

OUT OF THE BLUE(S): A COMPARISON OF BASALT WEATHERING RATES AT TWO SITES IN DIFFERENT STRATIGRAPHIC POSITIONS IN THE BLUE MOUNTAINS OF OREGON

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Variations in weathering characteristics of the Columbia River Basalt Group flows in the Blue Mountains of Oregon and Washington demonstrate a climatic shift throughout the eruption period (~16.8-5.5 Ma) from a wetter to drier climate. Basalt flows that have been uplifted in the Blue Mountains preserve weathering features that have not been influenced by erosion and deposition associated with late Pleistocene glacial outburst floods. Two field sites at 1000 and 1500 m elevation possess broadly similar stratigraphic sequences, each consisting of a sequence of basalt flows with weathered paleosols, mantled by a thin minimally-weathered loess-derived soil. We described stratigraphy, weathering, and soil properties at each site. We used hand tools and a core drill to collect samples of weathered and unweathered material to geochemically characterize weathering using XRF. Thin sections of unweathered and weathered samples help confirm the identity of basalt flows and better understand weathering processes. The lower elevation site contains two flows of the Wanapum Basalt. In between these flows lies a thin, brittle, reddish layer of highly weathered basalt that is up to 10 cm thick. The higher elevation site contains multiple flows ranging from the N2 Grande Ronde (~15.6 Ma) up to the lowest members of the Saddle Mountains flows (~13 Ma). The degree of weathering decreases from bottom to top. Despite the sites' geographic proximity, the weathering characteristics of each site is distinct, reflecting differences in weathering rates at the time of each eruption.

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