



## Microbial community development on the surface of Hans and Werenskiold Glaciers (Svalbard, Arctic): a comparison.

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Abstract: Surface ice and cryoconite holes of two types of polythermal Svalbard Glaciers (Hans Glacier-grounded tidewater glacier and Werenskiold Glacier-land-based valley glacier) were investigated in terms of chemical composition, microbial abundance and diversity. Gathered data served to describe supraglacial habitats and to compare microbe-environment interactions on those different type glaciers. Hans Glacier samples displayed elevated nutrient levels (DOC, nitrogen and seston) compared to Werenskiold Glacier. Adjacent tundra formations, bird nesting sites and marine aerosol were candidates for allochthonic enrichment sources. Microbial numbers were comparable on both glaciers, with surface ice containing cells in the range of  $10(4) \text{ mL}^{-1}$  and cryoconite sediment  $10(8) \text{ g}^{-1}$  dry weight. Denaturing gradient gel electrophoresis band-based clustering revealed differences between glaciers in terms of dominant bacterial taxa structure. Microbial community on Werenskiold Glacier benefited from the snow-released substances. On Hans Glacier, this effect was not as pronounced, affecting mainly the photoautotrophs. Over-fertilization of Hans Glacier surface was proposed as the major factor, desensitizing the microbial community to the snow melt event. Nitrogen emerged as a limiting factor in surface ice habitats, especially to Eukaryotic algae.

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