Soil Erosion in Dry Valleys, Antarctica

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Erosion of Earth’s surface is generally assumed to be ubiquitous, but published findings from the Antarctic Dry Valleys suggest nearly total preservation of ancient landscapes (~10 million years old). Our recent field observations on the active degradation of glacial moraines contradict the suggested stability of the Dry Valley’s landscape. Differential GPS was used to create high-resolution topographic profiles of previously dated moraines in the lower Wright valley. To calculate rates of surface erosion and magnitudes of topographic diffusivity, a computer model was used with the assumption that glacial moraines start with sharp crested profiles, which over time become smeared and rounded by erosion. Using the field data to constrain the parameters, the model tracked soil transport over the moraine surface and the relaxation of the moraine slopes over time. By visual inspection and simple slope angle measurements it can be shown that the moraines of the Dry Valleys are slowly degrading and the maximum values for topographic diffusivity are slightly lower than other arid climates around the world.

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