Northeastern Section - 44th Annual Meeting (22–24 March 2009)

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Presentation Time: 10:40 AM-11:00 AM

GRAIN-SIZE DATA FROM LACUSTRINE SEDIMENTARY RECORDS PROVIDE CONSTRAINTS ON THE TIMING OF ALPINE LOESS DEPOSITION IN THE UINTA MOUNTAINS OF NORTHEASTERN UTAH

MUNROE, Jeffrey S.[1], CORBETT, Lee B.[1], DURAN, Logan T.[1], FISHER, G. Burch III[1], PETERS, Andrew K.[1], and LAABS, Benjamin J.[2], (1) Geology Department, Middlebury College, Middlebury, VT 05753, jmunroe@middlebury.edu, (2) Geological Sciences, SUNY Geneseo, 1 College Circle, Geneseo, NY 14454

The Uinta Mountains of northeastern Utah support an extensive alpine upland that was above the reach of glaciers in the late Quaternary. Soil profiles on this upland feature a ubiquitous mantle of alpine loess ~20 cm thick. Physical and chemical properties of this loess greatly enhance the fertility of the alpine soils, underscoring the role of loess deposition in biogeochemical cycling in this environment. The thickness of this loess cap is similar across all landforms predating the latest Pleistocene, indicating that the fine sediment accumulated during the post-glacial period; however, the timing and duration of loess deposition have remained unknown. This study considered the grain-size distribution of well-dated sediment cores collected from seven high-elevation lakes in the Uintas. Sediment from near the bottom of all of the cores features a prominent bimodal grain-size distribution. The coarser mode of ~10 •m is consistently present throughout the Holocene section and likely reflects continuous delivery of clastic sediment from the surrounding watershed by overland flow and (in some lakes) inflowing streams. An extremely fine mode of ~0.5 •m is a major component of the grain-size distribution from ca. 11.8 ka to 9.5 ka BP, but is absent or greatly diminished in younger sediment. An identical fine mode is seen in loess-enriched soil horizons on the alpine upland, which average 15% clay (<2 •m). The universal distribution of this finer sediment and its age in post-glacial lacustrine cores suggest that it was deposited through eolian processes during a 2300-year window straddling the Pleistocene-Holocene boundary. The onset of loess deposition ca. 11.8 ka BP may have been triggered by the summer insolation maximum for 45°N ca. 12-11 ka BP, and/or by final desiccation of upwind pluvial lakes. Rare earth element analysis of one of the cores reveals that older sediment with a maximum abundance of the finer mode differs significantly from coarser, younger, sediment, suggesting a different clastic source area during the earliest Holocene.

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