

# Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop



Permafrost is a thermal condition -- its formation, persistence and disappearance are highly dependent on climate. General circulation models predict that, for a doubling of atmospheric concentrations of carbon dioxide, mean annual air temperatures may rise up to several degrees over much of the Arctic. In the discontinuous permafrost region, where ground temperatures are within 1-2 degrees of thawing, permafrost will likely ultimately disappear as a result of ground thermal changes associated with global climate warming. Where ground ice contents are high, permafrost degradation will have associated physical impacts. Permafrost thaw stands to have wide-ranging impacts, such as the draining and drying of the tundra, erosion of riverbanks and coastline, and destabilization of infrastructure (roads, airports, buildings, etc.), and including potential implications for ecosystems and the carbon cycle in the high latitudes. Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics is the summary of a workshop convened by the National Research Council to explore opportunities for using remote sensing to advance our understanding of permafrost status and trends and the impacts of permafrost change, especially on ecosystems and the carbon cycle in the high latitudes. The workshop brought together experts from the remote sensing community with permafrost and ecosystem scientists. The workshop discussions articulated gaps in current understanding and potential opportunities to harness remote sensing techniques to better understand permafrost, permafrost change, and implications for ecosystems in permafrost areas. This report addresses questions such as how remote sensing might be used in innovative ways, how it might enhance our ability to document long-term trends, and whether it

is possible to integrate remote sensing products with the ground-based observations and assimilate them into advanced Arctic system models. Additionally, the report considers the expectations of the quality and spatial and temporal resolution possible through such approaches, and the prototype sensors that are available that could be used for detailed ground calibration of permafrost/high latitude carbon cycle studies.

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Report of a Workshop (2014). Proceedings. **Committee on Opportunities to Use Remote Sensing in** Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop. The National Academy of **Opportunities to Use Remote Sensing in Understanding Permafrost** The Academies have produced a number of relevant reports including: Research Questions (2014) Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop (2014) **Opportunities to Use Remote Sensing in Understanding Permafrost** Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a \*Based on views expressed by individual workshop participants does not necessarily reflect the views of all participants **Permafrost Related Ecological Characteristics: Report of a Workshop** OPPORTUNITIES TO USE REMOTE SENSING IN UNDERSTANDING Permafrost AND RELATED ECOLOGICAL CHARACTERISTICS Report of a Workshop. **Opportunities to Use Remote Sensing in Understanding Permafrost Appendix D: Committee Biosketches Opportunities to Use Remote** 2014. Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop. Washington, DC: The **Polar Research Board (PRB) The National Academies Press** Return to Reports. Opportunities to Use Remote Sensing in Understanding Permafrost (2014) Workshop participants also discussed how measurements of ecological variables could provide insight to permafrost conditions and processes. **Opportunities to Use Remote Sensing in Understanding Permafrost** 2014. Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop. Washington, DC: The **Opportunities to Use Remote Sensing in Understanding Permafrost** Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop (2014). Polar Research Board. **About the Survey - The National Academies of Sciences** Download Opportunities to Use Remote Sensing in Understanding. Permafrost and Related Ecological Characteristics: Report of a. Workshop by Committee on **Permafrost Related Ecological Characteristics: Report of a Workshop** Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop (2014). Polar Research Board. **Opportunities to Use Remote Sensing in Understanding Permafrost** 2014. Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop. Washington, DC: The **Permafrost Related Ecological Characteristics: Report of a Workshop** 2014. Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop. Washington, DC: The **Opportunities to Use Remote Sensing in Understanding Permafrost** Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop (2014). Proceedings. National **Front Matter Opportunities to Use Remote Sensing in** The workshop brought together experts from the remote sensing community in Understanding Permafrost and Related Ecological Characteristics: Report of a **Opportunities to Use Remote Sensing in Understanding Permafrost** Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics is the summary of a workshop convened by the