

PROTEROZOIC(?) LOW-GRADE METAMORPHIC ROCKS OF THE CENTRAL GRAVELLY RANGE OF SW MONTANA

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Laramide uplift of the southern Gravelly Range of southwestern Montana exposed anomalously low-grade Precambrian basement metamorphic rocks that provide important insight into the tectonic setting of the Wyoming Province during the early Proterozoic. Metamorphism ranges from greenschist to lower amphibolite facies. Extent of recrystallization is low; in the north original crossbedding in quartzite and pillows in metabasalt are preserved. Protoliths vary greatly across and along strike and include interlayered quartzite, banded iron formation, epiclastic strata, conglomerate, mudstone, and discontinuous pods of gabbro. Penetrative cleavage, discrete zones of greater shear and mylonitization, at least two crenulation cleavages, meter-scale domes that suggest doubly folded open folds with two nearly perpendicular fold axes, and/or larger scale open folds up to tens of meters across, with amplitudes of less than one tenth wavelength occur locally in these rocks.

The Gravelly Range is located in the northern Wyoming province. Basement rocks in adjacent Laramide uplifts to the north and west have been metamorphosed to upper amphibolite and granulite facies. Within the Gravelly Range, the low grade metamorphic rocks abut silliminite schists to the north and staurolite schist to the south. The Big Sky orogeny, a regional two-phased metamorphism between 1.78 and 1.72 Ga, has been documented in the Tobacco Root Mountains to the north. This work puts the low grade metamorphism and structural style of the central Gravelly Range in context with models for the Big Sky orogeny.