

# **PS Provenance and Sandstone Modal Compositional Trends from Upper Cretaceous Nonmarine Siliciclastic Strata of the Sevier Foreland Basin in Northern and Central New Mexico\***

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## **Abstract**

New provenance data are summarized from Upper Cretaceous nonmarine strata of the Sevier foreland basin throughout northern and central New Mexico. Here, strata outcrop directly east and along-strike of the San Juan Basin, along Laramide structures as well as the western margin of the Great Plains. Strata of interest include fluvial deposits of the Albian-Cenomanian Dakota Sandstone and Albian (?) Lytle Sandstone. In an effort to better understand both subcrop contributions to the Dakota and maximum depositional ages for the Lytle, we also report new provenance data from the Upper Jurassic Morrison Formation throughout northern New Mexico. Overall, sandstone modal composition trends from Upper Cretaceous strata are dominated by elevated occurrences of quartz, lesser lithics, and rare feldspar. Throughout central New Mexico, the Dakota contains lower amounts of quartz (Q=84%, F=1%, L=15%) compared to northern New Mexico (Q=98%, F=1%, L=1%). The Lytle in northeastern New Mexico directly underlies the Dakota and has comparable composition (Q=98%, F=0%, L=2%). The underlying Morrison contains a greater abundance of feldspar (K-feldspar) and lithic fragments (Q=87%, F= 9%, L= 4%).

Previous studies have assumed the Lytle is similar to the Dakota but there has been no age constraint to confirm this. As such, we also report compositional trends from the Morrison as a means to compare with the Lytle and Dakota. All Cretaceous and Jurassic units contain minor but regular occurrences of lithic sandstone, volcanic, and metamorphic fragments. Detrital zircon ages from the Dakota, Lytle, and Morrison share somewhat similar age peaks. The Dakota in central New Mexico exhibits peak ages at 103, 230, 412, 626, 1050, 1416, 1651 Ma with isolated occurrences of Archean grains from 2.5-3.2 Ga. Throughout northern New Mexico, the Dakota shows peak ages of 100, 177, 416, 588, 1021, 1418, 1664, 2728 Ma and rare 2.5-3.2 Ga grains. Underlying strata of the Lytle and Morrison contain peak ages of 183, 273, 572, 606, 810, 1038, 1164, 1448, 1731 Ma and rare occurrences of Archean grains from 2.5-3.2 Ga. Provenance trends from the Dakota support a model where detritus was being shed eastward from the Sevier fold/thrust belt as well as northward from the northern paleo-rift shoulder of the Bisbee rift in southern Arizona and southwestern New Mexico. There is also evidence that the Dakota in northern New Mexico contains recycled detrital contributions from the underlying Lytle and Morrison.



