Habilitation Board Decision on the Nomination for Appointment to Associate Professor

Masaryk University	
Faculty	Faculty of Science
Procedure field	Geology
Applicant	Mgr. Tomáš Kumpan, Ph.D.
Applicant's home unit, institution	Faculty of Science, Masaryk University
Habilitation thesis	Time control and reconstruction of paleoenvironmental changes from Paleozoic carbonate record

Board members

Chair	prof. RNDr. Jaromír Leichmann, Dr. rer. nat. *Faculty of Science, Masaryk University*
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Evaluation of the applicant's scholarly/artistic qualifications

Dr. Kumpan is a stratigrapher whose scientific career has its roots in palaeontology. He began his scientific career with the palaeontological study of Devonian carbonates of the Moravian Karst. Over time, he broadened his scientific interests towards sedimentology and, particularly during the last decade, sedimentary geochemistry, integrated stratigraphy, and palaeoenvironmental reconstruction. His current research combines these disciplines to investigate the evolution of ancient marine environments, palaeoclimatic changes, and major events in Earth's history.

However, he did not remain a classical systematic palaeontologist. His research focuses particularly on the Devonian–Carboniferous transition, the Hangenberg Crisis, and environmental changes during the Early Carboniferous. An important contribution is his involvement in the ongoing international efforts to redefine the global Devonian–Carboniferous boundary (GSSP). His research has contributed to the evaluation of potential boundary stratotype sections, the reassessment of conodont biostratigraphic criteria, and the identification of geochemical and petrophysical markers for high-resolution stratigraphic correlation. His studies have also refined the biostratigraphy and carbon isotope stratigraphy of the lower Tournaisian, including the identification of smaller carbon isotope excursions with potential significance for global correlation.

He has considerably expanded the range of analytical methods used in his research beyond classical palaeontology. Besides biostratigraphy, he employs sedimentological and petrographic methods, petrophysical measurements, particularly gamma-ray spectrometry and magnetic susceptibility, as well as elemental and isotope geochemistry. His research also incorporates advanced microanalytical methods, including LA-ICP-MS, in cooperation with specialised laboratories. Combining these approaches enables detailed reconstruction of environmental changes in marine sedimentary successions.

From a geographical perspective, the Moravian Karst soon became too limited for his research, and he expanded his research to other regions. Apart from the Bohemian Massif, these include France, Germany, Belgium, Sweden, Italy, and China. His investigations include internationally significant geological sections, particularly those related to Devonian and Carboniferous stratigraphy. He also did not remain restricted to the Devonian in terms of geological time and stratigraphy. Although the Devonian and Carboniferous remain his principal focus, his research also covers other parts of the Palaeozoic, as well as Mesozoic and Cenozoic sedimentary successions.

It is obvious that he could not cover such extensive professional activities without wide-ranging national and international cooperation. At Masaryk University, he cooperates with specialists in chemistry, particularly in laser-ablation microanalysis (LA-ICP-MS). In the Czech Republic, he collaborates with colleagues from Palacký University Olomouc, Charles University, the Czech Geological Survey, and institutes of the Czech Academy of Sciences. Abroad, he maintains established research collaborations with scientists from Friedrich-Alexander-Universität Erlangen-Nürnberg, the University of Münster, the University of Trieste, the University of Montpellier, and the Nanjing Institute of Geology and Palaeontology of the Chinese Academy of Sciences, among others. These collaborations have resulted in joint publications and comparative studies of important stratigraphic successions.

Dr. Kumpan is the author or co-author of 30 articles (28 research and two review papers) indexed in the Web of Science, to date 27 October 2026. The number of citations without self-citations is 453, and his h-index is 14. In eight high-quality research outputs, he has made a major contribution, typically as first or corresponding author. His scientific achievements have also been recognised by several Dean's Awards from the Faculty of Science, Masaryk University, including awards for scientific publications and his doctoral dissertation.

Dr. Kumpan has demonstrated research independence through competitive national and international projects. He is currently a co-principal investigator of a Czech Science Foundation project focused on the Daleje Event in the Prague Basin (2026–2028). Previously, he served as co-principal investigator of another Czech Science Foundation project investigating signature of carbonate biogenicity (2020–2024). In 2022, he was the principal investigator of a DAAD-funded research project on Palaeozoic pelagic micrites and their response to global biocrises. He has

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also participated in several other Czech Science Foundation projects addressing stratigraphic boundary events, palaeoclimatic fluctuations, and carbonate sedimentary records as team member and administrator. His experience includes leading smaller research teams, coordinating field and laboratory investigations, and involving students in research.

In addition to fundamental research, he is involved in applied and contract-based geological research, including cooperation with Heidelberg Materials on the geological monitoring of limestones in active quarries and consulting activities related to limestone deposits.

Dr. Kumpan spent three months at GeoZentrum Nordbayern, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, during a DAAD-funded research stay in 2022, and five months at the Faculty of Geology, Universidad de Oviedo, Spain, during an Erasmus stay in 2009. He also completed a short research stay at Vrije Universiteit Amsterdam in 2012. Apart from these stays, he has undertaken extensive geological fieldwork in Europe, including the Carnic Alps, Rhenish Slate Mountains, Pyrenees, Montagne Noire, and Ardennes, and beyond Europe, particularly in South China (Guangxi and Hubei provinces) or Utah.

An important aspect of his scientific activities is his involvement in international stratigraphic organisations and the development of global chronostratigraphic standards. Since 2020, he has been a voting member of the Subcommission on Carboniferous Stratigraphy of the International Commission on Stratigraphy (ICS). He is also a voting member of the Devonian-Carboniferous Boundary GSSP Reappraisal Task Group and a corresponding member of the ICS Subcommission on Devonian Stratigraphy. Through these activities, he contributes to international discussions and decisions concerning geological time boundaries. At the national level, he has chaired the Czech Stratigraphic Commission since 2018 and served as vice-chair of the Czech National Geological Committee (2019–2024). He is also a member of the Pander Society and the Czech Geological Society.

Dr. Kumpan contributes to scientific publishing as a member of the editorial boards of Bulletin of Geosciences and Acta Musei Moraviae, Scientiae geologicae. He also serves as a peer reviewer for numerous international journals, including Palaeoworld, Palaeogeography, Palaeoclimatology, Palaeoecology, Palaeobiodiversity and Palaeoenvironments, Journal of Asian Earth Sciences, Geobios, Stratigraphy, Bulletin of Geosciences, Sedimentary Geology, Acta Geologica Sinica, and International Journal of Earth Sciences, among others. He also contributes to the organisation of national and international scientific conferences.

In addition to scientific activities, he is actively involved in the popularisation of geology through public lectures, educational exhibitions, geological excursions, and modern science communication platforms.

The Commission concludes that Dr. Kumpan has developed a well-established, internationally connected, and multidisciplinary research profile. It particularly appreciates his contributions to high-resolution stratigraphy and the ongoing reappraisal of the Devonian–Carboniferous boundary, his integration of palaeontological, sedimentological, geochemical, and petrophysical approaches, his publication record, successful participation in competitive research projects, and his active role in international stratigraphic organisations, scientific societies, and scholarly publishing. The Commission considers his scientific achievements to fully meet the requirements for habilitation.

Conclusion: The applicant's scholarly/artistic capabilities **meet** the requirements expected of applicants participating in a habilitation appointment procedure in the field of Geology.

Evaluation of the applicant's pedagogical experience

Dr. Kumpan has 16 years of experience in teaching. He first became involved in teaching during his doctoral studies, when in 2010 he participated in exercises in Historical Geology and Sedimentary Geology.

Since 2015, he has served as the principal lecturer for the course Sedimentary Petrology. The number of taught subjects has gradually increased, especially after his appointment as an assistant professor. Currently, he teaches or participates in teaching a total of eight courses. He introduced two new courses - Methods of Stratigraphy and Course of Geoenvironmental Monitoring. The latter was created as part of the NPO Green Skills project. He also introduced two CORE courses - Climatic changes and their reflection in the development of life on Earth and Hidden Secrets of Karst Areas. Both courses are based on his professional focus and allow students from other study programmes to gain insight into Earth's geological history, past climate change, and karst environments. He also teaches a course Geology for Teaching Natural History, Biology and Geography at Primary and Secondary Schools, aimed at strengthening geological knowledge and teaching skills among school teachers. He continues to participate in practical exercises and especially geological field courses.

Dr. Kumpan actively contributes to the development and modernisation of teaching materials. He is the author of original study materials for the lectures and practical classes he teaches, including presentations, practical exercises, illustrations, and other educational resources.

His teaching is very positively evaluated by students. The average rating in the student survey is 5.667 out of 6. He has also achieved the highest rating several times – 6.

Dr. Kumpan is or was the supervisor of 18 bachelor's and 12 master's theses. His students deal with topics from palaeontology, stratigraphy and petrology in their work. Their research frequently involves field observations, laboratory analyses, and the interpretation of original geological data.

One of his students has already completed PhD studies, and he currently supervises three other PhD students. He also encourages students to participate in scientific research and to present their results at scientific conferences and in publications.

He is a member of state examination committees at the bachelor's, master's and doctoral levels at both Masaryk University and Charles University in Prague. He was also a member of a doctoral committee at the University of Trieste.

Beyond formal university teaching, Dr. Kumpan has been actively involved in geoscience education and popularisation for many years. He has contributed to the Geological Olympiad, a nationwide competition promoting geological knowledge and interest among primary and secondary school students. He has also played a leading role in creating the scientific and educational content of museum exhibitions and geological educational trails, including the Moravian Karst House of Nature, the Prague-East Museum, and the Polabská geostezka geological trail. His contributions included authorship of explanatory texts and guidebooks, selection of geological specimens, and preparation of graphical materials. He is also author of the illustrated geological field guide Vycházky za geologií brandýského Polabí (2020), introducing 40 geological localities to both students and the wider public. In cooperation with Heidelberg Materials, he also contributes to educational information panels at the Mokrá quarries, communicating the results of his geological research to a wider audience. These activities represent a substantial contribution to informal geoscience education and the presentation of geological heritage to the public.

The Commission concludes that the applicant fully meets the required criteria for pedagogical activities. It particularly appreciates his long-standing teaching experience, active role in curriculum development, authorship of educational materials, supervision of students, and extensive contribution to geoscience education and public outreach.

Conclusion: The applicant's pedagogical capabilities **meet** the requirements expected of applicants participating in a habilitation appointment procedure in the field of Geology.

Habilitation thesis evaluation

The habilitation thesis consists of 15 published papers. It is thematically divided into two parts and focuses on multidisciplinary stratigraphy and palaeoenvironmental reconstruction from Palaeozoic carbonate rocks. Together, these studies document the development of an integrated research approach combining palaeontology, sedimentology, and geochemistry to address questions of geological time and environmental change.

The first part (Advances in Devonian and Carboniferous Stratigraphy) focuses primarily on conodont taxonomy, biostratigraphy, and integrated stratigraphic correlation. The studies contribute to the refinement of Devonian and Carboniferous stratigraphy, particularly around the Devonian–Carboniferous transition and the Hangenberg Crisis. An important contribution is the ongoing reappraisal of the global Devonian–Carboniferous boundary, including the reassessment of conodont-based criteria and the development of an integrated approach to its recognition and correlation.

The second part (Element Geochemistry in Palaeoenvironmental Reconstruction) documents the advantages of combining palaeontological methods with modern analytical techniques, including bulk elemental geochemistry (EDXRF, ICP-OES/MS) and in situ microgeochemistry (LA-ICP-MS), in palaeoenvironmental reconstructions based on Ordovician, Devonian, and Carboniferous limestones from Europe and Asia. Particular attention is paid to the reconstruction of marine redox conditions and environmental changes associated with major Palaeozoic events. The application of microanalytical methods provides additional insight into the mineralogical controls on bulk-rock geochemical signatures and their reliability as palaeoenvironmental proxies.

The thesis was evaluated by three external reviewers:

Distinguished Professor D. Jeffrey Over, State University of New York at Geneseo, USA

Sarah K. Carmichael, Ph.D., Appalachian State University, Boone, USA

Jitao Chen, Ph.D., Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, China

All three reviewers evaluated the thesis very positively. Prof. Over particularly emphasised Dr. Kumpan's broad scientific expertise and the significance of his publications, several of which he considers standard references for research on the Hangenberg Crisis and the Devonian–Carboniferous boundary. He also appreciated the contribution of his multidisciplinary studies to understanding environmental conditions during major geological crises.

Dr. Carmichael highlighted the originality of his geochemical research, particularly his early application of trace-element geochemistry to Devonian extinction events and the subsequent development of LA-ICP-MS microgeochemical approaches. She also strongly appreciated his role in developing new criteria for the recognition of the Devonian–Carboniferous boundary, noting their importance for global stratigraphic correlation.

Dr. Chen described the thesis as an excellent compilation and synthesis of research on the Late Devonian–Early Carboniferous transition, emphasising the successful integration of sedimentological, stratigraphic, and geochemical approaches.

The reviewers raised a total of seven questions for the habilitation defence, addressing methodological and interpretative issues related to stratigraphic boundary definition, conodont biostratigraphy, geochemical proxies, and the Hangenberg Crisis. These questions did not affect their overall positive assessments. All three reviewers concluded that the thesis fulfils the requirements expected of a habilitation thesis in the field of geology.

The Commission considers the thesis a coherent and scientifically valuable body of research that makes significant contributions to integrated stratigraphy and the reconstruction of Palaeozoic marine environments. It particularly appreciates the combination of traditional biostratigraphic approaches with modern analytical methods and the relevance of the results to international stratigraphic research.

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Conclusion: The applicant's habilitation thesis **meets** the requirements expected of habilitation theses in the field of Geology.

Habilitation Board Decision on the Nomination for Appointment to Associate Professor

Secret vote results

Voting took place: electronically

Number of board members		5
Number of votes cast		5
of which	in favour	5
	against	0

Board decision

Based on the outcome of the secret vote and following an evaluation of the applicant's scholarly or artistic qualifications, pedagogical experience and habilitation thesis, the board hereby submits a proposal to the Scientific Board of the Faculty of Science of Masaryk University to **appoint the applicant associate professor** of Geology.

In Brno on 06.11.2026

prof. RNDr. Jaromír Leichmann, Dr. rer. nat.

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