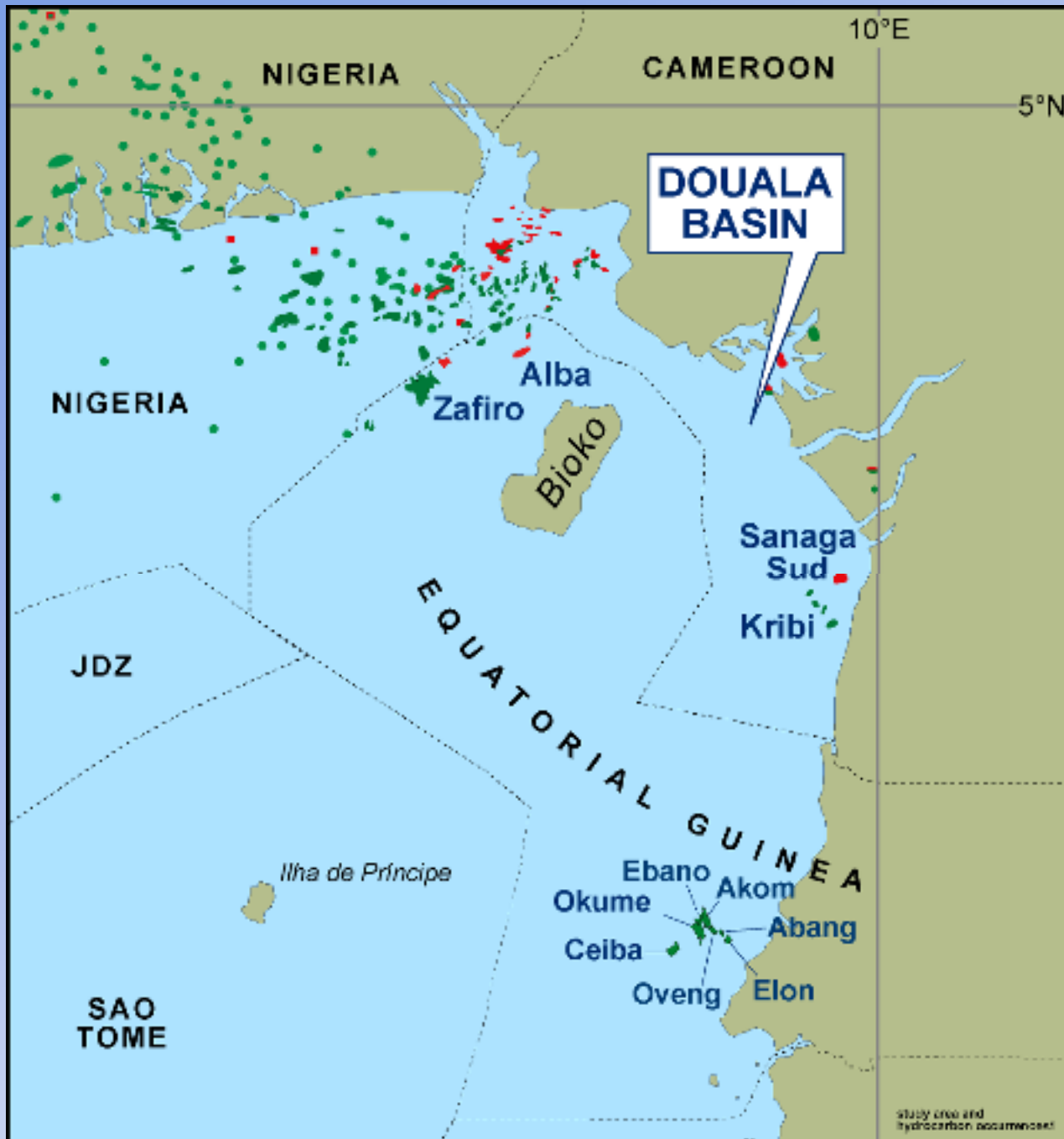


New Perspectives – New Plays in the Douala Basin of Cameroon

*Richard Bray &
Steve Lawrence, ECL, UK
Serge E Angoua Biouele,
SNH, Cameroon*



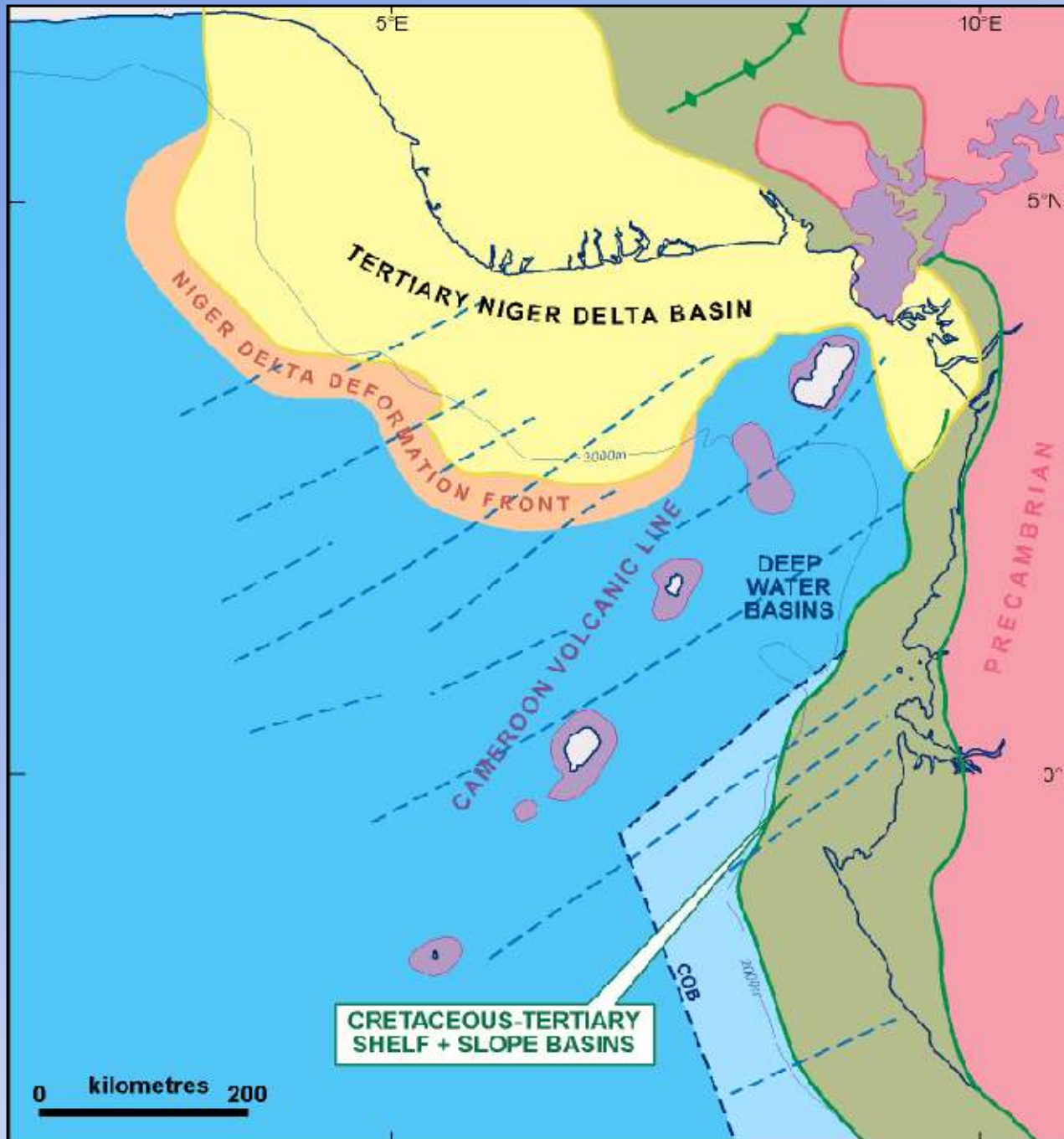


Eastern Gulf of Guinea

Douala Basin Location

Eastern Gulf of Guinea

Geological Setting



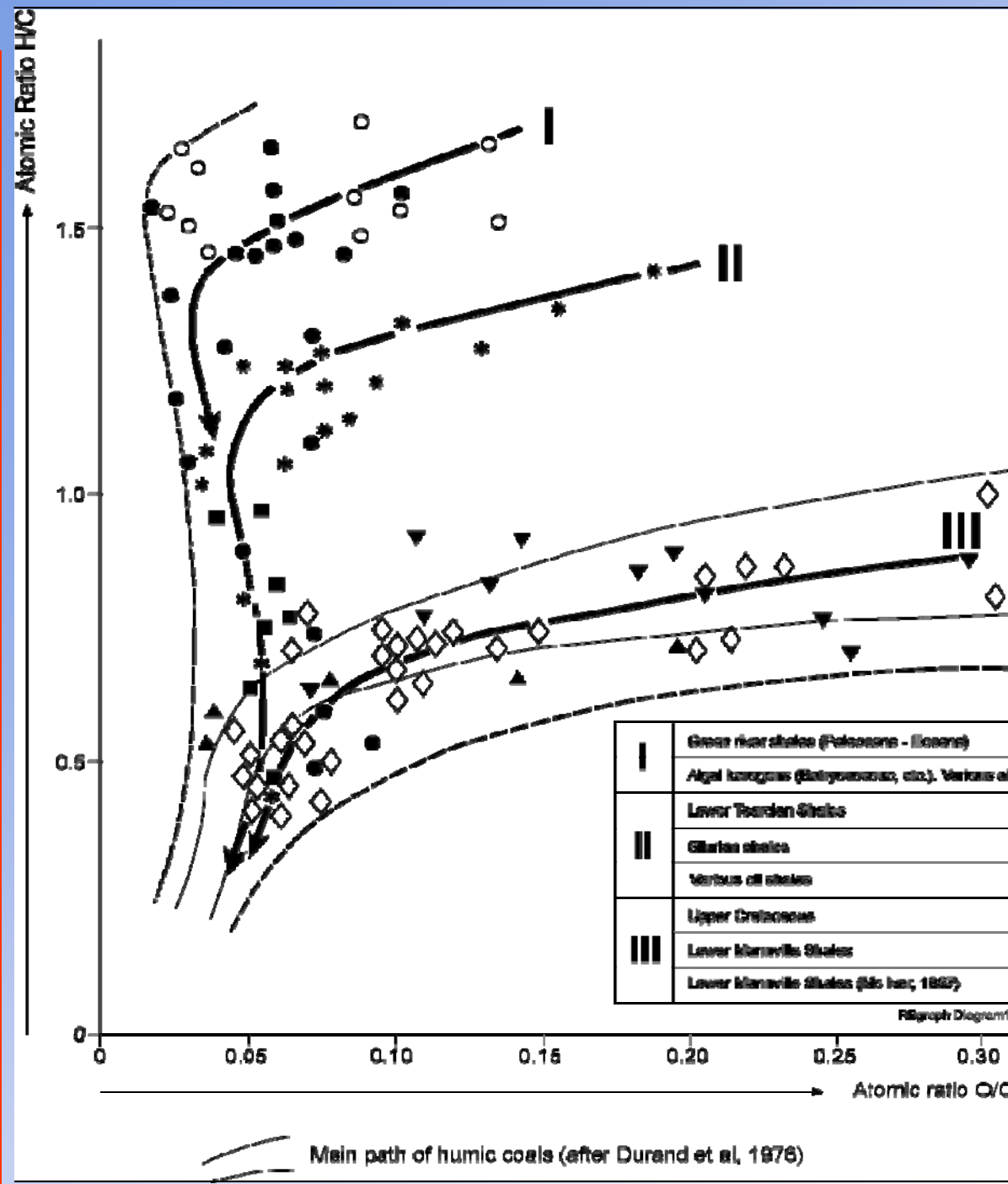
Cameroon Douala Basin

Well and Oil Seep Locations



Van Krevelen plot

Tissot & Welte 1978



Cameroon Douala Basin

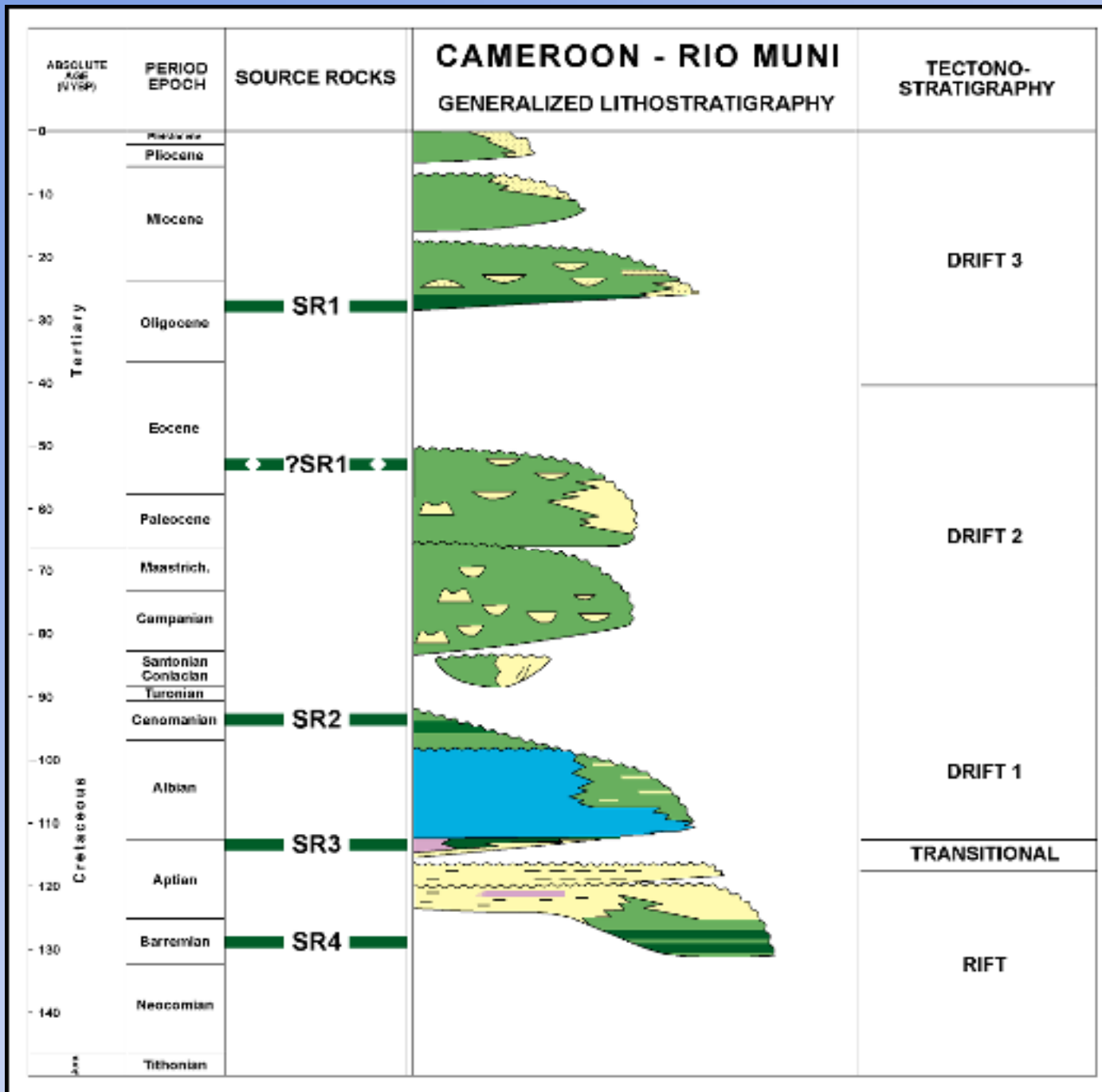
Hydrocarbon Occurrences





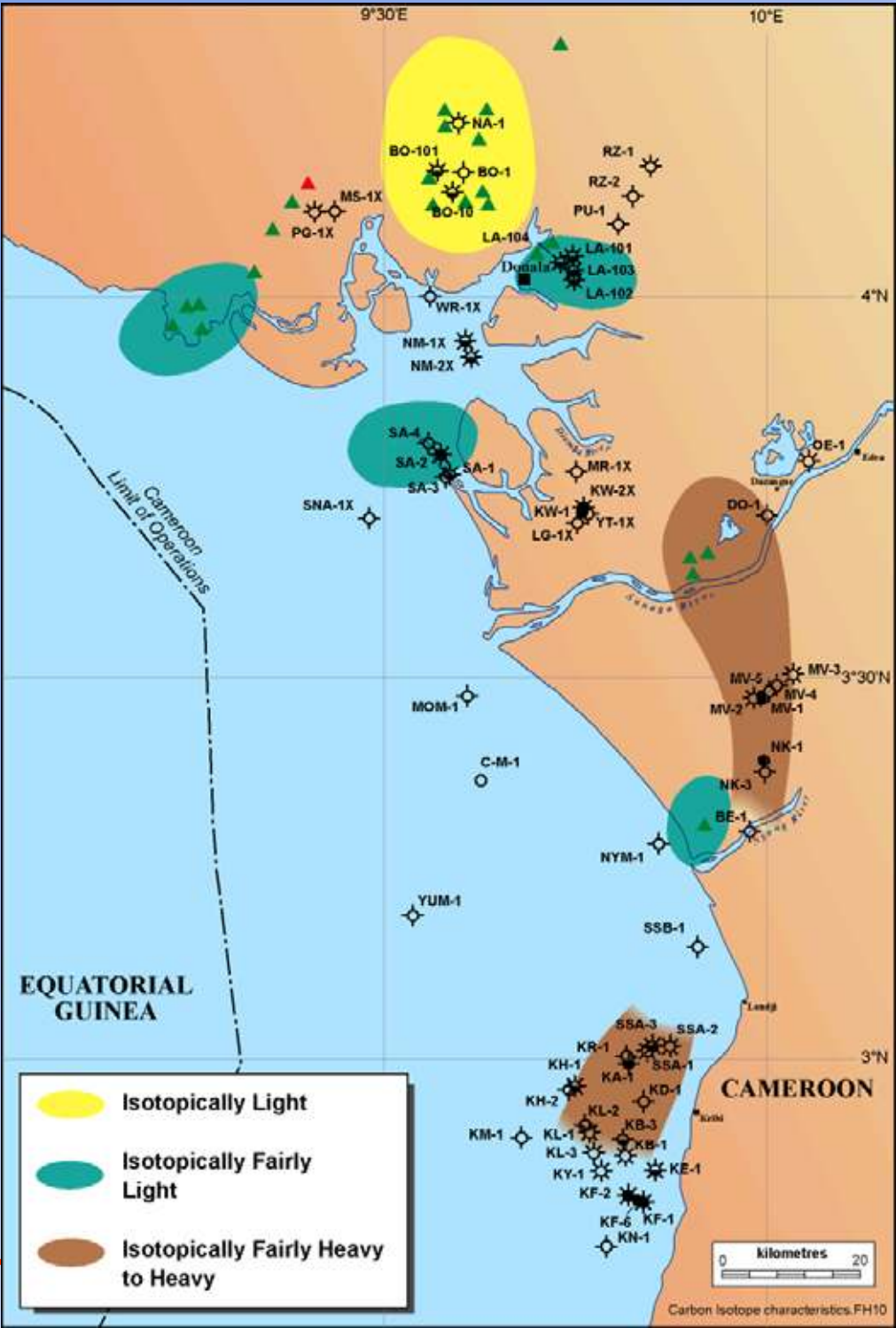
Cameroon – Rio Muni

Stratigraphy Source Rocks



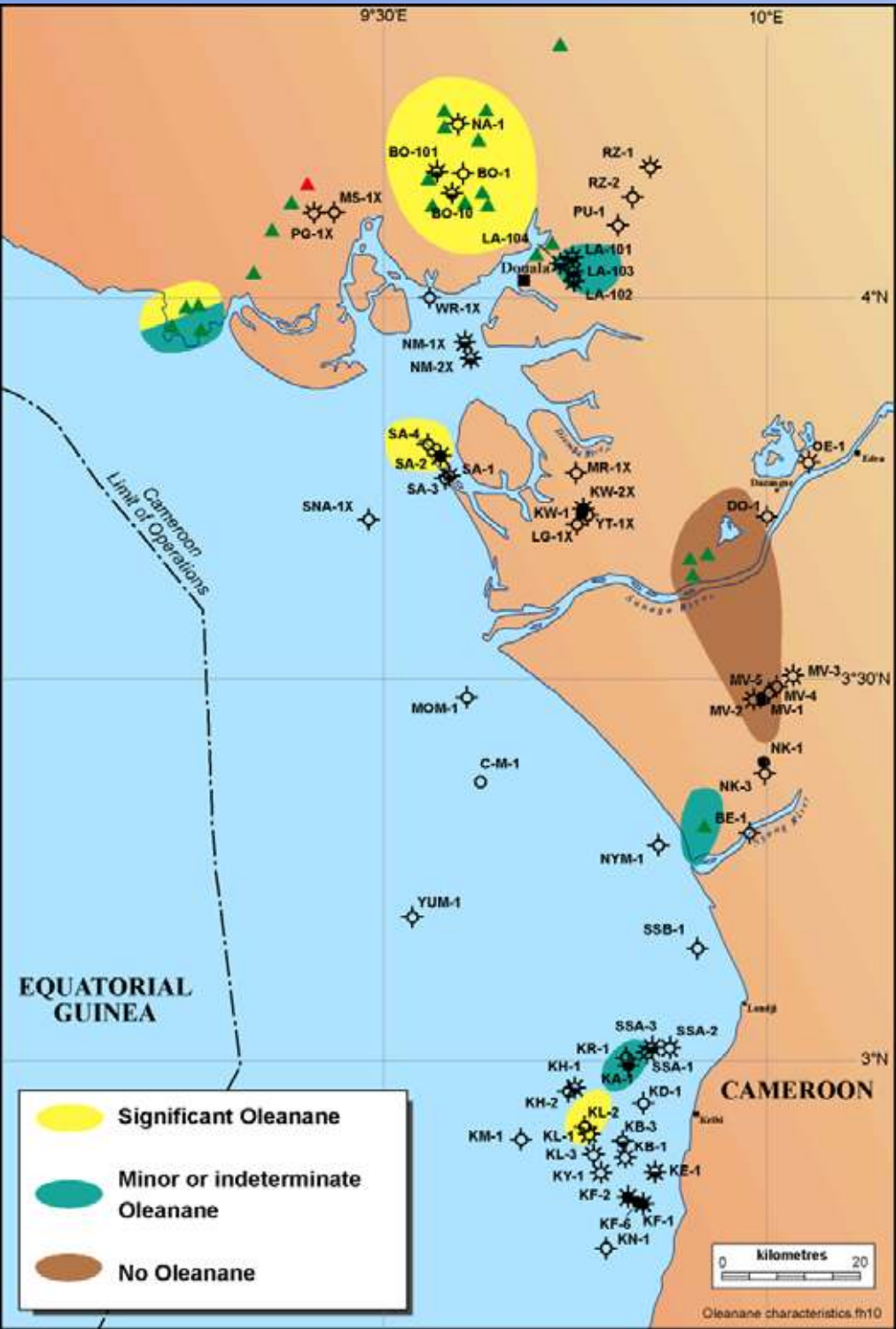
Douala Basin

Stable Carbon Isotope Characteristics - Seep and Reservoired Oils



Douala Basin

Oleanane Characteristics - Seep and Reservoired Oils



SOURCE ROCK PROPERTIES FROM OILS GEOCHEMISTRY 1

Two oil families are present:

Isotopically light with oleanane present – Tertiary source

**Isotopically heavy with oleanane absent – Pre-Campanian
source (most likely Albian-Cenomanian)**

Co-mingling of these two families occurs

SOURCE ROCK PROPERTIES FROM

OILS GEOCHEMISTRY 2

All oils indicate:

Terrestrially derived oil-prone kerogen deposited in a marine environment.

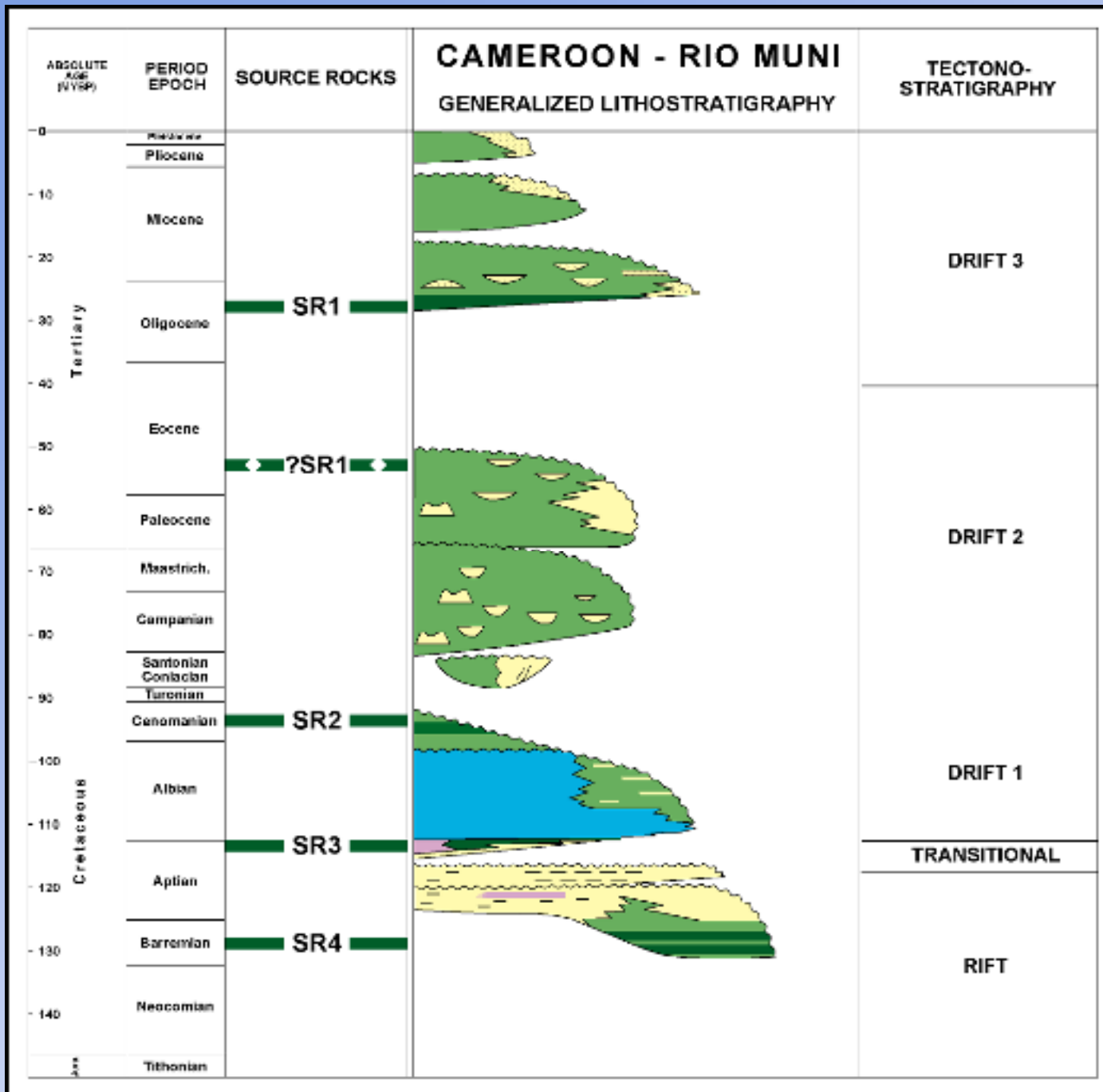
Dysoxic depositional conditions – organic preservation favoured by high sedimentation rate rather than sea-bed anoxia.

Oil maturities indicate source rocks mostly in the early to mid mature oil windows (some indications of late mature).

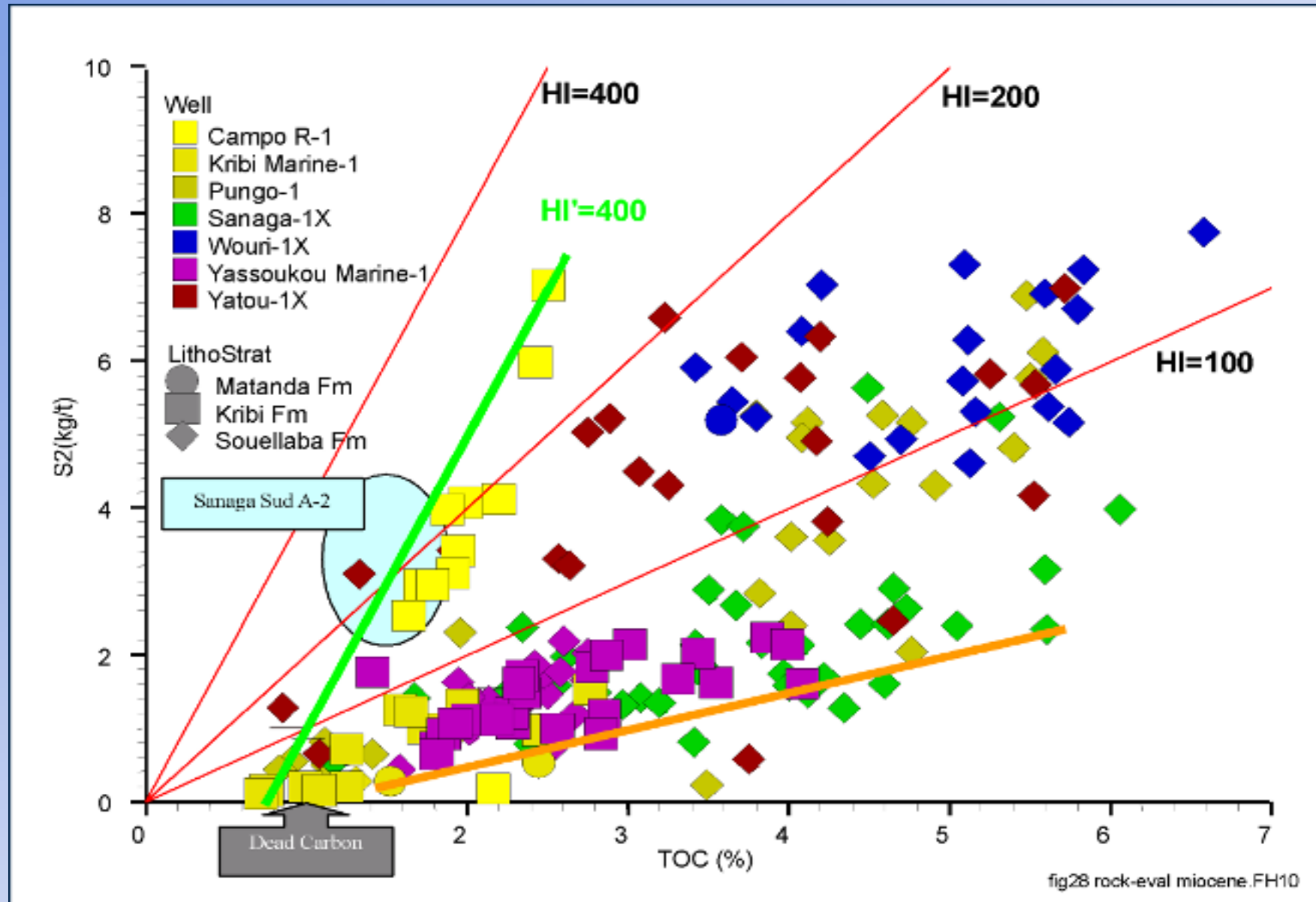
Other conclusions concern biodegradation, leakage from trapped accumulations versus migration from source etc.

Cameroon – Rio Muni

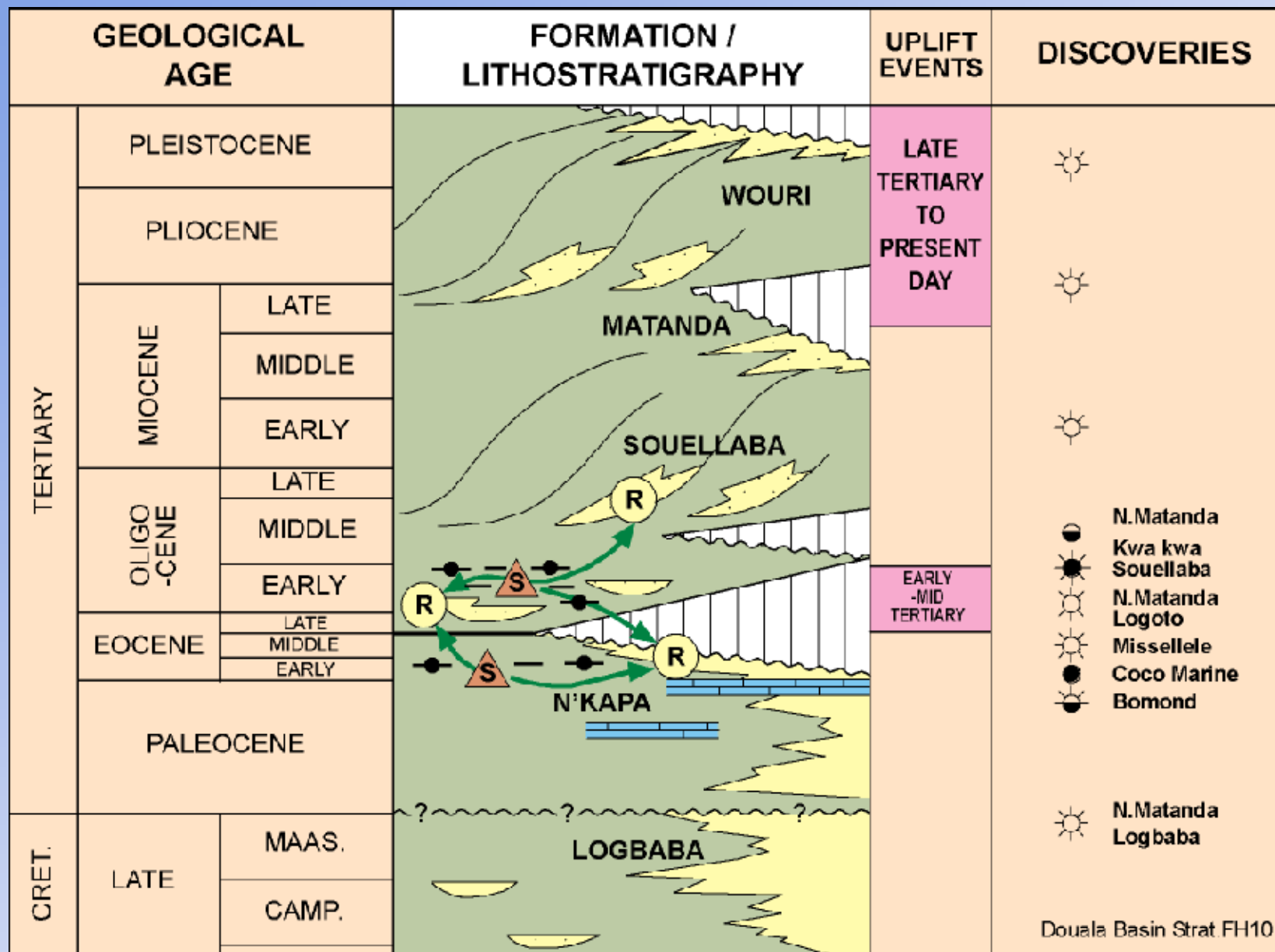
Stratigraphy Source Rocks



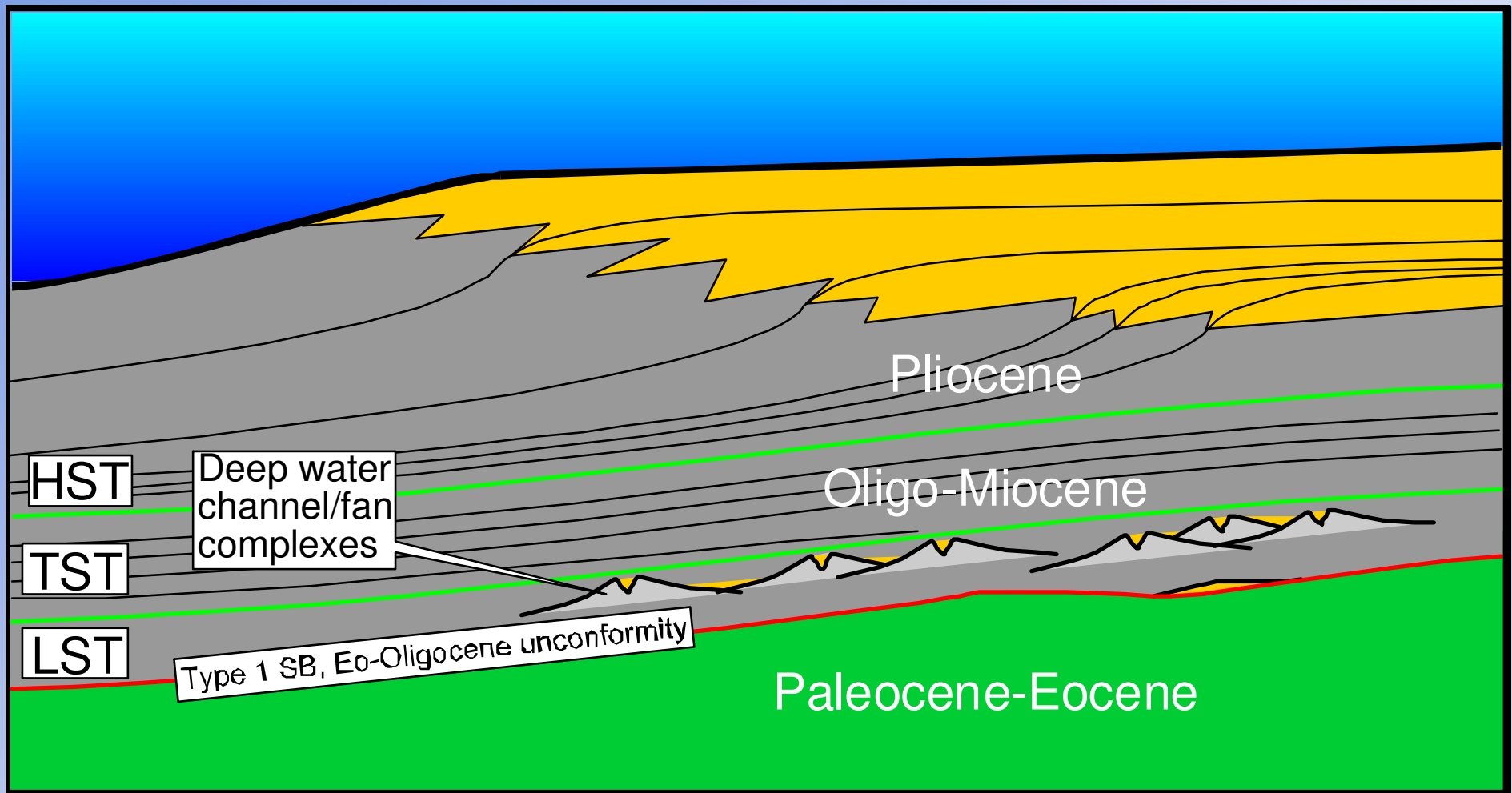
Douala Basin - Souellaba & Matanda Formations - Geochemistry



Douala Basin - Tertiary Petroleum System



Douala Basin – Tertiary Sequence Architecture

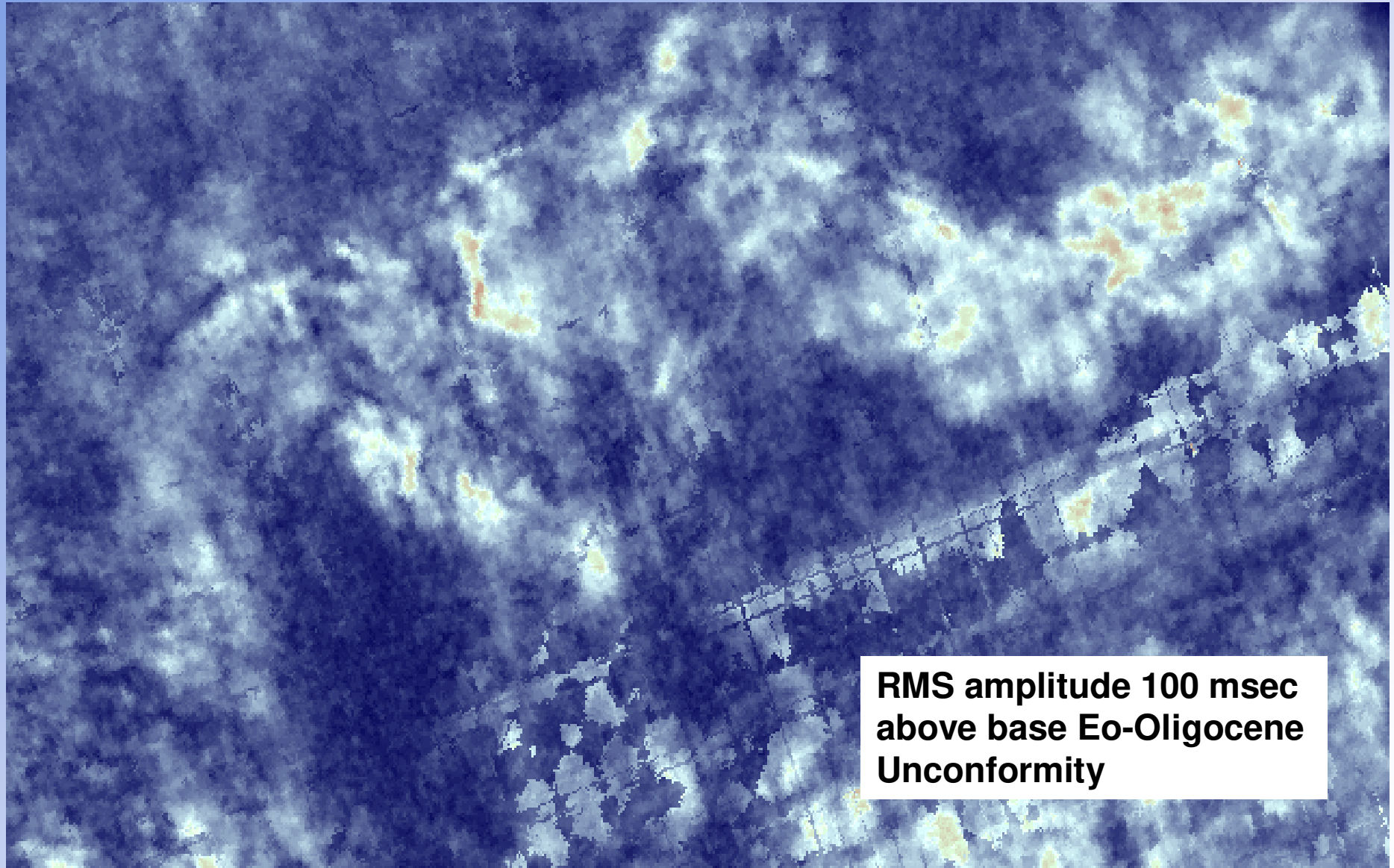


HST - Deltaics showing well developed (basinward) progradation

TST - Deep water muds showing local onlap, otherwise parallel reflectors

LST - Deep water sands, chaotic and concave-up reflectors, local progradation

Douala Basin - Seismic Amplitude Map

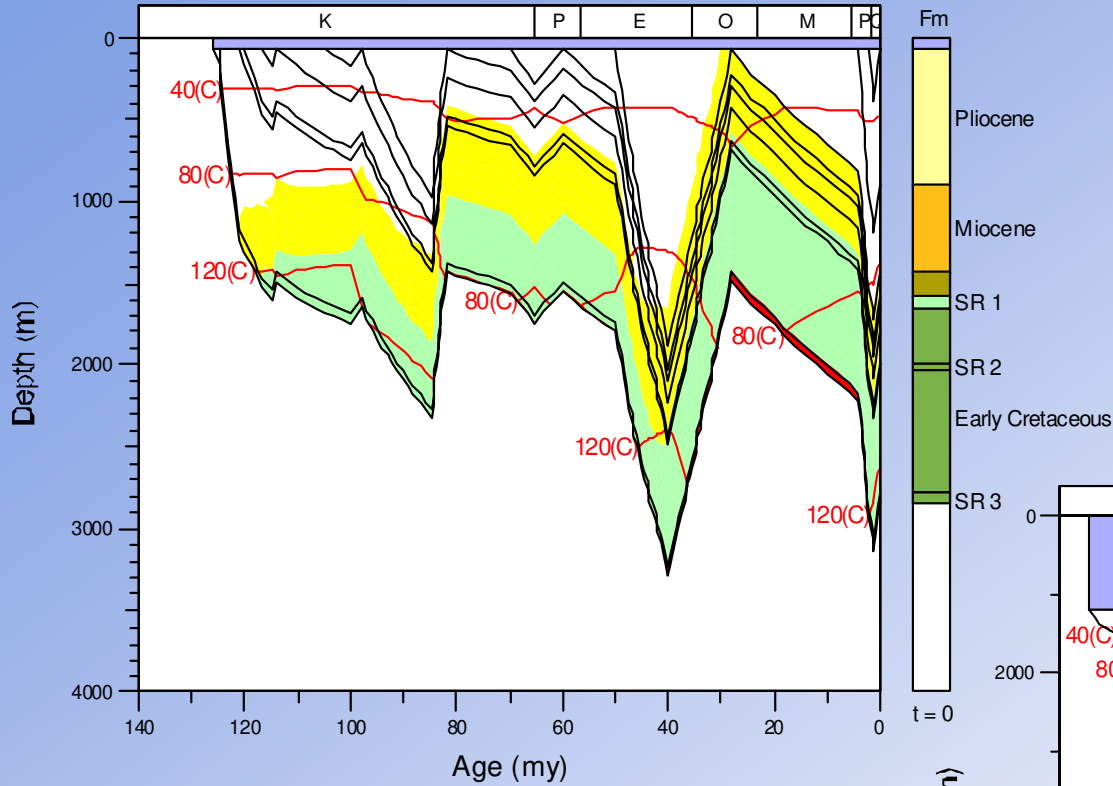


**RMS amplitude 100 msec
above base Eo-Oligocene
Unconformity**

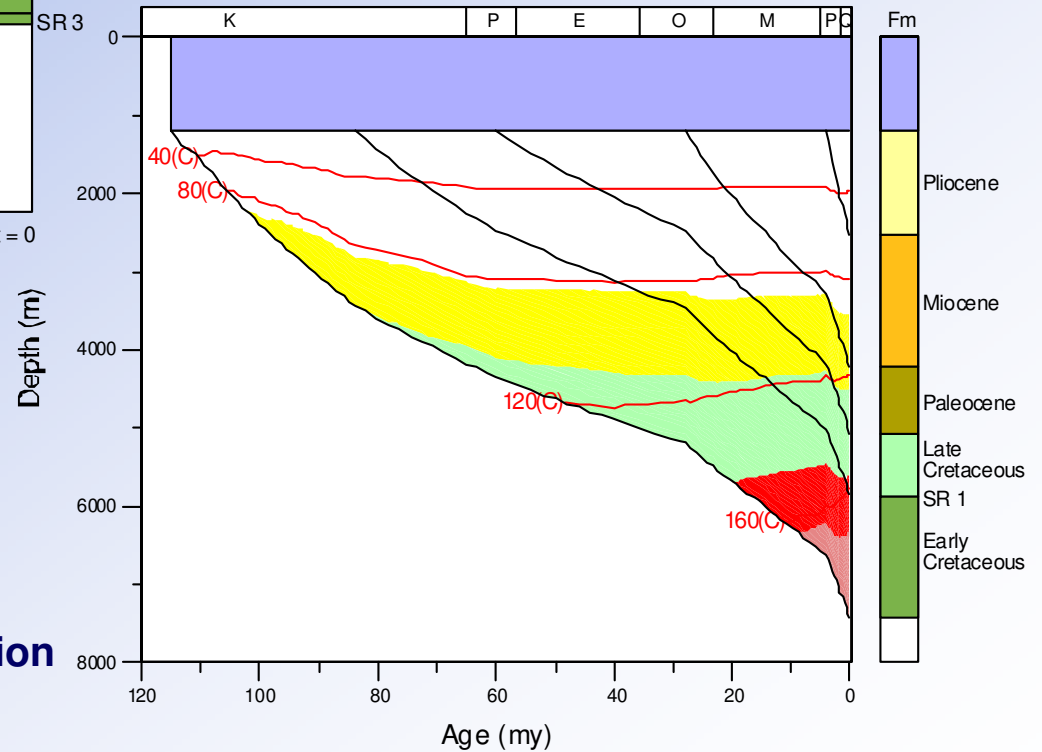
Courtesy of GSEis

Eastern Gulf of Guinea - Burial History Plots

Marginal Location

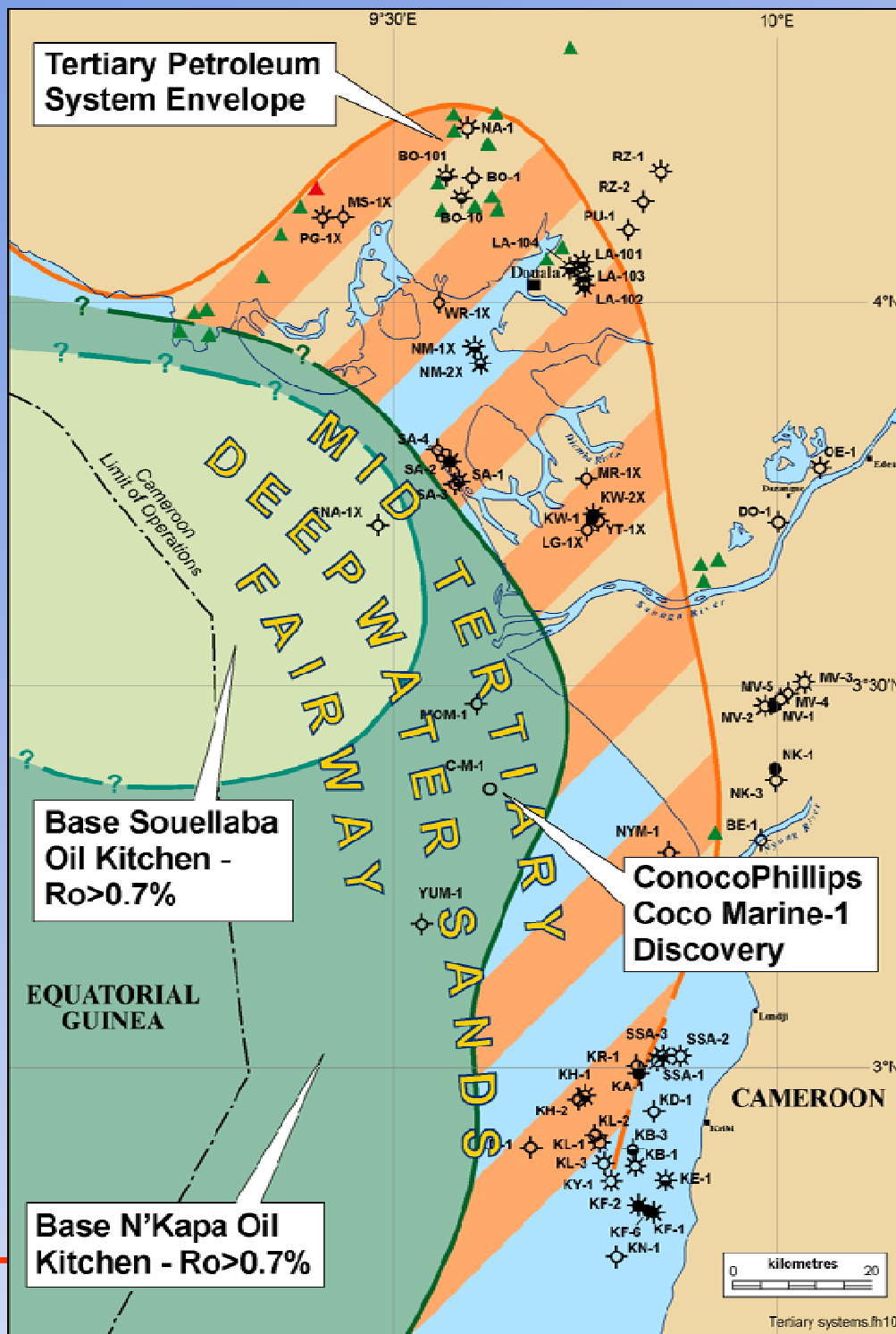


Basinal Location



Douala Basin

Tertiary Petroleum System Map



PETROLEUM SYSTEM

In accordance with convention the petroleum system is classified as hypothetical and described as follows:

N’Kapa/Souellaba – Northern oil seeps (.)

N’Kapa/Souellaba – N’Kapa/Souellaba (.)

CONCLUSIONS 1

Tertiary-sourced petroleum system associated with the mid Tertiary unconformity.

Source rocks in Souellaba Fm (Oligo-Miocene) or N'Kapa Fm (Paleocene-Eocene). Source rocks also exist in the Cretaceous section.

Position of source above or below the unconformity is critical to its maturation history.

Reservoirs are expected to be developed as lowstand channel/fan complexes within a sediment wedge above the sequence boundary.

CONCLUSIONS 2

More work is needed to positively identify a Tertiary source rock (oils / well sample geochem).

The stratigraphic framework is poorly constrained. Work is needed to resolve this (biostrat / seis-strat).

It is crucial to understand the thermal history and the history of uplift and erosion of the basin (AFTA & high quality VR data).

The petroleum systems approach is a necessary step towards mapping prospective play fairways.

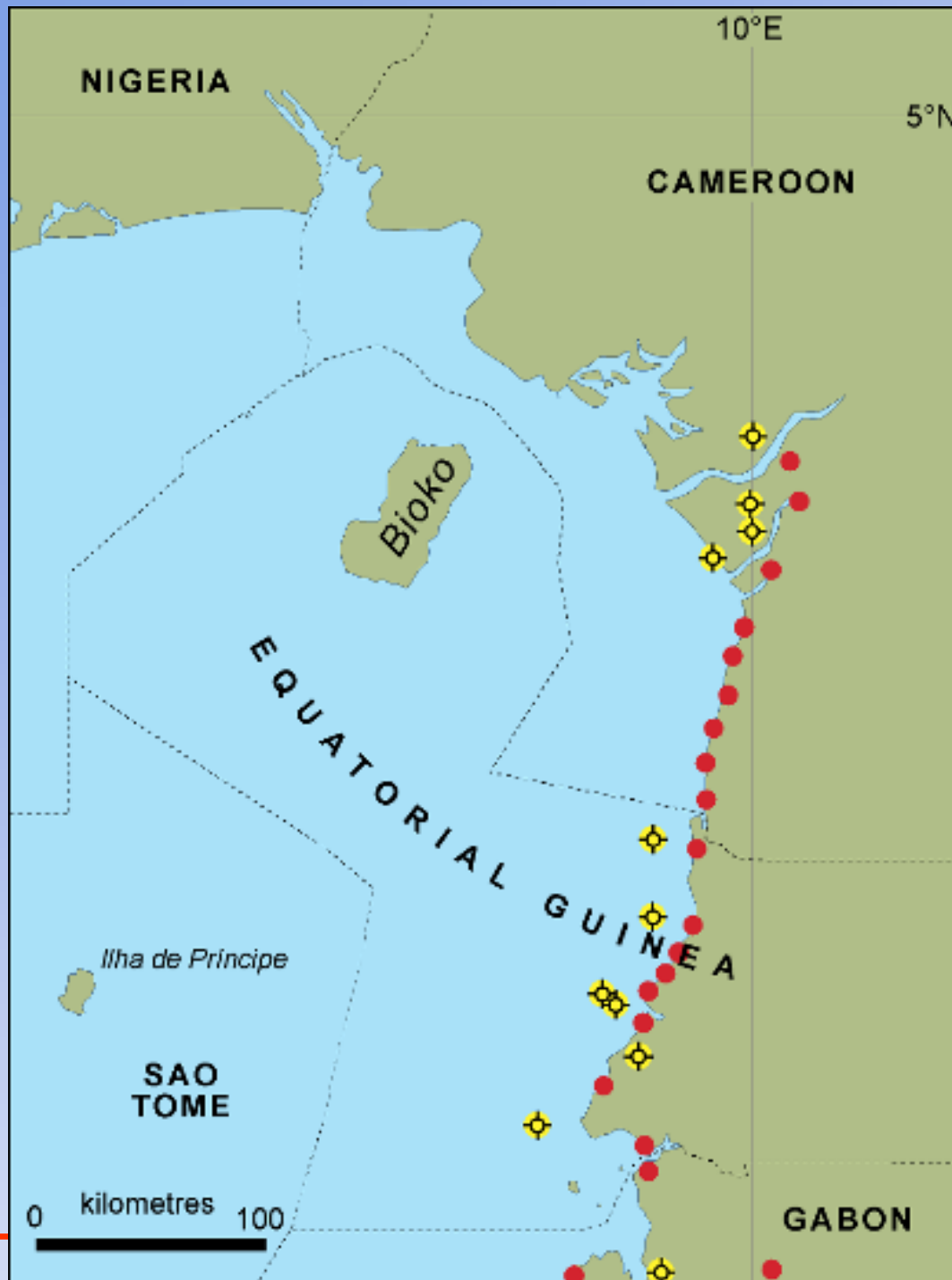




**Thank you for your
attention**

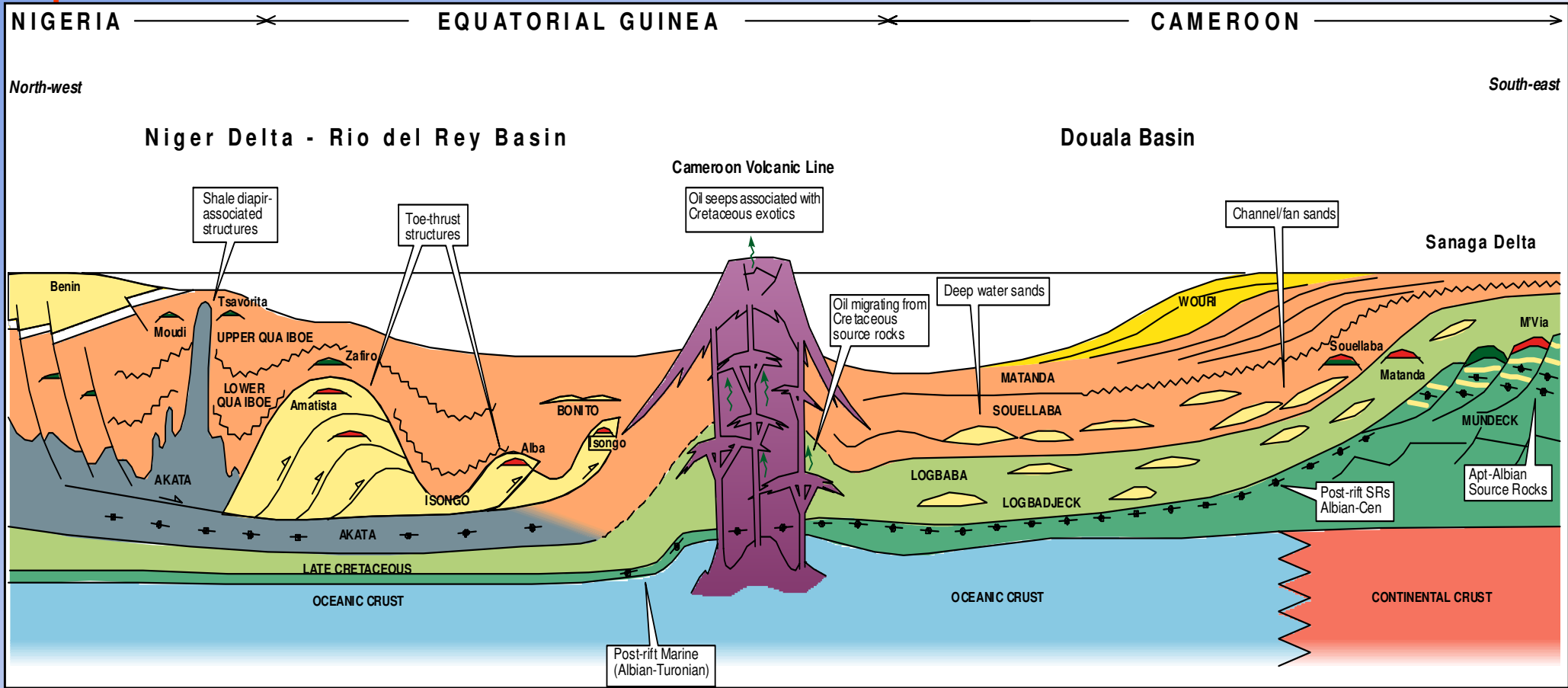
**Additional
slides follow**

Eastern Gulf of Guinea - Study Wells & Outcrop Sample Locations



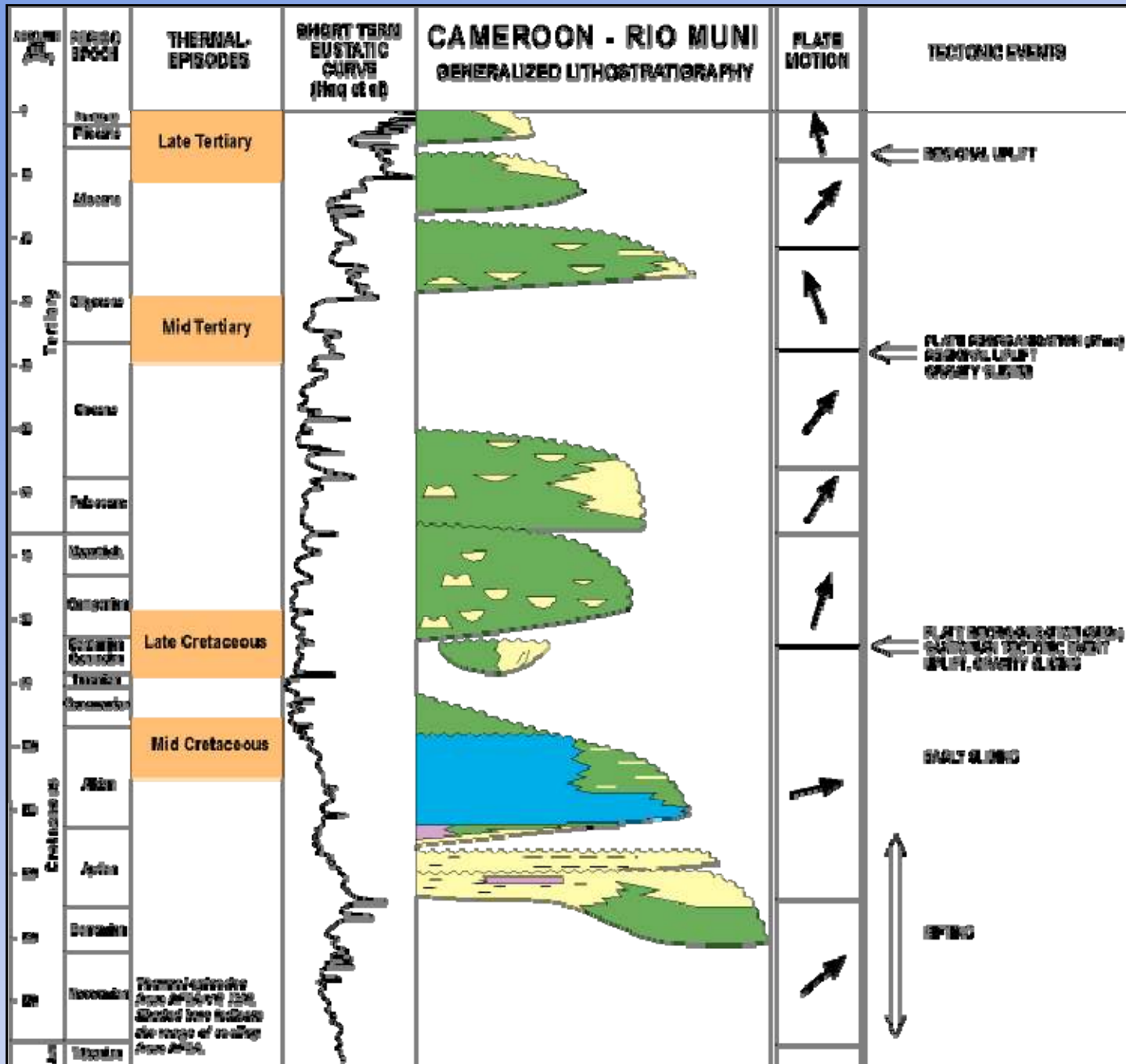
- AFTA/VR outcrop sample locations
- ◆ AFTA/VR study wells

Northern Equatorial Guinea - Northern Cameroon Cross-section

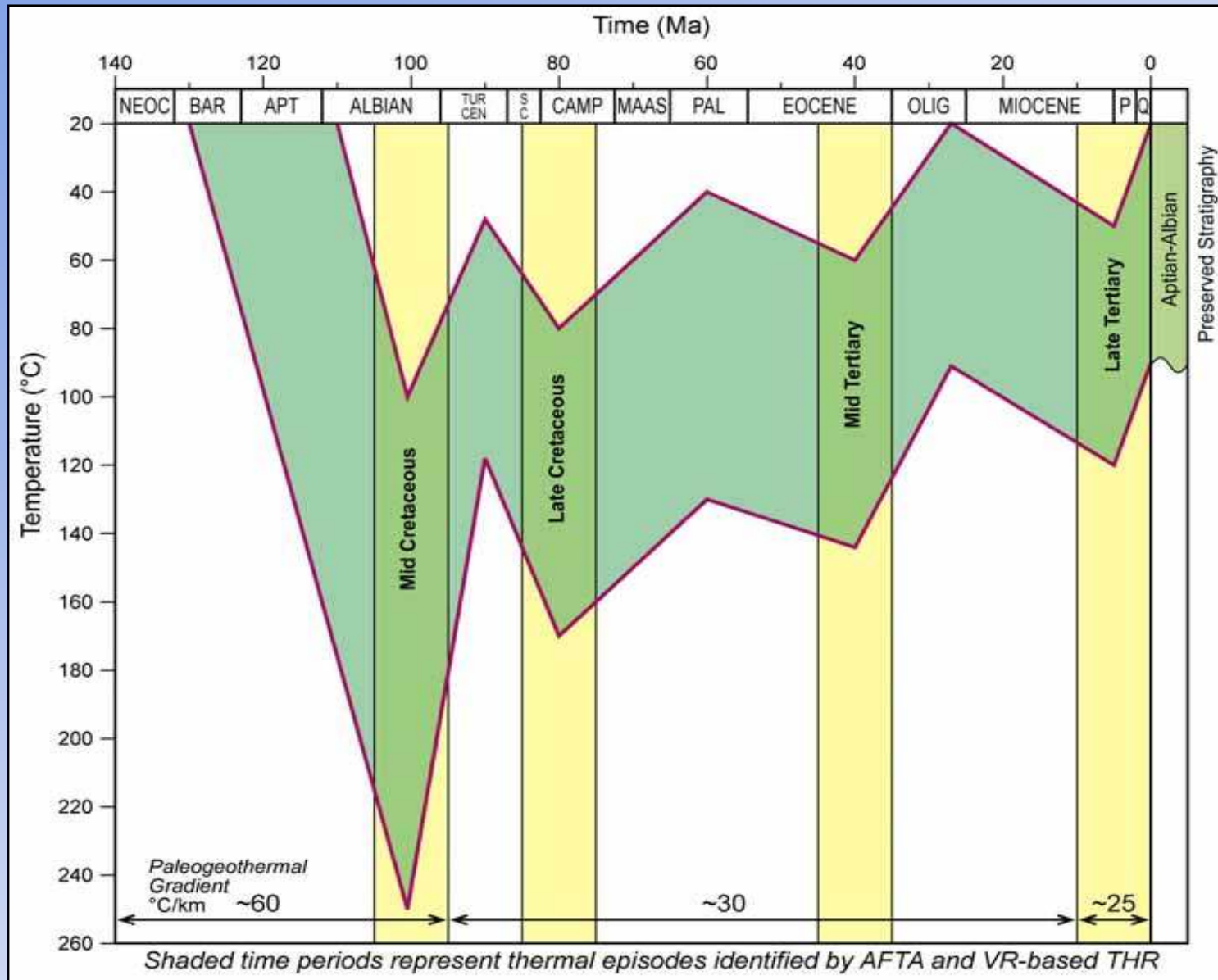


Rio Muni - Cameroon

Thermal Episodes & Eustatic Curve



S Cameroon - N Rio Muni - Schematic Thermal History



Cameroon Licence situation May 2003

