

## **Impact of Arctic Environmental Change on Society**

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Rapidly changing Arctic climate and natural environments are affecting society. Thawing permafrost causes damage on infrastructure and increasing amount of glacial discharge poses a risk of flooding. Weakening sea and river ice cover influences activities using ice as a platform, including a traditional dog sledge hunting by indigenous people. On the other hand, warming climate gives rise to positive aspects for human activity in the Arctic. Opening the Northern Sea Route provides a new opportunity for transport and mineral resources under melting ice draw increasing attention. Therefore, understanding the impact of natural environmental changes in the Arctic on human society is an important and urgent task for the Arctic research community. We tackle this complex problem based on research findings and collaborative framework between the natural and social sciences obtained through the GRENE-Arctic and ArCS Projects. The Strategic Goal 3 of the ArCS II Project is to evaluate the impact of Arctic environmental change on society. Researchers from the fields of natural science, engineering, and social science collaborate to understand how society is affected by climate changes and search for mitigation measures for sustainable future in the Arctic.

In this contribution, we introduce ArCS II research projects on human society, the Arctic Sea Route and coastal environment, which are most relevant to the Strategic Goal 3. In the "Human Security, Energy and Food in the Arctic under Climate Change" project, observational networks are going to be built on the terrestrial environment and ecosystems in Siberia and Alaska. In collaboration of natural and social scientists, impact of environmental changes on energy resources and food is assessed. The second project "Sustainable Arctic Sea Routes in a Rapidly Changing Environment" develops a new framework to analyze and deliver sea ice conditions for ship navigation in the Arctic Ocean. Performance of vessels and impact of oil spill accidents are assessed to contribute to safe and efficient shipping along the Northern Sea Route. Focus of the third project "Arctic Coastal Change and Its Impact on Society" is the coastal regions, which serve as an important human habitat as well as a transport hub in the Arctic. Multidisciplinary study is performed on Greenlandic coastal areas, where changing ocean, melting glaciers and thawing permafrost are affecting a local community.