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**Timing of Southern Ancestral Rocky Mountain Deformation from Stratigraphic Evidence**

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The southern Ancestral Rocky Mountains in southern New Mexico is manifested in a series of differentially subsiding basins (Pedregosa, Orogrande, and Delaware basins) and uplifts (Florida, Pedernal, and Central Basin Platform). The timing of initiation and cessation of tectonic subsidence and uplift in this area vary. We focus here on stratigraphic data that place constraints on the tectonic timing of the Orogrande basin and Pedernal uplift. We have divided the late Paleozoic stratigraphy of this region into four tectonostratigraphic units: (1) miogeoclinal assemblage - pre-ARM, (2) Ancestral Rockies tectonic assemblage, (3) relief onlap assemblage, and (4) post-relief overlap assemblage based on isopach patterns, sedimentologic data such as grain size variation, depositional environments, and provenance, and the presence of progressive unconformities.

Miogeoclinal strata are pre-Pennsylvanian in age and have isopach patterns that display depositional thickening uniformly southward and correspond to progressively deeper water marine facies. They do not display depositional thinning or shallowing of facies onto the Pedernal structural element indicating it had not yet developed. In southern New Mexico Morrowan or Atokan strata lie directly on Mississippian and older. Isopach maps for the early Atokan display depositional thinning and shallowing of facies onto the Florida and Pedernal uplifts. Coarse-grained siliciclastic units within the Atokan section were locally derived from erosion of the uplifts suggesting a pre-Atokan, but post-Mississippian initiation of ARM tectonics in this region. A more precise initiation age can not be determined because the Mississippian-Pennsylvanian boundary is a major erosional unconformity both in New Mexico and throughout the world; and corresponds to the boundary between the Kaskaskia and Absaroka Sloss Supersequences.

The Ancestral Rockies tectonic assemblage comprises both marine and non-marine rocks that display depositional thinning and shallowing of facies on to the Pedernal uplift and progressive unconformities adjacent to uplift bounding structures. Structural relief culminated in the Early Permian (Wolfcampian) as evidenced by strata displaying the greatest amount of isopach thickness variation, deposition of the coarsest grained clastics, and highest number of stacked progressive unconformities. Conglomeratic strata within the late Wolfcampian Abo Formation within the Sacramento Mountains display a transition from conglomerate beds with progressive unconformities and depositional thinning to conglomerate beds with depositional thinning but no progressive unconformities. This transition marks the end of active tectonism in the region and the beginning of passive onlap and beveling of pre-existing topographic relief. The passive in filling system fines upward, but continues to show depositional thinning on to paleo highs and is referred to as relief onlap assemblage. The basal Yeso Formation (lowermost Leonardian) in the Pedernal Hills contains arkosic, coarse-grained siliciclastic strata that thin

onto the Pedernal high and are included in the relief onlap assemblage. However, overlying Yeso strata are very fine-grained and depositional thicknesses are relatively continuous across the region displaying gradual southward and westward thickening toward the Holbrook basin in Arizona. We refer to this overlying Yeso strata as the post-relief overlap assemblage that indicates deposition on a surface of little or no topographic relief.