Geophysical Research Abstracts
Vol. 21, EGU2019-6268, 2019
EGU General Assembly 2019

Tropical glacier fluctuations during late glacial time: a view from equatorial Africa

Margaret S. Jackson (1), Meredith A. Kelly (1), James M. Russell (2), Alice M. Doughty (3), Jennifer A. Howley (1), David B. Cavagnaro (1), Jonathan W. Chipman (1), Susan R.H. Zimmerman (4), and Bob Nakileza (5)

(1) Dartmouth College, Earth Sciences, Hanover, NH, United States, (2) Brown University, Departmet of Earth, Environmental, and Planetary Sciences, Providence, RI, United States, (3) Bates College, Geology, Lewiston, ME, United States, (4) Lawrence Livermore National Laboratory, Livermore, CA, United States, (5) Makerere University, College of Agriculture and Environmental Sciences, Kampala, Uganda

Warming following the Last Glacial Maximum was interrupted by abrupt, millennial-scale climate reversals. Registered in high-latitude proxy records, these reversals were apparently anti-phased between hemispheres. Although the signals of these late-glacial (∼15-11 ka) climate events are found far beyond the poles, the thermal footprint of these events around the globe remains enigmatic. This is particularly true in low-latitude regions, where terrestrial temperature records are relatively rare. Here we present a beryllium-10 chronology of glacier fluctuations from the equatorial Rwenzori Mountains, Uganda, which elucidates the timing and magnitude of deglacial warming in tropical Africa during late-glacial time. In the Bujuku valley, a suite of moraines that mark the maximum late-glacial ice extent in the valley date to ∼15-14 ka. Up valley from these deposits, a lateral moraine dated to ∼11.8 ka marks the last preserved late-glacial ice margin. In the Nyamugasani valley, beryllium-10 ages suggest a similar pattern of glacier fluctuations. Expanded glacier conditions are marked by perched boulders on bedrock dated to ∼14 ka. After ∼12 ka, glacier retreat was punctuated by stillstands or readvances until ∼11.2 ka. In both the Bujuku and Nyamugasani valleys, ice apparently retreated rapidly during the earliest Holocene. Overall, the chronology indicates that glaciers in the Rwenzori were more extensive during the southern hemisphere Antarctic Cold Reversal (ACR; ∼14.7-13.0 ka) than during the northern hemisphere Younger Dryas (YD; ∼12.9-11.7 ka), yet the moraine sequence does not necessarily align with the timing of either late-glacial event. The Rwenzori data are similar to chronologies reported from the South American tropics, where expanded glaciers during the ACR are recognized across the region. This similarity suggests that glaciers across the tropics responded to a common forcing during late-glacial time, most likely temperature. Potential mechanisms to induce such change include radiative greenhouse-gas forcing and tropical ocean dynamics.