LARAMIDE STRESS CONDITIONS AND DEFORMATION MECHANISMS DURING THE FORMATION OF HUDSON AND DALLAS DOMES, LANDER QUADRANGLE, WIND RIVER MOUNTAINS, LANDER, WY

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ABSTRACT

Laramide fold forms along the northeastern flank of the Wind River Mountains in west central Wyoming include a series of doubly plunging folds arranged in a left-stepping en echelon pattern. The fold patterns and geometries are derived from regional scale tectonic stresses that were complicated by local stress conditions associated with buckle folding and potential basement involved faulting. This study evaluates folding mechanisms forming Dallas Dome, an asymmetric pericline verging toward the core of the Wind River Mountains. The study involved geologic mapping of surface deformation, collecting and analyzing fault and fracture orientation data, and deducing the fold's deformation geometry, folding mechanisms, and associated stresses. Mapping and well log constraints indicate that the geometry of the fold form is a result of local basement involved faulting, propagating upward into a dual thrust system in the overlying sedimentary units. The offset on the dual thrust system diminishes northward.

Regional fracture sets R1 (45/225) and R2 (75/255) were determined to be directly associated with maximum principal shortening directions during Laramide and Sevier orogenies, respectively. Fold induced fracture sets include J1 (60/240), J2 (160/340), J3 (105/285), and J4 (55/235; 65/245), and are associated with both buckle and forced folding.