68-2 - THE ROLE OF OCEANIC PLATEAU COLLISION AND BREAK-UP IN THE GEOLOGIC DEVELOPMENT OF THE PACIFIC NORTHWEST AND SOUTHEASTERN ALASKA USING SEDIMENTARY ANALYSES AND U-PB ZIRCON GEOCHRONOLOGY

Sunday, 15 October 2023

1:50 PM - 2:05 PM

326 (3, David L Lawrence Convention Center)

Abstract

Two pieces of thick basaltic crust accreted to North America during the Cenozoic in the Pacific Northwest (Siletzia terrane) and southeastern Alaska (Yakutat terrane) as fragments of an oceanic plateau. Based on similar geochemistry, age, and thickness, one hypothesis is that they formed as the same ridge-centered oceanic plateau offshore present-day Washington, Oregon, and southern BC between 56-48 Ma. In this model, both plateaus collided with the continental margin at ~50 Ma as a composite plateau before the Yakutat terrane was transported northward along strike-slip faults to its present-day position.

This study uses an integrative basin analysis approach to test the Siletzia-Yakutat composite oceanic plateau hypothesis and subsequent translation models of the Yakutat terrane. Both oceanic plateau fragments are overlain by a thick section of Eocene to Miocene strata that record the pre-, syn-, and post-accretion sedimentary response to oceanic plateau collision and translation. Research was conducted in basin strata exposed along the northern Olympic Peninsula (WA; Siletzia terrane), and between Katalla and the Samovar Hills in southeastern AK (Yakutat terrane). New high-precision geochronology (CA-ID-TIMS) from tuffs interbedded with basement basalts and overlying basin deposits on the northern Olympic Peninsula (N=11) and from the Samovar Hills (N=2) help establish a detailed chronostratigraphy. To constrain lateral and temporal variations in sediment provenance, detrital zircon samples on the Siletzia (N=10; n=2308) and Yakutat (N=13; n=3378) were collected systematically throughout the basin stratigraphy.

Our results support an early shared history of the Siletzia and Yakutat terranes. Initial collision to the continental margin as a composite plateau resulted in deformation of the pre-accretion sequence, unconformity development, and an influx of coarse-grained detritus into a newly established basin overlying accreted basement basalts. Sediments on the Siletzia terrane were initially derived from local sources, followed by rapid subsidence and deposition of regionally derived sediments. Sediment provenance on the Yakutat

terrane helps constrain ~1000 km of northward translation in relation to exposed source terranes within the Coast Mountain Batholith.

Geological Society of America Abstracts with Programs. Vol. 55, No. 6, 2023
doi: 10.1130/abs/2023AM-392911

Author

D

Erin E. Donaghy
Purdue University

Authors

E

Michael Eddy

R

Kenneth Ridgway
Purdue University

View Related