

PUBLIC LECTURE EVALUATION

Masaryk University

Faculty

Faculty of Science

Procedure field

Physical Geography

Applicant

Mgr. Filip Hrbáček, Ph.D.

Lecture date

November 10th, 2025

Lecture topic

Active layer thickness and thermal regime in Antarctica: from local patterns to continental trends

Persons present

(number)

31 (on-site)/7 (online)

Designated evaluators

(board members)

Prof. RNDr. Rudolf Brázdil, DrSc. (on-site)

Faculty of Science, Masaryk University, Brno

Prof. RNDr. Vít Vilímek, Ph.D. (on-site)

Faculty of Science, Charles University, Prague

Prof. RNDr. Tomáš Pánek, Ph.D. (on-site)

Faculty of Science, Ostrava University, Ostrava

Prof. Dr. Piotr Migoń (on-line)

Faculty of Science, Wrocław University, Wrocław

Doc. RNDr. Zdeněk Máčka, Ph.D. (on-site)

Faculty of Science, Masaryk University, Brno

The public habilitation lecture of Dr. Filip Hrbáček concentrated on the study of changes in the thickness of active layer and its thermal regime in Antarctica, demonstrated in the scale from local to continental with considering of all triggering factors. The lecture was structured into the following three parts. The first part focused on introducing permafrost research in general, including the motivations for research in Antarctica and the geographical distribution of ice-free areas. The second part presented the major findings on active layer and permafrost research from James Ross Island. Dr. Hrbáček introduced the key research areas, specific research questions, and the most important results. These results were discussed in comparison with findings from other sites in Antarctica, highlighting the unique environment of James Ross Island. The final part of the lecture provided a general overview of the active layer and permafrost thermal regime across the Antarctic continent, as well as an assessment of spatial and temporal patterns in the ground thermal regime and active layer thickness. The conclusions of the presentation summarized the main results and, importantly, identified current research gaps and challenges for future studies on active layer and permafrost in Antarctica. This thematic structuring enabled the audience to follow Hrbáček's field research in Antarctica, methodological approaches, theoretical background of presented research and including its results into broader international context accepting all

necessary aspects of active layer thickness and thermal regime in Antarctica, being now particularly influenced by warming in the context of recent climate change.

Dr. Hrbáček successfully attracted and maintained the audience's attention through clear explanations of the applied methods and interpretations of the results. He considered the findings not only from a geographical perspective but also in terms of how these results can contribute to the overall understanding of environmental research in Antarctic ice-free areas.

Hrbáček's lecture was thoughtful and well-structured, convincingly demonstrating his expertise in the field of polar research and physical geography. The lecture clearly highlighted the author's ability to connect field research with theoretical background and situate well his own work within broader international context.

During the second part of the lecture, Dr. Hrbáček addressed the main comments and questions raised by the reviewers. In responses to Prof. Murton, he commented to ideal attributes of active-layer monitoring site, ground thermal effects of lichens compare to moss, how to distinguish soil containing variable amounts of liquid water and soil containing variable amounts of ice based on instrumental measurements, and finally the use of "non-cryotic form" term. As for the review by Dr. Šafanda, he discussed a minimum temperature at the base of the active layer, the possibility and benefits of drilling at the Mendel station to study the temperature-on-the-top-of-permafrost history and the extent of ice-free areas. From the review of Assoc. Prof. Kropáček he characterized the potential of older active layer measurements in Antarctica, expected changes in active layer properties and distribution in ice-free areas of Antarctica with advancing climate change, and potential of methods of measurements, including those from satellites.

In the general discussion, Dr. Hrbáček responded to questions focused on knowledge permafrost thickness with respect to active layer thickness, design of thermal conductivity experiments, changes in geomorphic processes in active layer in James Ross Island, future differences between various stations in Antarctica in the sense of ongoing climate change, and a role of thermal conductivity of individual minerals in the study of the active layer and its thermal regime.

Conclusion

The lecture delivered by Dr. Filip Hrbáček, entitled "Active layer thickness and thermal regime in Antarctica: from local patterns to continental trends" and delivered as part of the habilitation procedure, **demonstrated** sufficient scholarly qualifications and pedagogical capabilities expected of applicants participating in a habilitation appointment procedure in the field of Physical Geography.

The lecture took place in a hybrid form at the Department of Geography on November 10th, 2025, at 2 p.m. The mentioned members of the habilitation board attended the lecture personally or on-line (Prof. Piotr Migoń) and provided their evaluation. All below designated evaluators are familiar with the text of the evaluation and agree with it.

Date: November 10th, 2025

Rudolf Brázdil

Vít Vilímek

Tomáš Pánek

Zdeněk Máčka