

HABILITATION THESIS REVIEWER'S REPORT

Masaryk University

Applicant

Mgr. Tomáš Kumpan, Ph.D.

Habilitation thesis

Time control and reconstruction of paleoenvironmental changes from Paleozoic carbonate record

Reviewer

Sarah K. Carmichael, Ph.D.

Reviewer's home unit, institution

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I have been requested to write a letter of support for the habilitation thesis defence of Tomáš Kumpan, of Masaryk University. Dr. Kumpan is well-regarded in my field and is the expert on the Paleozoic rocks of the Moravian Karst region as well as in the Namur-Dinant basin in Belgium. I first met Dr. Kumpan in 2015 at a joint International Geoscience Programme 596 and Subcommission on Devonian Stratigraphy conference. I was mostly familiar with his dissertation research at that time, and so we were eager to discuss our projects (his in Europe, and mine in Asia). Dr. Kumpan was one of the few people in the early 2010s who was regularly using whole rock and trace element geochemistry (rather than just stable isotopes) to determine the nature of Devonian anoxia and extinction events.

I have used many of Dr. Kumpan's journal articles on his geochemical work in Belgium, the Czech Republic, and Carnic Alps as a guide for my own research (Bábek *et al.*, 2016; Kalvoda *et al.*, 2019; Kumpan *et al.*, 2014a; Kumpan *et al.*, 2014b; Kumpan *et al.*, 2019; Kumpan *et al.*, 2015). In the past 12 years, Dr. Kumpan's work has expanded from broad geochemical assessments of Devonian extinction horizons to detailed LA-ICPMS microgeochemistry approaches. These LA-ICPMS trace element measurements of individual minerals provide far greater clarity on the mineral species that are responsible for whole rock geochemical variations, and lead to important questions about the applicability of chemostratigraphy using whole rock geochemistry, particularly in regard to trace and rare earth elements. His work has the potential to really reform and reconfigure the way that we approach chemostratigraphy.

I have also actively followed Dr. Kumpan's work on the redefining of the Devonian-Carboniferous boundary (DCB). This redefinition has inspired hours (years!) of heated debate in the conodont biostratigraphy community and in the Subcommission on Devonian Stratigraphy. He has been an integral part of solving a truly frustrating and long-standing problem, where the index conodonts that defined the boundary (and a major mass extinction) were determined to be unreliable nearly 20 years ago. The new four-part criteria which he helped develop for determining the DCB has been a vital step forward, particularly in my field sites where it is either difficult to find conodonts or difficult to see evidence of a regression (or both). His work on this project is particularly commendable, not only for his scientific contributions on the chemostratigraphy of the DCB, but it also deeply impresses me when a geochemist has the patience to sit through extended arguments about conodonts.

Although I have been asked to write specifically about his research (47 papers in 16 years!), I also want to note that he also has a wide variety of teaching responsibilities, supervises graduate student theses, has a history of successfully funding projects through grant agencies, and provides service to the profession. He is well-respected across the Devonian community and I am eager to see how his work evolves and progresses throughout his impressive career.

Reviewer's questions for the habilitation thesis defence:

1. How often does your LA-ICPMS microgeochemistry work contradict whole rock geochemical signatures? What would you suggest as best practices for incorporating whole rock geochemistry when microgeochemistry is not available?
2. How do you propose that the four-part criteria for determining the Devonian-Carboniferous boundary be used in facies that do not record all four criteria (i.e. no conodonts, or no evidence of a regression)? Are three parts sufficient, or even two?

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 geology.

Date: August 17, 2026

Signature:

References Cited:

- Bábek, O., Kumpan, T., Kalvoda, J., and Grygar, T. M., 2016, Devonian/Carboniferous boundary glacioeustatic fluctuations in a platform-to-basin direction: a geochemical approach of sequence stratigraphy in pelagic settings: *Sedimentary geology*, v. 337, p. 81–99.
- Kalvoda, J., Kumpan, T., Qie, W., Frýda, J., and Bábek, O., 2019, Mercury spikes at the Devonian-Carboniferous boundary in the eastern part of the Rhenohercynian zone (central Europe) and in the South China block: *Palaeogeography, Palaeoclimatology, Palaeoecology*, 10.1016/j.palaeo.2019.05.043.
- Kumpan, T., Bábek, O., Kalvoda, J., Matys Grygar, T., and Frýda, J., 2014a, Sea-Level and Environmental Changes Around the Devonian–Carboniferous Boundary in the Namur–Dinant Basin (S Belgium, NE France): A Multi-proxy Stratigraphic Analysis of Carbonate Ramp Archives and its Use in Regional and Interregional Correlations: *Sedimentary Geology*, v. 311, p. 43–59.
- Kumpan, T., Bábek, O., Kalvoda, J., Frýda, J., and Matys Grygar, T., 2014b, A high-resolution, multiproxy stratigraphic analysis of the Devonian–Carboniferous boundary sections in the Moravian Karst (Czech Republic) and a correlation with the Carnic Alps (Austria): *Geological Magazine*, v. 151, no. 02, p. 201–215.
- Kumpan, T., Kalvoda, J., Bábek, O., Holá, M., and Kanický, V., 2019, Tracing paleoredox conditions across the Devonian–Carboniferous boundary event: A case study from carbonate-dominated settings of Belgium, the Czech Republic, and northern France: *Sedimentary Geology*, v. 380, p. 143–157.
- Kumpan, T., Bábek, O., Kalvoda, J., Grygar, T., Frýda, J., Becker, T. R., and Hartenfels, S., 2015, Petrophysical and geochemical signature of the Hangenberg Events: an integrated stratigraphy of the Devonian-Carboniferous boundary interval in the Northern Rhenish Massif (Avalonia, Germany): *Bulletin of Geosciences*, v. 90, no. 3, p. 667–694.