

Permafrost peatlands under climate warming pressure

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This project relates to the spearhead nature and aims of Arctic Avenue by providing a more comprehensive understanding of factors and processes that are involved in a changing Arctic. Knowing about the current status of permafrost peatlands helps us better understand and project future potential carbon losses from these ecosystems.

Background

Peatlands cover vast areas in the permafrost region and store large amounts of soil organic carbon. In a future warmer climate, permafrost thaw will lead to a positive climate feedback due to increased emissions of greenhouse gases when more organic matter becomes available for decay. To better understand and project future potential carbon losses from these ecosystems we need to know the current status of the permafrost. From a recent study on global trends in permafrost temperatures (Biskaborn et al., 2019) it is obvious that data is lacking especially from the northern Fennoscandian lowland region. In this project, that started up in 2019, we aim to fill some of these data gaps by monitoring ground temperatures in permafrost peatlands along a transect through northern Sweden, Finland and Norway. Since September 2021 snow depth is also monitored at our five study sites, since snow depth has been suggested to be the most important meteorological parameter impacting ground temperatures in permafrost peatlands (Sannel et al., 2016).

Objectives

The overall aim of this project is to increase our knowledge of ground thermal conditions in Fennoscandian permafrost peatlands along a climatic and topographic gradient, in order to better project how these environments will be affected by future climate change.

Societal impacts

The Finnish TV Broadcasting Company (YLE) joined the project team during fieldwork both in 2020 and 2021, and a 1 hr documentary was launched on YLE Arena in May 2022 (https://areena.yle.fi/160960979?fbclid=IwAR3C4hMiUE_xD5hMhfzr3YJ6E2UWaJzdZzOVp4gZ5BrT7t41Yp3cxYy2l4c). In northern Finland the local (Sami) community in Kevo has been informed about the project through the Kevo Research Station Instagram account, and in northern Sweden the Sami community in Idivuoma has been informed through personal communication.

First results

The first years of measurements show that the permafrost temperatures in the studied peatlands are warm, just below 0 °C, suggesting that the permafrost has already started to thaw. Signs of permafrost thaw, ground collapse and thermal erosion can also be seen in the landscape at all study sites.

References

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