

STRUCTURAL ANALYSIS OF KLAMATH FALLS, OREGON

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ABSTRACT

South-central Oregon lies within an apparent transition in tectonic regime. Here, crustal scale dextral strike slip associated with the Walker Lane belt terminates, and transitions into east-west directed extension characteristic of the Basin and Range. Rotational northwest translation of the Oregon Coast Range results in back-arc tension east of the Cascades, which transitions to thrusting in Washington. Klamath Falls, Oregon lies at the junction between Basin and Range extension, Walker Lane strike slip, and rotational back-arc spreading, making it an ideal locality to study the structural manifestations of this transition in crustal scale deformation. One possibility is that the crust is segregated into blocks, locally deformed and bound by zones of strike slip. Individual blocks might experience a degree of vorticity due to the rotational spreading, and would likely be detached. These detachments might occur at multiple crustal levels. We expect that faults rooting into different detachment levels might have unique spacing and degrees of rotation, which we see evidence for in Klamath Falls. In order to test this hypothesis, I plan to collect a suite of field data and observations that can be used to construct a regional cross-section that traverses the Klamath Falls area, perpendicular to the main trends of the faults. Uncertainties in the projections of measured surface bedding and faults to depth will be assessed by balancing this cross-section, and ideally also by retrodeforming it, to constrain the deformational history of the region. The primary goal of this study is to fit this structural model into a regional context, providing insight on how the crust might be responding to a complex kinematic transition.