185-7 - WHAT HAPPENS TO LARGE DISPLACEMENTS ON PALEOGENE STRIKE-SLIP FAULTS IN CENTRAL BRITISH COLUMBIA AND ALASKA TO THE SOUTH?

Tuesday, 11 October 2022

3:10 PM - 3:25 PM

Colorado Convention Center - 607

Abstract

Major dextral slip (>400 km) on N- to NW-striking Paleogene faults has been recognized from Alaska to central British Columbia. Multiple hypotheses have been proposed to explain how this slip was accommodated near the Canada-U.S. border. Our study region is largely centered on the crystalline core of the North Cascades and southernmost Coast Mountains batholith. There, strike-slip faulting migrated from east to west. The easternmost high-angle structure is the Pasayten fault, which records Early Cretaceous sinistral ductile shear. Subsequent brittle slip of uncertain sense involves Late Cretaceous or younger conglomerates and Eocene sediments localized next to the fault. The brittle movement is likely dextral, but the magnitude of slip is unknown. To the west, the Ross Lake fault system (Hozameen-Yalakom-Ross Lake faults) has ~115 km of dextral slip. It was transpressional from ca. 65-53 Ma and transtensional from 53-49 Ma. The Leavenworth and Entiat faults, which join along strike, have ca. 55 km of dextral slip bracketed between ~49 Ma - 45 Ma. The N-S-striking Fraser-Straight Creek fault is the youngest of the strike-slip faults. It has ca. 150 km of dextral slip from ~49 Ma to as late as 34 Ma, and offsets the other high-angle faults. Cumulative dextral displacements of ~320 km occurred from ca. 65 Ma – 35 Ma. This estimate does not include likely limited dextral motion on the Pasayten fault and transfer of slip via subhorizontal Eocene ductile stretching between the Ross Lake and Entiat faults, and WNW-ESE extension on voluminous 49-46 Ma dikes. Our estimates thus account for most, but probably not all of the slip to the north.

Complicating interpretations are relationships at the southern end of the Ross Lake system. The ca. 49-48 Ma Cooper Mountain pluton obliterated the system, and south of the pluton E-W-trending contacts between Cretaceous units and foliations are continuous across the projection of the fault. We speculate that the >100 km of slip to the north was transferred to the SW to the southern segment of the Entiat fault via a subsurface detachment. Motion would have predated the post-48 Ma slip on the fault. A final major question is what happens to the south to the >700-km-long Coast shear zone of the central Coast Mountains batholith.

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