He-3 and Cl-36 cosmogenic surface exposure ages from alpine glacier deposits in the McMurdo Dry Valleys

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The ice-free McMurdo Dry Valleys (MDV), located in southern Victoria Land, Antarctica, are an important terrestrial archive of paleoclimate and ice sheet histories, including glacial records from the East Antarctic Ice Sheet dating back to the Miocene. Additionally, alpine glacier deposits in the MDV record regional climate variation in the Ross Sea sector, potentially covering the last several million years. Here, we use cosmogenic surface exposure dating to determine the deposition age of boulder drop moraines and glacial drifts emplaced by alpine glaciers located in the Asgard and Olympus Ranges, MDV.

We present a suite of cosmogenic surface exposure ages from pyroxenes in dolerite boulders sampled from three alpine glacial systems. With the exception of one terminal drop moraine from Stocking Glacier (Asgard Range) dated to MIS 11 [1], He-3 surface exposure ages from all glacial deposits display siginificant age scatter, precluding a clear determination of their climatic significance. In order to further refine the chronology, we measured cosmogenic Cl-36 on a subset of the samples. Using the paired Cl-36 and He-3 data, we will discuss the possible processes influencing cosmogenic age scatter in Antarctic alpine glacial systems.

This study highlights (1) the utility of multi-nuclide approaches to cosmogenic surface exposure studies, and (2) the role of source-region geomorphology and glacial thermal regime in cosmogenic exposure age scatter.

[1] Swanger *et al*. (2017), *Scientific Reports* **7**, 41433.