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Title: *Cosmogenic-nuclide geochronology of glaciated surfaces in the upper Dry Valleys*

Abstract:

The investigator will use cosmogenic-nuclide exposure dating on glaciated surfaces in the Dry Valleys of Antarctica to probe the history of ice-sheet advance and erosion processes there. The project is motivated by two outstanding questions. The first is to determine the history of advance and retreat of the East Antarctic Ice Sheet in the Dry Valleys. There is little evidence of glacial advances prior to the last glacial maximum; however, the history of these fluctuations is not well determined. Cosmogenic-nuclide geochronology can distinguish rock surfaces that have been continuously exposed for long periods of time. By applying this dating method to the present ice margins of the outlet glaciers, a continuous history of ice-sheet fluctuations in the upper Dry Valleys can be determined back to the most recent deglaciation and possibly earlier. The second outstanding question is the possible role of cold-based, stable ice in protecting and preserving the ancient surficial deposits of the region. Erosion and sediment transport processes in the upper Dry Valleys are considered insignificant, if not unmeasurable, for the last 10 - 15 million years. However, these observations could also be explained through the presence of cold-based ice that protected such rock surfaces from the effects of erosion. Cosmogenic-nuclide dating of rocks near the ice margins in these regions can determine the exposure history of these surfaces, and whether there were long periods of cover by snow or ice.