Provenance Trends from Modern Tributaries Along the Western Margin of the Rio Grande Rift, Implications for Drainage Development Post ~1 Ma

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Provenance data from modern sediment in headwater streams of the Rio Grande provide insight on how these drainages developed over the last ~1 million. Summarized here are new U-Pb detrital zircon ages (N=1186) from the modern Jemez, Rio Puerco, and Rio Salado drainages along the western margin of the Rio Grande Rift in the Santa Domingo, Albuquerque, and Socorro basins in central and southern New Mexico.

The Jemez River is the furthest upstream locality in this study and records peak ages at 1725, 1686, 1441, 1089, 223, 165, 87, and 36 Ma. The Rio Puerco and Rio Salado are south of the Jemez River and samples collected above the confluence of the Rio Puerco and Rio San Jose exhibit peak ages at 1729, 1685, 1425, 1160, 419, 165, 93, and 74 Ma. Samples collected below the confluence of the Rio Puerco and Rio San Jose exhibit peak ages of 1731, 1669, 1437, 1133, 556, 414, 166, and 95 Ma. The Rio Salado is the southernmost locality in this study and exhibits peak ages at 1739, 1678, 1637, 1432, 1067, 218, 165, and 95 Ma. Peak ages from all samples overlap with Precambrian source areas of the Yavapai-Mazatzal, A-type granite, and Grenville provinces as well as with portions of the Mesozoic Cordilleran arc and Eocene-Oligocene volcanic fields in northern New Mexico.

Although peak ages are similar across all three basins, there are down-system spatial changes in percent occurrence of zircon populations among tributaries. The highest occurrences of Jurassic–Cretaceous aged zircons occur in central New Mexico in the Rio Puerco and Rio Salado drainages. Zircons that overlap in age with Eocene-Oligocene volcanic fields in New Mexico are rare, and occur only in the Jemez, and Rio Salado drainages. Plio-Pleistocene zircons are absent in the Rio Puerco and Rio Salado and are limited to a single occurrence in the Jemez River. A comparison of these data with previously published detrital zircon ages from Plio–Pleistocene strata from the ancestral Rio Grande show upsection changes in provenance and evolution of drainage development since the last ~1 million years.