

Changes in Greenlandic coastal environments and their impact on Society – Overview of the 2023 field activities in Qaanaaq –

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Coastal environments around Greenland are rapidly changing under the influence of a warming climate. Glaciers are melting and glacial meltwater discharge is affecting ocean environments, resulting in a wide range of impacts on marine ecosystems. Steep terrains along the coast are destabilized by thawing permafrost and more frequent heavy rain events. These changes in natural environments are serious concerns of Greenlandic societies. Increasing amounts of glacial melt cause flooding of streams. Settlements at the foot of a steep slope are threatened by landslide hazards. Accordingly, an increasing number of damages to buildings and infrastructures are reported. To investigate changing coastal environments and their impact on society in Greenland, we have been running a research project in Qaanaaq, northwestern Greenland, under the framework of GRENE (Green Network of Excellence), ArCS (Arctic Challenge for Sustainability) and ArCS II Projects. In this presentation, we introduce the overview of the project and field research activities performed in the Qaanaaq region in 2023 (Fig. 1).

In the summer 2023, our field campaign began in July with glacier and glacial stream measurements. On Qaanaaq Ice Cap, annual mass balance and ice speed were measured to continue the glacier monitoring since 2012. Discharge of the outlet stream was measured near the coast, where a road was destroyed by flooding several times in the past. In a nearby small village Siorapaluk, a slope affected by a landslide was investigated by surveying underground electric resistance. In August, soon after sea ice melted away and boat operation became possible, research activities in glacial fjords were performed with support of local collaborators. Using boats operated by hunters in Qaanaaq, moorings were recovered after year around measurements in a glacial fjord, Inglefield Bredning. Fish, seabird and marine mammal surveys were conducted from the boats as well as on land in Qaanaaq, Siorapaluk and Qeqertat. Biologger tagging was performed in collaboration with Greenland Institute of Natural Resources in Nuuk. In September, researchers in the field of waste management engineering surveyed and sampled in the dump site of the village. Measurements were also carried out in village houses to evaluate the performance of the buildings for energy efficiency and healthy living environment.

Project activities and study results were reported to the community in a workshop organized in Qaanaaq. About 50 people attended presentations by five ArCS II researchers. Focus of the discussion took place after the presentations was health and safety. Questions were raised to ask details of pollution around the dump site and concentrations of toxic substances in animals. Involvement of local society in scientific research is a matter of importance in the Arctic. To contribute sustainable future of Arctic societies, we continue collaboration, conversation and designing research together with local community.

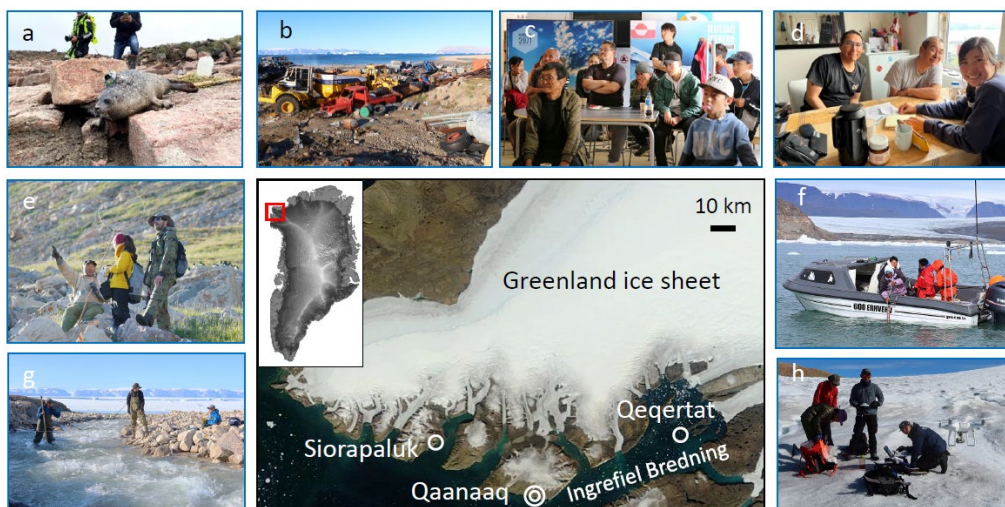


Figure 1. Study area and research activities of the ArCS II Coastal Environments Project. (a) Biologger tagging on a seal, (b) dump site in Qaanaaq, (c) community workshop in 2023, (d) interview to local hunters, (e) seabird survey and (f) ocean measurement with local collaborators, (g) discharge measurement in a glacial stream, and (h) drone survey on Qaanaaq Glacier.