

The future of permafrost research: a contribution from early career researchers to ICARP III and beyond

Anne Morgenstern¹, Michael Fritz^{1,2}, Bethany Deshpande^{3,4}, Frederic Bouchard^{4,5,6}, Elin Högström^{7,8}, Julie Malenfant-Lepage^{4,5,9}, Alexandre Nieuwendam¹⁰, Marc Oliva¹⁰, Michel Paquette^{4,5}, Ashley Rudy¹¹, Matthias Siewert^{12,13}, Ylva Sjöberg^{12,13}, & Stefanie Weege^{1,14}

¹ Alfred Wegener Institute Helmholtz Center for Polar and Marine Research, Potsdam, Germany

² Utrecht University, Department of Earth Sciences, Utrecht, The Netherlands

³ Université Laval, Department of Biology, Quebec City, Quebec, Canada

⁴ Université Laval, Centre for Northern Studies (CEN), Quebec City, Quebec, Canada

⁵ Université de Montréal, Department of Geography, Montreal, Quebec, Canada

⁶ Centre Eau Terre Environnement, Institut national de la recherche scientifique (INRS), Quebec City, Quebec, Canada

⁷ Vienna University of Technology (TUW), Dept. of Geodesy and Geoinformation (GEO), Vienna, Austria

⁸ Vienna University, Austrian Polar Research Institute, Vienna, Austria

⁹ Department of Civil and Water Engineering, Université Laval, Quebec, QC G1V 0A6, Canada

¹⁰ Universidade de Lisboa, Center for Geographical Studies, Institute of Geography and Spatial Planning, Lisbon, Portugal

¹¹ Queen's University, Department of Geography, Kingston, Ontario, Canada

¹² Stockholm University, Department of Physical Geography, Stockholm, Sweden

¹³ Stockholm University, The Bolin Centre for Climate Research, Stockholm, Sweden

¹⁴ University of Potsdam, Institute for Earth and Environmental Science, Potsdam, Germany

Over the past two decades, the International Arctic Science Committee (IASC) and the Scientific Committee on Antarctic Research (SCAR) have organized activities focused on international and interdisciplinary perspectives for advancing Arctic and Antarctic research cooperation and knowledge dissemination in many areas (e.g. Kennicutt et al., 2014). For permafrost science, however, no consensus document exists at the international level to identify future research priorities, although the International Permafrost Association (IPA) highlighted the need for such a document during the 10th International Conference on Permafrost in 2012. Four years later, this presentation, which is based on the results obtained by Fritz et al. (2015), outlines the outcome of an international and interdisciplinary effort conducted by early career researchers (ECRs). This effort was designed as a contribution to the Third International Conference on Arctic Research Planning (ICARP III). In June 2014, 88 ERCs convened during the Fourth European Conference on Permafrost to identify future priorities for permafrost research. We aimed to meet our goals of hosting an effective large group dialogue by means of online question development followed by a “World

Café” conversational process. An overview of the process is provided in Figure 1. This activity was organized by the two major early career researcher associations Permafrost Young Researchers’ Network (PYRN) and the Association of Polar Early career Scientists (APECS), as well as the regional research projects PAGE21 (EU) and ADAPT (Canada). Participants were provided with live instructions including criteria regarding what makes a research question (Sutherland et al., 2011). The top five questions that emerged from this process are:

1. How does permafrost degradation affect landscape dynamics at different spatial and temporal scales?
2. How can ground thermal models be improved to better reflect permafrost dynamics at high spatial resolution?
3. How can traditional environmental knowledge be integrated in permafrost research?
4. What is the spatial distribution of different ground-ice types and how susceptible is ice-rich permafrost to future environmental change?

5. What is the influence of infrastructures on the thermal regime and stability of permafrost in different environmental settings?

As the next generation of permafrost researchers, we see the need and the opportunity to participate in framing the future research priorities. Across the polar sciences, ECRs have built powerful networks, such as the Association of Polar Early Career Scientists (APECS) and the Permafrost Young Researchers Network (PYRN), which have enabled us to efficiently consult with the community. Many participants of this community-input exercise will be involved in and also affected by the Arctic science priorities during the next decade. Therefore, we need to (i) contribute our insights into larger efforts of the community such as the Permafrost Research Priorities initiative by the Climate and Cryosphere (CliC) project together

with the IPA and (ii) help identify relevant gaps and a suitable roadmap for the future of Arctic research. Critical evaluation of the progress made since ICARP II and revisiting the science plans and recommendations will be crucial. IASC and the IPA, together with SCAR on bipolar activities, should coordinate the research agendas in a proactive manner engaging all partners, including funding agencies, policy makers, and local communities. Communicating our main findings to society in a dialogue between researchers and the public is a priority. Special attention must be given to indigenous peoples living on permafrost, where knowledge exchange creates a mutual benefit for science and local communities. The ICARP III process is an opportunity to better communicate the global importance of permafrost to policy makers and the public.

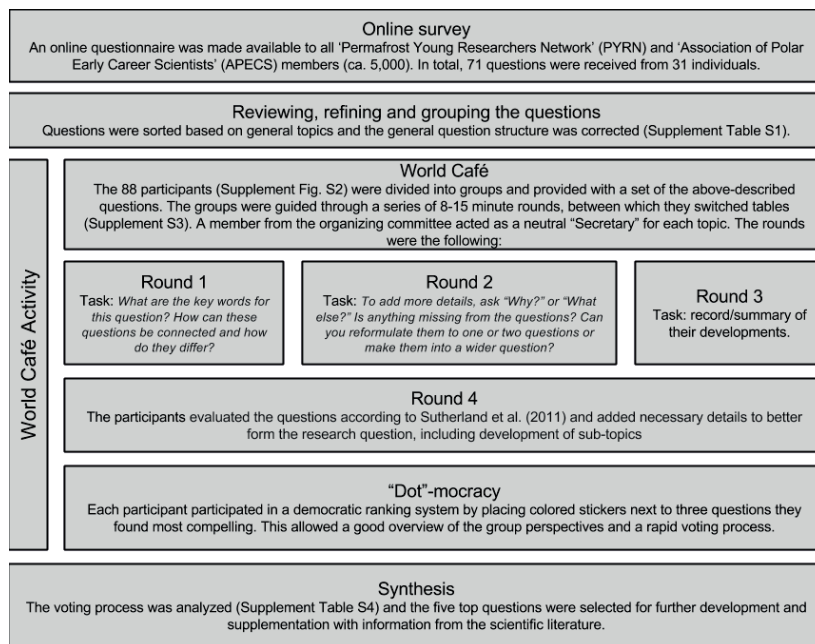


Figure 1: Flowchart of the process used to develop and refine future research questions for permafrost science. Based on community votes, five questions were selected for further development and dissemination (after Fritz et al., 2015).

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