Paleoecology of heliolitid corals from Wellin bioherm (Eifelian, Dinant Synclinorium, Belgium): preliminary results

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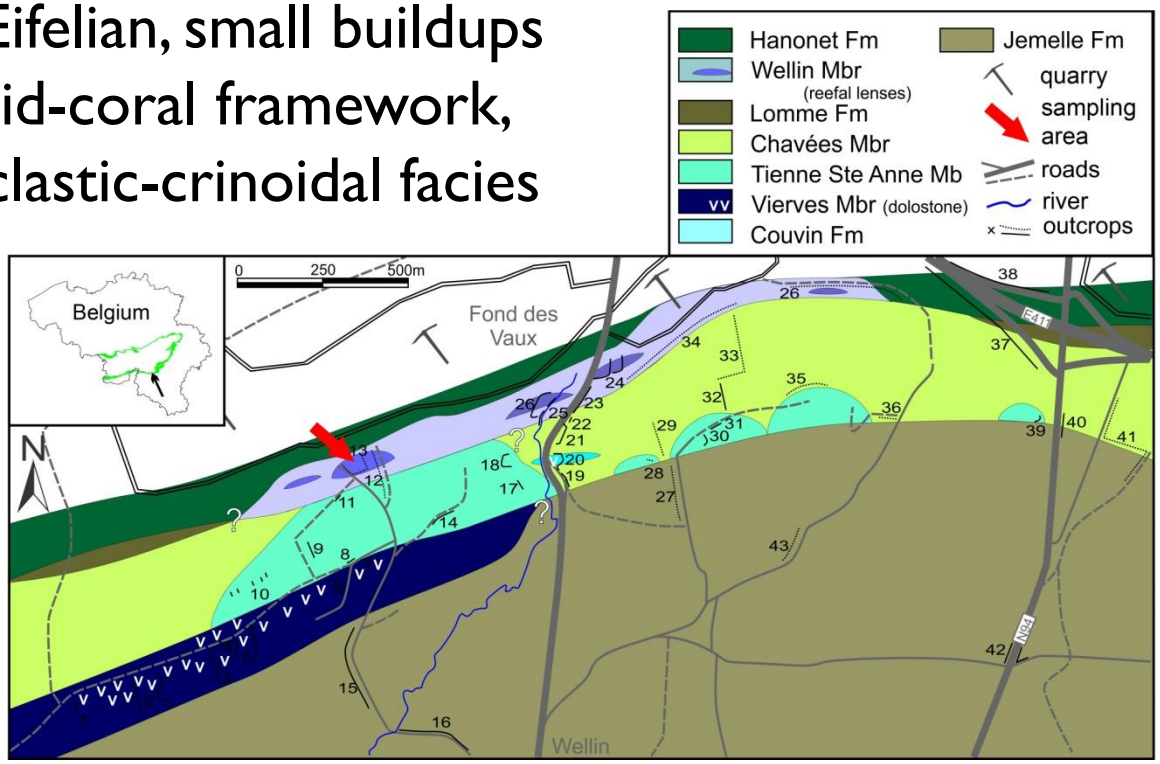
Geological setting

- 40 km SE of Dinant, Belgium
- Southern parts of the Dinant Synclinorium
- Upper Eifelian–Lower Givetian Hanonet Fm
- Wellin Mb: Upper Eifelian, small buildups with stromatoporoid-coral framework, surrounded by bioclastic-crinoidal facies
- Located on the paleohighs of the Jemelle Fm



Geological map of the Wellin and Fond-des-Vaux area (Denayer, *in press*, modified).

Aims & methods

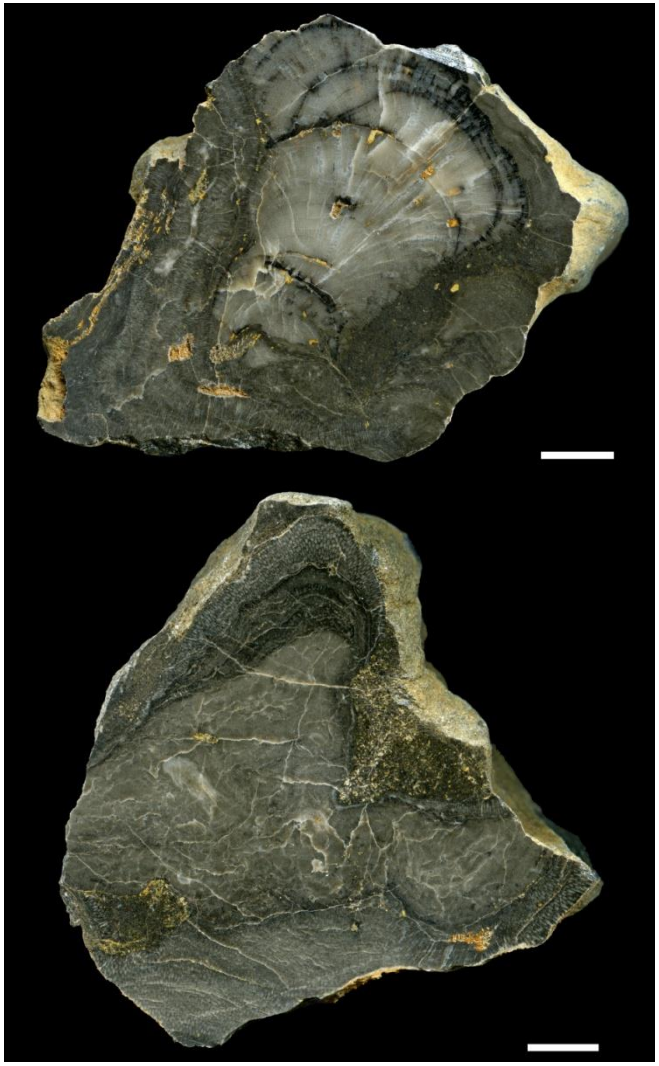
Reconstruction of paleoenvironmental factors controlling the growth and development of heliolitid corals from Wellin.

- Heliolitid coral taxonomy
- Growth forms and growth patterns analysis
- Evaluation of taphonomic signatures
- Comparison with Middle Devonian heliolitid material from Morocco, Poland, and other outcrops in Belgium
- Comparison with modern analogues (genus *Heliopora*)

Improved understanding of the paleoecology of heliolitids in general and the genus *Heliolites* in particular.

Reefal assemblage

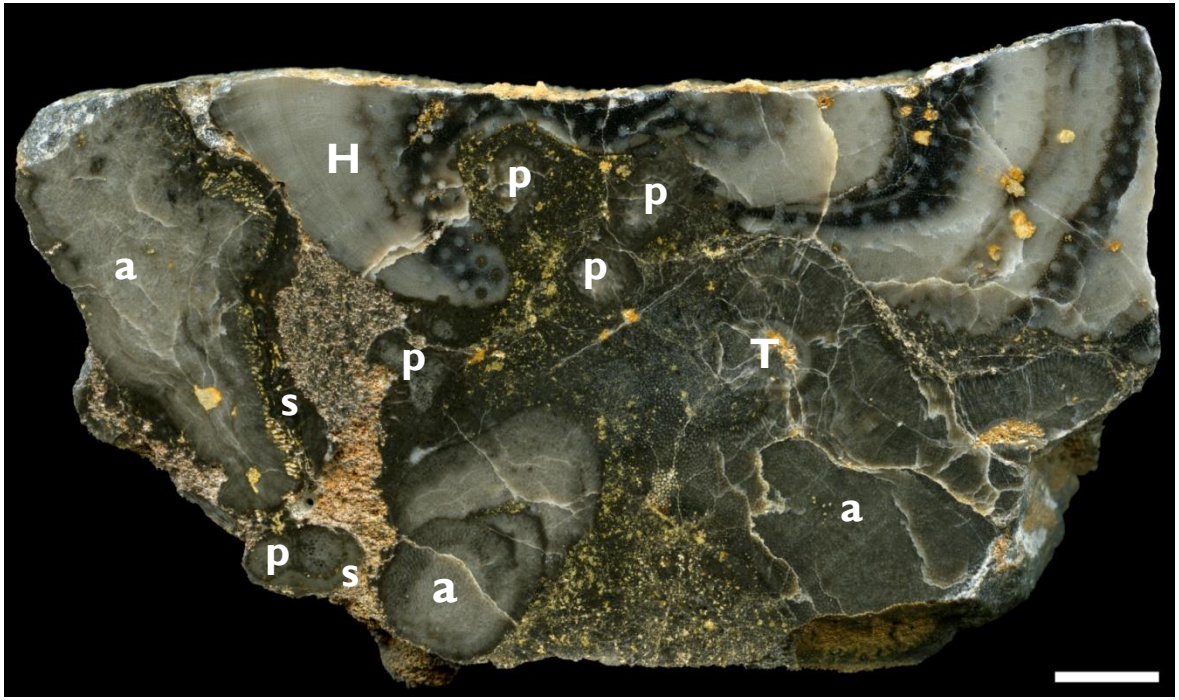
- Stromatoporoids, commonly with caunopore tubes
- Heliolitids (*Heliolites ?porosus*)
- Other tabulates: alveolitids, favositids, coenitids, pachyporids. Abundant, but not very diverse.
- Solitary rugose corals (genera: *Temnophyllum*, *Mesophyllum*, *Lyrielasma*)
- Colonial rugose corals (genera: *Spongophyllum*, *Cyathophyllum*)
- Crinoids



All scale bars are 1 cm

Facies

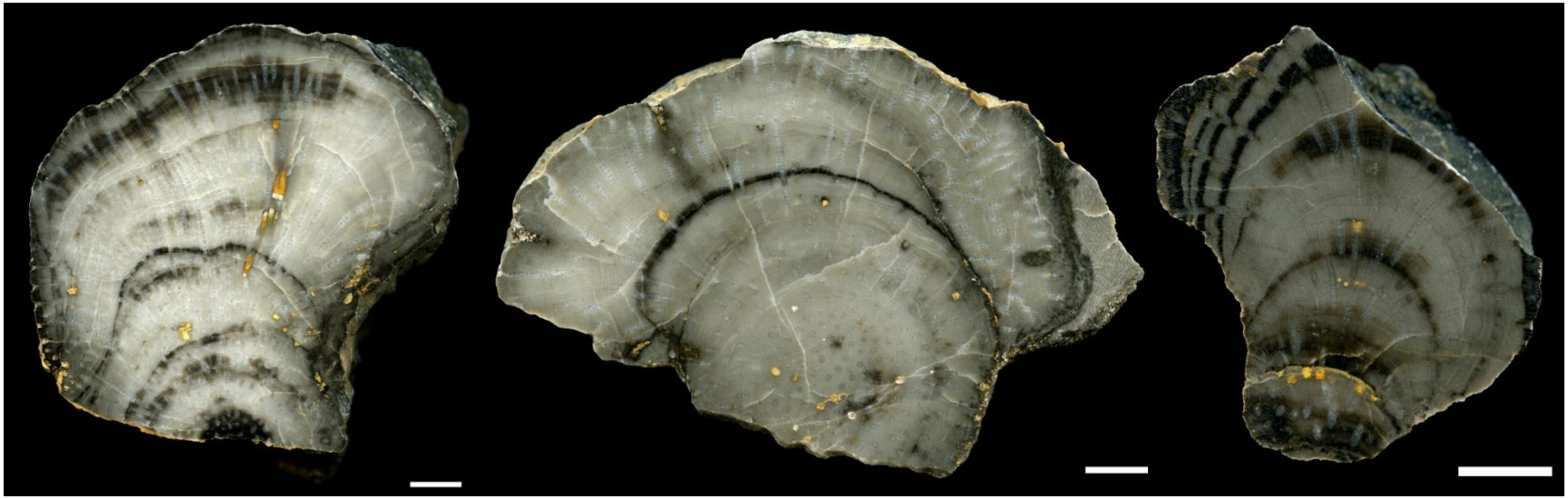
- Small bioherms surrounded by crinoidal limestone
- Packstone-wackestone matrix
- Corals and stromatoporoids ?paraautochthonic
- Skeletons mostly in contact, forming a ?framework



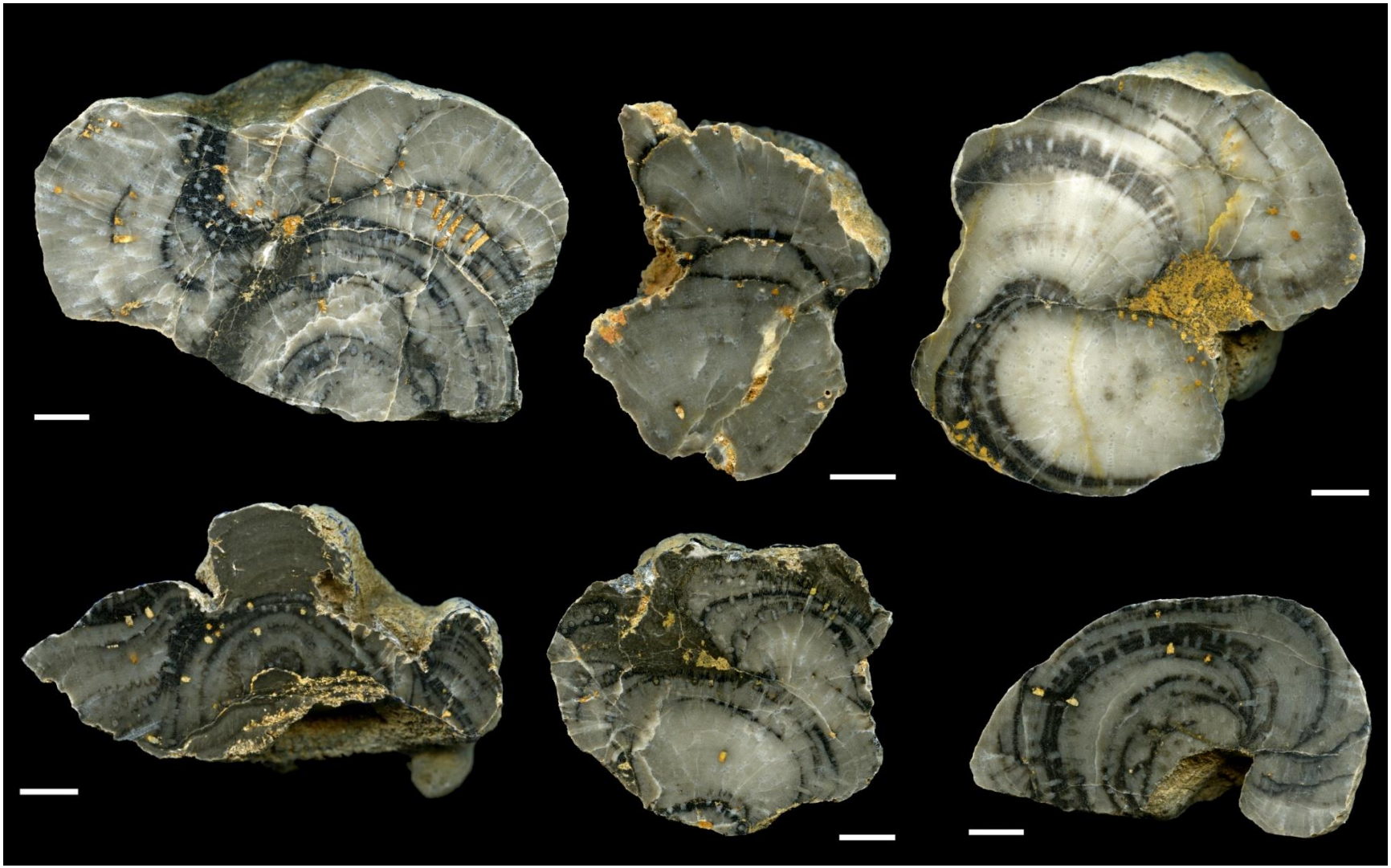
H – Heliolites
T – Temnophyllum
a – alveolitid coral
p – pachyporid coral
s – stromatoporoid

Heliolitid corals

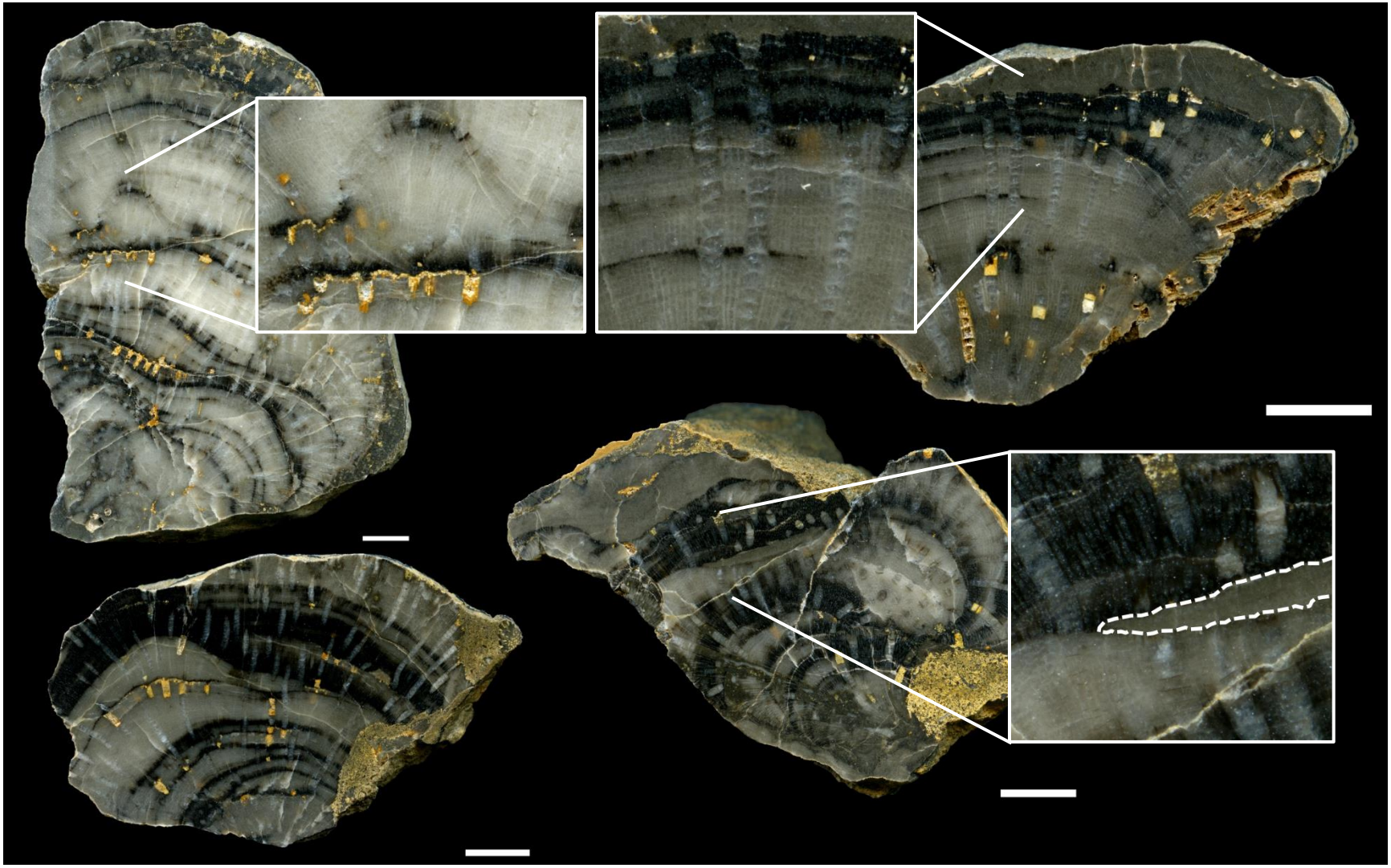
- Very abundant
- Small to medium sized (3.4-14.9 cm in diameter)
- Bulbuous, domal, flattened, irregular growth forms
- Growth interruption surfaces, rejuvenations – very common
- Encrustations – very common; borings – moderately common
- Commonly settled on other organisms



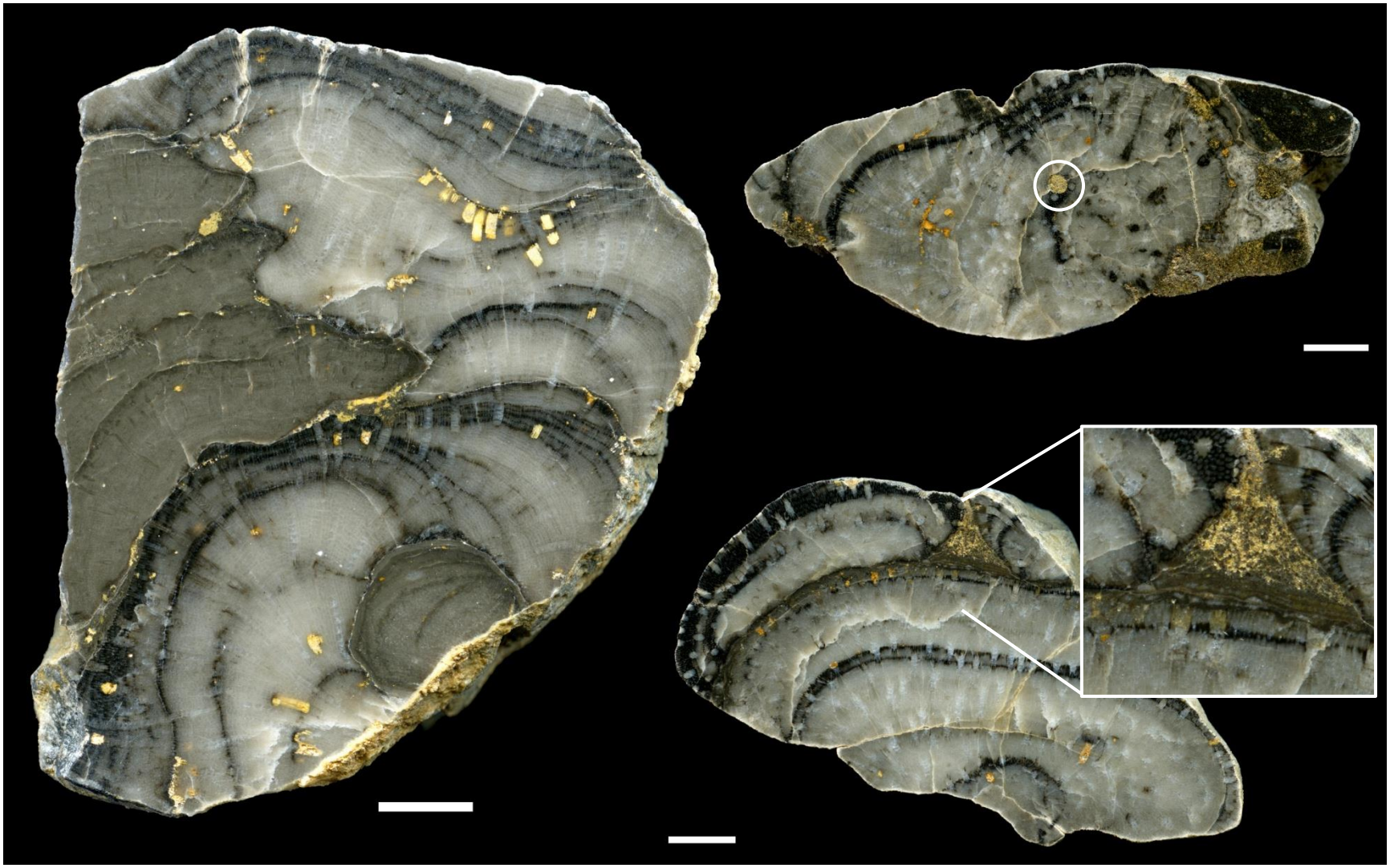
Growth forms



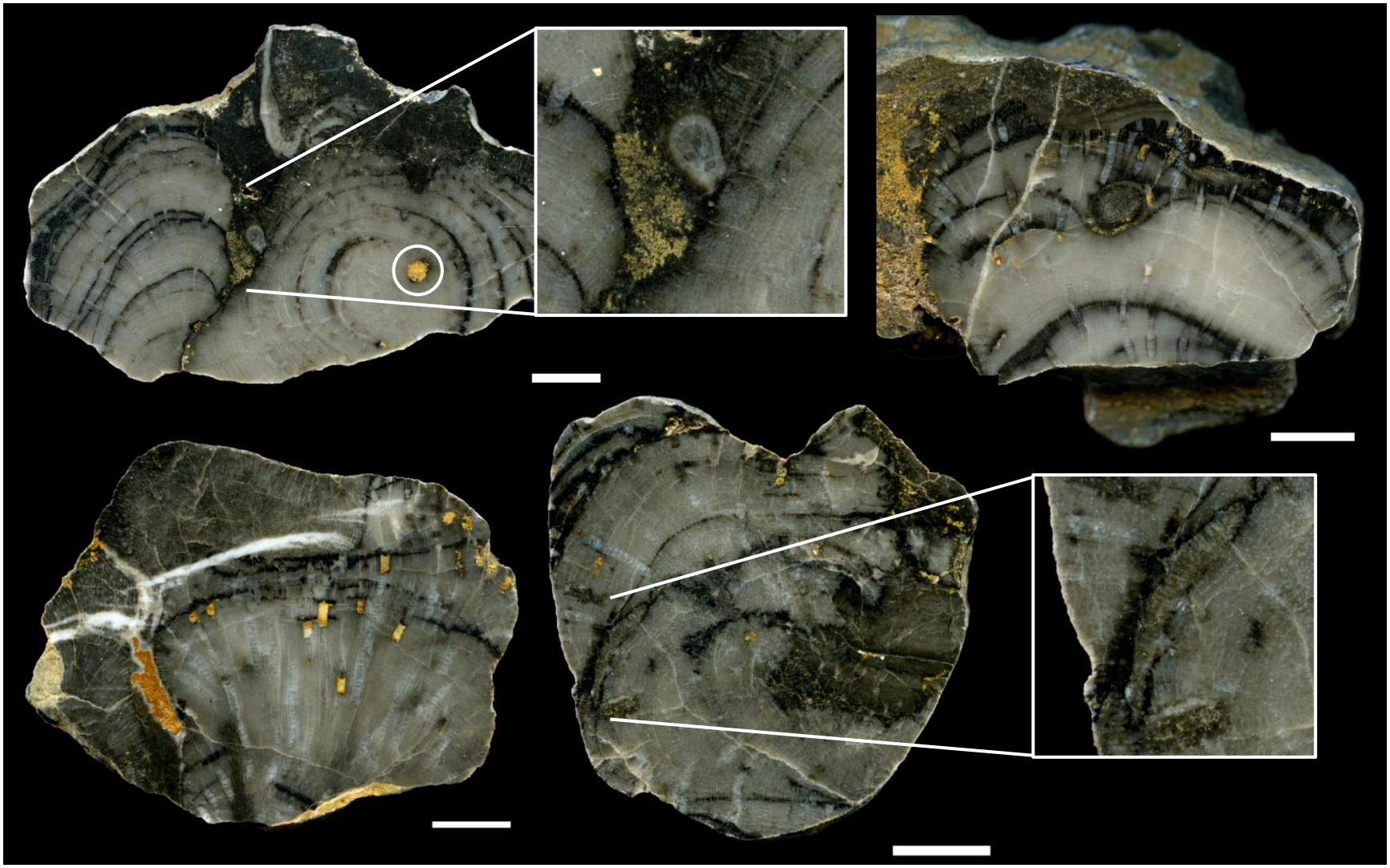
Growth interruption surfaces



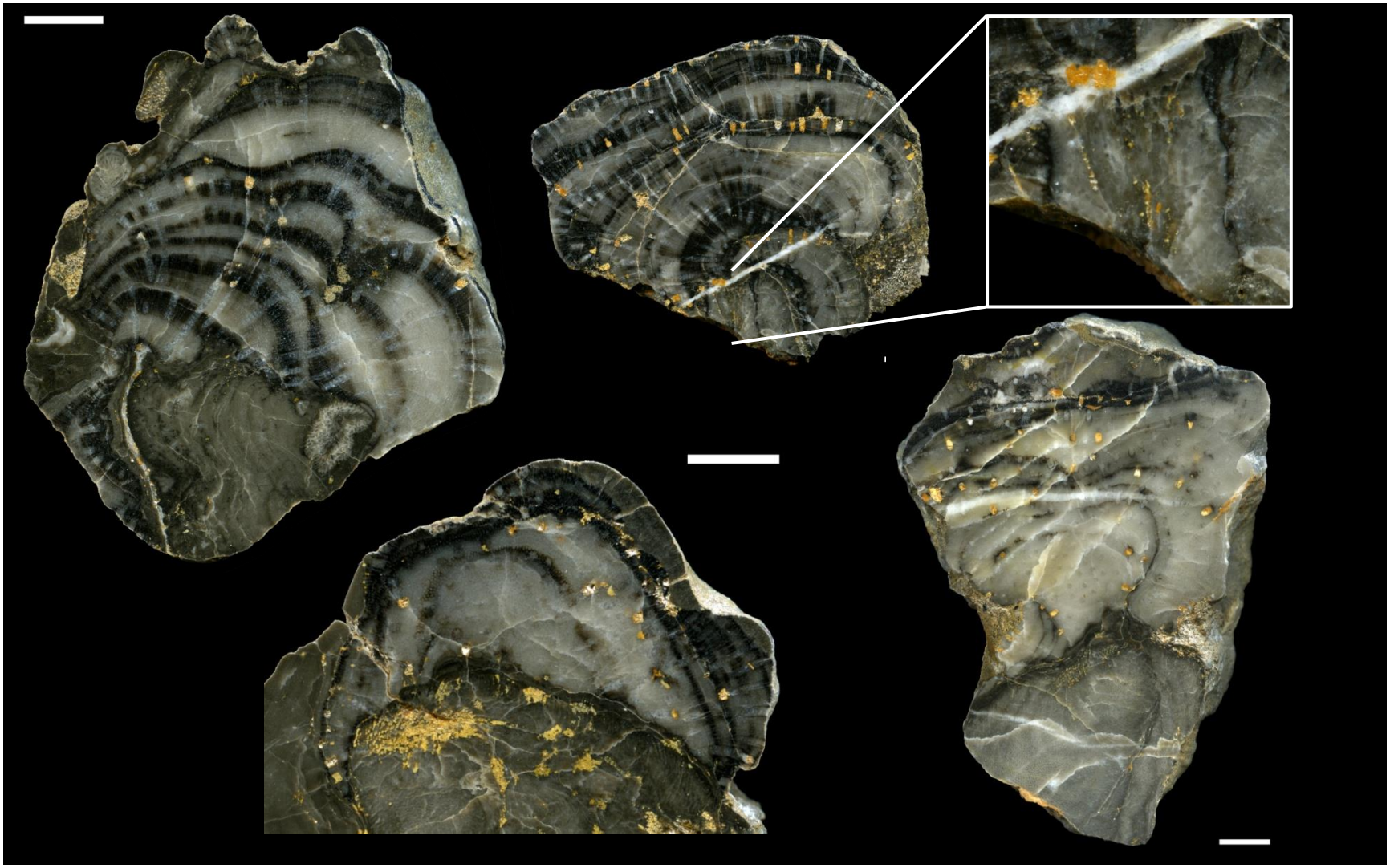
Encrustation & bioerosion



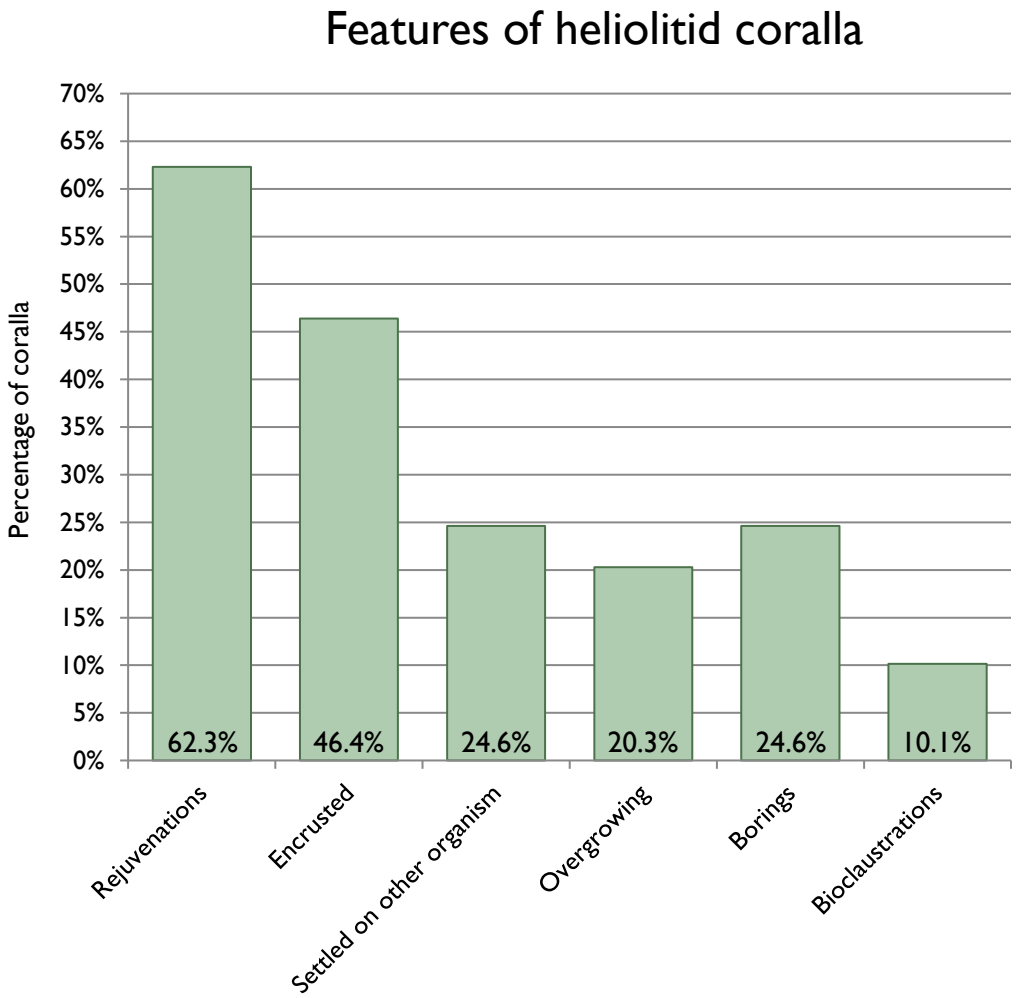
Encrustation & bioerosion



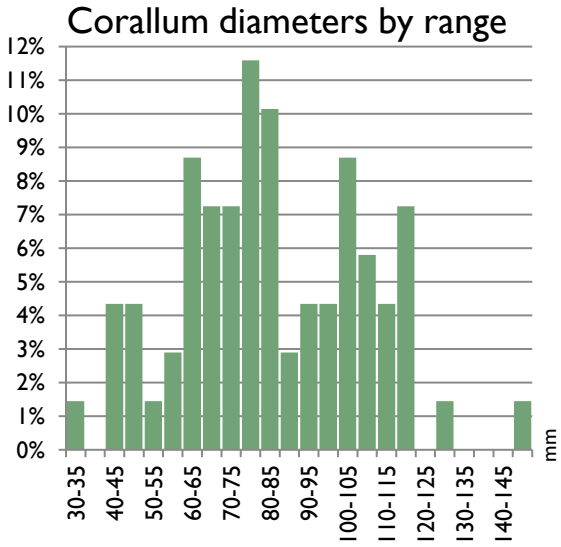
Settlement on other organisms



Results summary



Corallum diameters:
mean = 82.8 mm
standard deviation = 23.9 mm
coefficient of variation= 0.288
range = 33.9 - 148.9 mm

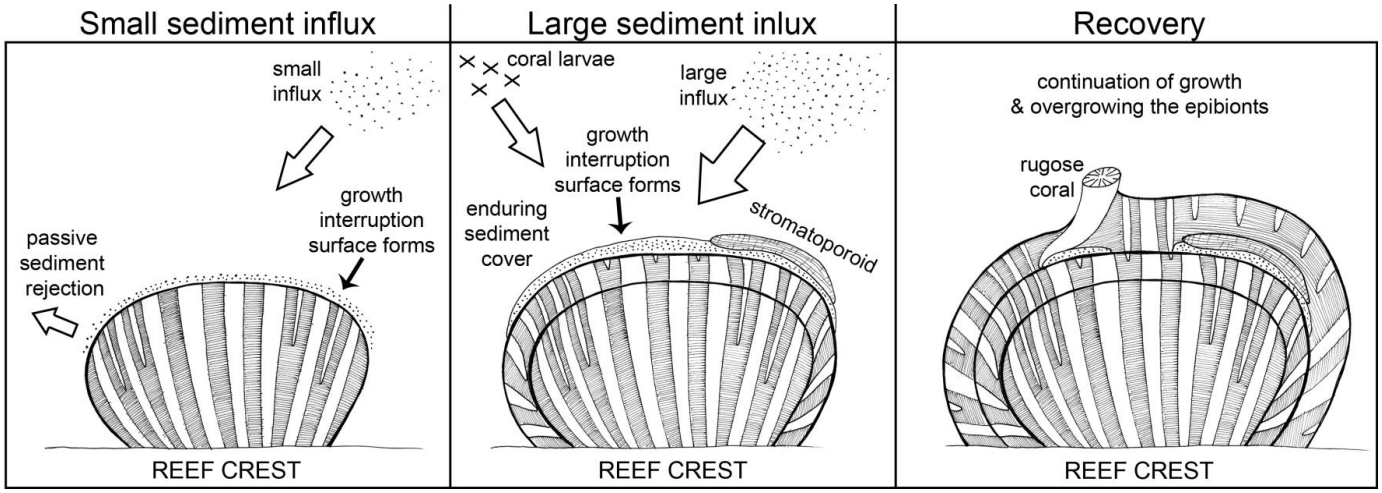


Interpretation

- Commonly settled on other organisms, prevalence of micritic matrix – scarcity of hard substrate?
- Paraautochthonic, overturned coralla, sediment-derived growth interruption surfaces, prevalence of carbonate mud – relatively low energy setting with storm episodes?
- Prevalence of domal growth forms – relatively low sedimentation rate
- Syn-vivo encrustations, scarcity of hard substrates – competition for space
- Periodically increased hydrodynamics, abundance of massive corals and stromatoporoids – relatively shallow*, within the reach of storm wave base
- Paleohighs of Jemelle Fm – favourable trophic conditions

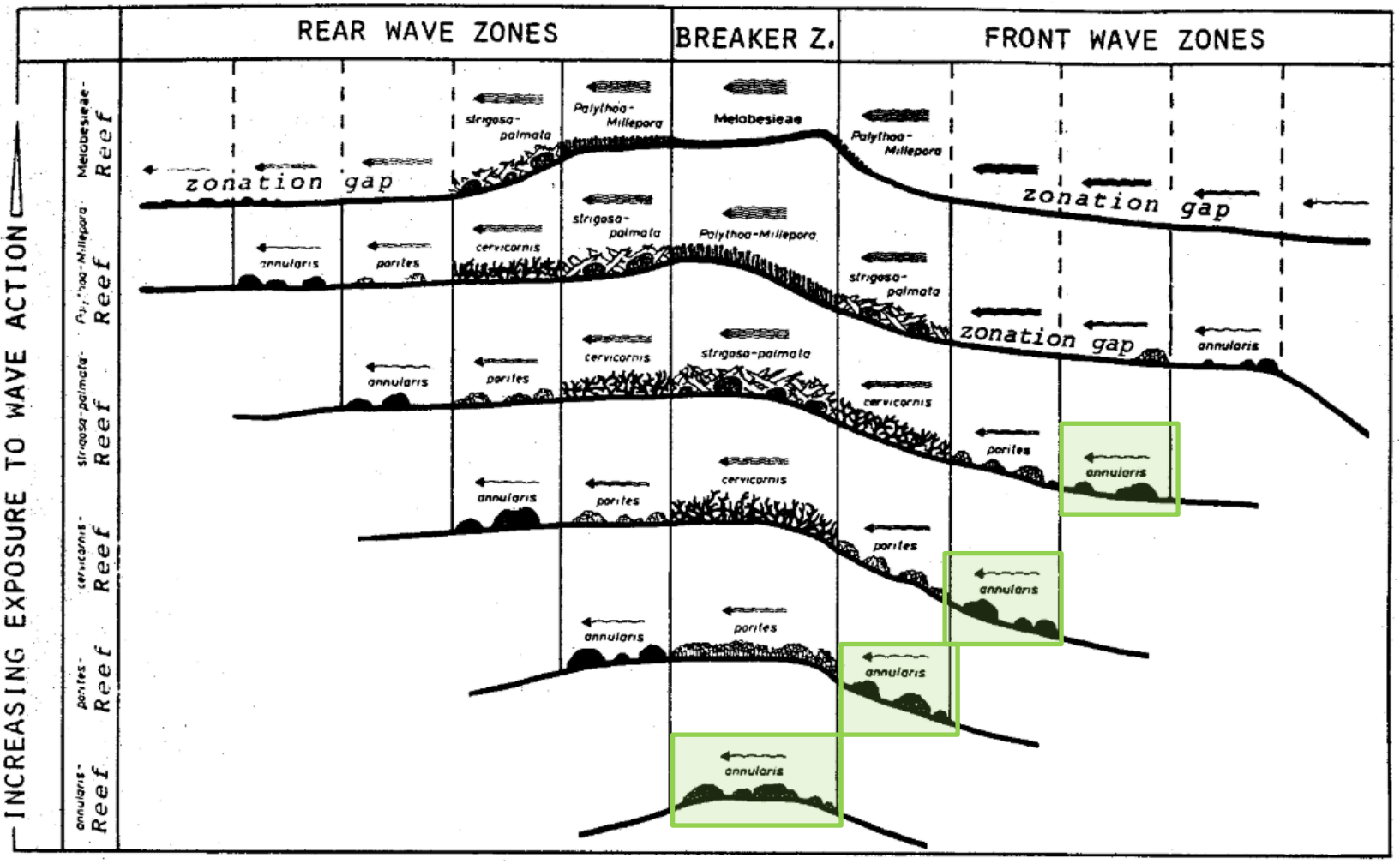
Comparisons

- Similar growth patterns and inferred paleoenvironment to Givetian *Heliolites porosus* of Aferdou el Mrakib (Morocco)
- Similar resistance to sediment cover as *Heliopora coerulea* (Wesseling et al. 1999)
- *Heliolites* and massive stromatoporoids inhabiting the same niche? (similar to Moroccan, Polish *Heliolites*)
- Life environment corresponding to the scleractinian annularis zone? (Geister 1977, Machel & Hunter 1994).



Reconstruction of survival strategies of *Heliolites porosus* under sedimentary stress (Król et al. 2018, modified).

Comparisons



Idealized wave zonation of the six basic Caribbean reef types (Geister 1977).

Conclusions

- The results of the preliminary analyses of *Heliolites* from Wellin conform well with the data on heliolitids from Morocco and Poland.
- The presence of the paleohighs possibly provided the corals with better life conditions and therefore controlled the distribution of the bioherms.
- The hypothesis of *Heliolites* being a resilient genus, capable to withstand sedimentary stress, scarcity of hard substrates, competition for space, and storm events, is further reinforced.
- *Heliolites* commonly co-occuring with massive stromatoporoids of similar growth forms might suggest that their development was largely controlled by the same factors and they preferred similar environments.

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Thank you for your attention.

Research funded by the National Science Centre of Poland
grant no. 2017/27/N/ST10/01776

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