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**Sinistral strike-slip along the southwest boundary of the Uncompahgre uplift as shown by
basement-cover interaction in post-Mississippian folds, southwestern Colorado**

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Along the southwest-boundary faults of the Uncompahgre uplift, now exposed in the San Juan Mountains of southwestern Colorado, a Cambrian-Mississippian cratonic succession (generally <100 m thick) of clastic and carbonate rocks unconformably overlies a variety of Precambrian basement rocks and structures. Basement rocks and cover strata are broken by steep faults that were reactivated episodically during Cambrian, Devonian-Mississippian, and later. On one fault block between the Coal Bank Pass (south) and Snowdon (north) faults, folded Paleozoic strata overlie a vertically dipping Precambrian succession of alternate units of quartzite and metapelite (each ~150 to 250 m thick); average angular discordance is ~90° at the sub-Cambrian unconformity. The folded Cambrian-Mississippian strata are parallel with the surface of unconformity.

Gently plunging anticlines and synclines in the Paleozoic cover strata are distributed systematically with respect to five successive lithologic contacts in the Precambrian quartzite-metapelite succession; wavelength of the folds in the Paleozoic rocks corresponds to thickness of the quartzite and metapelite units. The synclines are box-shaped, flat-bottomed folds and are positioned above Precambrian quartzite units. The anticlines are open, asymmetric folds and are positioned above Precambrian metapelite units. Hinges of folds in the cover strata are parallel with strike of the quartzite-metapelite contacts, and the fold limbs are positioned over quartzite-metapelite contacts. A steep fault locally accentuates the steepness of one fold limb. A geometrically simple envelope of fold amplitude is defined by an upper plane that contains the anticline axes and a lower plane that corresponds to the flat bottoms of synclines. The northeasterly strike of the envelope of the gently plunging folds is perpendicular to the northwesterly strike of the vertical quartzite-metapelite succession. The structural relief of the anticlines corresponds to the volume between the anticlinal surface of the sub-Cambrian unconformity and the average floor of the envelope of the folds.

The systematic location of anticlines over metapelites and synclines over quartzites shows that the structural relief of the anticlines was filled by vertical upward extension of metapelite parallel with foliation. A possible mechanism includes subhorizontal compression nearly perpendicular to strike of the quartzite-metapelite, layer-perpendicular shortening and layer-parallel upward ductile extension of the metapelite (accompanied by no layer-perpendicular shortening of the quartzite), and passive folding of the Paleozoic strata. Although folding of the Paleozoic strata probably reflects passive draping over the upward-extending metapelite, a component of compressional buckle folding with axes perpendicular to compression is also possible.

The age of folding is only imprecisely constrained. Strata as young as Devonian-Mississippian Ouray and Leadville formations are folded, limiting the maximum age of folding. At the present outcrop level, the plunging folds are exhibited in a dip slope stripped on the top of

Ouray-Leadville massive carbonates, and no post-Leadville strata are preserved over the folds. The anticlines decrease in amplitude and flatten northwestward down plunge, suggesting a conical geometry. Northwest of the northwest ends of the plunging folds, the Ouray-Leadville beds dip northwestward beneath Pennsylvanian strata. The outcrop pattern shows that the plunging folds end down plunge within the Mississippian and older strata, and exposed Pennsylvanian strata are not involved in the folds. The preserved fold geometry permits an age of folding later than Mississippian; however, present outcrops do not confirm the minimum age of folding.

Map distribution of the northwestward plunging ends of the conical anticlines shows an en echelon arrangement of fold axes, wherein the more northerly plunging fold noses are progressively offset to the left toward the Snowdon fault. The en echelon plunge geometry is consistent with sinistral slip on the Snowdon fault and a secondary sinistral stress field in the fault-bounded block south of the fault. Sinistral slip on the Snowdon fault may represent the pervasive slip sense for the southwest boundary of the Uncompahgre uplift during the Ancestral Rockies (Pennsylvanian-Permian) phase of deformation.