

Investigation of the Deformation History in Reactivated Asymmetric Anticlines in Northwestern New Mexico

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North-trending Laramide age dextral faults in New Mexico help to explain shortening features along the northern margin of the Colorado Plateau. However, a palinspastic reconstruction of aeromagnetic anomalies that are cut by these dextral faults (Cather et al., 2006), do not explain shortening in the Tusas-Brazos uplift. The reconstructed map by Cather (2006) does show shortening accommodated along the Nacimiento fault system to produce the Nacimiento Mountains, but the lack of shortening to produce the Tusas- Brazos Mountains suggests that the geometry of the faults needs to be reassessed. The Nacimiento fault as it propagates north becomes difficult recognize if not unidentifiable, indicating that deformation is possibly accommodated somewhere else. I propose an alternative hypothesis which states that the Nacimiento fault system merges with the Tusas-Picuris fault system. This model explains the uplifted Tusas-Brazos Mountains and the appearance of Proterozoic basement rocks. The hypothesized transition zone between the two uplift provinces may be indicative of reactivated Laramide structures producing transpressional en echelon monoclines. The geometry proposed here provides an explanation for the geometry and polarity reversal of the Rio Grande rift. Testing the hypothesized model will include collecting fault and fracture data in the field to determine deformational strain and form a basis for the sequential restoration. Sequential restorations of geologic maps and subsurface deformation will be performed using Midland Valley software. The proposed hypothesis predicts a kinematic link between shortening structures by studying the geometry and style of strain, if these amounts of strain are found to be unequal in the proposed transition zone then the model is void. If the en echelon style monoclines are indeed indicative of transpressional deformation and a result of reactivated Laramide structures then the area is not dominated by north trending strike-slip faults.