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# The Permafrost Coastal Systems Network (PerCS-Net) C13D-1351: An emerging international network focused on permafrost coastal systems in transition

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#### Permafrost Coasts - A Wicked Problem

There is no place more representative of the challenges faced at the intersection of natural, social, and built systems than the rapidly changing Arctic. In particular, permafrost coastal systems are sensitive to Arctic Ocean-land linkages and permafrost degradation, owing to permafrost thaw and land subsidence, rising sea levels, reductions in sea ice cover and the resulting increase in open water, and increasingly frequent and impactful storms. These changes in the Arctic system have increased the vulnerability of peramfrost coasts to erosion and altered coastal morphologies, ecosystems, and carbon export to oceans. Aside from environmental impacts, this presents a wicked problem for the many human interests operating along the arctic coasts, including those involved in traditional lifestyles, as well as industrial and commercial activities. To improve our understanding and management of permafrost coastal change, a coordinated approach is required that facilitates knowledge exchange across borders, the involvement of a wide array of stakeholders, and the incorporation of research from a diverse range of fields.

#### **Coastal Erosion and Thaw Subsidence**



#### **Socioeconomic and Cultural Impacts**



A better understanding of permafrost coastal systems and how they are responding to changes in the Arctic is important since a high proportion of Arctic residents live on or near coastlines, and many derive their livelihood from terrestrial and nearshore marine resources.

## **PerCS-Net Mission and Vision**

The Permafrost Coastal Systems Network will accelerate the process of scientific discovery, facilitate public access to scientific data, and promote convergence through an international, transdisciplinary network focused on science, engineering, and societal issues associated with permafrost-affected coasts and communities in the Arctic. PerCS-Net envisions building:

 A sustainable, pan-Arctic permafrost coastal observatory network providing coordinated and timely information to researchers, managers, indigenous stakeholders, and the general public

 A transdisciplinary research network that fosters linkages in order to amplify the broader impacts of each individual network and maintain a circumpolar alliance for Arctic coastal community information exchange

 An international community that fosters and empowers the next generation of students, early-career researchers, and indigenous communities faced with the known and unknown challenges of the future Arctic System.

Join the Network permafrostcoasts.org

## PerCS-Net Goals and Objectives

(1) develop internationally recognized protocols for quantifying the multitude of changes and impacts occurring in Arctic coastal permafrost systems,

(2) sustain observations from representative coastal key sites,

(3) unify annual and decadal-scale observations of circum-arctic permafrost-influenced coasts,

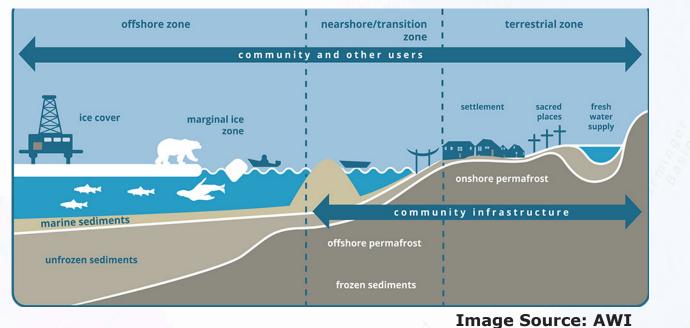
(4) refine a circum-arctic coastal mapping classification system and web-based delivery of geospatial information for management planning purposes and readily accessible information exchange for vulnerability assessments,

(5) engage local communities and observers to capture impacts on subsistence and traditional livelihoods, and

(6) promote 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.

## **Future Permafrost Coastal Systems**

Future permafrost coastal system dynamics will challenge conventional wisdom as the system enters a new dynamic state impacting human decision making and likely resulting in unforeseen challenges across the



Arctic. PerCS-Net will fill fundamental knowledge gaps in science, engineering, and societal issues associated with permafrostaffected coasts in the Arctic by linking over ten existing national and international networks.

Currently, there members from 21 countries that are aligned with several themes. More than half of the members are early career researchers. Over the next year, PerCS-Net will endeavor to forge connections with underrepresented groups and nations, especially those within the Arctic.

to physical, ecological, and social change.

**Education and Outreach** 

PerCS-Net Collaborator Universities, Institutes, Agencies, and Associations ALASKA FAIRBANKS

Permafrost Voung Network

Permafrost Researchers

Ports DAM

GFZ

Helmholtz-Zentrum Ports DAM

Wrocławski

Uniwersytet Wrocławski

UNIWERSYTET

Wrocławski

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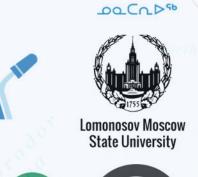
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**Strengthening Connections across Borders** 

Since the issues involved with changing permafrost coasts span political, cultural, geographical, and

disciplinary borders, an international network focused on permafrost coastal systems in transition is

needed. An integrative, international network focused on permafrost coastal systems is required to

realize and address the scale and complexity of the processes, dynamics, and responses of this system

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