

GEOMORPHIC LANDSCAPES OF THE INLAND PACIFIC NORTHWEST BASED ON COMPARATIVE WEATHERING AT TWO FIELD SITES

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The Columbia river flood basalts and overlying sediments record a changing landscape in the inland Pacific Northwest over the last 15 million years. Since the Columbia River Basalts consisted of many flows over millions of years, the weathering we observe in different basalt layers captures a weathering environment from the time of flow deposition to the time of the next flow covering the landscape. Relative stages of weathering in early basalt flows suggest a climate that was wetter than the current conditions in the Columbia River Basin. Past studies have described weathering between basalt flows; however, less research has described weathering features of the upper flows and overlying sediments. We present the weathering characteristics and geologic landforms that cap this weathering in two sites of the Saddle Mountains and Umatilla formations of the Columbia River Basalt Group. At the top of each outcrop, deeply weathered basalt is capped by other sediments which are distinctly less weathered than the flows beneath them. At one site, at a current drainage divide, a gravel strath terrace deposit and a thick layer of unweathered loess overlay a basalt flow which once represented a low point in the landscape. At the other site close to the Columbia River, basalt layers are exposed in a drainage basin developed during the uplift of the Horse Heaven Hills. Visual mapping of the outcrops sampled helped gain context within the flow and gain understanding of the vertical and horizontal variations within the outcrop such as flow structures and degrees of weathering. This mapping characterized the variability of weathering both in the flow and in the overlying sediments. We additionally described weathering in rock cores, hand samples, and sediment samples and further quantified the degree of weathering by geochemical analysis using XRF. Together, these features of the outcrop record a changing environment based on different degrees of weathering among the basalt flows and the landforms above. Variation in weathering between sites may allow us to describe how events such as the Horse Heaven Hills uplift and the Missoula floods changed the landscape near the Columbia River.

Session No. 128--Booth# 121

[T5. Geologic and Geomorphic Evolution of the Columbia River Basin \(Posters\)](#)

Monday, 11 October 2021: 2:30 PM-6:30 PM

Exhibit Hall A (Oregon Convention Center)

Geological Society of America *Abstracts with Programs*. Vol 53, No. 6

doi: 10.1130/abs/2021AM-369642