

Masaryk University

Faculty

Procedure field

Applicant

Applicant's home unit, institution

Habilitation thesis

Board members

Chair

Members

Faculty of Science

Physical Geography

Mgr. Filip Hrbáček, Ph.D.

Faculty of Science, Masaryk University

Active layer thermal regime and thickness in Antarctica

prof. RNDr. Rudolf Brázdil, DrSc.

Faculty of Science, Masaryk University

doc. RNDr. Zdeněk Máčka, Ph.D.

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prof. RNDr. Tomáš Pánek, Ph.D.

*Department of Physical Geography and Geoecology (Faculty of Science),
University of Ostrava*

prof. RNDr. Vít Vilímek, CSc.

*Department of Physical Geography and Geoecology (Faculty of Science), Charles
University*

prof. dr hab. Piotr Migoń

Institute of Geography and Regional Development, University of Wrocław (Poland)

Evaluation of the applicant's scholarly/artistic qualifications

Dr. Filip Hrbáček obtained his Ph.D. degree in Physical Geography at the Faculty of Science, Masaryk University, Brno in 2017. After PhD, he continued and further developed the research focused on active layer thermal properties in Antarctica. The work was gradually extended from James Ross Island to other regions of Antarctica, which was achieved thanks to international collaborations. In his research, he implemented methodical approaches such as analysis of thermal properties and geophysical surveying or soil moisture monitoring, which provide thorough and more complex insights into the active layer behaviour. The applicant has authored or co-authored 42 publications indexed in the Web of Science Core Collection, including 12 papers in which he was the first author. From the total of 42 papers, 11 were published in D1 and 16 in Q1 journals. According to the Web of Science Citation Report, his publications have received 1068 citations in total and 931 excluding self-citations, resulting in an H-index of 17 and an average of nearly 26 citations per publication. Notably, Filip Hrbáček led two studies within international teams providing results of the active layer thermal regime on Antarctic continental scale and is responsible for the annual update of Antarctica active layer and permafrost thermal regime published in the State of the Climate report. This information underlines the importance of applicant's research at the international level as well as the visibility and impact of his research in the international scientific community. The results of the applicant significantly contributed to the overall understanding of the active layer thermal regime in Antarctica in terms of temporal and spatial distribution and variability, response to climate change and determination of the driving mechanisms and processes affecting the overall state of these parameters.

The applicant participated in seven expeditions to James Ross Island, Antarctica, between 2014 and 2025, and in 2022 and 2023 he was even the expedition and project leader. In five years without his personal participation in expeditions he coordinated research activities.

Dr. Hrbáček was involved in the technogrant project PERM2ERT funded by Swiss Polar Institute, whose goal was to develop a low-cost and robust electrical resistivity tomography system for surveying in remote areas. His role was consultative and he managed the installation of one of these systems on James Ross Island. He was also the principal investigator of GAČR Juniorstar project "Dynamics of the periglacial environment in the Antarctic Peninsula region under ongoing climate change" (2022-2025) and he is currently the principal investigator of ERC-CZ project "SEAL", funded by Ministry of Education, Youth and Sports of the Czech Republic. Both projects provide funding allowing to run small research group, developing field and laboratory instruments and equipment and securing funds for fieldwork in Antarctica. The ability to secure funds in highly competitive and prestigious project calls creates research independence and great opportunities for training and educating new scientists focused on polar regions.

The applicant has a broad international collaboration with scientists and institutions in Portugal (University of Lisbon, INIAV Oeiras), Spain (University of Alcalá, University of Barcelona), Switzerland (University of Fribourg), Germany (Technical University of Berlin), Slovakia (Comenius University, Bratislava). Beside these collaborations, Dr. Hrbáček is a member of the steering committee of Ground Terrestrial Network – Permafrost (since 2021), council of International Permafrost Association (since 2025) and most recently, vice-chair of COST-EU action PermaCOST. These partnerships are embedded in common publication activities, but also in participation in joint research projects. Overall, these facts demonstrate an effective integration of Dr. Hrbáček into international research networks.

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

Evaluation of the applicant's pedagogical experience

Dr. Filip Hrbáček has been involved in teaching activities in the Department of Geography, Faculty of Science of Masaryk University in Brno, since 2017. Currently, he is having lectures on Physical Geography, Pedogeography, Methods in Physical Geography 1 and 3, Contemporary Changes of the Pedosphere, Polar Geosciences, Geography of Polar Region and Regional Geography of the World – America. Formerly, he also participated in teaching of Geographical Data Analysis 1 and Microclimate and Mesoclimate. He is leading the laboratory work in Pedogeography and co-leading Field Work Physical Geography 2, as well as the new course "Contemporary Changes of the Pedosphere", which is focused on soil protection and management, and provides also practical and legal aspects of the soil management. Until now, the applicant successfully supervised two bachelor's theses and one master's thesis, while one bachelor thesis and two master theses are ongoing. He also supervised successfully defended doctoral dissertations by Dr. Lucia Kaplan Pastířiková in 2025. Remarkable are also Hrbáček's activities in the promotion of Antarctic research for students and general public on different levels, counting actually more than 20 such public lectures or interviews, which also improves his pedagogical experience. During a relatively short time span of pedagogical activity in the Department of Geography (after finishing Ph.D. in 2017), he demonstrated good pedagogical ability characterised by high professional level and continuous inclusion of new scientific results into his lectures, especially in terms of methodological and instrumental development of physical geography. New approaches and state-of-the-art techniques in permafrost research are also subjects of the thesis of students he is currently supervising.

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

Habilitation thesis evaluation

The habilitation thesis entitled "Active Layer Thermal Regime and Thickness in Antarctica" consists of a set of 16 previously published works, accompanied by a synthetic commentary. The thesis offers a coherent and scientifically original concept which is based on twelve studies primarily focused on James Ross Island in Antarctica. These studies described the general patterns, relationships and properties of the active layer, and brought different methodological approaches and views on the active layer thermal regime. The obtained results were further upscaled using results from other parts of Antarctica (four studies). The last part of the thesis provides commentary on the application of different models used by the author and his colleagues and their reliability to model active layer thickness and permafrost temperature on James Ross Island and in other sites of Antarctica.

The collected works cover a broad thematic spectrum, including geomorphology, climatology, geoscientific modelling and analytical laboratory work. The synthetic commentary systematically and effectively integrates these works into a unifying framework, demonstrating the applicant's intellectual ability and the consistency in his research orientation and activities. The thesis stands out for advancing the dialogue between permafrost researchers, soil scientists, climatologists, glaciologists and ecologists, which is crucial for the understanding of further evolution of ice-free environments in Antarctica.

The members of the habilitation board appreciated the thesis in agreement with the positive written reviews received by all three referees, Associate Professor Jan Kropáček from Charles University in Prague, Dr. Jan Šafanda from the Institute of Geophysics of the Czech Academy of Sciences in Prague, and Professor Julian Murton from the University of Sussex in Brighton (UK). Dr. Hrbáček responded successfully to all comments and questions of three reviews in his public habilitation lecture.

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

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 Physical Geography.

In Brno on 18.11.2025

prof. RNDr. Rudolf Brázdil, DrSc.