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Lacustrine Basal Ages Constrain the Last Deglaciation in the Uinta Mountains, Utah, USA

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Basal radiocarbon ages from 21 high-elevation lakes limit the timing of final Pleistocene deglaciation in the Uinta Mountains of northeastern Utah, USA. The lakes are located in glacial valleys and cirques 5 to 20 km upstream from LGM terminal moraines at elevations from 2830 to 3475 m. Many are impounded behind recessional moraines. Cores were retrieved from a floating platform with a percussion corer driven to the point of refusal. All penetrated inorganic silty clay beneath gyttja. AMS radiocarbon analyses were made on terrestrial macrofossils, daphnia ephippia, pollen concentrates, and bulk sediment retrieved from the base of each core. No radiocarbon reservoir effect was observed when bulk dates were checked against terrestrial material. Radiocarbon results were converted to calendar years using the IntCal09 calibration curve in OxCal 4.1. Given the stratigraphy observed in the cores, these calibrated basal ages are considered close limits on the timing of the local deglaciation and lake formation. The oldest three lakes have basal radiocarbon ages that calibrate to a few centuries after the Bölling/Alleröd warming, indicating that the landscape was becoming ice free at this time. These are followed by an overlapping group of five lakes with basal ages between 13.5 and 13.0 ka BP. Five more cores, from four separate lakes, have basal ages tightly clustered between 13.0 and 12.5 ka BP. Three of these lakes are dammed by moraines, suggesting glacial activity during the early part of the Younger Dryas interval. The lone kettle lake in the study yielded a basal age of 12.3 ka BP, considerably younger than the basal age of 13.9 ka BP from a nearby lake filling a bedrock basin, indicating that buried ice may have been locally stable for more than a millennium after deglaciation. The remaining seven lakes have basal ages between 12.0 and 11.0 ka BP. Four of these lakes are also dammed by moraines. These two non-overlapping clusters of basal ages for moraine-dammed lakes, with maximum probabilities ca. 12.7 and 11.3 ka BP, suggest that active glaciers were present in the Uinta Mountains during the Younger Dryas, and that Younger Dryas glacier activity was concentrated in two separate intervals.