

Mgr. Marta L. H. Kerkhoff

Tracing Microendolithic Ichnocenoses: A paleoecological and taphonomic approach over the Phanerozoic

The PhD. dissertation represented results of studies of microbial activity in marine environments of three different areas and stratigraphic levels. The presented work mainly represents the theoretical basis of the subject of the dissertation. The author summarized the current knowledge about the paleoecology and taphonomy of microbial endolithic structures from marine hard substrates.

The results were processed in three publications (two published in *Marine Micropaleontology* and *Paleoworld*, one submitted to *Cretaceous Research*).

Actuality of the selected topic

The doctoral student worked on an interesting topic in micropaleontology devoted to the issues of bioerosion on various substrates, primarily the shells of organisms. The publication of the results in prestigious journals proves its relevance.

Selected processing methods

The author used a number of methods from optical microscopy, resin casts preparation, SEM, MicroCT and the NannoCT, X-ray tomography, not only for the study of microstructures but also sulphur, phosphorus and iron in biofilm. The study is based on extensive material on the one hand from Barrandian area (was a survey over 792 thin sections, clasts and shells from Ordovician to Middle Devonian of Prague Basin), from Sassnitz (Germany, approximately 100 tests of foraminifera Maastrichtian) and Western Carpathians (out of 300 individual foraminiferal tests from Oligocene and Miocene).

Evaluation of the results achieved by the doctoral student

The results are presented especially in the published papers. The results consist of analyzes and observations of three stratigraphic levels.

Paleozoic interval from the Ordovician to the lowermost Devonian is characterized by rare microbioerosion structures produced by the combined bacterial and fungal activity on the bioclast surface. This trend may partially reflect the Mid- Palaeozoic marine development which was more likely driven by local factors such as the drift of this area from temperate to tropical climate zone.

Gradually reduce microboring structures with the decrease of oxygen content, and the increasing precipitation of framboidal pyrite at the same time were observed on the tests of benthic foraminifera in the Oligocene and Miocene.

On material from the White Chalk at the coastal area in the Baltic Sea, Germany, whose exposed layers were deposited during the lower Maastrichtian microendolithic organisms are represented by Chlorophytes, red algae, and heterotrophic fungi that actively penetrate carbonate substrates.

Formal arrangement of the dissertation and language level

The dissertation is well structured. The actual text part is suitably complemented by pictures. The cited sources are reflected, understood and used functionally.

Not all works cited in the text are listed (e. g., Jacques et al., in prep.).

Not all citations in the references are sorted alphabetically correctly.

Language and spelling without reservation.

Review questions and comments on the dissertation

Considering that the work is represented as a set of publications that have gone through a proper review process, I do not have many comments on the work.

In addition to the presented bioclastic material, did you study microbial activity on hard substrates?

In addition to benthic foraminifera from Rügen chalk, would it be possible to study microbial activity on macrofauna, e.g. belemnites?

Final evaluation

The dissertation fulfils the conditions of creative scientific work for the award of the Ph.D. degree.

I evaluate the dissertation as original and up-to-date. The author has fulfilled the set objectives and therefore I recommend the dissertation for defence. I propose to award Marta Kerkhoff by academic degree philosophiae doctor – Ph.D.

In Ostrava on March 15, 2024



prof. Ing. Petr Skupien, Ph.D.
Katedra geologického inženýrství
VŠB-Technická univerzita Ostrava
17. listopadu 15
708 33 Ostrava-Poruba