MORPHOMETRICAL ANALYSIS OF THE ASPIDOLITHUS/BROINSONIA GROUP AROUND THE SANTONIAN–CAMPANIAN BOUNDARY IN THE LOIBICHL SECTION (AUSTRIAN EASTERN ALPS)

Paula **GRANERO**[1*], Adam **WIERZBICKI**[2] and Michael **WAGREICH**[1]

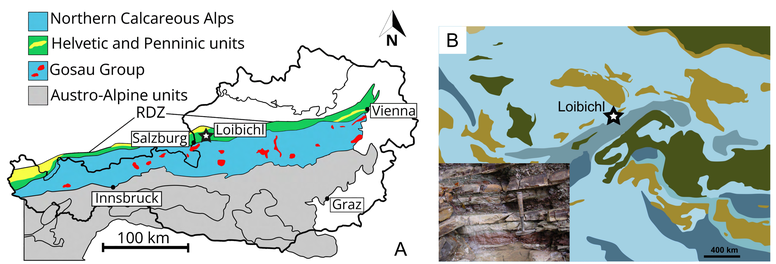
[1]Department of Geology, University of Vienna, Josef-Holaubek-Platz 2, 1090 Vienna, Austria, paula.granero.ordonez@univie.ac.at; [2]Institute of Geological Sciences, Jagiellonian University in Krakow, Gronostajowa 3a, 30-387 Kraków, Poland

This presentation participates in OSPP

Outstanding Student & PhD candidate Presentation contest

INTRODUCTION & GEOLOGICAL SETTINGS

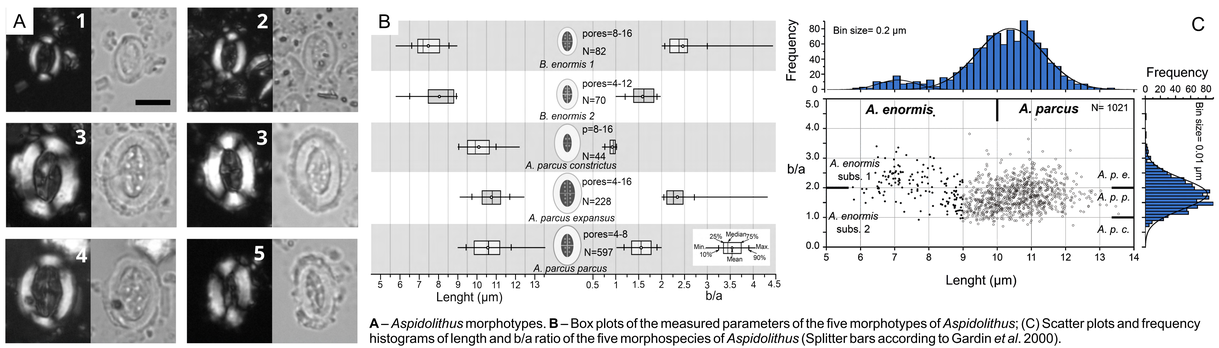
The present study focuses on the light-microscope morphometric analysis of *Broinsonia/Aspidolithus* group, in the Lower Campanian (UC14a–UC14b) in the Loibichl section (Austrian Eastern Alps).



A – Sketch map of Austria with the studied area marked by a white star, RDZ: Rhenodanubian Flysch Zone. **B** – paleogeographic reconstruction of Europe during the Late Cretaceous (redrawn after Wolfgring et al. (2021)). Lithological composition of the Loiblichl section with a dominance of characteristic reddish colour shales (*see* picture).

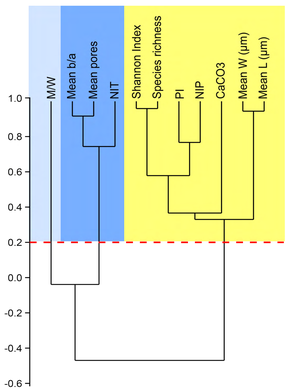
MORPHOMETRICAL ANALYSIS

Five morphotypes were distinguished: (1) *B. enormis* subs. 1; (2) *B. enormis* subs. 2. (3) *A. parcus expansus*. (4) *A. parcus parcus*. (5) *A. parcus constrictus*. Morphometric analysis: distinction between small morphotypes (L<8 µm; *B. enormis* or "small" *A. parcus* sensu Gardin *et al*. (2021) and "large" *A. parcus/B. parca* group (L>8 µm).

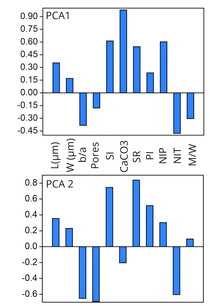


A – *Aspidolithus* morphotypes. **B** – Box plots of the measured parameters of the five morphotypes of *Aspidolithus*; (C) Scatter plots and frequency histograms of length and b/a ratio of the five morphospecies of *Aspidolithus* (Splitter bars according to Gardin *et al*. 2000).

STATISTICAL ANALYSIS

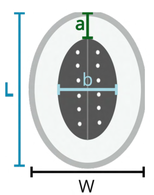


PCA	Eigenvalue	% variance
1	142.707	75.453
2	45.7915	24.211



Multivariate method of R-mode cluster analysis using the Pearson Correlation Coefficient (PCC= 0.906) and Principal Component Analysis (PCA) loadings

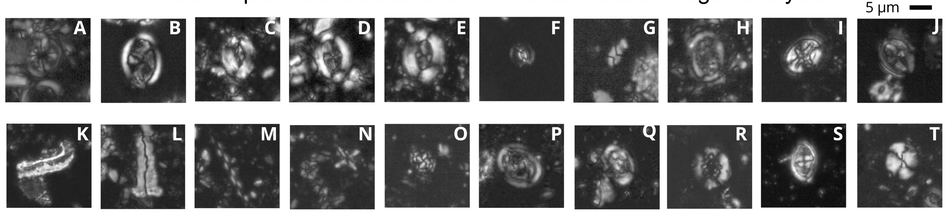
MATERIALS AND METHODS



A total of 1021 specimens with a moderate to good state of preservation of *Aspidolithus* spp. have been measured using *JMicroVision* software.

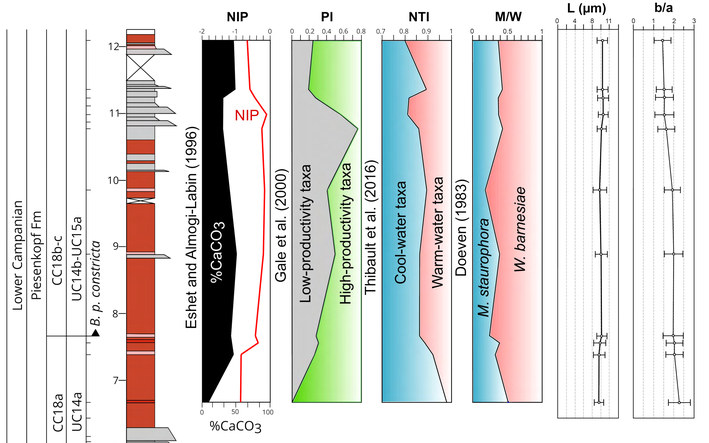
(1) length (L) and width (W) of the coccolith;
(2) b/a ratio;
(3) Number and arrangement of perforations in the central area.

Semi-quantitative calcareous nannofossil assemblages analysis



Common taxa: **A** – *Ahmuerella octoradiata*. **B** – *Arkhangelskiella cymbiformis*. **C** – *Aspidolithus parcus constrictus*. **D** – *Aspidolithus parcus expansus*. **E** – *Aspidolithus parcus parcus*. **F** – *Biscutum constans*. **G** – *Calculites obscurus*. **H** – *Cribrosphaerella ehrenbergii*. **I** – *Eiffellithus eximius*. **J** – *Gartnerago* cf. *obliquum*. **K** – *Lucianorhabdus cayeuxii*. **L** – *Lucianorhabdus maleformis*. **M** – *Microrhabdulus decoratus*. **N** – *Micula staurophora*. **O** – *Prediscosphaera cretacea*. **P** – *Reinhardtites anthophorus*. **Q** – *Reinhardtites levis*. **R** – *Retecapsa crenulata*. **S** – *Tranolithus orionatus*. **T** – *Watznaueria barnesiae*.

PALAEOENVIRONMENTAL PROXIES



Changes in the $CaCO_3$, Nannoplankton Productivity Index (NPI), Productivity Index (PI;), Nannofossil Temperature Index (NTI), and the ratio of *M. staurophora/W. barnesiae* (M/W) in the Loibichl section.

CONCLUSION

- Throughout the section, 3 of the evolutionary trends reported by Lauer (1975) can be observed in the studied material:
  (1) slight overall increase in coccolith size,
  (2) reduction of the central area,
  (3) overall reduction in number of perforations in the central area.
- No significant trends are shown in the results that would allow for a natural division from the "*subspecies*" of the *A. parcus* group.
- The cluster and PCA analysis suggest a correlation in two different trends:
- (1) Maximum lenght and width, Shannnon Index, NPI, PI and $CaCO_3$,
  (2) b/a, M/W, perforations and NTI.
- Futher comparisons with other records and more detailed investigations in terms of global factors are necessary to confirm environmental influence for the size variation.

REFERENCES

Doeven, P. H. 1983. Geological Survey of Canada (356).
Gale, A. S., *et al.* 2000. Journal of the Geological Society, 157(4), 745–757.
Gardin, S., *et al.* 2001. Developments in Palaeontology and Stratigraphy 19, 745–757.
Lauer, G. 1975. Archives des Sciences de Genève 28, 259–262.
Thibault, N., *et al.* 2016. Climate of the Past 12(2), 429–438.
Wolfgring, E., *et al.* 2021. Cretaceous Research (120), 104704.

ABSTRACT

Sharing not permitted