Molluscs from Underwater Meadows

On the Miocene diversification of Indo-Pacific molluscan communities associated to seagrass meadows

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THROUGHFLOW

MARIE CURIE ACTIONS

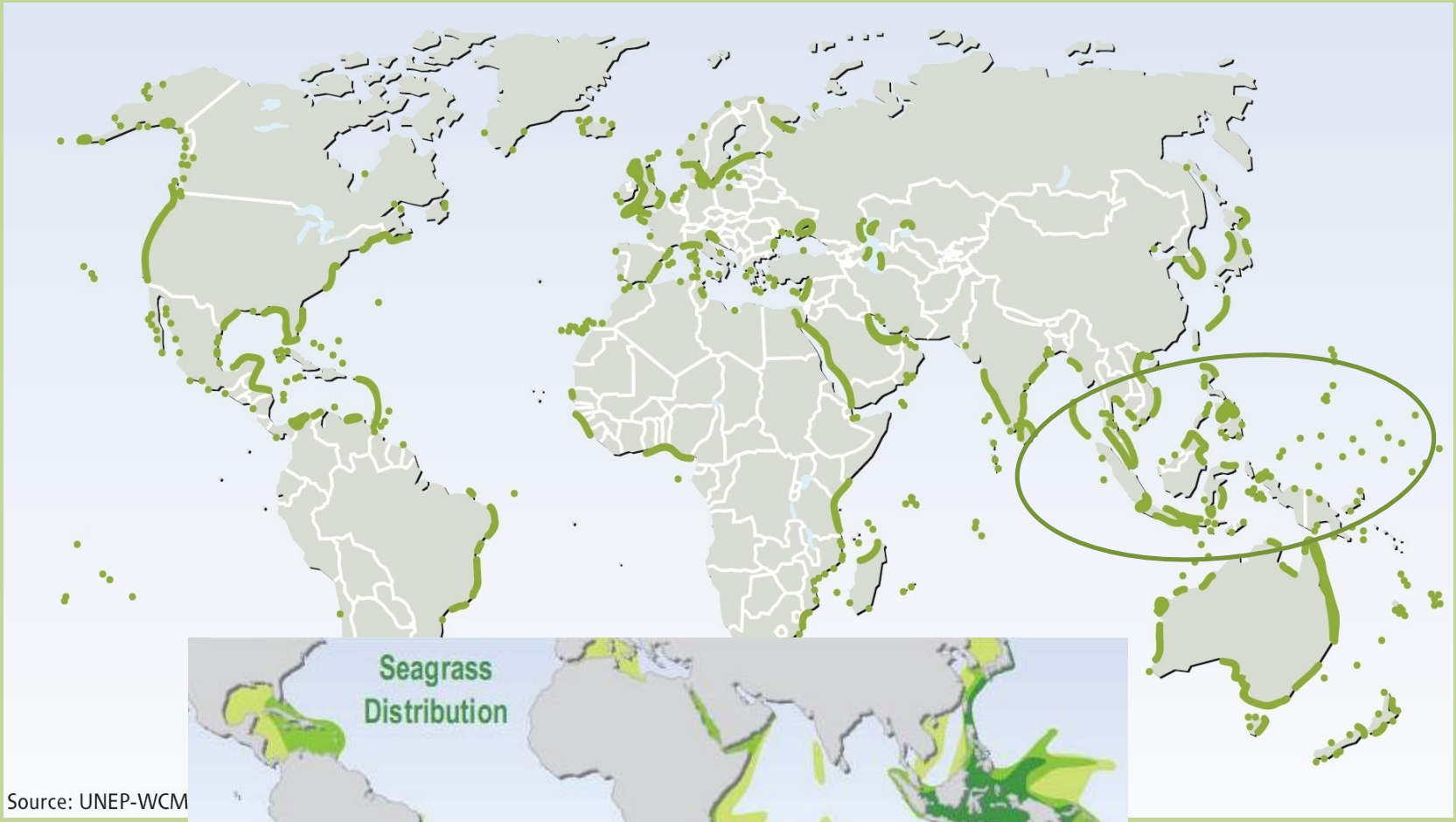
naturalis

On the Miocene diversification of Indo-Pacific molluscan communities associated to seagrass meadows

Seagrass communities are a good modelgroup

- Follows global diversity patterns, yet taxonomic diversity not overwhelming
- Diversity in ecological characteristics
- They are present and decently preserved, unlike e.g. true coral reef faunas.
- Possibilities for integrative research within the ITN Throughflow

The distribution of seagrasses



Source: UNEP-WCM

Spalding et al, 2000

Where do we expect seagrasses?

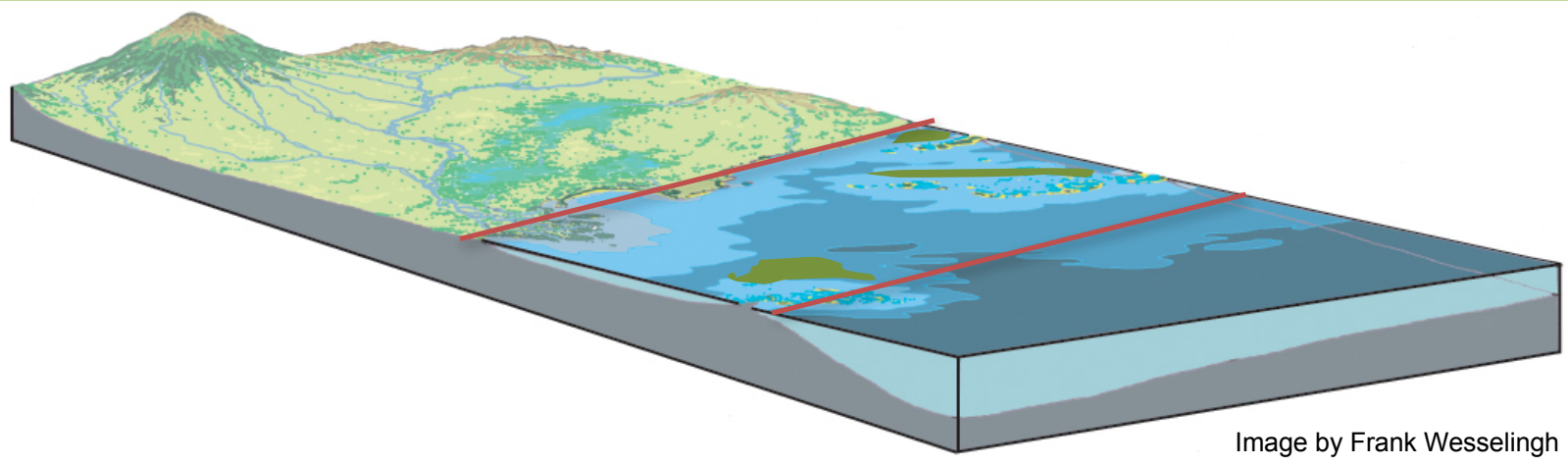


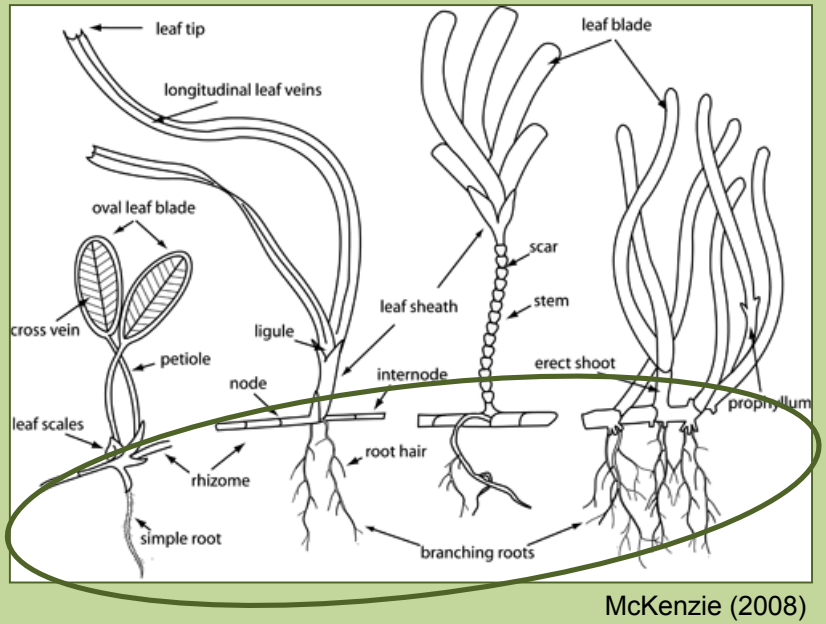
Image by Frank Wesselingh

tidal and subtidal areas

sheltered environments (back-reef lagoons)

The importance of seagrasses

Sediment stabilization – coastal protection



McKenzie (2008)

Water purification and nutrient cycling

Nutrients

relativly rapid uptake

slow decomposition and consumption

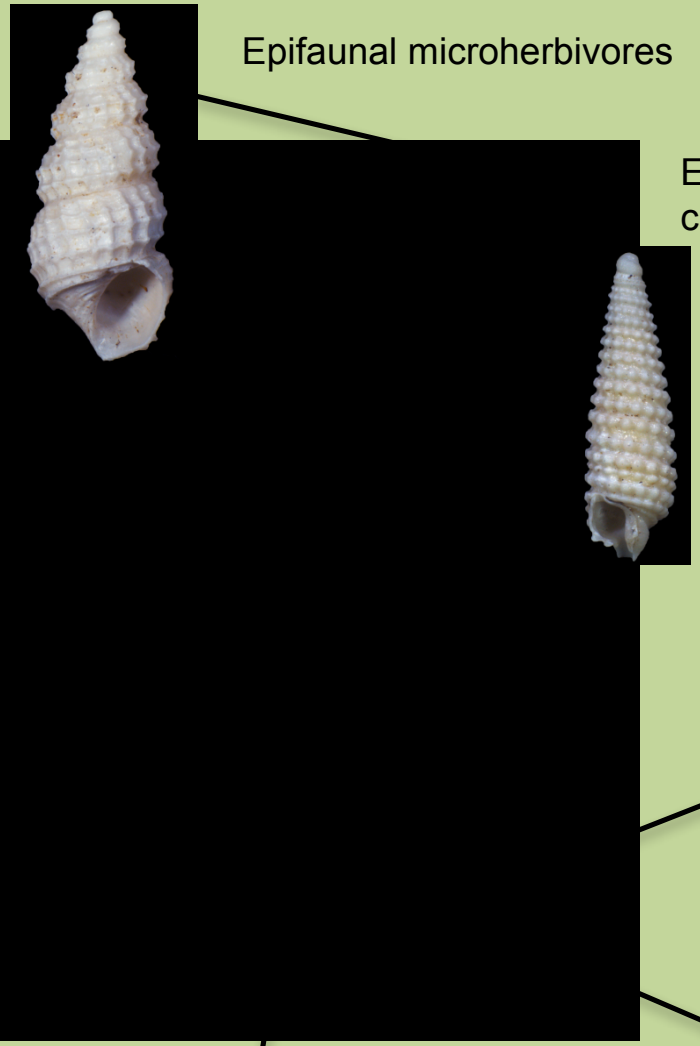
reduction of eutrification
binding of organic pollutants

after Green & Short, 2000

The importance of seagrasses

Food and shelter for a wide range of organismens

Mollusks in seagrass meadows



Epifaunal microherbivores

Epifaunal browsing carnivores

Epifaunal microcarnivores

Epifaunal herbivores

Epifaunal active predators

Infaunal suspension feeders & Infaunal (chemoautotrophic) deposit feeders

Epifaunal detritivores

Seagrasses in the fossil record

first appearance in the Late Cretaceous
expanding geographically in the Early-middle Miocene

Moulds of *Posidonia oceanica* leaves from the Pliocene of Greece (Moisette et al., 2007)

The occurrence of ancient seagrass meadows has to be concluded from sedimentological and palaeontological data.

Bioimmuration

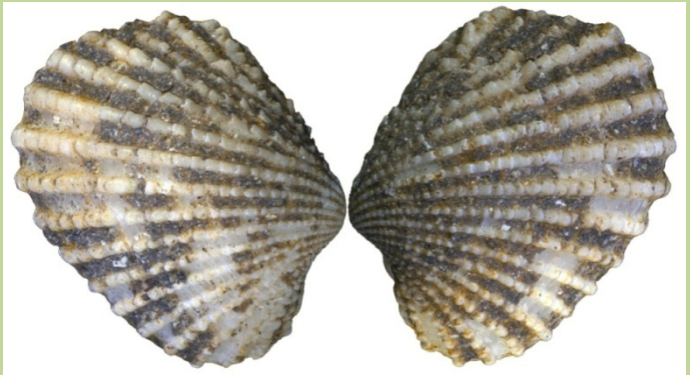
The hydroid *Dynamena* on a seagrass blade overgrown by the oyster *Cubitostrea*, Middle Eocene , Paris Basin (image by Jon Todd)

The Banjung Ante fauna

Rissoina indrai
Beets, 1941
(>1200 specimens)

~140 gastropod species of
39 different families
(>3500 individuals)

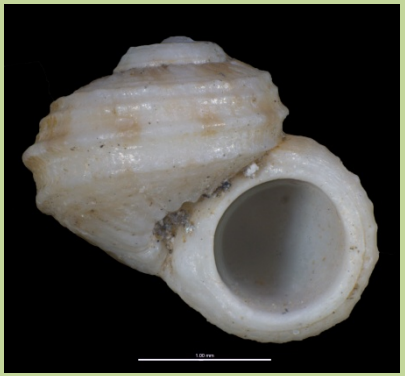
24 bivalve species of
11 different families
(~ 320 individuals)



Cardita sp.
(111 specimens)

Fossil gastropods from Banjung Ante: genera that might indicate seagrass vegetation

Smaragdia sp.



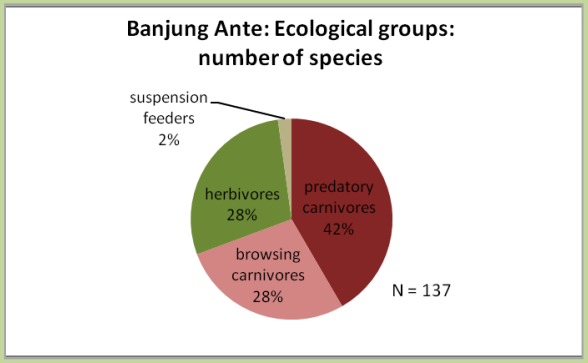
Bothropoma sp.

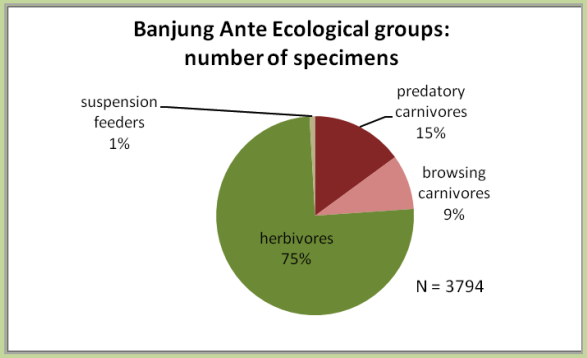
Diala sp.

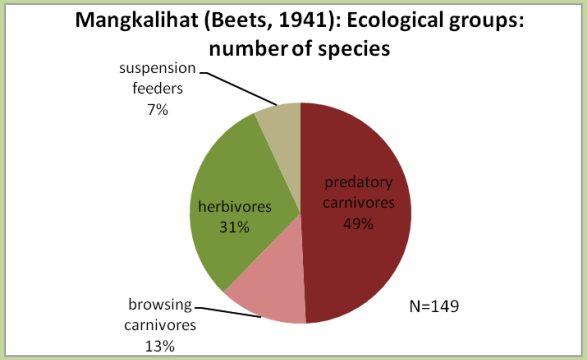
Modulus sp. 1

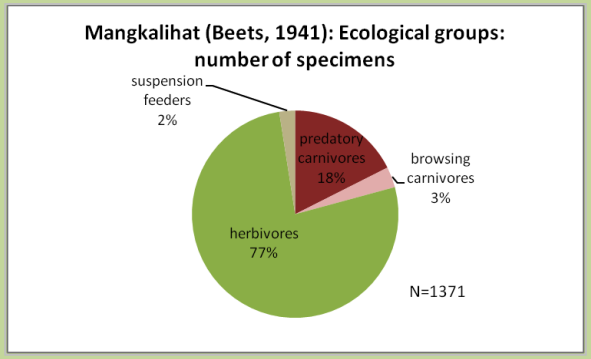
Modulus sp. 2

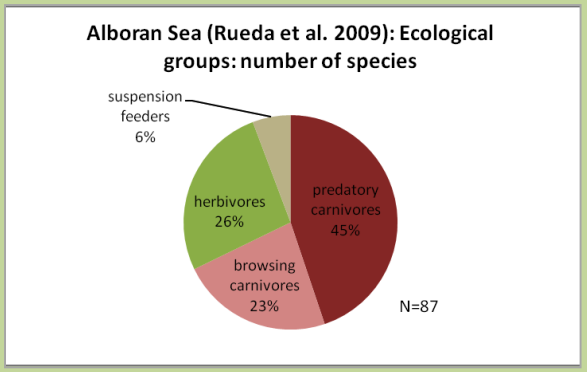
Finding a possible key to the identification of fossil seagrass habitats…

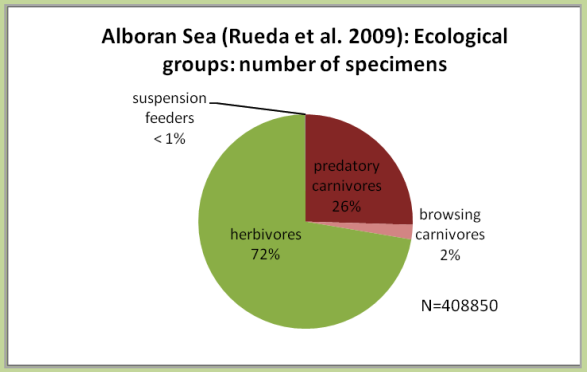












Independent proxies to establish the presence of seagrass

foraminifers

bryozoans

taphonomic signature

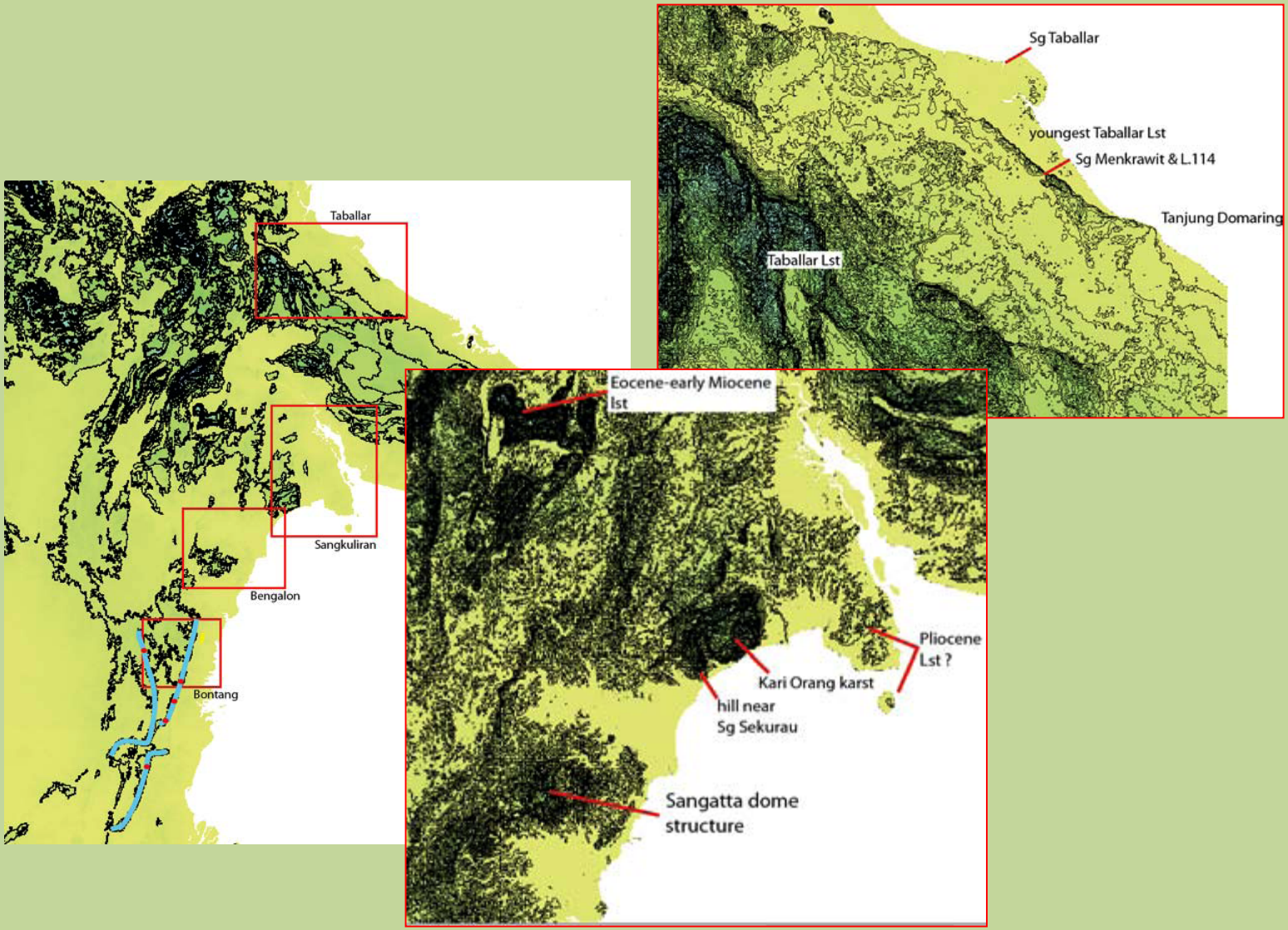
geochemistry

Another likely seagrass associated molluscan fauna: TF 110 (Bontang)

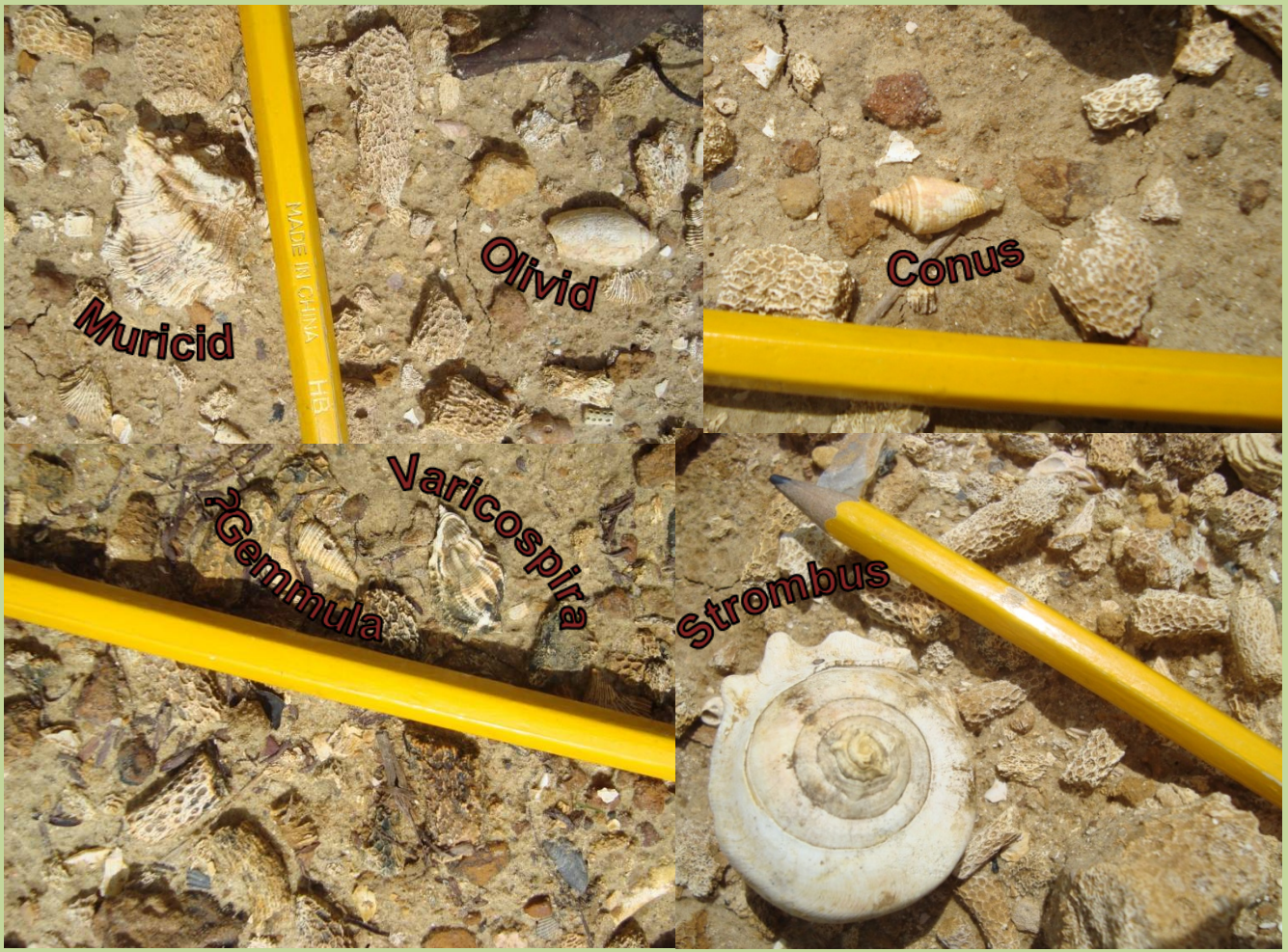
Locality TF 110

In-situ preserved tellinid (TF 110)

NTA 4: Searching for more seagrass faunas



Comparison with fossil faunas from other habitats: a coral associated fauna from TF 102 (Bontang)



Aims of the PhD

Characterization and identification of seagrass faunas

Development of biodiversity of seagrass associations through time

Responses on regional expressions of global change (e.g. Mid-Miocene climate optimum)

Thank You for Attention!

References

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Rueda, J.L., Gofas, S., Urra, J. and Salas, C., 2009. A highly diverse molluscan assemblage associated with eelgrass beds (*Zostera marina* L.) in the Alboran Sea: microhabitat preference, feeding guilds and biogeographical distribution. Scientia Marina, 73: 679-700.