

HABILITATION THESIS REVIEWER'S REPORT

Masaryk University

Applicant

Mgr. Tomáš Kumpan,
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Habilitation thesis

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Reviewer

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Mgr. Tomáš Kumpan, Ph.D.

Doctor Kumpan has clearly demonstrated expertise in several fields: conodont taxonomy, conodont biostratigraphy, carbonate petrology, and trace metal/rare earth element geochemistry which are used for integrated chronostratigraphy in solving geological problems, in his case, focused primarily in Upper Devonian and Carboniferous studies, a time of major global change marked by two mass extinctions and the establishment of the first forested terrestrial ecosystems. Kumpan has also investigated Ordovician strata and has a profound knowledge of the Moravian Karst – indicated by numerous excursions he has lead with colleagues and students, Czech geology, and the geology of central Europe.

Kumpan has published numerous articles as lead author or co-author that have been impactful and standard references for work on the Hangenberg Crisis and the associated Devonian-Carboniferous boundary, notably Kumpan et al. 2014a, 2014b, 2019, 2021; Babek et al., 2016; Kalvoda et al., 2018, 2019; Kaiser et al., 2020; Spalletta et al., 2021; and Hartenfels et al., 2022. This expertise is recognized by membership on the International Union of Geological Sciences Subcommittee on Devonian Stratigraphy, Subcommittee on Carboniferous Stratigraphy on which he is a voting member (Titular), and a member of the Devonian/Carboniferous Boundary Working Group that has been tasked with the redefinition of the base of the Carboniferous and Tournaisian and designation of a new type section and

point. Kumpan is an active member and his wide range of expertise – regional and global – gives weight to his opinions.

Kumpan is an expert on *Protognathodus* and *Siphonodella* taxonomy. These are the two genera used for zonal designations in the highest Devonian and Tournaisian (lower Carboniferous). Three articles as co-author, one of which is a student lead author publication: Kaiser et al., 2017; Zhuravlev et al., 2021; and Cigler et al., 2025; demonstrate this expertise. These articles document subtle, but important differences in conodonts used for zonation and recognition of the D-C boundary, complicated by the non-cosmopolitan distribution of these taxa.

The geochemical works produced by Kumpan are multidisciplinary – the nature of science in general, where multiple areas of expertise are combined in able to answer questions – where he has access to the instrumentation at MUNI, a laser ablation inductively coupled plasma mass spectrometer (LA-ICP-MS), to measure trace metals and rare earth elements (REEs) from small areas with very high sensitivity. This has allowed measurements of elemental composition from single laminae to determine the depositional conditions of problematic strata, in several cases associated with the Devonian mass extinctions: Kumpan et al., 2015, 2019; Kalvoda et al., 2019; Babek et al., 2021a, 2021b, 2022, 2026; Vodrážková et al., 2025. These studies require patience, expertise in data manipulation, and in-depth knowledge of marine water and sediment chemical and oxygenation systems. This understanding of conditions at mass extinction events then has relevance to modern oceanic and sediment changes.

Doctor Kumpan is an impressive scientist who has developed significant working relations with numerous colleagues in several fields. This group is productive and have produced published works that have contributed to a better understanding of earth systems, Devonian mass extinctions, and the nature of marine strata during these crisis intervals. Kumpan has also supervised graduate students that have also made significant contributions to the scientific literature. These accomplishments fulfil the requirements expected of a habilitation thesis in the field of Geologie.

Reviewer's questions for the habilitation thesis defence (number of questions up to the reviewer)

Question 1. Are Global Stratotype Sections and Points necessary, justify, and if not, are there viable alternatives?

Question 2. In conodonts, and other fossils, morphotypes that have the characteristics of a taxon from a significantly higher interval are not uncommon, especially in samples that have yielded numerous specimens. What criteria for taxon recognition should be used, especially when other stratigraphic or biostratigraphic indicators suggest an index taxon may be out of place?

Question 3. Geochemical data represent a moment in time or a time averaged sample of a moment in time. How can this single sample bias be reconciled with an interpretation of regional conditions in a sedimentary basin, or global conditions when correlated from basin to basin?

Conclusion

The habilitation thesis entitled Time control and reconstruction of paleoenvironmental changes from Paleozoic carbonate record] by Tomáš Kumpan **fulfils** requirements expected of a habilitation thesis in the field of Geologie.

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Signature: