REFINING THE AGE OF THE RESERVE GRABEN, WEST-CENTRAL NEW MEXICO, WITH $^{40}$Ar/$^{39}$Ar DATING.

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The Reserve Graben is a small rift basin situated between three major tectonic features of the Southwestern United States: the Rio Grande Rift to the east, the Colorado Plateau to the northwest, and the Basin and Range Province to the southwest. The graben’s location at the junction of these three features suggests its formation can be tied to their relative motions (Martin et al., this meeting). However, more data are needed on the age and duration of rifting within the graben. In order to refine older, mainly K/Ar ages of graben fill, 11 samples taken from igneous intrusive and extrusive units interlayered with the basin fill have been dated using the $^{40}$Ar/$^{39}$Ar radiometric method. Dated materials include groundmass from 10 basalt flows and biotite/sanidine from a quartz diorite volcanic plug. The oldest basalt, within the deepest sediments near the floor of the basin, yields an age of 16.35 ± 0.04 Ma while the youngest basalt age is 1.89 ± 0.01 Ma. The latter flow crosses the master fault of the graben without offset, providing a minimum age for fault activity, which is slightly older than the previous K/Ar age of 1 Ma (Marvin et al., 1987). Another basalt, previously dated by K/Ar at 19.2 ± 2.5 Ma (Ratté 1980), yields a precise $^{40}$Ar/$^{39}$Ar age of 16.02 ± .04 Ma, consistent with other basalts in the area. These findings suggest that rifting in the Reserve Graben began significantly later than the previously estimated 21 Ma (Crews, 1994). Onset of Reserve Graben subsidence around 16 Ma corresponds closely with a rapid pulse of subsidence in the nearby Rio Grande Rift during early and middle-Miocene time (Chapin & Cather, 1994). This also occurred during the transition from southwest-directed to west-northwest-directed extension in the Basin and Range Province (McQuarrie & Wernicke, 2005). Additional samples are being dated to determine sedimentation rates and constrain better the youngest sedimentation history within the basin.

References:


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