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GeoDay Abstract

Structure and timing of range fronts bounding the Tygh Valley, Oregon

Distributed deformation of the back arc region of Cascadia in Pacific Northwest is complex, factors influencing active geologic features include; rotation of the Oregon Cascade Range block, subduction angle of the down-going plate and the change from north to south from continental contraction to extension. Off the west coast lies a convergent margin where the Juan de Fuca oceanic plate is subducting beneath the North American plate at $\sim 35 \text{ mm yr}^{-1}$. East of the plate boundary, clockwise rotation of the Oregon Coast Range with respect to stable North America appears to control the back arc deformation, causing extensional features in southeast Oregon, contraction features in southeast Washington and a predicted transition region in north central Oregon. The transition region ought to be characterized by a mixed mode of deformation, where thrust and normal faults dominate structure. To the south, Basin and Range style extension dominates back arc deformation and to the north, contraction is expressed in the Yakima Fold belt. The Tygh Valley, near the town of Maupin, Oregon is a topographic low between two large structures. A swarm of earthquakes beginning in December of 2006 has focused attention on this region, as the source of these earthquakes is unknown and lack of structural data prevents further interpretation. During the course of this project I hope to provide temporal and kinematic constraints on the timing of features and determine the active style of deformation in this transition region.