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Paper No. 94-2

Presentation Time: 5:50 PM

A COMPARISON OF POST-GLACIAL SEDIMENT VOLUMES FROM SOURCE TO SINK IN MORAN AND SNOWSHOE CANYONS, TETON RANGE, WYOMING

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Where valley-bottom gradients are flattened by glaciers, fluvial processes have difficulty removing post-glacial colluvial debris. Here we demonstrate this by quantifying sediment volumes from source to sink for Moran and Snowshoe Canyons, major glacial drainages in the Teton Range, Wyoming. The volume of sediment in Moran canyon was estimated by differencing a lidar-derived surface digital elevation model (DEM) and a modeled bedrock DEM. The bedrock DEM was generated by projecting an estimated bedrock surface beneath the sediment along 28 cross sections using exposures of bedrock along the valley walls and a smoothing-spline function in the MATLAB curve-fitting toolbox. A total sediment volume for all of Moran and Snowshoe Canyons was then estimated using the denudation rate calculated for Moran Canyon. Post-glacial alluvial sediments from both canyons are deposited in Moran Bay, which is isolated from the rest of Jackson Lake by a submerged Pinedale age (14.4 ka) moraine. Four CHIRP seismic reflection profiles were acquired in the bay; an isopach map and sediment volume estimate were produced using Seisware and Trinity T3 software. The resulting volume estimates show that fluvial processes have moved only roughly 1% of post-glacial sediment into the bay. We conclude that where valley-bottoms have been flattened by glaciers, rivers are unable to move most post-glacial colluvial sediment, and debris will accumulate until the next glacial advance, or tectonic uplift steepens the river channels.

Session No. 94

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