2007 Fall Meeting
Search Results

Cite abstracts as **Author(s) (2007), Title, *Eos Trans. AGU,* *88*(52), Fall Meet. Suppl., Abstract xxxxx-xx**

Your query was:
munroe

1340h
PP33B-1274

Cosmogenic Surface-Exposure Age Limits for Latest-Pleistocene Glaciation and Paleoclimatic Inferences in the American Fork Canyon, Wasatch Mountains, Utah, U.S.A.

*** Laabs, B J**
laabs@geneseo.edu
Geology Department Gustavus Adolphus College, 800 W. College Ave., Saint Peter, MN 56082, United States
Bash, E R
ebash@gustavus.edu
Geology Department Gustavus Adolphus College, 800 W. College Ave., Saint Peter, MN 56082, United States
Refsnider, K A
kurt.refsnider@colorado.edu
INSTAAR University of Colorado-Boulder, 1560 30th Street 450 UCB, Boulder, CO 80303, United States
Becker, R A
rabecker@wisc.edu
Department of Geology and Geophysics, University of Wisconsin-Madison 1215 W. Dayton St., Madison, WI 53706, United States
Munroe, J S
jmunroe@middlebury.edu
Geology Department Middlebury College, Bicentennial Hall, Middlebury, VT 05753, United States
Mickelson, D M
davem@geology.wisc.edu
Department of Geology and Geophysics, University of Wisconsin-Madison 1215 W. Dayton St., Madison, WI 53706, United States
Singer, B S
bsinger@geology.wisc.edu
Department of Geology and Geophysics, University of Wisconsin-Madison 1215 W. Dayton St., Madison, WI 53706, United States

The Wasatch Mountains of north-central Utah bordered the eastern shore of Lake Bonneville and were occupied by numerous valley glaciers during the latest Pleistocene. Stratigraphic and morphostratigraphic observations near the mouths of Little Cottonwood and Bells Canyons reveal that glaciers in these two valleys began constructing terminal moraines before Lake Bonneville reached its maximum shoreline elevation at about 19-17 cal. ka. Although the chronology of the lake highstand is well constrained by numerous radiocarbon dates, the timing of deglaciation in the Wasatch Mountains is relatively unclear. Moreover, there is considerable disagreement over the climatic conditions (cold/dry vs. cool/wet) that led to the expansion of glaciers and the lake. To address these issues, we explore the glacial record in the American Fork canyon by combining field mapping with cosmogenic ^{10}Be surface-exposure dating and numerical modeling of

glacier mass balance and ice flow to limit the extent, timing and climate of the last glaciation in the Wasatch Mountains. Six of ten cosmogenic surface-exposure ages from a terminal moraine in the canyon are tightly clustered (ranging from 14.4 ± 1.3 to 15.2 ± 1.1 ka; 2σ analytical error) and yield an error-weighted mean age of 14.8 ± 0.4 ka (2σ, MSWD = 0.26; individual age calculations based on a high latitude/sea level production rate of 4.98 ± 0.34 atoms g SiO_2^{-1} yr^{-1} scaled for elevation and latitude). This age is consistent with previously reported cosmogenic-exposure dates from elsewhere in the range, and suggests that ice retreat in the Wasatch Mountains began as much as 4 kyr later than in other Rocky Mountain ranges and was in phase with the hydrologic fall of Lake Bonneville from the Provo shoreline. Numerical glacier modeling experiments (based on methods of Plummer and Phillips, 2003) simulate maximum ice extent in the American Fork, Little Cottonwood and Dry Creek canyons under a broad range of potential temperature and precipitation changes. The combined results of these experiments suggest that if glaciers in the Wasatch Mountains were being fed by substantial precipitation derived from Lake Bonneville (as suggested by previous studies of this region), temperature depression was likely equal to or less than 7-9° C. Latest-Pleistocene temperature depressions greater than 9° C, which are also suggested by previous studies of this region, would have been accompanied by less-than-modern precipitation.

0720 Glaciers
0762 Mass balance (1218, 1223)
0776 Glaciology (1621, 1827, 1863)
1616 Climate variability (1635, 3305, 3309, 4215, 4513)
1637 Regional climate change
Paleoceanography and Paleoclimatology [PP]
2007 Fall Meeting

New Search