Geophysical Research Abstracts
Vol. 20, EGU2018-10306-1, 2018
EGU General Assembly 2018

Scoping the risks associated with accelerated coastal permafrost thaw: lessons from Bykovsky (Sakha Republic) and Tuktoyaktuk (Northwest Territories)

Jean-Paul Vanderlinden (1), Paul Overduin (2), Donald L. Forbes (3), Vyacheslav Shadrin (4), and Natalia Doloisio (1)

(1) Laboratoire CEARC, Observatoire de Versailles Saint-Quentin, Université de Versailles Saint-Quentin-en-Yvelines, Guyancourt, France, (2) Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Potsdam, Germany, (3) Geological Survey of Canada, Natural Resources Canada, Bedford Institute of Oceanography, Dartmouth, NS, Canada,, (4) Institute of Humanities and Northern Indigenous Peoples, Siberian Branch of the Russian Academy of Sciences, Yakutsk, Sakha Republic, Russian Federation

Several risk analysis, management, and governance frameworks have been proposed to manage the coastal risks associated with climate change. Yet permafrost thaw at the coast, as a unique geophysical process, combined with the cultural, social and economic characteristics of Arctic communities, may not lend itself well to existing risk studies frameworks. In order to explore the risk implications of accelerated coastal permafrost thaw, we combine multi-temporal aerial photography and satellite imagery with field data in two northern coastal communities: Bykovsky (Sakha Republic, Russian Federation) and Tuktoyaktuk (Northwest Territories, Canada). In both communities, regional climate change has local consequences, including (i) coastal retreat that threatens cultural sites and community infrastructure, (ii) a lengthening open-water season that changes marine transportation and subsistence access, and (iii) changes to the ecosystem affecting food resource species and community food security. Accelerated coastal permafrost thaw is triggering coastal landscape instability with widespread cross-cutting impacts: local economies, lifestyles, cultural heritage, infrastructure, livelihoods, identity, and even worldviews may all be affected. Comparing two Arctic coastal communities subject to similar uniquely northern stressors in different cultural, economic, and governance contexts may provide further insight on breadth of the impacts, going beyond natural resources, which have been the primary focus to date in the literature. Using a risk governance framework, we propose key performance criteria that should be applied to risk analyses to assess their relevance to accelerated coastal permafrost thaw. We apply this framework to three currently dominant approaches: IPCC's climate risk framework, the source-pathway-receptor-consequences model, and an integrated perception analysis framework.