

The Mudmound System

Products and Processes

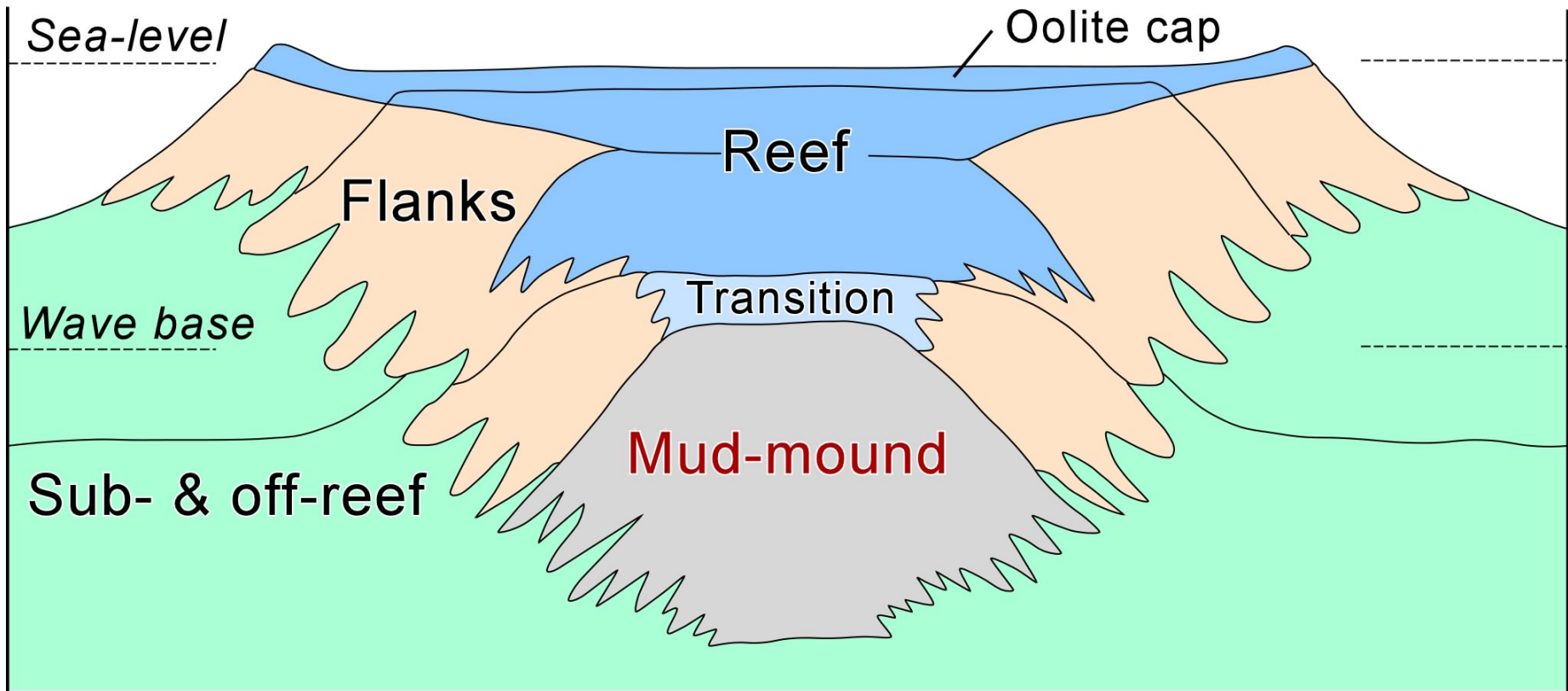
Pierre-André Bourque
Fritz Neuweiler
Frédéric Boulvain



Variations on the word mudmound

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- 1. At the beginning was a puzzling mudstone facies at base of Niagaran reefs (Textoris, 1966)*



Variations on the word mudmound

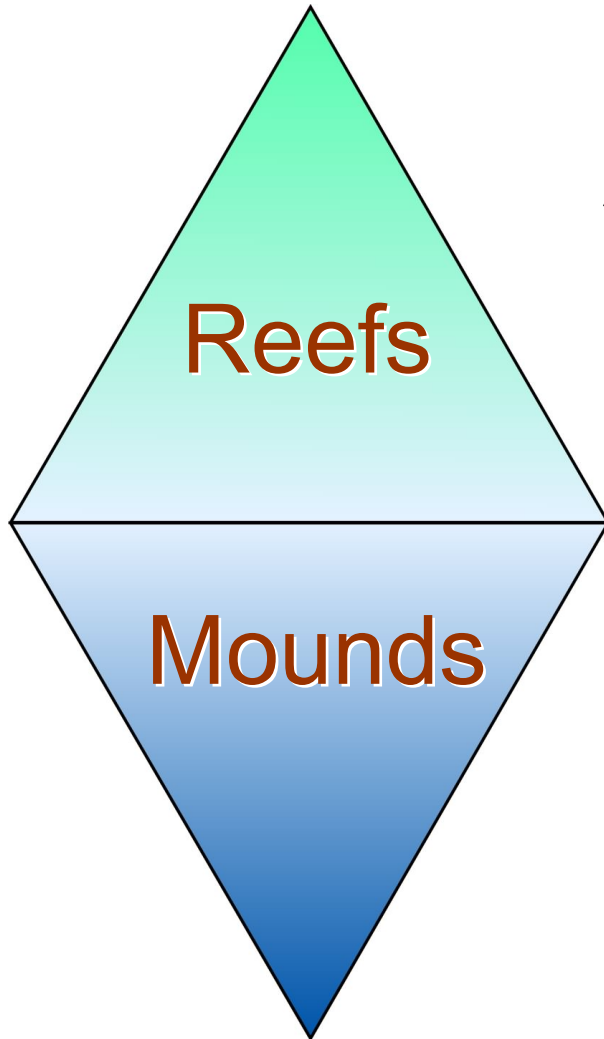
2. *At the beginning was a puzzling mudstone facies ... that rapidly became synonymous with deep water mud-rich composite mounds*



Wilson's (1975) profiles III

Variations on the word mudmound

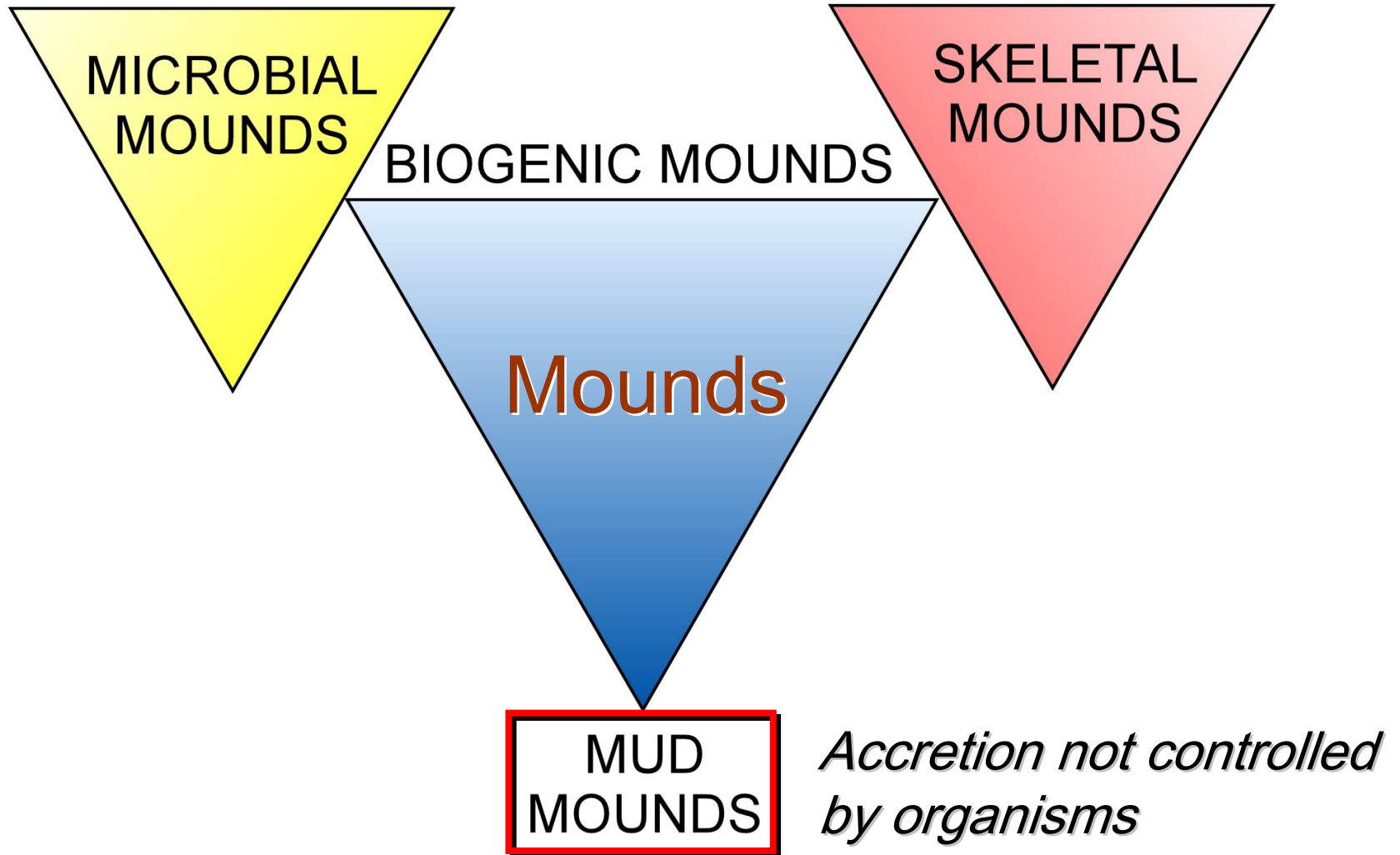
3. *Mounds differ from reefs (James & Bourque, 1992)*



Able to resist significant wave and current energy

Unable to resist wave and current energy

Mound types



The accretionary processes ?



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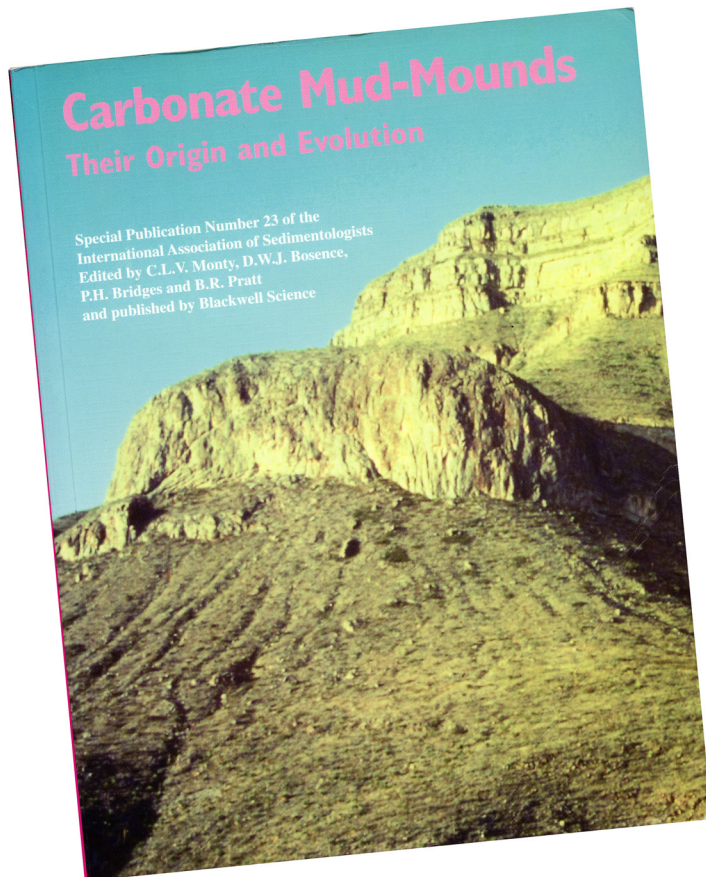
1. Piling of loose lime mud

The accretionary processes ?

1. *Piling of loose lime mud*
2. *The microbial paradigm (Monty, 1976-1995, and many others)*

The microbial paradigm

- Mud-mounds represent a mega-development of cryptalgal textures (= microbial textures) – Monty (1976)



- « *We know now that the carbonate mud-mounds are microbial buildups controlled essentially by bacteria and cyanobacteria as the primary producers* »
Monty (1995)

The accretionary processes ?

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2. *The microbial paradigm (Monty, 1976-1995, and many others)*
3. *Sea-floor lithification (Bathurst, 1982)*

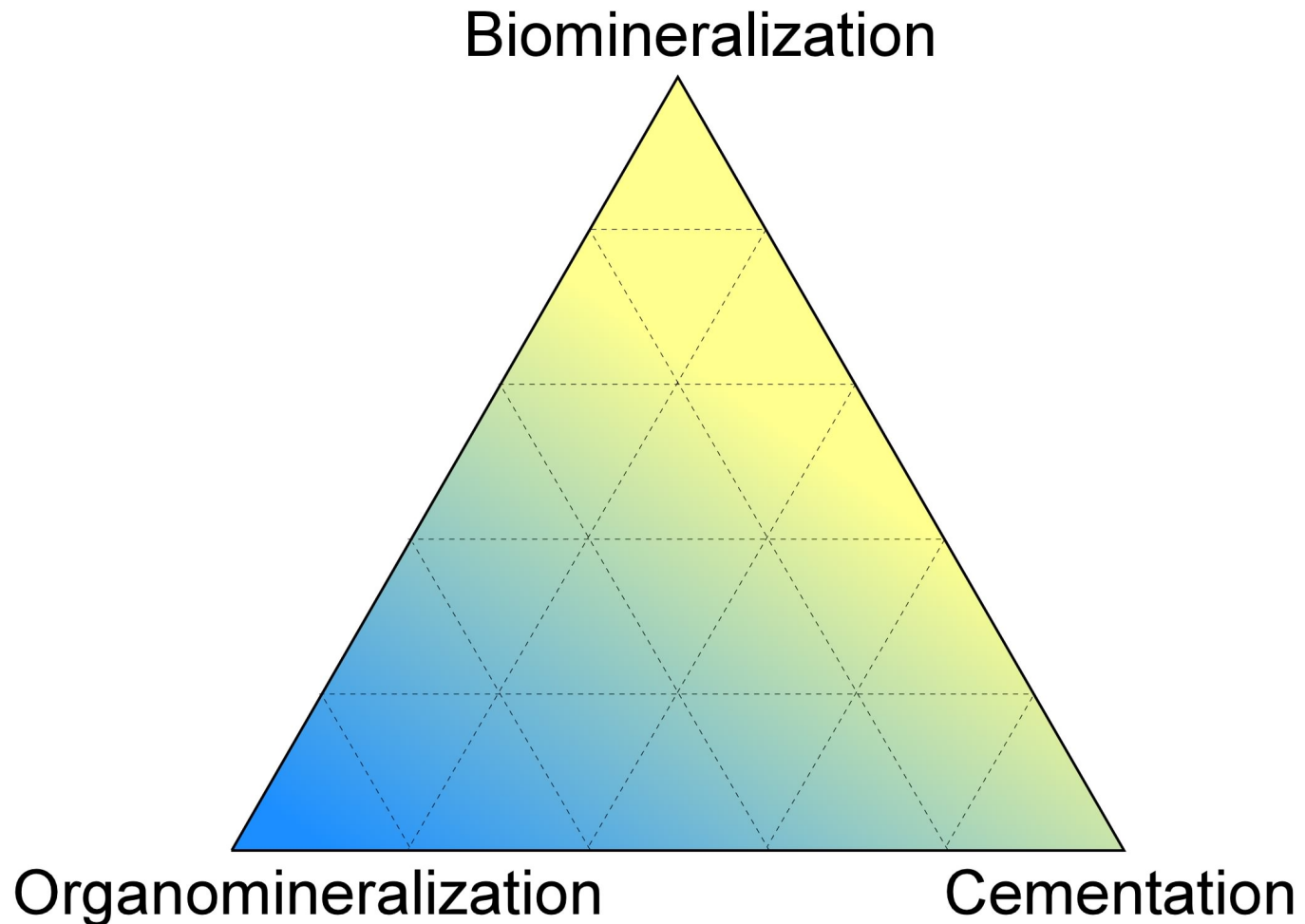
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5. *Organomineralization (Reitner – Neuweiler team, 1993-1995)*

Three basic modes of carbonate production in the marine benthic realm

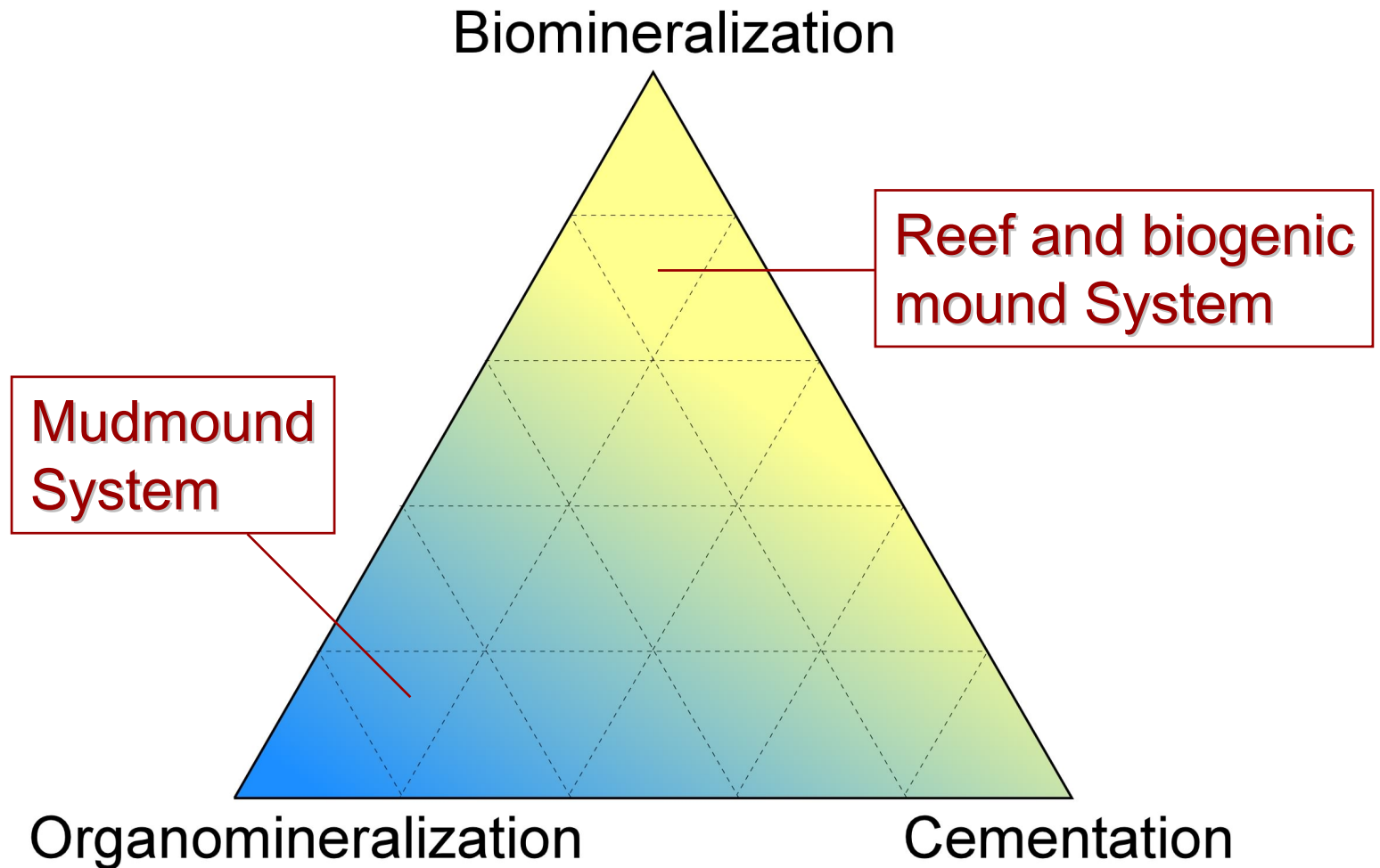


Biom mineralization: movement of ions, from the surrounding medium to the cell, is under the control of life forces (Trichet & Défarge, 1995)

Organomineralization: mineral formation in close association with non-living organic substrates without intracellular control (*ibid.*)

Cementation: space-filling crystals that grew attached to a free surface (Bathurst, 1975)

Three basic modes of carbonate production in the marine benthic realm

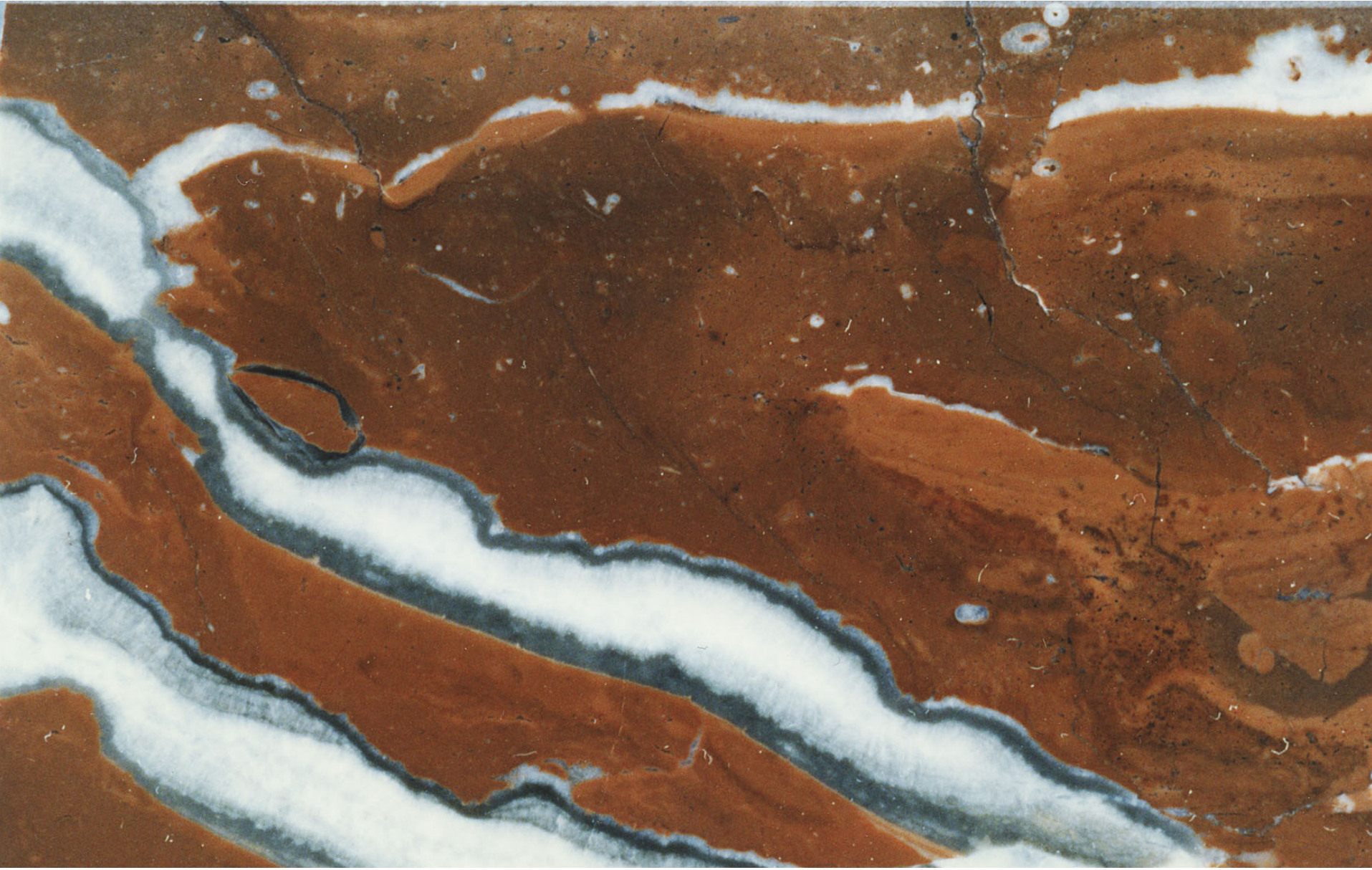


Products

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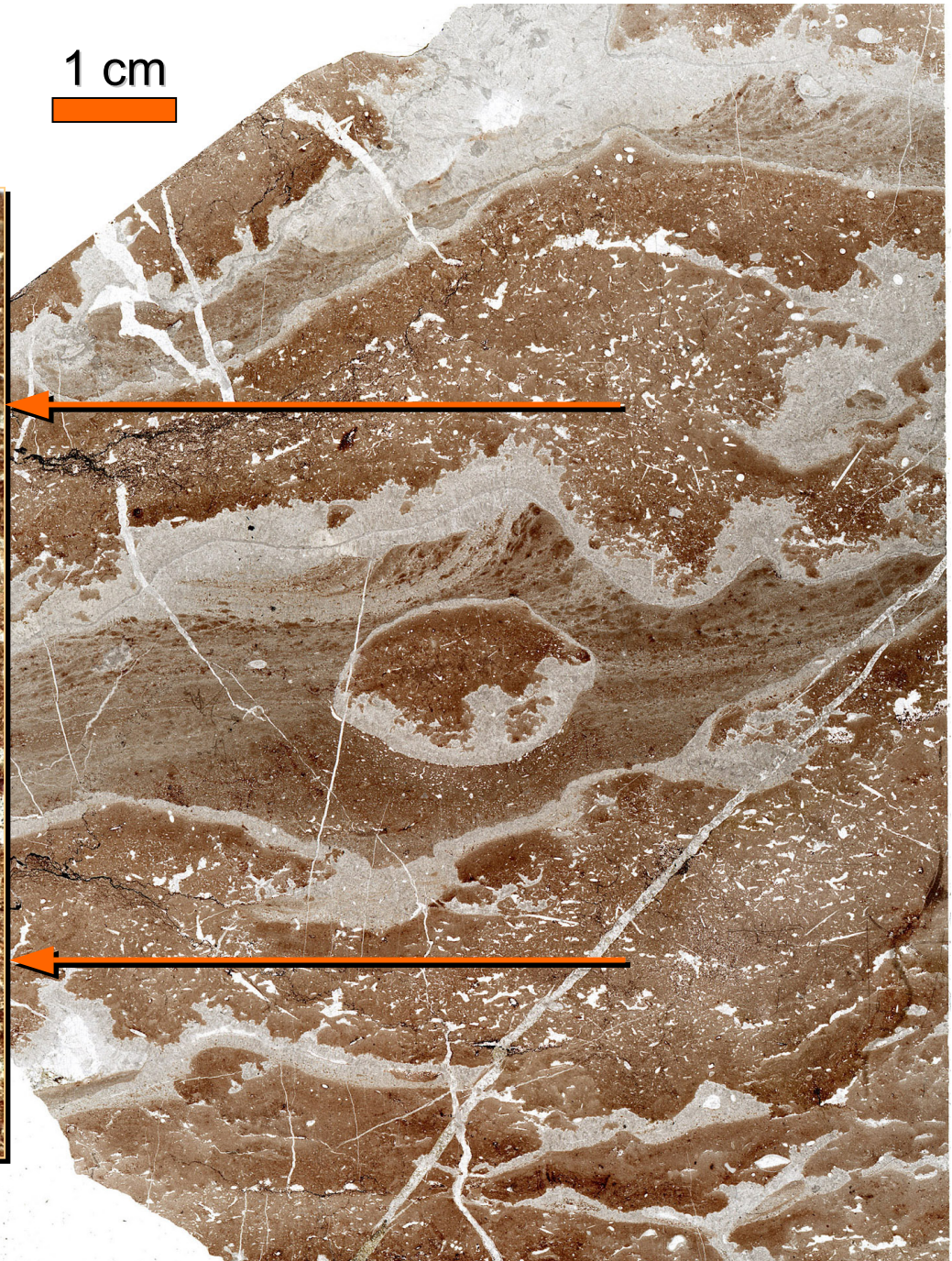
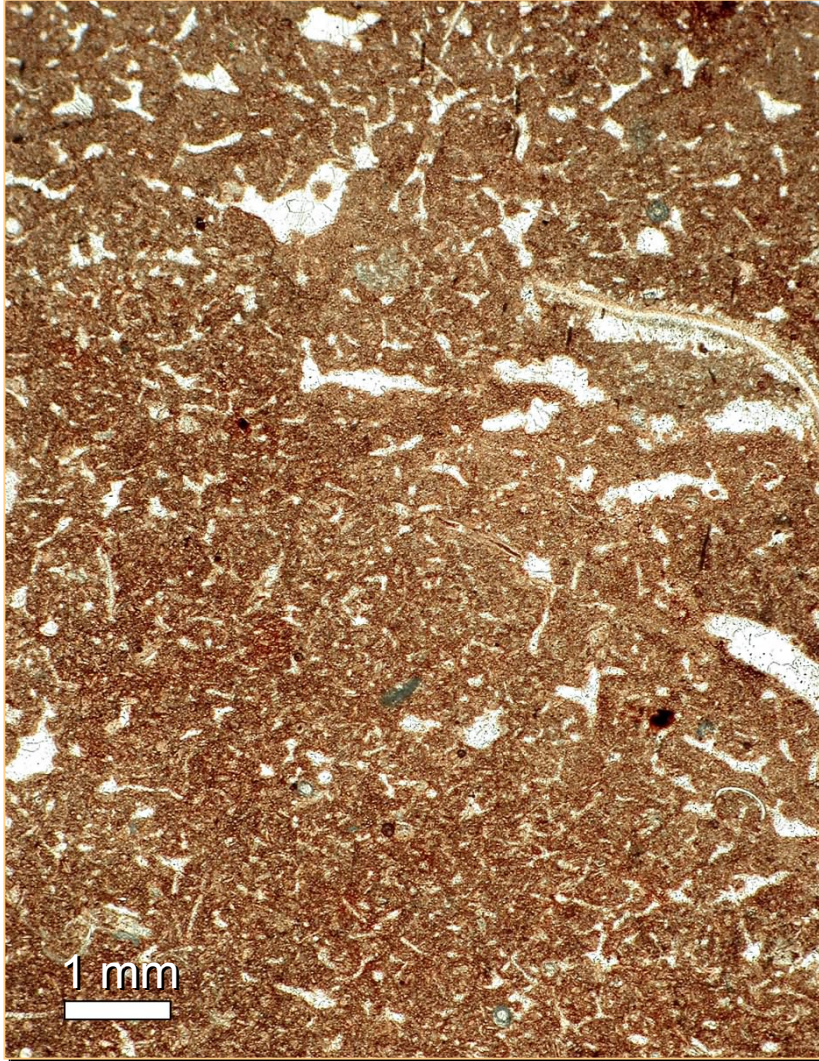
- The polymud fabric (Lees and Miller, 1985) is a direct product of organomineralization/cementation

Polymud fabric – Polished slab, Frasnian, Belgium



Thin-section Frasnian, Belgium

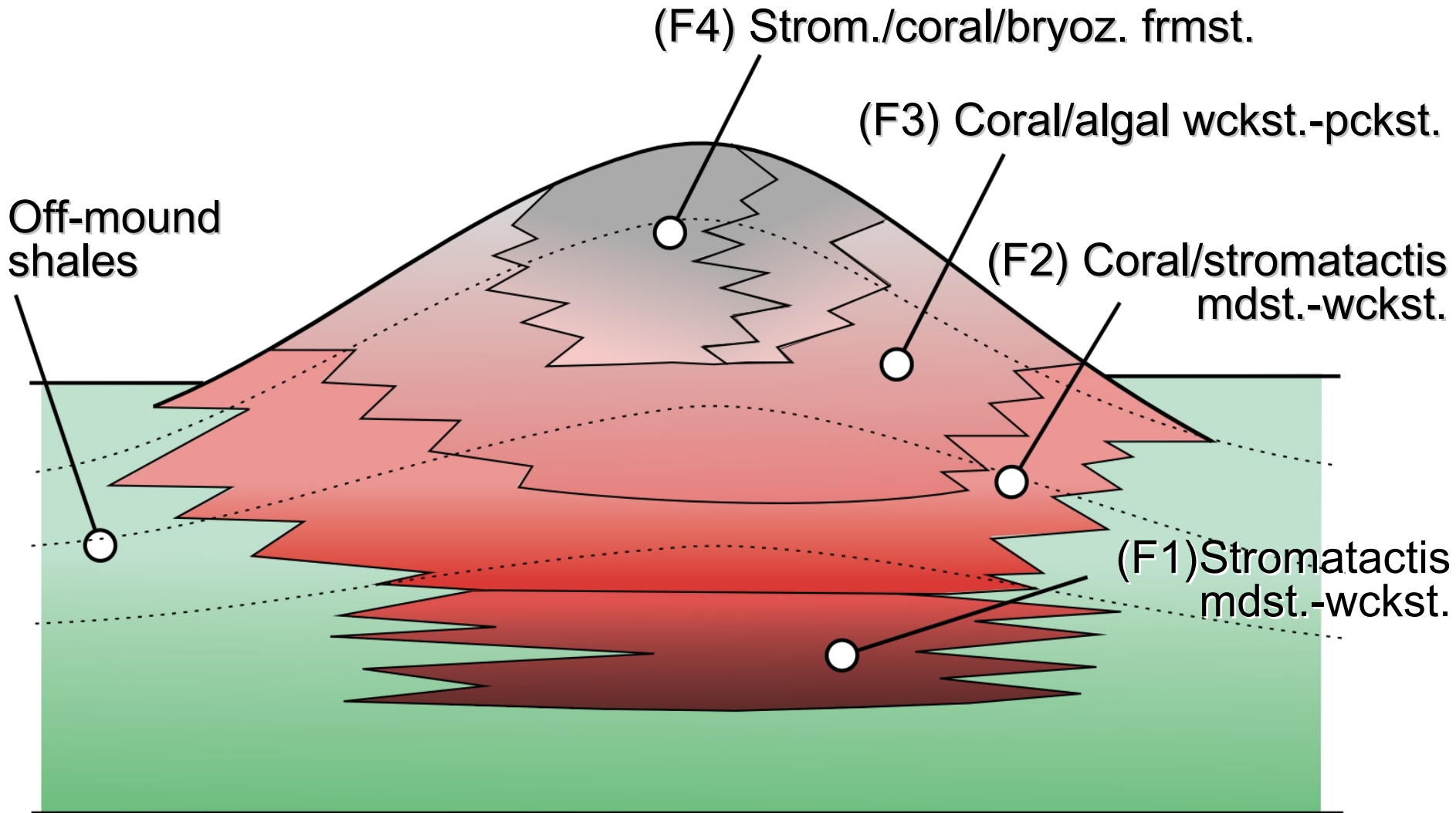
1 cm



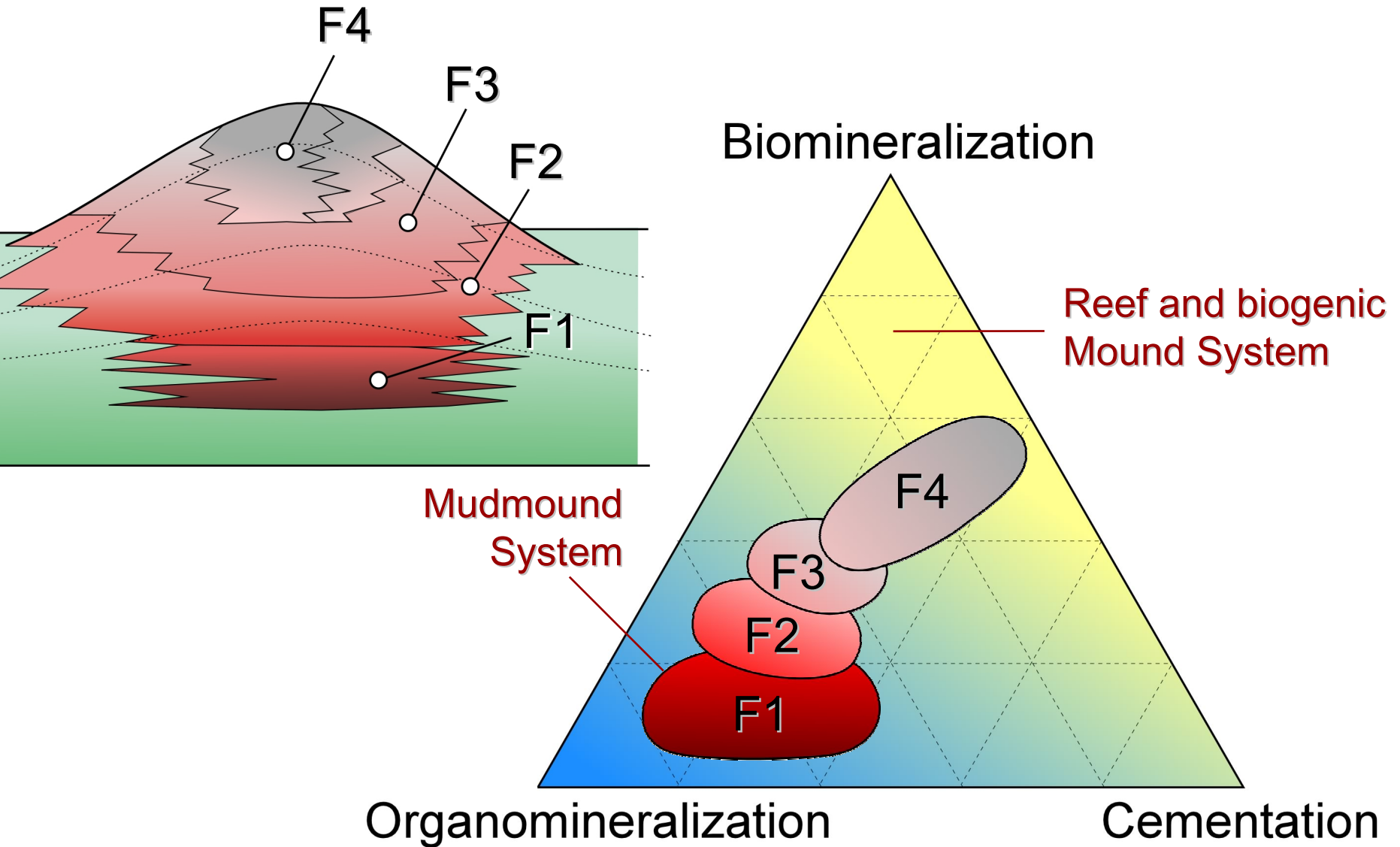
Products

- The polymud fabric (Lees and Miller, 1985) is a direct product of organomineralization/cementation
- Only part of the “classical mudmounds” is the product of the mudmound system
..... **Two examples ...**

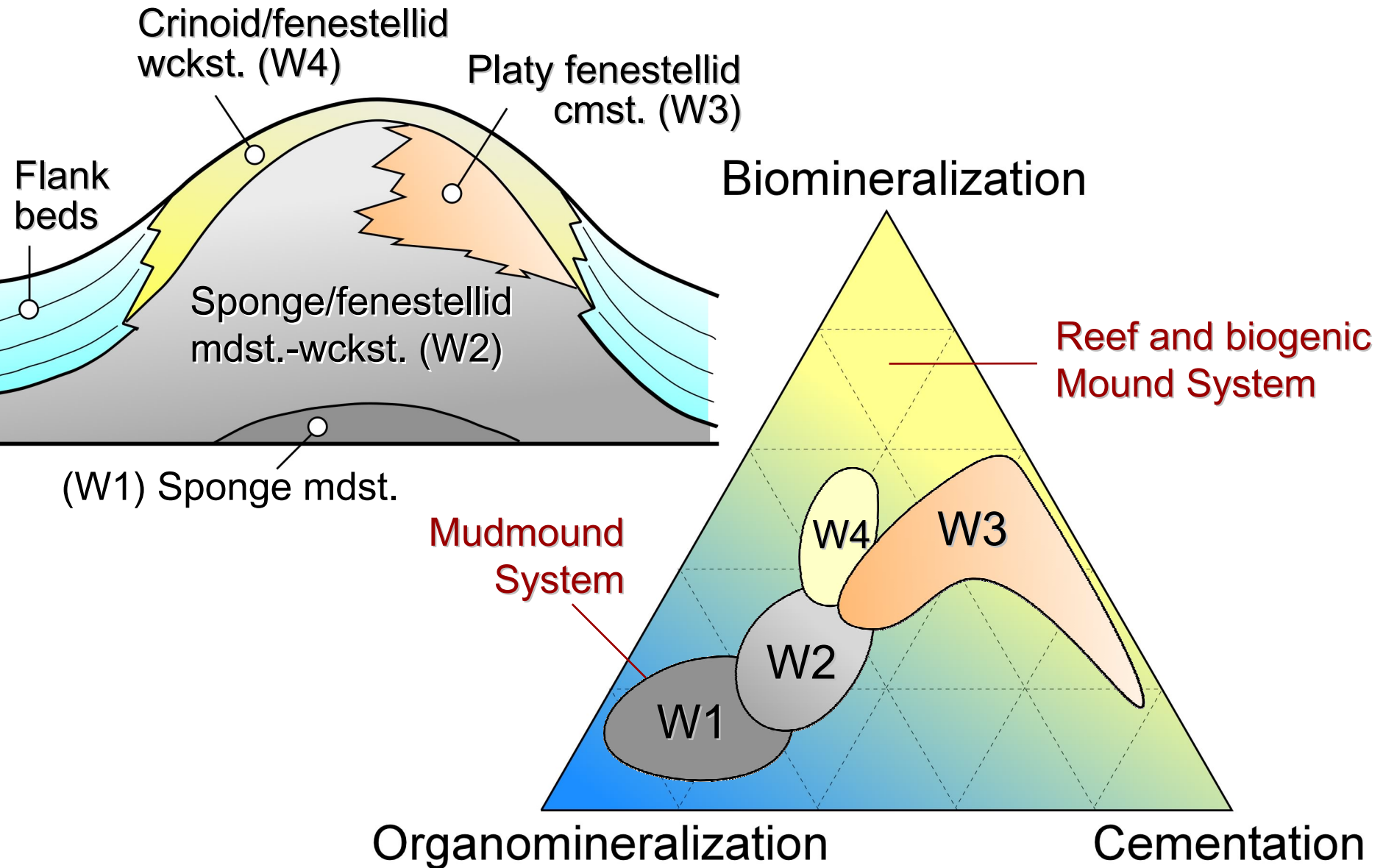
➤ The Frasnian « mudmounds » of Belgium



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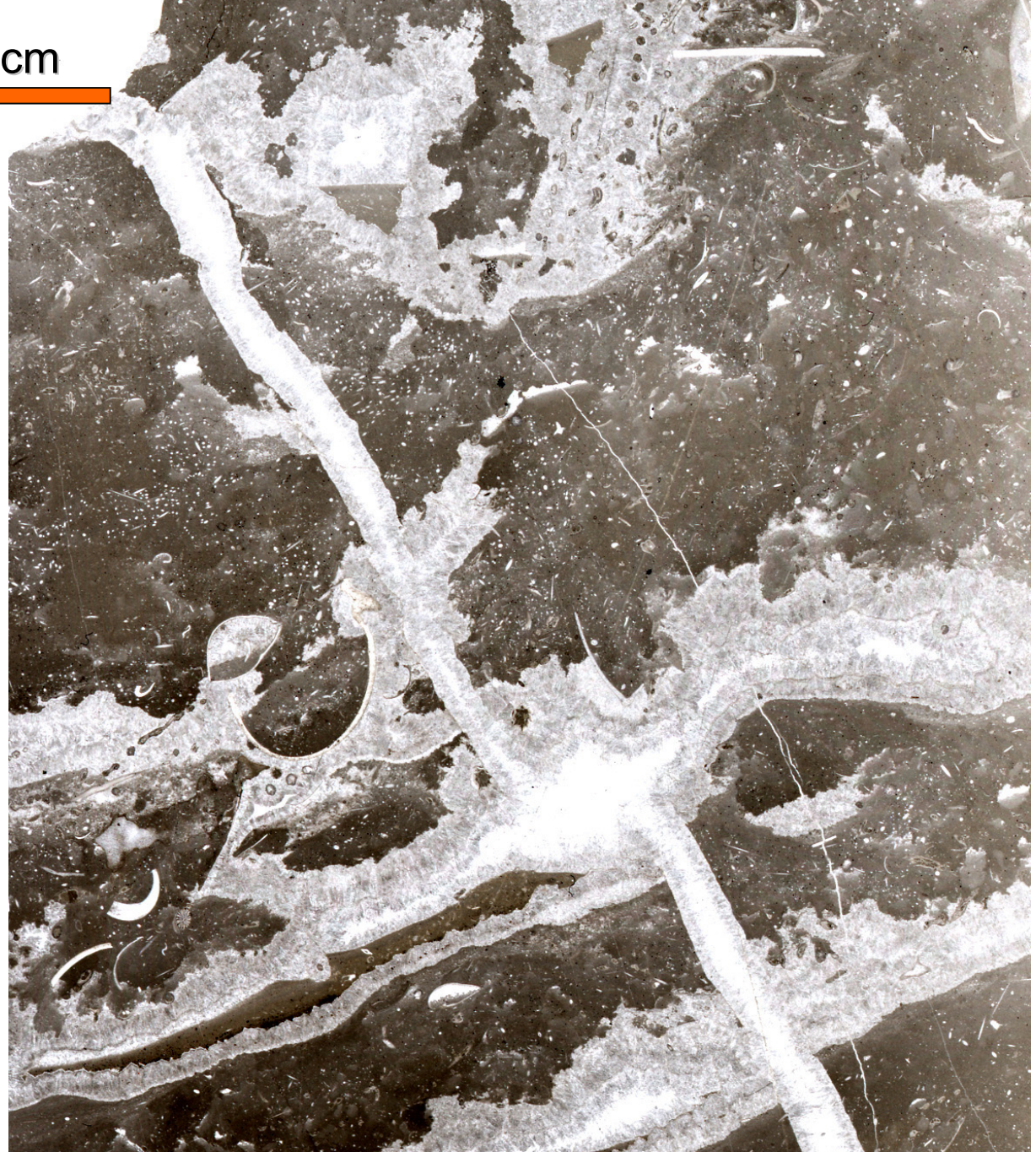


➤ Waulsortian-type « mudmounds »

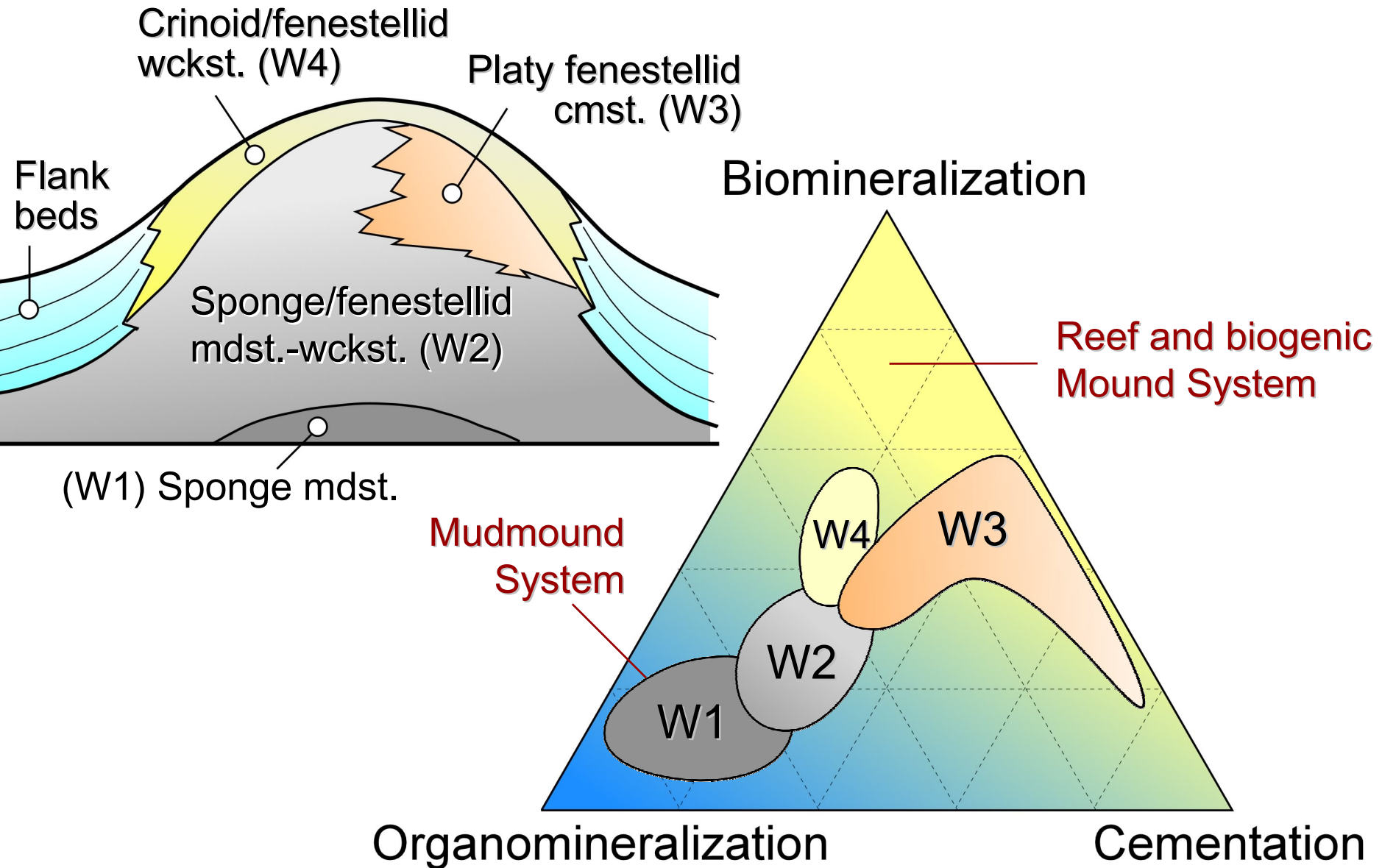


Thin-section,
Waulsortian mound,
Ireland

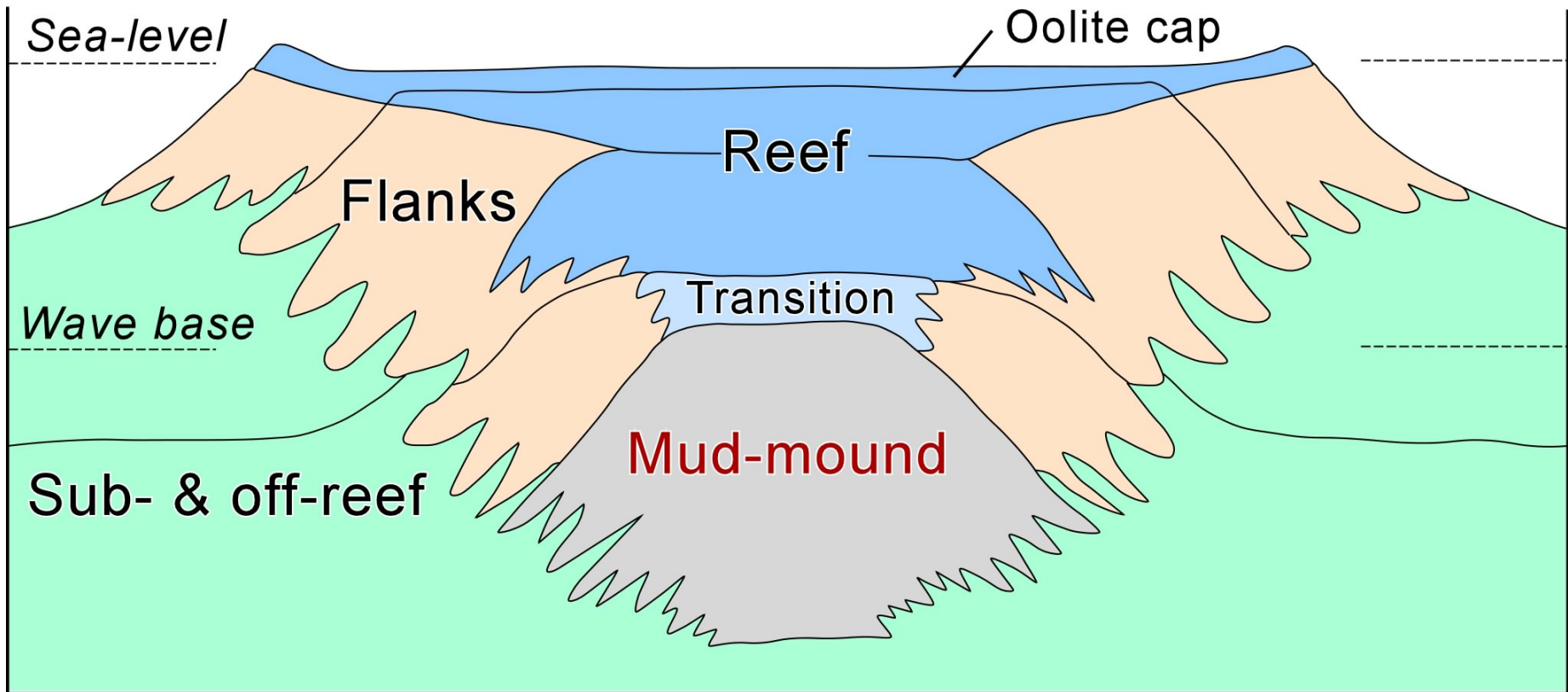
1 cm



➤ Waulsortian-type « mudmounds »



Back to the original object of Textoris (1966)



Textoris & Carozzi, 1964

Conclusions

- ❑ Mudmound is not any mud-rich, mound shaped buildup
- ❑ It is a carbonate buildup whose accretion is not controlled by organisms
- ❑ It is the product of a carbonate system based on organomineralization-cementation processes
- ❑ It is a diagenetic buildup that would not exist without the action of organomineralization

Thanks to UNESCO-IGCP Project 380