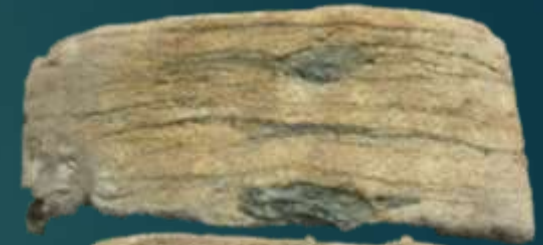
Albian Reservoirs, Senegal



Albian Core Observations



1



2



(1) Asymmetrical ripples in medium-to-fine-grained sandstone; (2) Silty laminations and lag deposits; DL-1 Core 20



3

(3) Laminated, micaceous, fine-grained sandstone; Br-1 Core 22



Questions? Theme 1: Regional expression of the base Albian unconformity

- Understanding the spatial distribution of the unconformity
- Characterising the early-late Aptian stratigraphy
- Effects on the Aptian source rock (OAE-1A)
- Super-regional mechanisms



Theme 2: *J/K Boundary – Maio to 367*

- Recognition of the lower Berriasian unconformity in 367
- Absence of Jurassic stratigraphy on Maio, Cape Verde
- Discussion: Correlation

367: Lower Berriasian Unconformity



- ← base *Nannoconus steinmannii ssp minor* at 1088.07m
- lower Berriasian unconformity 1088.10m**
- ← top *Nannoconus infans/compressus* and *Polycostella beckmannii* at 1088.19m

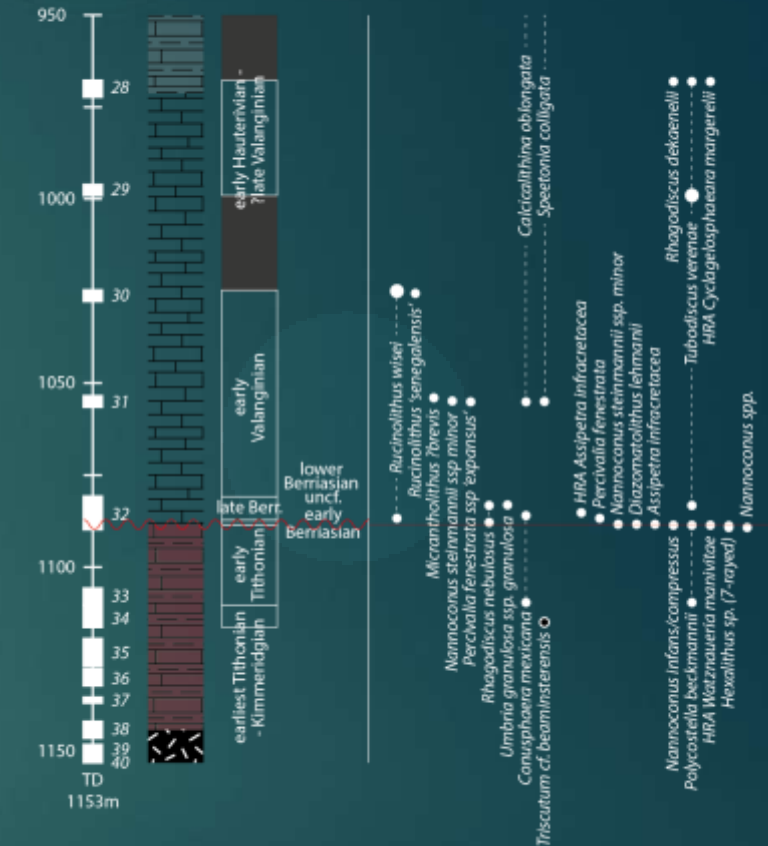
- ← base *Nannoconus infans/compressus* at 1088.82m

- late Tithonian missing – J/K boundary
- Condensed interval, heavily bioturbated

Leg 41 Site 367 Core 32-5

DSDP
Leg 41
Site 367

Cape Verde Basin



Lithology Key

- red limestone and marls
- grey limestone & 'paper shale'
- white limestone w. low shale content
- basaltic basement

Nanno-Fossil Event Key

- FAD
- LAD
- range
- presence
- influx

Maio, Cape Verde



Geological Map – Maio, Cape Verde



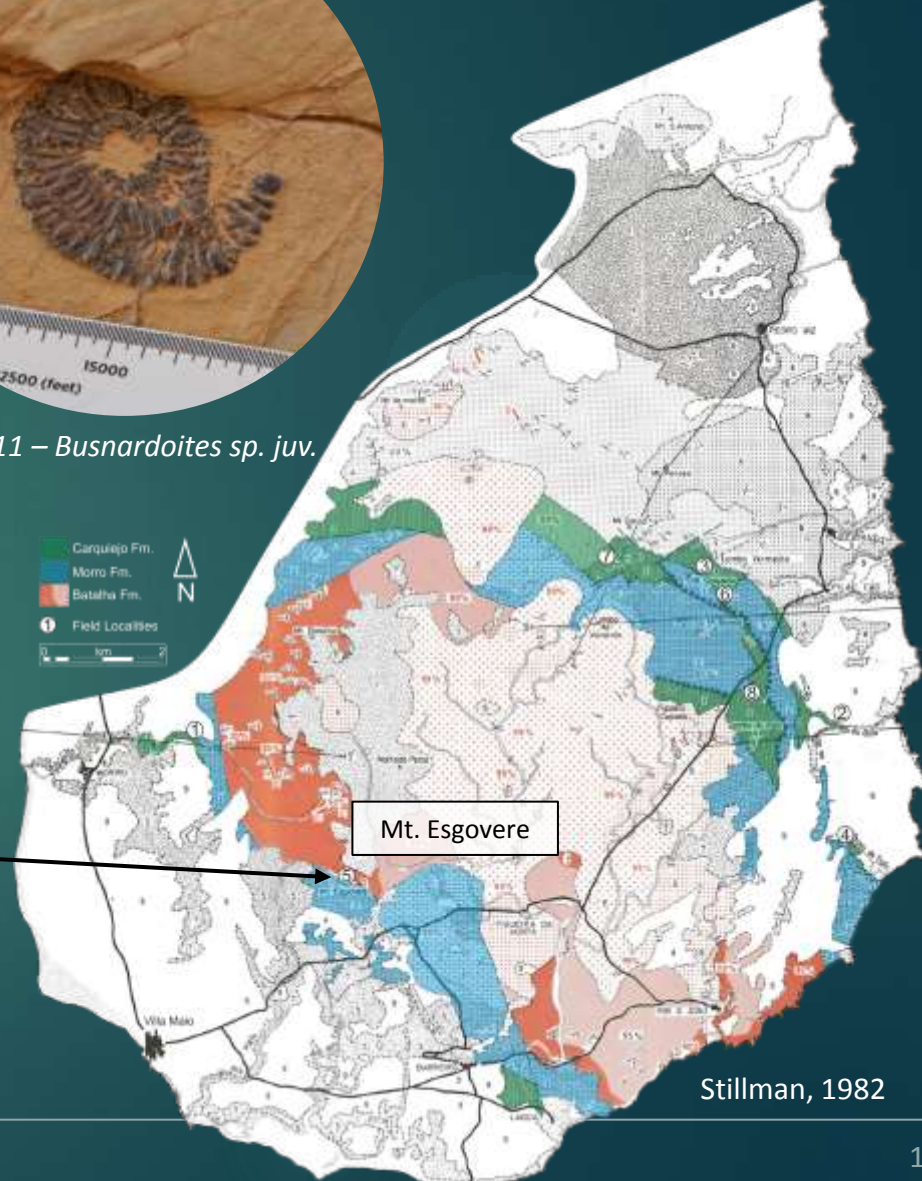
ESG-3 – *Neolissoarus (Vergoligeras) sp. juv.*



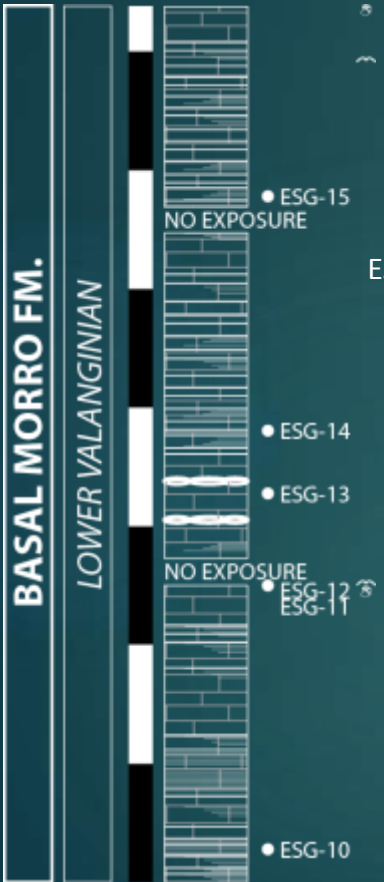
ESG-9 – *Kilianella sp. juv.*



ESG-11 – *Busnardoites sp. juv.*



Stillman, 1982



Mt. Esgovere Stratigraphy

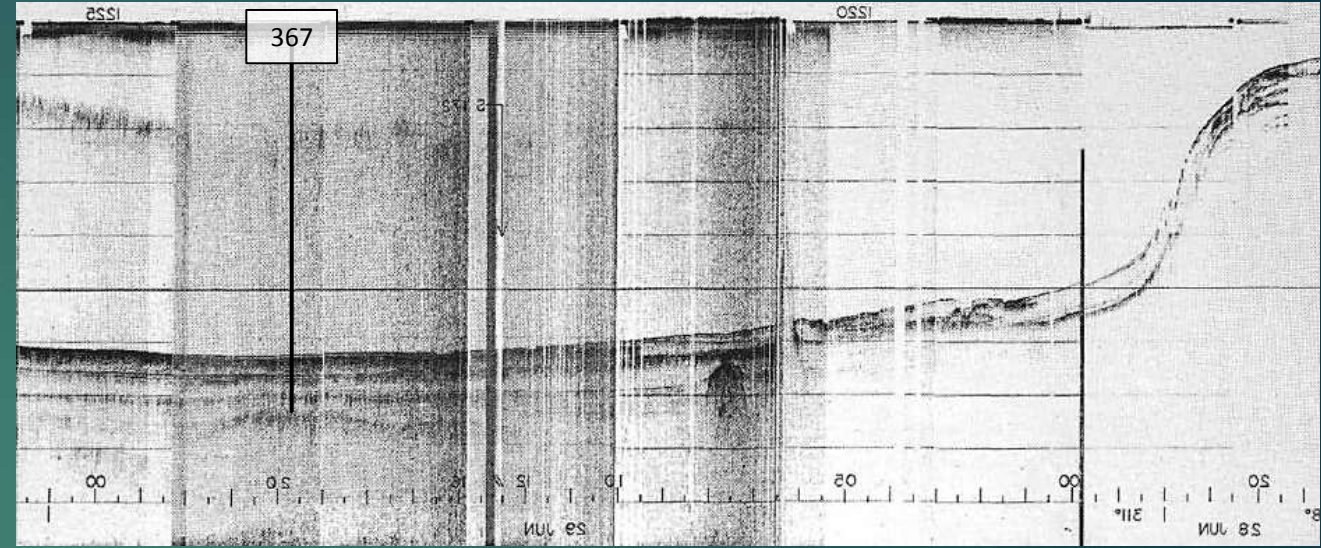


All samples – Mt. Esgovere (5)

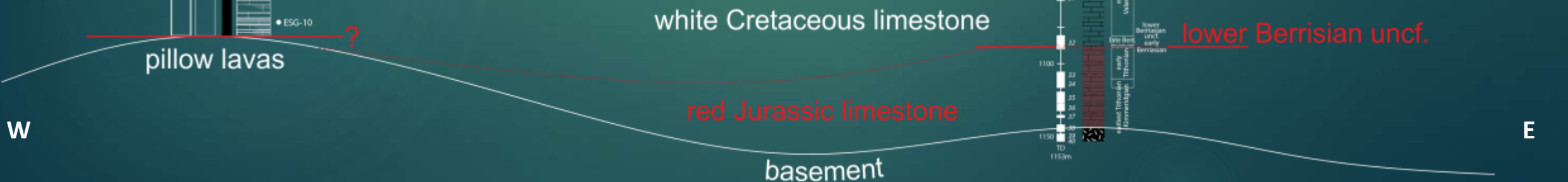
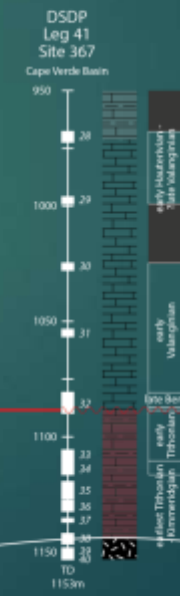
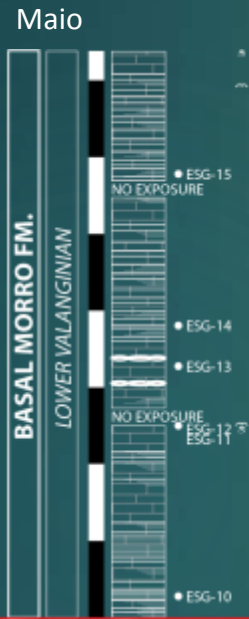
Maio – 367 Correlation



1. lower Berriasian unconformity
2. onlap on to a pre-existing high



Lamont-Doherty VEMA 29 Seismic Profile
(Lancelot *et al.*, 1976)



W

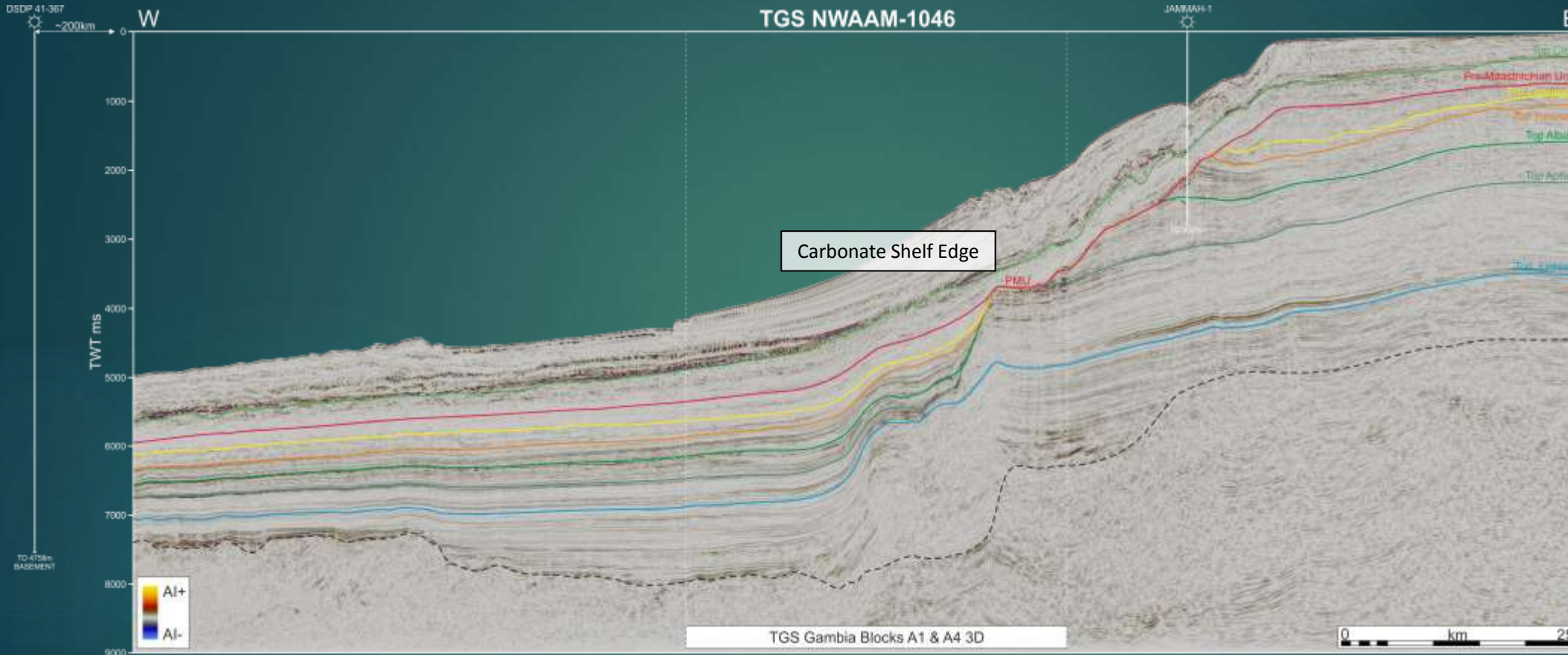
E



Problem 3: Basin to Shelf Stratigraphic Correlation

- Constructing a stratigraphic framework across the full depositional system

Basin to Shelf Seismic Tie



Senegal well database



- Carbonate shelf edge prevents correlation from the basin (367) to the shelf
- Define two frameworks or ...



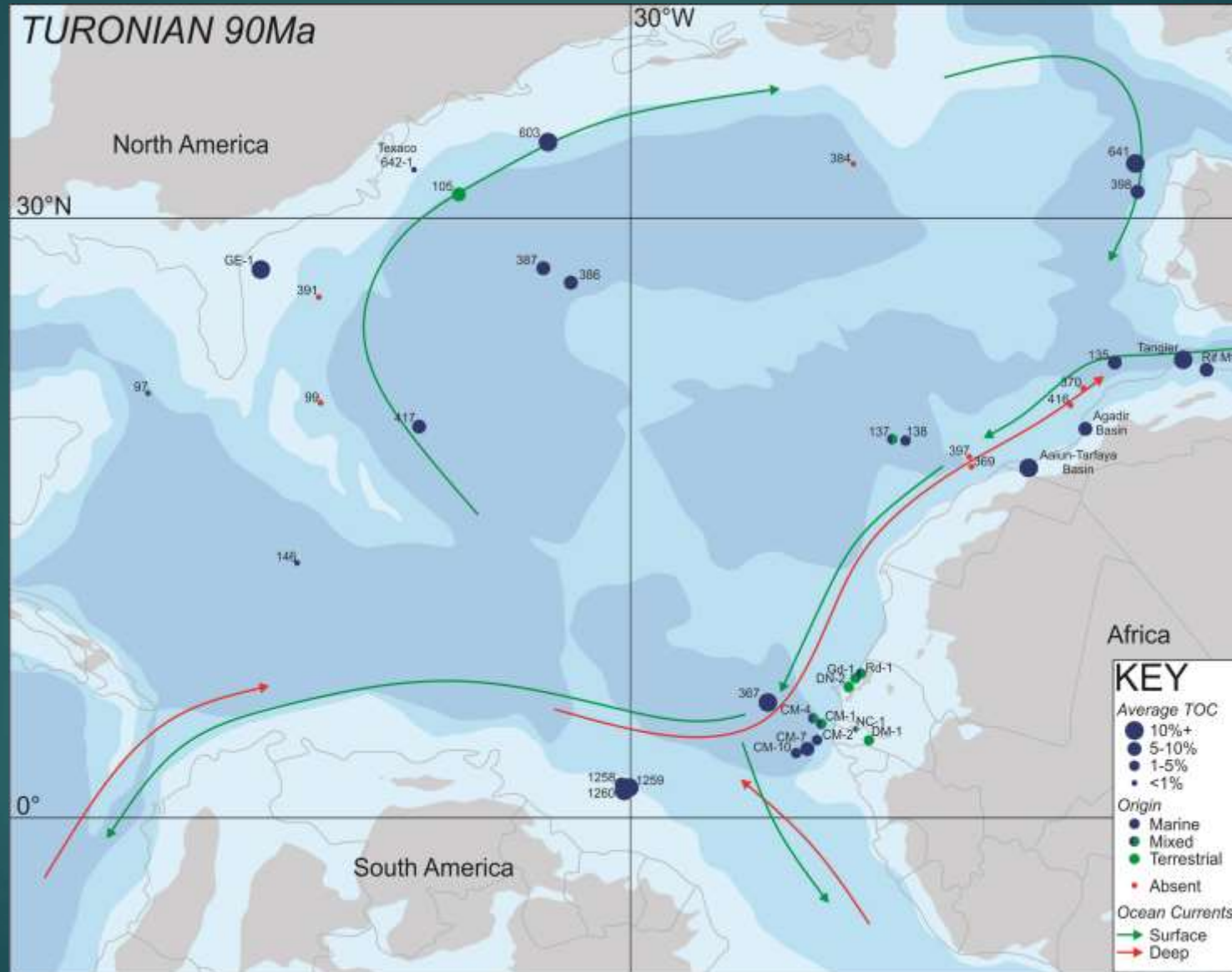
Many thanks for your on-going support



Statoil



DSDP Results: C/T Source Rock Distribution



Compilation of published TOC data averaged for Cenomanian-Turonian period, displayed on Scotese, 2003 palaeogeography.