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# Patterns of ice nuclei from natural water sources in the mountains of Tirol, Austria

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Heterogeneous ice nucleation—the process by which particles can nucleate ice between 0 and -35°C—is important for generating artificial snow. Though abiotic and biotic ice nuclei are present in many different natural and managed ecosystems, little is known about their nature, sources, and ecological roles. We collected samples of water and snow from the mountains of Tyrol, Austria in June, July, and November, 2016. The collected water was mostly from sources with minimal anthropogenic pollution, since most of the water from the sampled streams came from glacial melt. The samples were filtered through a 0.22$\mu$m filter, and microorganisms were cultured on different types of media. Resulting colonies were tested for their ice nucleation ability using a droplet freezing assay and identified to the level of the species. The unfiltered water and the filtered water will be subjected to additional assays using cryo microscopy and vibrational microscopy (IR and Raman- spectroscopy). Preliminary analyses suggested that the percentage of ice-nucleating microbes varied with season; greater percentages of ice nucleating microbes were present during colder months. The glacial melt also varies strongly over the year with the fraction of mineral dust suspended in it which serves as an inorganic ice nucleation agent. Further investigation of these samples may help to show the combined ice nuleation abilities of biological and non biological particles present in the mountains of Tirol, Austria. Future work may shed light on how the nucleation properties of the natural water changes with the time of the year and what may be responsible for these changes.