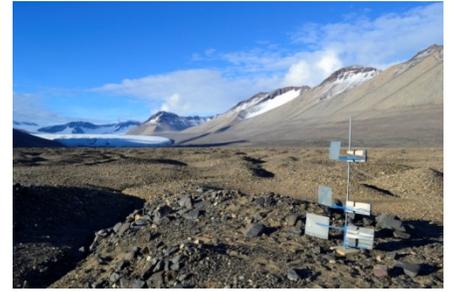


Local, Regional and Global Connectivity – Byron Adams and Diane McKnight

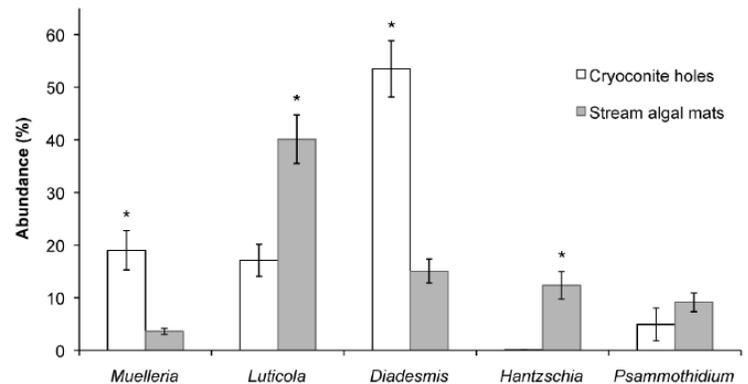
Aeolian Connectivity: To address our hypothesis that changes in aeolian transport will influence the distribution of soil organisms and ecological connectivity, PhD student Alia Khan is collecting material at about 10 sites in the MDV distributed to identify long range and within valley transport (particle collector installation at right). This research is conducted in collaboration with New Zealand researchers. **(H1)**



Transport Markers: Black carbon (BC) aerosols may travel thousands of kilometers before they are scavenged by rain or snow, after which they are stored in snow, soils and sediments. In the MDV local sources of BC are present, e.g. helicopters and generators. We aim to quantify aeolian transport processes by using the local production of BC as a tracer for aeolian connectivity. Based on a previous study estimating inputs of carbon from helicopter traffic, we are now measuring the transport and distribution of black carbon in aeolian particles, streams and lakes, and will be modeling the processes controlling the fate in the lakes. **(H1)**



Interconnected Bioreactors: Cryoconites are cylindrical holes formed when windblown sediment melts into ice, often supporting microbial metabolism. We predict that with warmer summers cryoconites will expand and increase connectivity across the glacier (with other cryoconites) and to meltwater streams. Lee Stanish and others found that cryoconites have distinct diatom communities (at right) and that there is a species richness gradient corresponding to distance inland from the coast. **(H3)**



Mean relative abundances of the most abundant diatom genera in cryoconite holes and stream algal mats. Genera that are more abundant in one habitat than another are noted by an asterisk ($p < 0.0001$).

Terrestrial Observation Network: Over a decade ago, scientists and program managers from the United States, New Zealand, and Italy came together to “... conserve and protect the unique and outstanding environment of the McMurdo Dry Valleys ... especially the value of the extensive scientific datasets that have been collected.”

In a similar spirit of international cooperation we initiated the McMurdo Dry Valleys Terrestrial Observation Network (MCM TON) to assess and address environmental change on Dry Valley ecosystems. Alongside our colleagues from New Zealand, Italy, Korea, and Australia, we have developed:

- i) the minimum core set of measurements
- ii) the requisite standards and protocols
- iii) a draft data coordination and development plan
- iv) tools for assessing the effectiveness of current environmental protection guidelines.

By coordinating international experimental and observational measurements through the MCM TON, we have significantly increased our ability to measure key processes associated with environmental change in Dry Valley ecosystems, as well as assess the effectiveness of environmental stewardship and management policies. **(H1-4)**