

248-2 - Booth No. 268: STRATIGRAPHIC AND STRUCTURAL EVOLUTION OF THE EOCENE ALDWELL AND LYRE FORMATIONS IN A SYN- TO POST-COLLISION BASIN FOLLOWING ACCRETION OF SILETZIA, NORTHERN OLYMPIC PENINSULA, WA



Wednesday, 18 October 2023



8:00 AM - 5:30 PM



Hall B (2, David L Lawrence Convention Center)

Booth No. 268

Abstract

Eocene-Miocene sedimentary strata exposed along Washington's northern Olympic Peninsula are known as the peripheral rock sequence. They were deposited following accretion of the Siletzia oceanic plateau to the continental margin at ~50 Ma and directly overlie the plateau's basaltic basement (Crescent Fm.). This sequence of rocks was previously interpreted to represent deposition in the regional Tofino-Juan de Fuca basin. However, new high-precision U-Pb zircon geochronology (CA-ID-TIMS) of interbedded volcanics in this sequence indicates that the lowermost formations represent deposits that both predate and are synchronous with Siletzia's accretion to North America. This record is distinct from the younger post-collisional basin strata of the Tofino-Juan de Fuca basin.

The Eocene Aldwell Fm. is the lowermost formation in the peripheral rock sequence and is characterized by massive siltstones with thin interbeds of fine-grained sandstone. Rhyolites and volcanic breccias are mapped within the lower part between the Lower Elwha River valley (LERV) and near Lake Crescent. The origin of these rhyolites is unclear: some researchers mapped them as interbedded with lowermost strata, whereas others mapped them as large olistostromes. New geochronologic data from one rhyolite indicates an eruption age of ~52.1 Ma. If this rhyolite is interbedded with the Aldwell Fm., then the date would indicate that the Aldwell Fm. represents a pre-accretionary sedimentary package. However, if the rhyolite is an olistostromal block, the date represents a maximum depositional age. The distinction between these two possibilities will impact our interpretation of the timing and type of sedimentary basin that formed following the collision of Siletzia.

To help determine the origin of rhyolites within the Aldwell Fm., we have integrated additional geochronology, lithofacies mapping, and structural studies from the area between Lake Crescent and the LERV. An angular unconformity is mapped separating the Aldwell from overlying coarse-grained syn- to post-collisional deposits of the Lyre Fm.,

marking a period of exhumation and deformation. We discuss the relationship of the Aldwell and Lyre Fms., and describe the depositional setting of these units within context of an oceanic plateau forming near the North American continent.

Geological Society of America Abstracts with Programs. Vol. 55, No. 6, 2023
doi: 10.1130/abs/2023AM-392962

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