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Updated glacial chronology of the South Fork Hoh River valley, Olympic Peninsula, Washington through detailed stratigraphy and OSL dating

Cianna E. Wyshnytzky
Utah State University

Tammy M. Rittenour
Utah State University

Glenn D. Thackray

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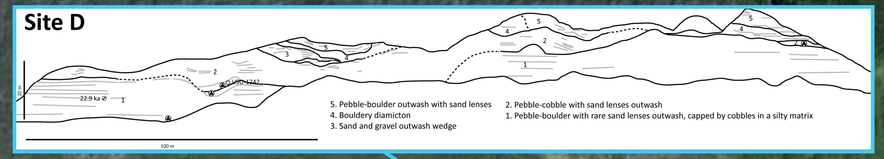
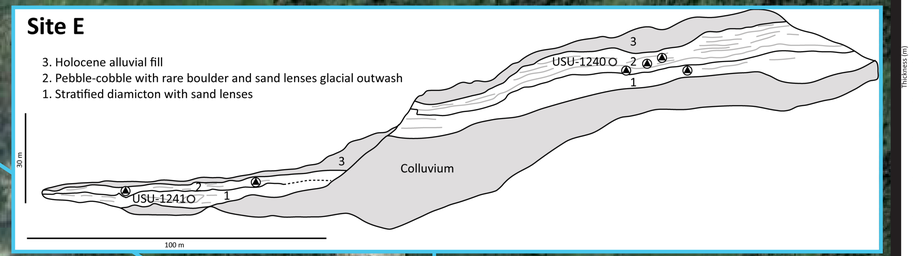
RESEARCH OBJECTIVES

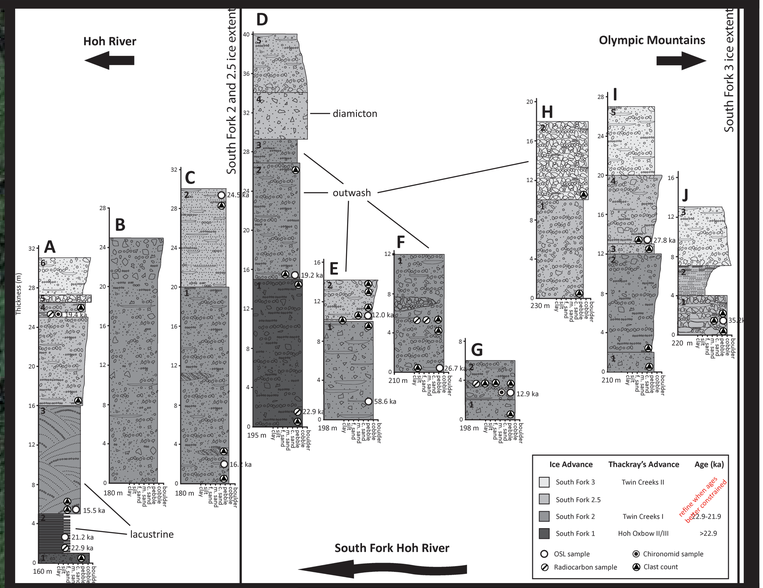
- Revising the stratigraphic record and chronology of glacial advances in the South Fork Hoh River valley after Thackray, 1996
- Providing data that may contribute to reconstructing the MIS 2 paleoclimate of the western Olympic Mountains
- Recording the sedimentology and depositional processes of maritime mountain glaciers
- Assessing the feasibility of OSL in several ice-proximal environments

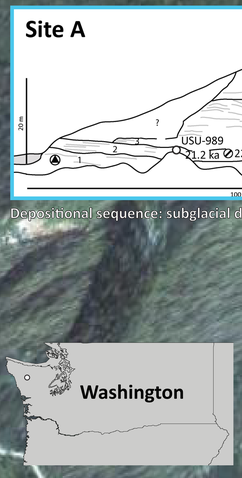


Depositional sequence: glacial outwash (3 packages) > subglacial deposition > glacial outwash

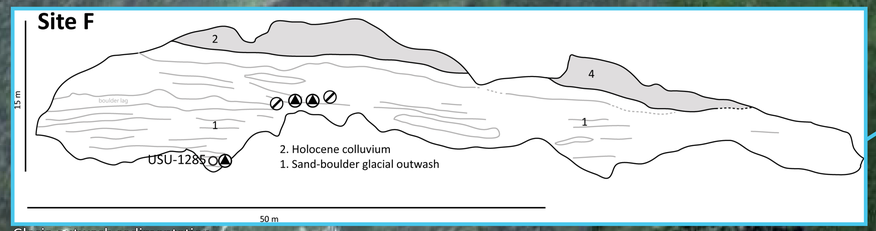


Depositional sequence: subglacial deposition > glacial outwash

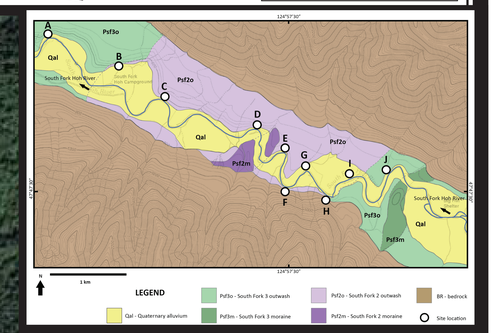




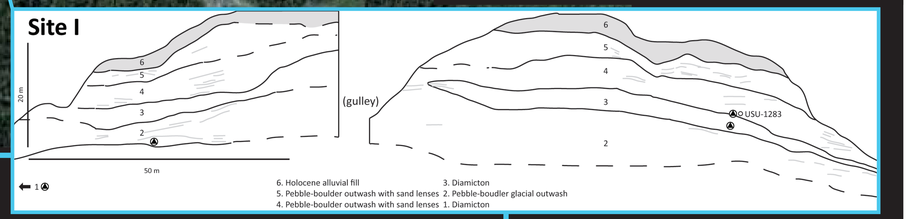
Depositional sequence: subglacial deposition > lacustrine deposition (2 packages) > glacial outwash (3 packages)



Glacia outwash sedimentation



Depositional sequence: subglacial deposition > glacial outwash > subglacial deposition > glacial outwash (2)



BACKGROUND

Name	Age (ka)
Twin Creeks 2	undated
Twin Creeks 1	19.1-18.3
Hoh Oxbow 3	22-19.3
Hoh Oxbow 2	30.8-26.3
Hoh Oxbow 1	42-35
Lyman Rapids	≥54

Western Olympic Peninsula glacial advance chronology (Thackray, 1996)

- Pollen-derived temperature data and glacial advance chronology of the western Olympic Mountains suggest periods of enhanced precipitation correspond to glacial advances (Florer, 1971; Heusser, 1972; Thackray, 2001)
- The MIS 2/global LGM advance does not mark greatest ice extent in both the Olympic and Cascade Mountains. This is in contrast with non-maritime glaciers of the western United States, which reached their maximum extents during the global LGM (26-23 ka), suggesting that regional precipitation influence on maritime mountain glaciers, in contrast to the hemispheric or global insolation/temperature influences on continental glaciation (Thackray, 2008).
- This study relies heavily upon the descriptions and interpretations of the sedimentology and stratigraphy exposed along the South Fork Hoh River cutbanks to provide information on the style and sequence of MIS 3-2 ice advance and deglaciation in the South Fork Hoh valley.
- This research also explores the use of quartz OSL dating in proximal glacial environments.

RESULTS & CONCLUSIONS

Four glacial advances are preserved and exposed in the stratigraphy of the South Fork Hoh River valley. The oldest of these advances extended beyond the South Fork valley into the Hoh River valley. The three younger advances are preserved in the stratigraphy cut bank exposures in the valley and geomorphically by moraines and outwash plains. One of these advances represents a re-advance to the same terminal position of the previous advance and has not previously been recognized in this valley or other glaciated valleys in the western Olympic Mountains. This finding advocates for a detailed sedimentologic and stratigraphic approach to glacial deposits and questions whether a similar advance is seen in other glaciated valleys of the region. If so, this may reveal information regarding climate influences on glacial advance not previously considered for this specific time period.

Cianna E. Wyshnytzky;
cianna.wyshnytzky@aggiemail.usu.edu;
Utah State University, 4505 Old Main Hill, Logan, UT 843222

Tammy M. Rittenour;
tammy.rittenour@usu.edu;
Utah State University, 4505 Old Main Hill, Logan, UT 84322

Glenn D. Thackray;
thacglen@isu.edu;
Idaho State University, 921 S. 8th Ave, Stop 8072, Pocatello, ID 83209