

PENNSYLVANIAN STRATIGRAPHY IN THE MANZANO-MANZANITA MOUNTAINS, CENTRAL NEW MEXICO

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Pennsylvanian strata overlie Proterozoic basement along the crest and dip slope of the Manzano and Manzanita Mountains in Valencia, Torrance and Bernalillo counties, New Mexico. However, locally, along the Tijeras Hogback Ridge in the northernmost Manzanita Mountains, the Pennsylvanian sits on 16-21 m of Mississippian red beds. Study of Pennsylvanian successions at Priest Canyon, Sol se Mete Peak, Cedro Peak and Tijeras Hogback Ridge, as well as other less complete successions, indicates that the Pennsylvanian strata in the Manzano-Manzanitas can be assigned to the (ascending order) Sandia, Gray Mesa and Atrasado formations. The Sandia Formation is interbedded shale, quartz-rich sandstone, limestone and conglomerate, mostly in depositional contact with the Proterozoic basement. Sandia Formation thickness ranges from 14 to 70 m, largely because of the paleotopography upon which it was deposited at the local onset of the ancestral Rocky Mountain orogeny. The Gray Mesa Formation (= Los Moyos Limestone) is 67-192 m thick and can be divided into three members (ascending): Elephant Butte Member, 20-47 m of limestone and shale; (2) Whiskey Canyon Member, 30-84 m of cherty limestone; and (3) Garcia Member, 18-84 m of non-cherty limestone and shale with lesser amounts of cherty limestone, sandstone and conglomerate. The Atrasado Formation (=Wild Cow Formation) is 200-272 m thick and divided into eight members (ascending): (1) Bartolo Member, 28-66 m of slope-forming shale with thin beds of sandstone, limestone and conglomerate; (2) Amado Member, 9-19 m of bedded, cherty, brachiopod-rich limestone; (3) Tinajas Member, 45-115 m of shale with interbedded limestone and sandstone; (4) Council Spring Member, 7-23 m of mostly algal limestone without chert; (5) Burrego Member, 23-63 m of arkosic red beds and limestone; (6) Story Member, 6-22 m of limestone; (7) Del Cuerto Member, 9-26 m of arkosic red beds and limestone; and (8) Moya Member, 5-11 m of bedded limestone and shale. The Atrasado Formation is overlain by the transitional Pennsylvanian-lower Permian (Wolfcampian) Bursum Formation, which is 30-90 m of interbedded red-bed mudstone, sandstone, conglomerate and limestone. The continuity of Atrasado Formation stratigraphic architecture reflects tectonic events in the Pedernal highland and adjacent basin over a distance of at least 150 km, from the northern Oscura Mountains of Socorro County to the northern Manzanitas. The Pennsylvanian section at Priest Canyon includes the type sections of units named by Myers and long applied to Pennsylvanian strata throughout the Manzano-Manzanita mountains. It is very similar to the Pennsylvanian section in the Cerros de Amado, ~60 km to the SW, and the stratigraphic nomenclature used in Socorro County can be applied to the Gray Mesa and Atrasado formations throughout the Manzano-Manzanita Mountains. We thus abandon all of Myers' Pennsylvanian lithostratigraphic terms because they are either synonyms of earlier named units or do not identify useful lithostratigraphic units. In the Manzano-Manzanita Mountains, fusulinid and conodont biostratigraphies indicate that the Sandia Formation is late Atokan-earliest Desmoinesian, the Gray Mesa Formation is early-middle Desmoinesian and the Atrasado Formation is late Desmoinesian-middle Virgilian.

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