

3-8 - COSMOGENIC CHRONOLOGIES OF LATE PLEISTOCENE MOUNTAIN GLACIER RETREAT IN THE GREAT BASIN, USA



Tuesday, 15 March 2022



10:40 AM - 11:00 AM



UNLV Classroom Building Complex A - CBC-A 108

Abstract

Glacial deposits and landforms are abundant in mountains of the interior Great Basin, chiefly representing the last two Pleistocene glaciations. The chronology of terminal moraines has been developed through cosmogenic exposure dating of moraines and outwash, revealing correspondence of regional glacier maxima to marine oxygen isotopes stages 6 (penultimate) and 2 (last), respectively termed the Lamoille and Angel Lake Glaciations. The chronology of glacier recession remains less developed to date, however, with a small number of radiocarbon dates from lakes limiting the time when Pleistocene glaciers vanished. Here, we present new and existing cosmogenic ^{10}Be exposure ages of recessional moraines and glacially scoured bedrock from multiple mountains in Utah and Nevada to limit the timing of ice retreat.

In most mountains, glaciers occupied terminal moraines until the latter part of the Last Glacial Maximum and persisted at or readvanced to maximum or near maximum lengths at 18-16 ka in the Wasatch, Ruby, East Humboldt, Santa Rosa, South Snake, and Pine Forest Ranges. Final recession commenced thereafter, with limited evidence of down-valley moraine deposition after 16 ka. Recessional moraines in the Wasatch, Ruby, Santa Rosa, and South Snake Ranges representing glacier length reductions of 30-50% have exposure ages of 15-14 ka. Subsequent ice retreat is limited by cosmogenic exposure ages of glacially scoured bedrock, which span 14-12 ka in the Wasatch and Ruby Ranges for surfaces upvalley of recessional moraines. Cirque-floor moraines in the region have variable exposure ages ranging from 14-10 ka, which are generally consistent with limiting radiocarbon ages from alpine lakes and suggest that valleys became ice-free conditions during this interval.

The commencement of mountain glacier recession at 16 ka is consistent across the Great Basin and elsewhere in the western United States. Numerical simulations of known glacier extents and reconstructions of equilibrium-line altitude changes during glacier recession indicate warming of 2-6° C from 16-11 ka. Such variability may reflect inter-range differences in glacier responses to temperature and precipitation changes or differences in the pace and magnitude of regional climate changes.

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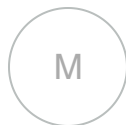
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