



## Strengthening connections across disciplines and borders through an international permafrost coastal systems network (PerCS-Net)

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Changes in the Arctic system have increased the vulnerability of permafrost coasts to erosion and altered coastal morphologies, ecosystems, biogeochemical cycling, infrastructure, cultural and heritage sites, community well-being, and human subsistence lifestyles. Better understanding the pace and nature of rapid changes occurring along permafrost coastlines is urgent, since a high proportion of Arctic residents live on or near coastlines, and many derive their livelihood from terrestrial and nearshore marine resources

The US National Science Foundation's AccelNet and Arctic System Sciences Programs, recently awarded a collaborative grant funding the Permafrost Coastal Systems Network (PerCS-Net). PerCS-Net focuses on leveraging resources from existing national and international networks that have a common vision of better understanding permafrost coastal system dynamics and emerging transdisciplinary science, engineering, and societal issues in order to amplify the broader impacts by each individual network. PerCS-Net strengthens linkages between existing networks based in Germany, Russia, Norway, Denmark, Poland, and Canada with the activities of several active US NSF-funded networks as well as several local, state, and federally funded US-based networks.

PerCS-Net will benefit the US and international research communities by (1) developing internationally recognized protocols for quantifying the multitude of changes and impacts occurring in Arctic coastal permafrost systems, (2) sustaining long-term observations from representative coastal key sites, (3) unifying annual and decadal-scale observations of circum-arctic permafrost-influenced coasts, (4) refining a circum-arctic coastal mapping classification system and web-based delivery of geospatial information for management planning purposes and readily accessible information exchange for vulnerability assessments, (5) engaging local communities and observers to capture impacts on subsistence and traditional livelihoods, and (6) promoting synergy across networks to foster the next generation of students, postdoctoral scholars, and early-career researchers faced with the known and unknown challenges of the future Arctic System.

Ultimately, PerCS-Net will develop a circumpolar alliance for Arctic coastal community information exchange between stake-, rights- and knowledge holders, scientists, and land managers. There is increasingly diverse interest in permafrost coastal system issues and currently no unified source

of information on the past, present, and potential future state of permafrost coastal systems that provide the level of detail needed to make decisions at scales relevant for indigenous communities across the Arctic. Such new engagement will inform intergovernmental agencies and international research and outreach programs in making science-based decisions and policies to adapt to changing permafrost coastal system dynamics. PerCS-Net will build a network of networks to assess risks posed by permafrost coastal system changes to local and global economies and well-being and facilitate knowledge transfer that will lead to circum-arctic adaptation strategies.

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