Stratigraphy and structure of the southern Espanola Basin, New Mexico

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On-going studies have refined our understanding of the stratigraphy and structure of the southern Española basin south of Santa Fe. Here, four lithostratigraphic units of the Tesuque Fm (Oligocene-Miocene) laterally grade into one another. Lithosome S is mostly a pebbly sand deposited by an ancestral Santa Fe River sourced east of the Picuris-Pecos fault. To the south, lithosome S laterally grades into sand and silty sand of lithosome A derived from the southern Sangre de Cristo Mountains. Lithosome E generally consists of muddy sand derived from erosion of Cieneguilla Basalt and Espinaso Formation on the eastern flank of a paleotopographic high between the Santa Fe embayment and Santo Domingo basin. A fourth lithosome within lithosome S consists of clay and sandy clay, possibly as thick as 150 m, that is penetrated by drill holes north of Arroyo Hondo near the Santa Fe Airport. We interpret that these clayey sediments were deposited in a lake or playa in a closed basin, possibly during rapid tectonic subsidence during the middle(?) Miocene.

Miocene-age tectonic activity also formed a broad, north plunging, synclinal trough in strata beneath relatively undeformed Ancha Fm (Plio-Pleistocene), based on well cuttings that compliment aeromagnetic, gravity, and seismic data. Both aeromagnetic data and subsurface stratigraphic correlations indicate an approximate east-northeast trending hinge line near Bonanza Creek. Near the State Penitentiary, strata steepen northward across this hinge line. To the east, the southern boundary of lithosome S approximately corresponds with the hinge line location, suggesting possible structural control on its deposition.

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