

Recent Geophysical Studies of the San Luis Basin, Rio Grande Rift, Colorado and New Mexico

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Project website: <http://crustal.usgs.gov/projects/rgb/>

The San Luis Basin of Colorado & New Mexico is a natural geologic laboratory where aeromagnetic and gravity methods have critical importance to studies of natural resources, particularly groundwater. One of the larger basins that make up the Rio Grande rift, the San Luis Basin includes thick accumulations of rift sediments, syn-rift volcanic flows, and active faults. Aeromagnetic, gravity, and geologic mapping studies over the basin began in 2003, in order to facilitate 3D mapping in the context of these geologic features. The geometry of the basin is estimated from 3D gravity inversion and allows delineation of basin segments. In particular, a poorly understood region of the basin between Alamosa and the New Mexico border is found to contain three sub-basins filled with at least 1 km of rift sediments, separated by two intrabasin structural highs. Rift sediments reach their greatest thicknesses near the Sangre de Cristo Mountains, and more recent stages of rifting appear to be localized on the eastern portion of the valley. North-south-trending aeromagnetic gradients indicate many north-south faults that cut both volcanic rocks and rift sediments. The temporal development of the syn-rift volcanic rocks can be studied by an approach that includes both aeromagnetic interpretations of rock magnetic polarities and geochronologic age estimates.



Author in Afghanistan using a Scintrex gravimeter