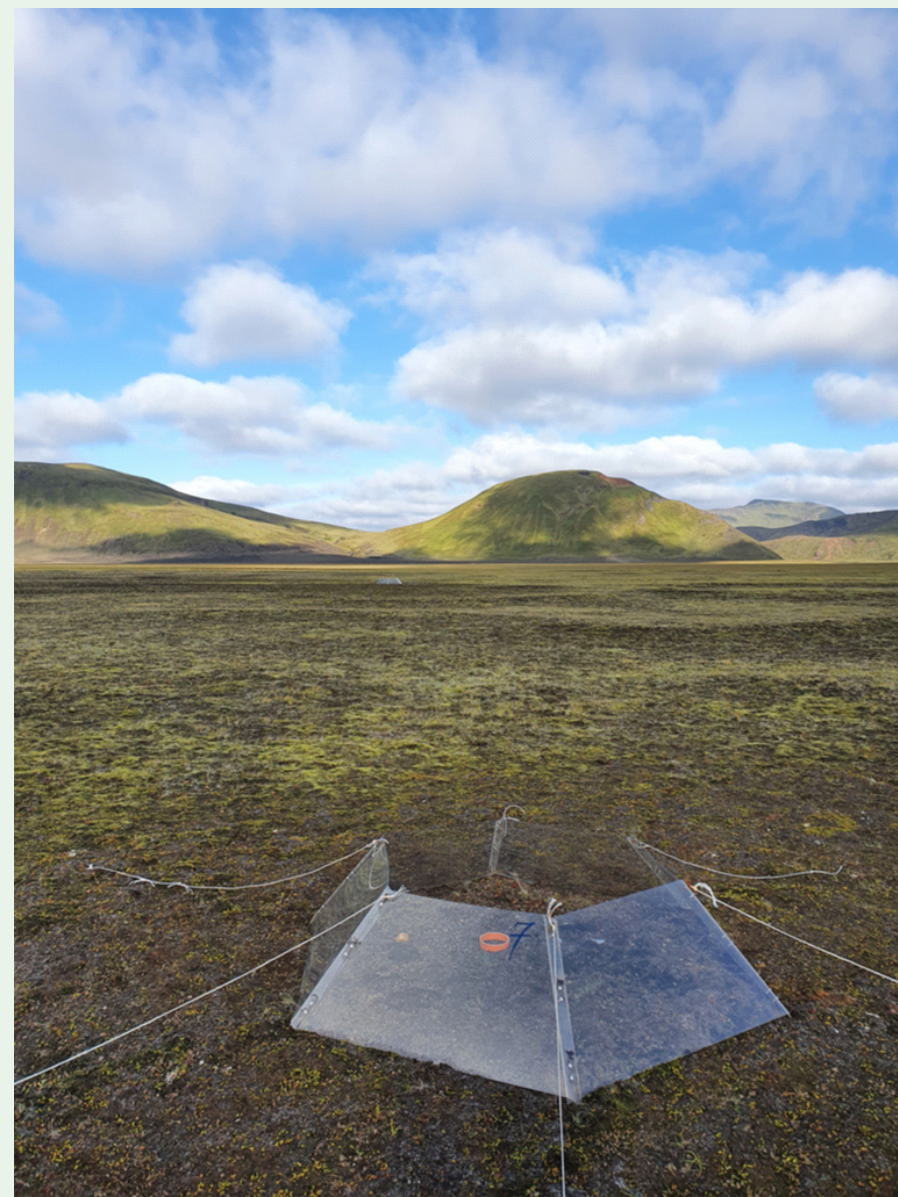


Warming effects on soil respiration and vegetation composition in a Subarctic ecosystem dominated by biocrust

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The site

OTCs (Open Top Chambers) were put up in the highlands of Iceland, by Landmannahellir, in 2018 in an ecosystem dominated by *Anthelia* biocrust for a better understanding of the influences of projected climate change. The OTC chambers cause 1°C warming but let rain in.

Biocrust research has mainly been done in arid ecosystems.

Temporal dynamics of biocrust respiration are unknown in subarctic ecosystems.

The research being done at this site is a part of ITEX, International Tundra Experiment.



Biocrust, biological soil crust

Community of highly specialized organisms that aggregate soil particles and form a crust on top of soil.

- Cyanobacteria, algae, microfungi, lichens, bryophytes

It is estimated that roughly 12% of Earth's terrestrial surface is covered with biocrust.

Seeds are more likely to set foot in biocrust than bare soil, and have better growing conditions.

Soil respiration, seasonal and a diurnal scale

We asked whether soil respiration varies on a seasonal and/or a diurnal scale, as well as if there is a variation between OTC and ctrl plots.

We found a correlation between temperature and soil respiration ($p < 0.05$). Interestingly though, the difference between soil respiration in OTCs and ctrl plots was not found to be significant ($p > 0.05$). Soil respiration was less affected by soil water content than temperature ($p > 0.05$).

A bell shape was found in both soil respiration and temperature on a diurnal scale, with a peak during mid day and a minimum during midnight. Time of peak varied between seasons, showing a variation both on a diurnal and a seasonal scale.



Vegetation composition

We did vegetation quadrat measurements in September, 2021.

Species that we found in site were e.g. *Salix herbacea*, *Empetrum nigrum*, *Equisetum* sp., *Poa* sp., *Selaginella selaginoides*, *Bistorta vivipara* and *Carex* sp.

Bistorta vivipara was more likely to be found within OTC plots ($p < 0.05$) and *Salix herbacea* more likely to be found within ctrl plots ($p < 0.05$).

We found more cover of vascular plants within the ctrl plots when compared with OTC plots after three years of warming. Previous measurements after only one year of warming show the opposite results.

