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TITLE: Landscape Degradation and Regolith Transport in McMurdo Dry Valleys of Antarctica

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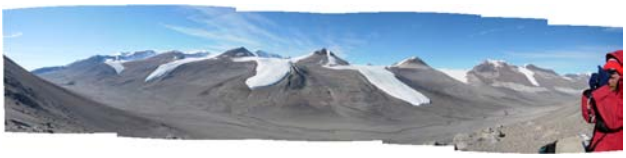
ABSTRACT BODY: Many of the currently ice free areas in Antarctica, although few and far in between, have been at least partially free of ice for millions of years. Several of those areas are known to contain rich records of past ice advances and they potentially contain signs of other surface processes or biological remains. With a long subaerial exposure the expectation is that erosion has significantly modified the deposits and rock surfaces, and possibly erased signs of ancient events. On the other hand, as these rainless deserts remain almost continuously frozen the geological surface processes may be active but proceed at such a slow pace as to render the surfaces practically stable. We analyzed cosmogenic nuclides in surficial boulders, bedrock, and regolith in the McMurdo Dry Valleys to determine the surface degradation in million year time scale. We also set up soil traps and repeat photo sites to establish the current rate of regolith transport along the surfaces. We found that exposed bedrock surfaces degrade at rates of 0.25-2 m/Ma (dependent on lithology), the regolith surfaces degrade at rates of 0.2-3 m/Ma. It is notable that while the regolith degrades the subsurface (0-1 m depth) remains undisturbed even on slopes. The repeat photography and soil traps revealed a slow rate of surface transport. Combined our results reveal a landscape where both bedrock and regolith surfaces have been continuously eroding in the past and today. As the area has been subaerially exposed for millions of years this rate of degradation has resulted in a loss of rock and regolith of several meters across the landscape.

https://sites.google.com/site/undgeomorphology/home

KEYWORDS: [1824] HYDROLOGY / Geomorphology: general.



Lower Wright Valley, McMurdo Dry Valleys, Antarctica

(No Table Selected)

Additional Details

Previously Presented Material: This overview has never been presented before

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