

PROTEROZOIC GEOLOGY OF THE ARKANSAS RIVER CANYON, COLORADO

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Mapping, structural analysis, and geochemical sampling of Proterozoic rocks from north of Howard to east of Texas Creek in the Arkansas River canyon established similar geologic histories between the 1.7 Ga Salida and Wet Mountain terranes and were unable to locate evidence of a distinct boundary between these terranes. Rocks north of Howard, at the western end of the canyon, are low-amphibolite grade metabasalt, metatuff, and metasediments. The lack of deformation or partial melting is similar to Salida terrane rocks. Geochemistry of the metabasalts correlates well with Salida and southern Front Range amphibolites and supports an arc or back-arc setting. Magma-mingling occurs on a local scale. Further east, near Texas Creek, the rocks are extensively deformed, partially melted and perforated by granitic plutons. However, the rocks show similar lithologies including amphibolite-grade bimodal volcanics and metasedimentary gneisses such as sillimanite-muscovite-biotite gneiss and cordierite schist. The latter unit contains large cordierite porphyroblasts, which appear to have overgrown original bedding which was crenulated. An early penetrative deformation involved isoclinal folding and transposition. Foliation and axial surfaces strike E-W to SE-NW with N to NE dips. Locally, high-grade shear zones truncate these rocks and record oblique-slip displacement. Open folding about NE axes warped the regional foliation, possibly during the emplacement of 1.4 Ga plutons. Growth of randomly oriented minerals is interpreted to have accompanied this plutonism. Geochemical studies of the felsic metavolcanics revealed two groups of volcanics interlayered throughout the region from Howard to the northern Wet Mountains. Similar studies of metabasalt showed immature arc signatures nearly indistinguishable from Salida and Wet Mountain rocks. Thus, no distinct lithologies or structural zones were found to separate these terranes.