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Mudflow Disturbance In Latest Miocene Forests In Lewis County, Washington

Thomas E. Yancey,[1]* George E. Mustoe,[2] Estella B. Leopold,[3] and Matt T. Heizler[4]

*[1]Geology and Geophysics Department, Texas A&M University, College Station, Texas 77843, USA, tyancey@geos.tamu.edu; [2]Geology Department, Western Washington University, Bellingham, Washington 98225, USA, mustoeg@geol.wwu.edu; [3]Biology Department, University of Washington, Seattle, Washington 98105, USA, eleopold@u.washington.edu; [4]New Mexico Bureau of Geology and Mineral Resources, Socorro, New Mexico 87801, USA, matt@nmt.edu*Corresponding author.*

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ABSTRACT

The lower part of the Wilkes Formation (uppermost Miocene) exposed along lower Salmon Creek in Lewis County, Washington, consists of volcaniclastic-dominated deposits. The section contains a stacked series of volcanic runout mudstone beds overlain by more distal runout mudstone beds, interlayered with carbonaceous mudstone and lignite-woodmat beds that are in turn overlain by poorly sorted volcaniclastic mudstone and sandstone. The section contains a record of forested lowlands inundated by volcanic mudflows, followed sequentially by rising water level associated first with deposition in swamp and lake-margin environments and later by deposition in a lake environment. The lakebed sediments contain common siderite concretions of varied form, including coprolite-shaped concretions that are confined to lakebed deposits. The volcanic mudflow deposits are similar to deposits of mudflows-lahars of modern Cascades stratovolcanoes. Two volcanic ash fall beds contained within lignites in the middle of the section yield $^{40}Ar/^{39}Ar$ radiometric dates. After separation of plagioclase crystals into populations of cloudy appearance (inherited) and clear appearance (newly crystallized), a best age of 6.13 ± 0.08 Ma is determined for the lower ash bed. Sediments contain abundant and well-preserved pollen and spores that document botanical changes progressing from *Nyssa*-dominated to *Taxodium*-dominated to mixed forest assemblages. The existence of *Taxodium* and other warm-climate taxa in the Wilkes Formation indicates the presence of a wet, warm temperate climate in the Puget lowlands during the latest Miocene.