Rock watching along the Canyon Trail, Bosque del Apache National Wildlife Refuge-A pictorial guide to Neogene landscape evolution in central New Mexico

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Recent geologic mapping and paleocurrent observations indicate that interbedded volcanic-rich conglomerates and cross-bedded eolian sandstones exposed along the Canyon Trail predate the Rio Grande and mark the time "before a river ran through it". Equivalent volcanic-rich conglomerates NW of the Bosque Visitors Center are overlain by a basaltic lava flow that yields a 40Ar/ 39Ar age of 8.57 ± 0.26 Ma; they are therefore assigned to the Miocene Popotosa Formation of the lower Santa Fe Group.

Pebble imbrications and clast compositions in the cobbly conglomerates indicate paleocurrents to the WSW (250 ± 45°, n=14); whereas maximum dip directions (>25-35°) in the coeval eolian sandstones show prevailing wind directions toward the ENE (080± 30°, n = 23). In late Miocene time, about 9-10 Ma, the Little San Pascual Mountains (east of the Canyon Trail) must have been a prominent fault block range capped by a thick volcanic pile overlying the Permian Abo Formation. Mountain streams carried the volcanic-rich gravels and rare Abo siltstone clasts westward toward a basin floor. At the same time strong westerly winds carried fine sand eastward across the toes of the alluvial fans. Minor mudstone drapes found where conglomerate beds overlie eolian sandstones probably mark small marshlands formed at the toe of alluvial fans, on the lee (mountainward) sides of the dunes. The Ibex Dunes, in the Death Valley region of Southern California, are considered to be a modern analogue for the Canyon Trail area in late Miocene time. Remnants of east transported piedmont-slope gravels (early? Pleistocene) disconformably overlie the Popotosa conglomerates where they are locally preserved on the downthrown side of the NNW-striking Solitude fault, which transects the Canyon Trail.

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