

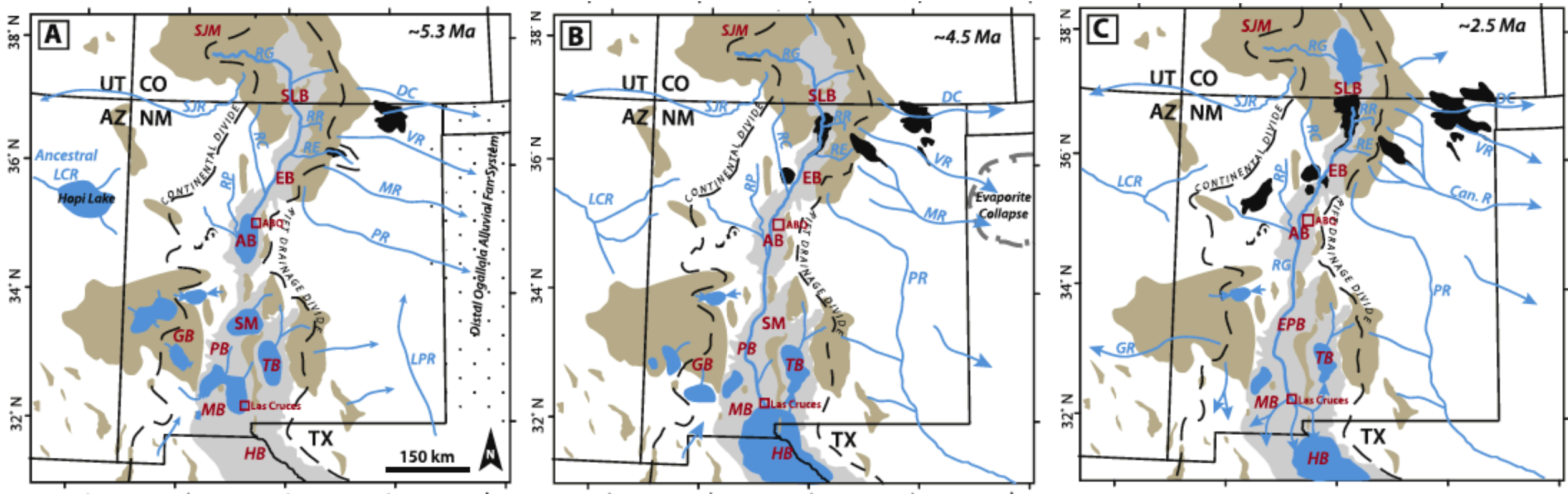
# Detrital Zircon Provenance Trends Across the Plio-Pleistocene Upper Santa Fe Group, Implications for Drainage Evolution of the Ancestral Rio Grande Fluvial System



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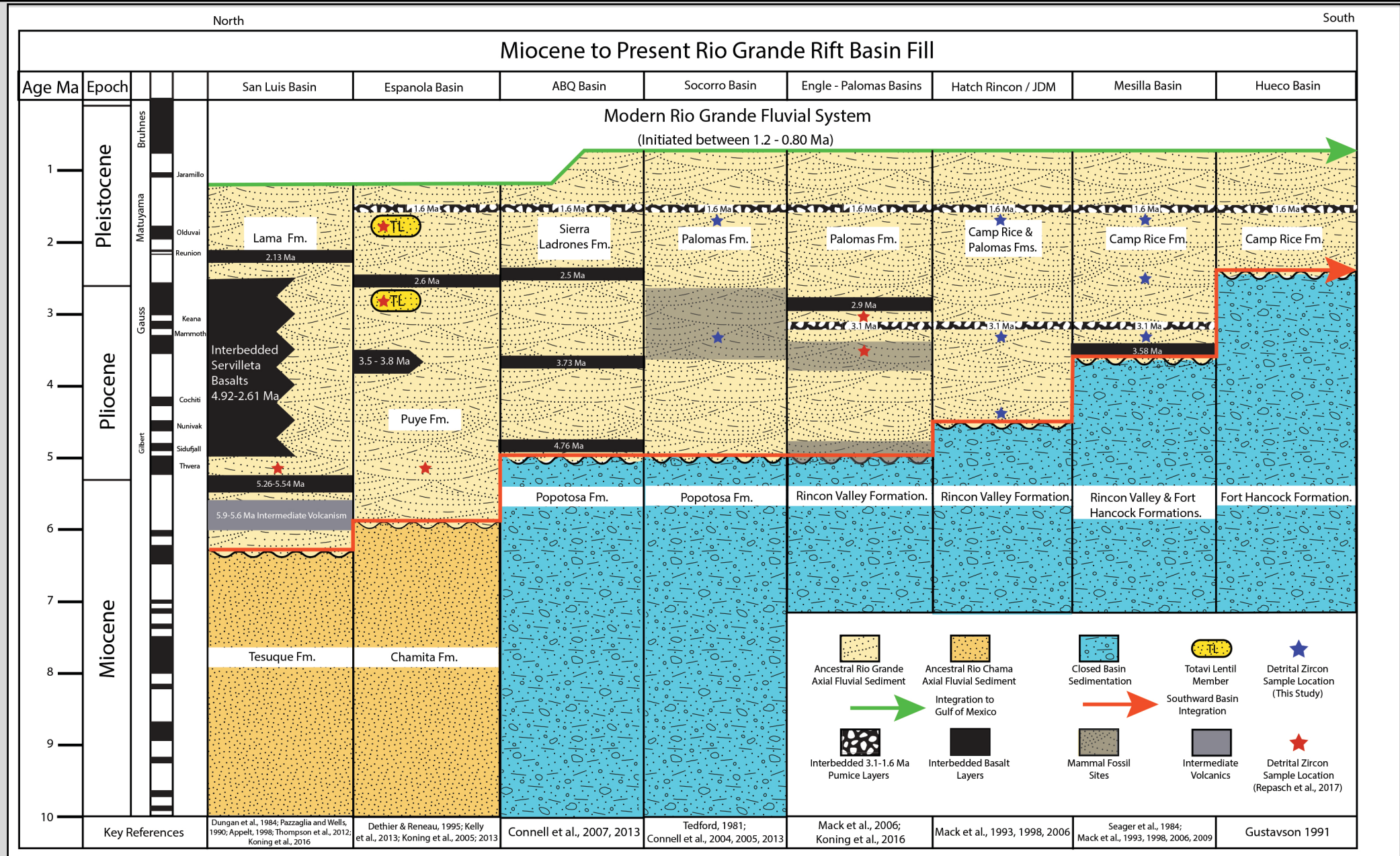


# GEOLOGIC BACKGROUND - HISTORY OF RIVER INTEGRATION

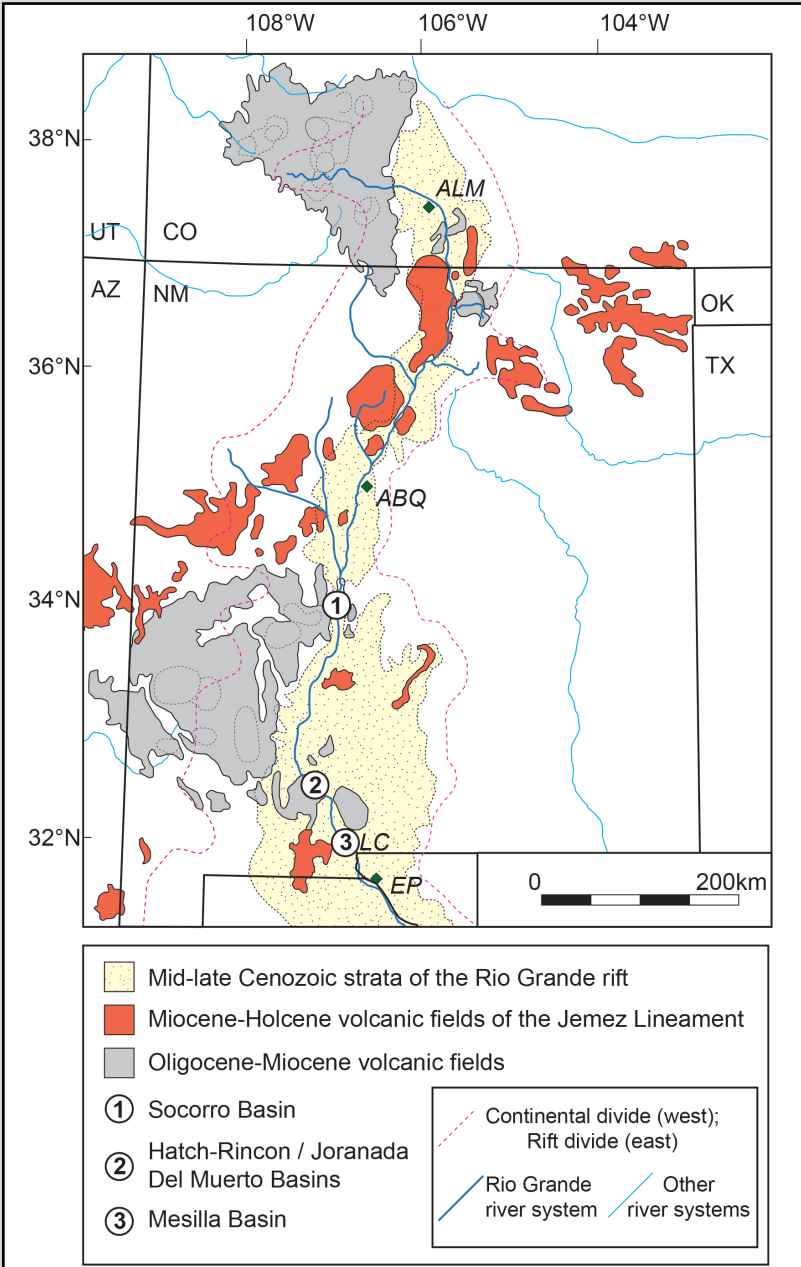




# STRATIGRAPHIC OVERVIEW

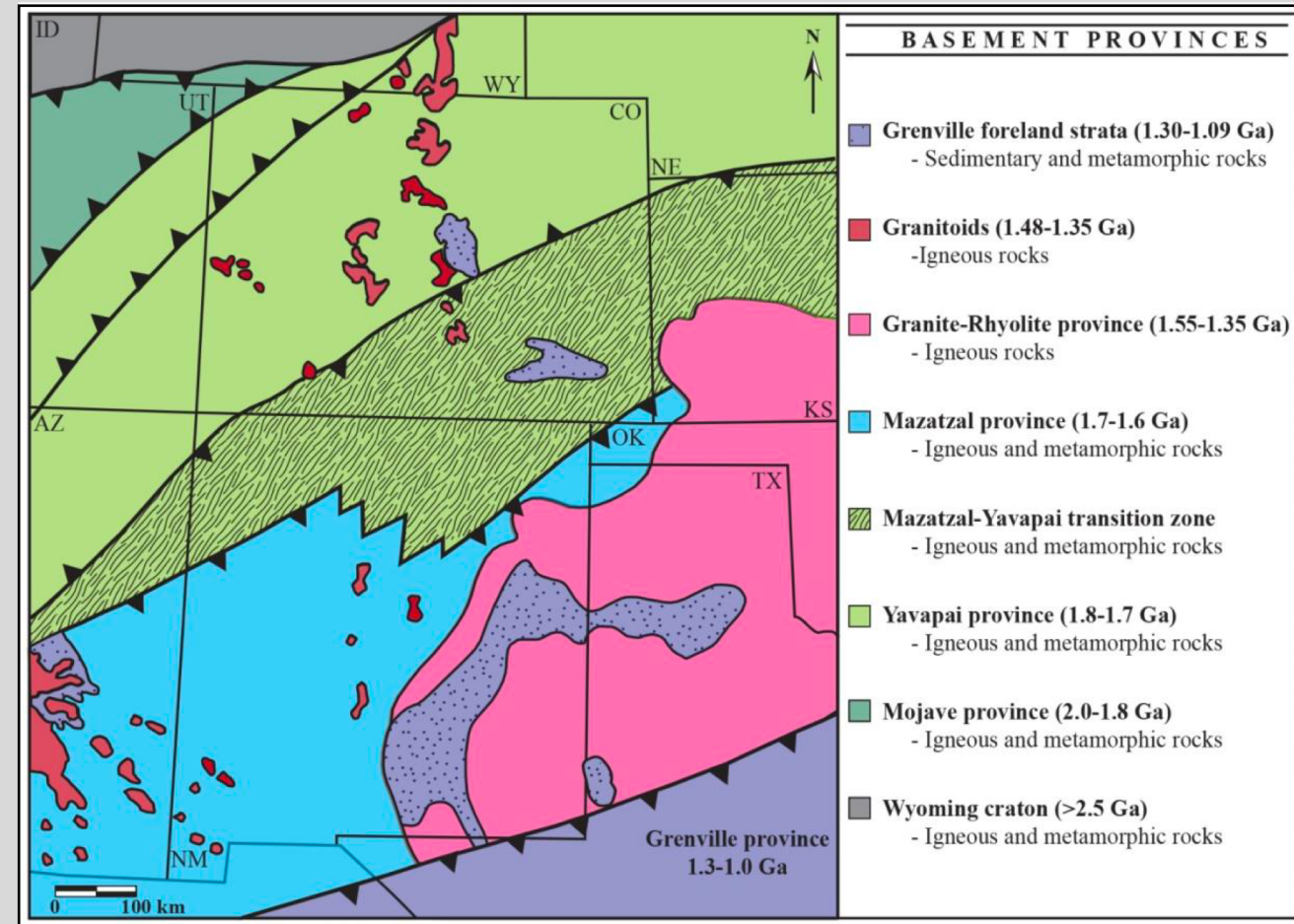


# SAMPLING STRATEGY & FIELD LOCALITIES



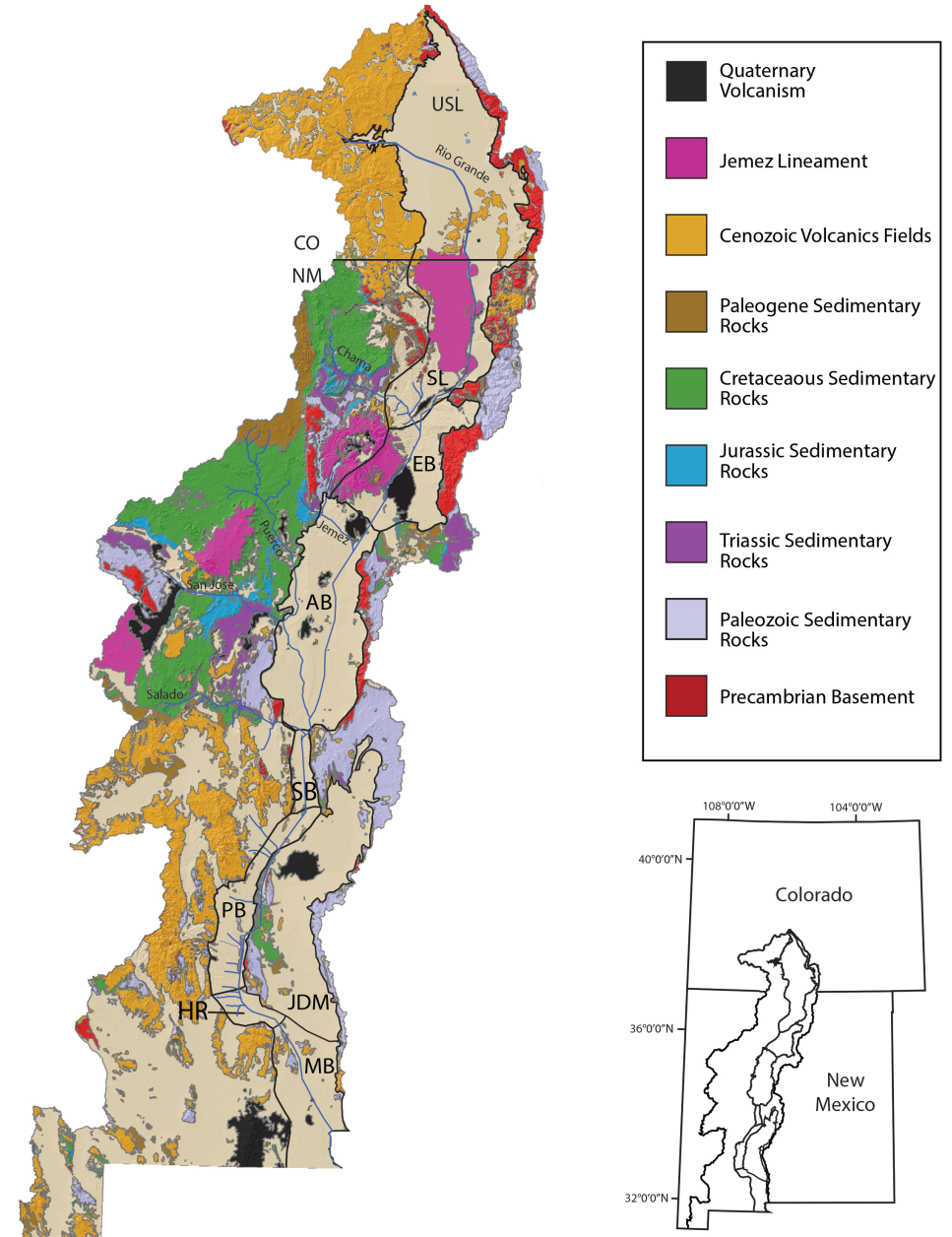
# POTENTIAL SOURCE AREAS FOR DETRITAL ZIRCONS

- Young Cenozoic volcanic fields of the Jemez Lineament
- Oligocene volcanic fields
- Recycled Cretaceous and Jurassic strata from the Colorado plateau
- Grenville Province (1300-900 Ma)
- Granite-Rhyolite Province & Bimodal A-type Granitoids (1550-1350 Ma)
- Yavapai-Mazatzal Provinces (1800-1600 Ma)

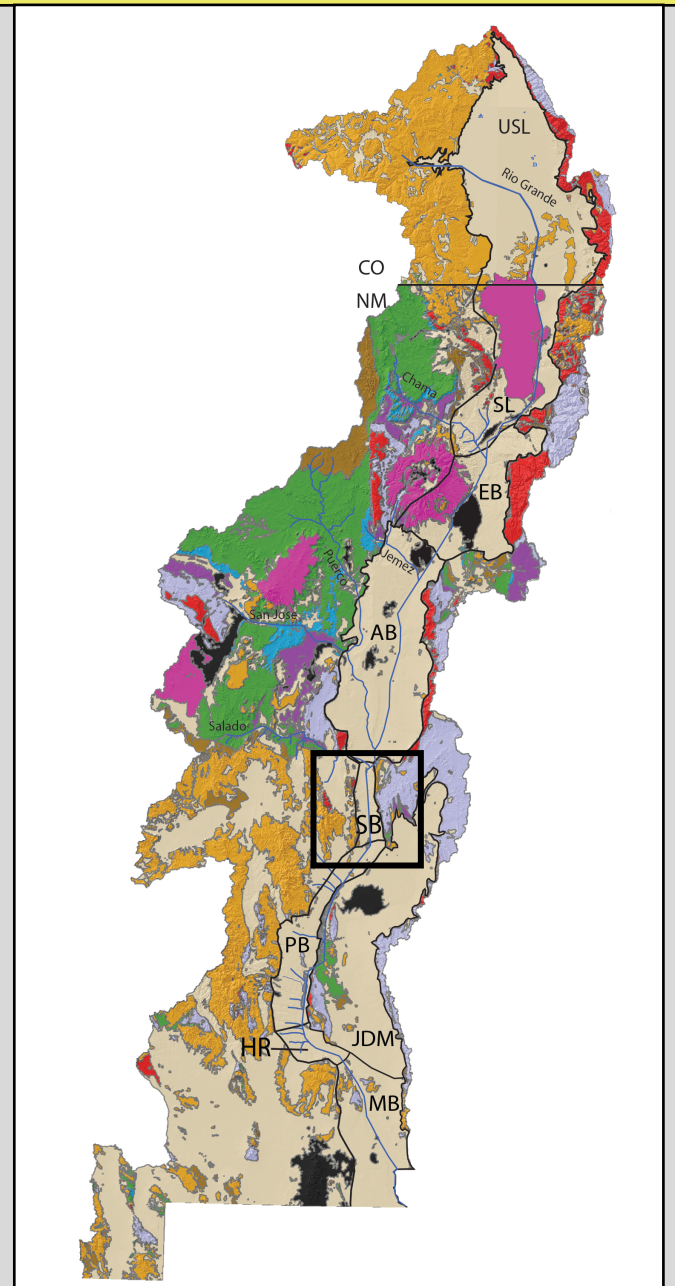
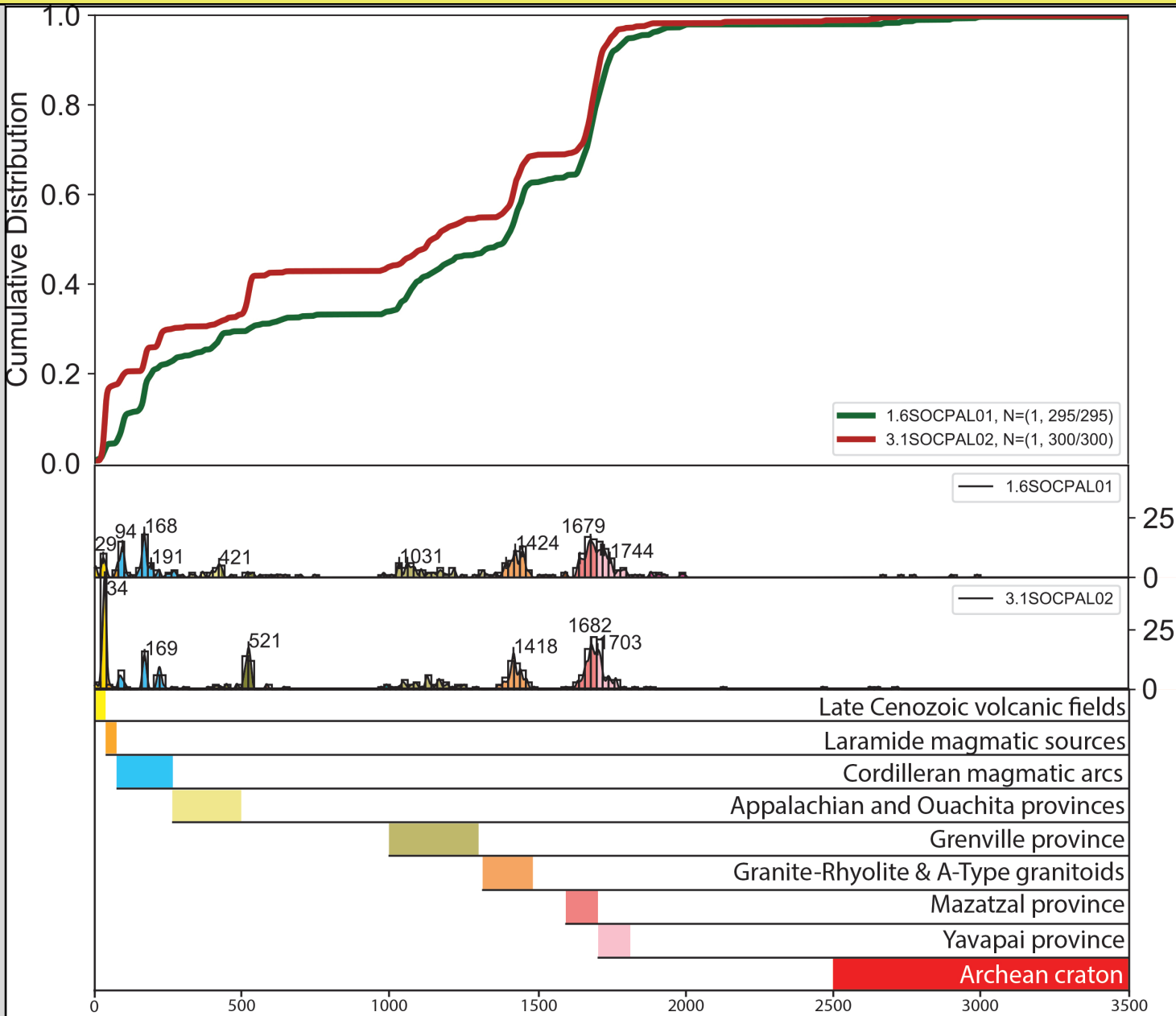


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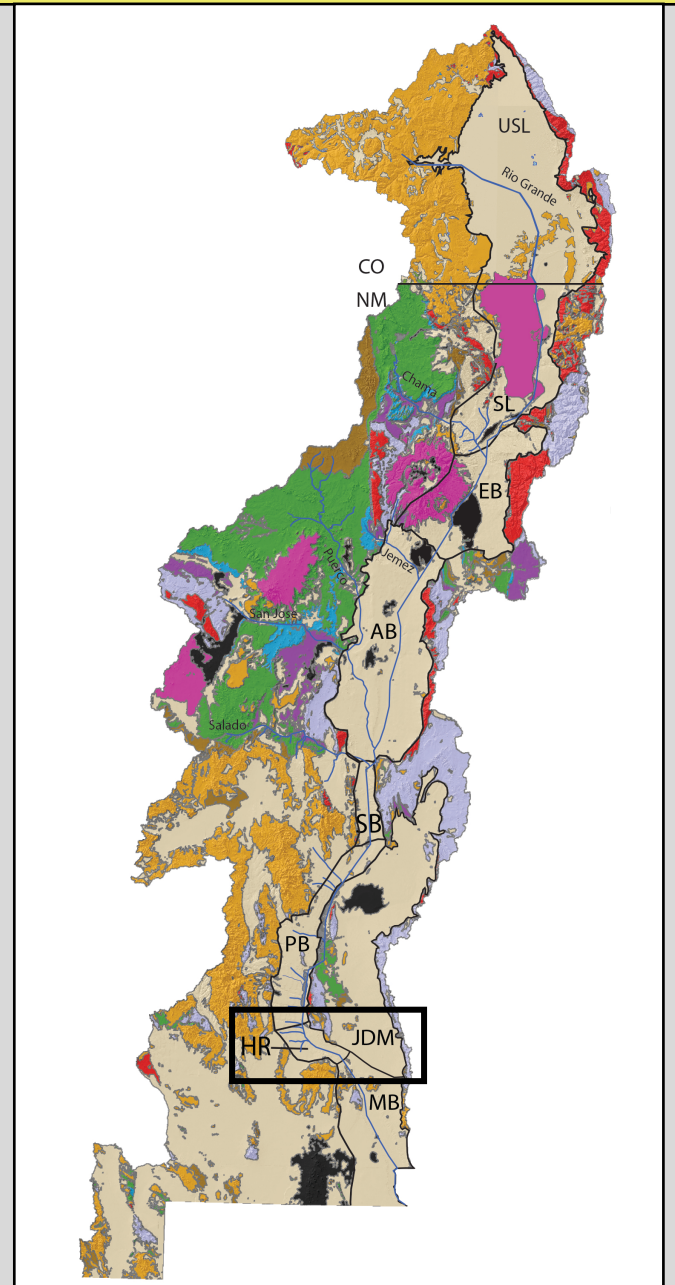
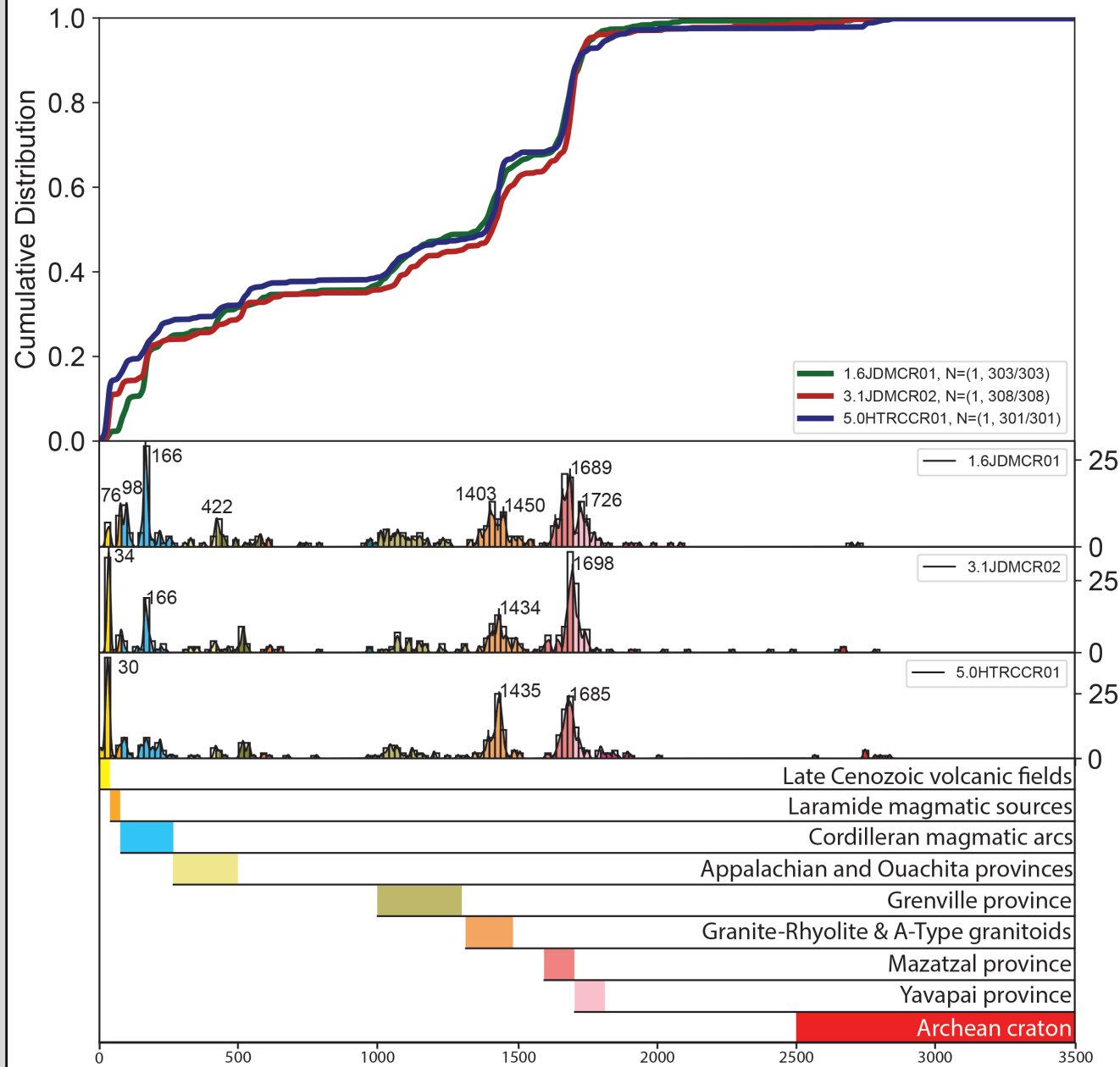


# RESULTS - SOCORRO BASIN PROVENANCE

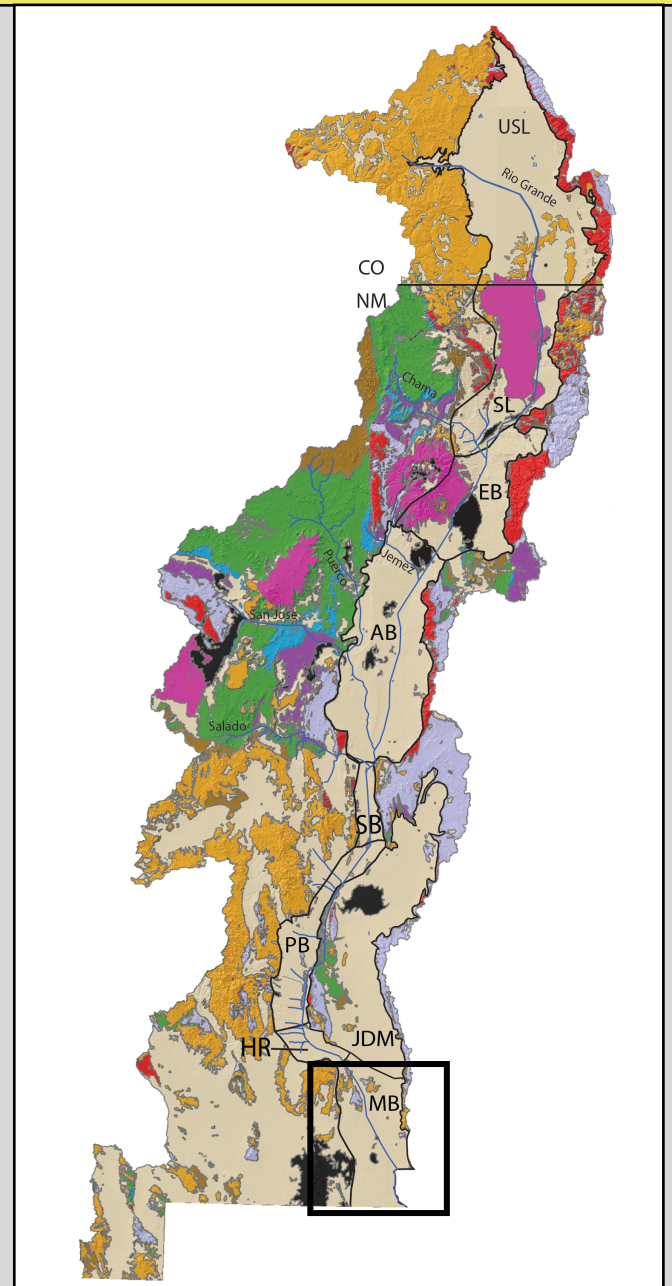
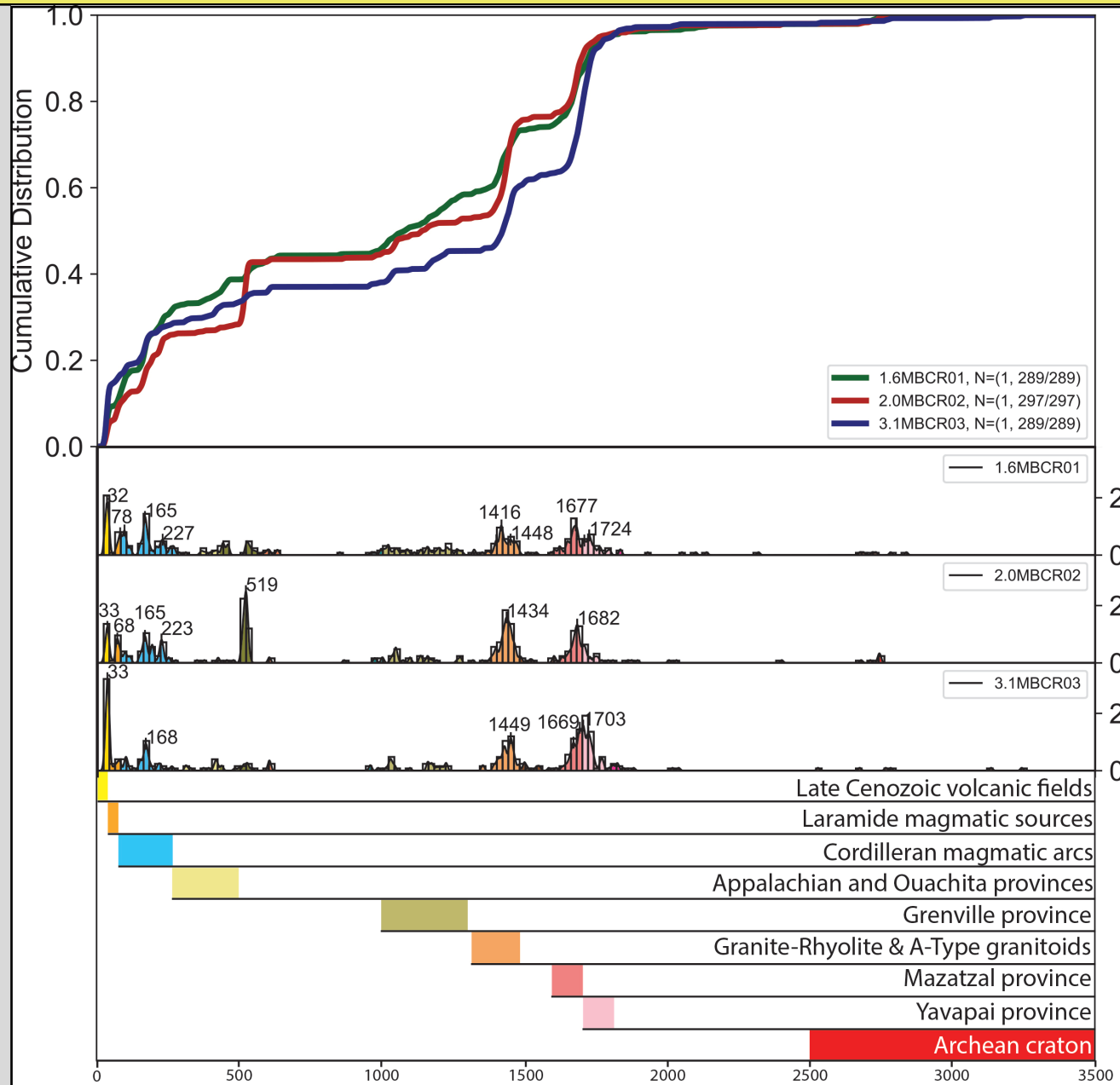




# HATCH-RINCON/JORANADA DEL MUERTO BASIN PROVENANCE

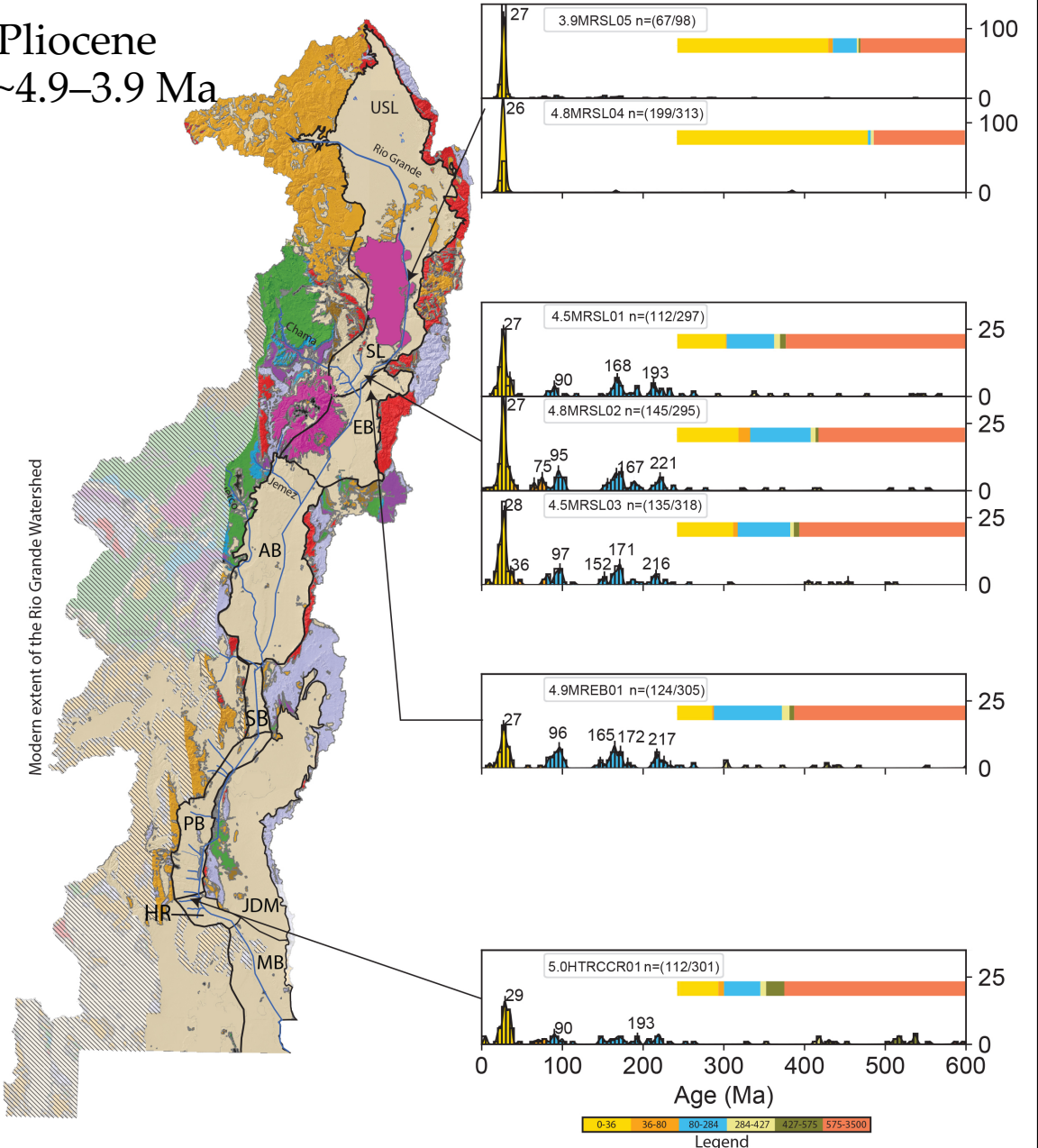


# MESILLA BASIN PROVENANCE

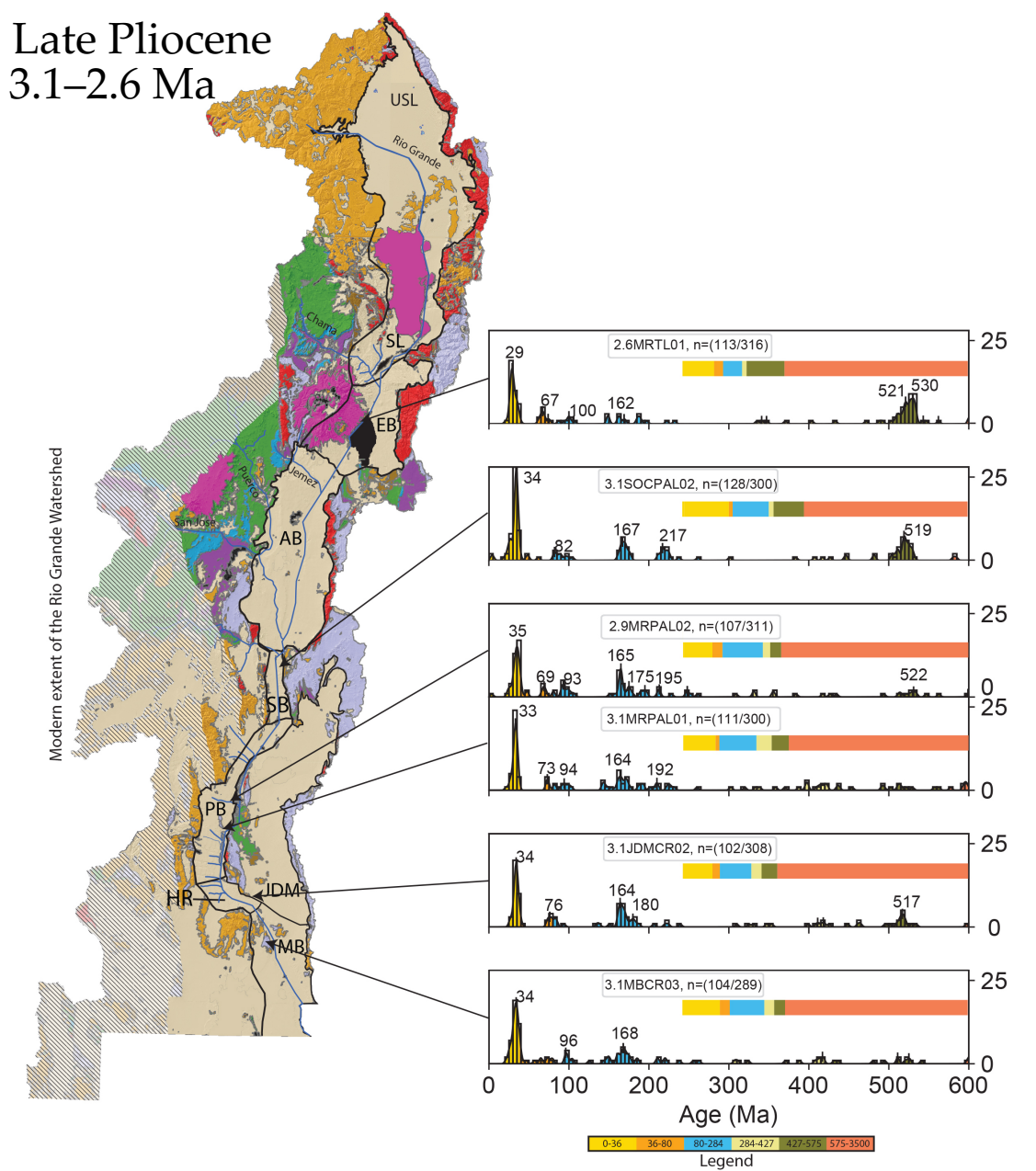


# REGIONAL MODEL OF DRAINAGE EVOLUTION

## Pliocene ~4.9–3.9 Ma

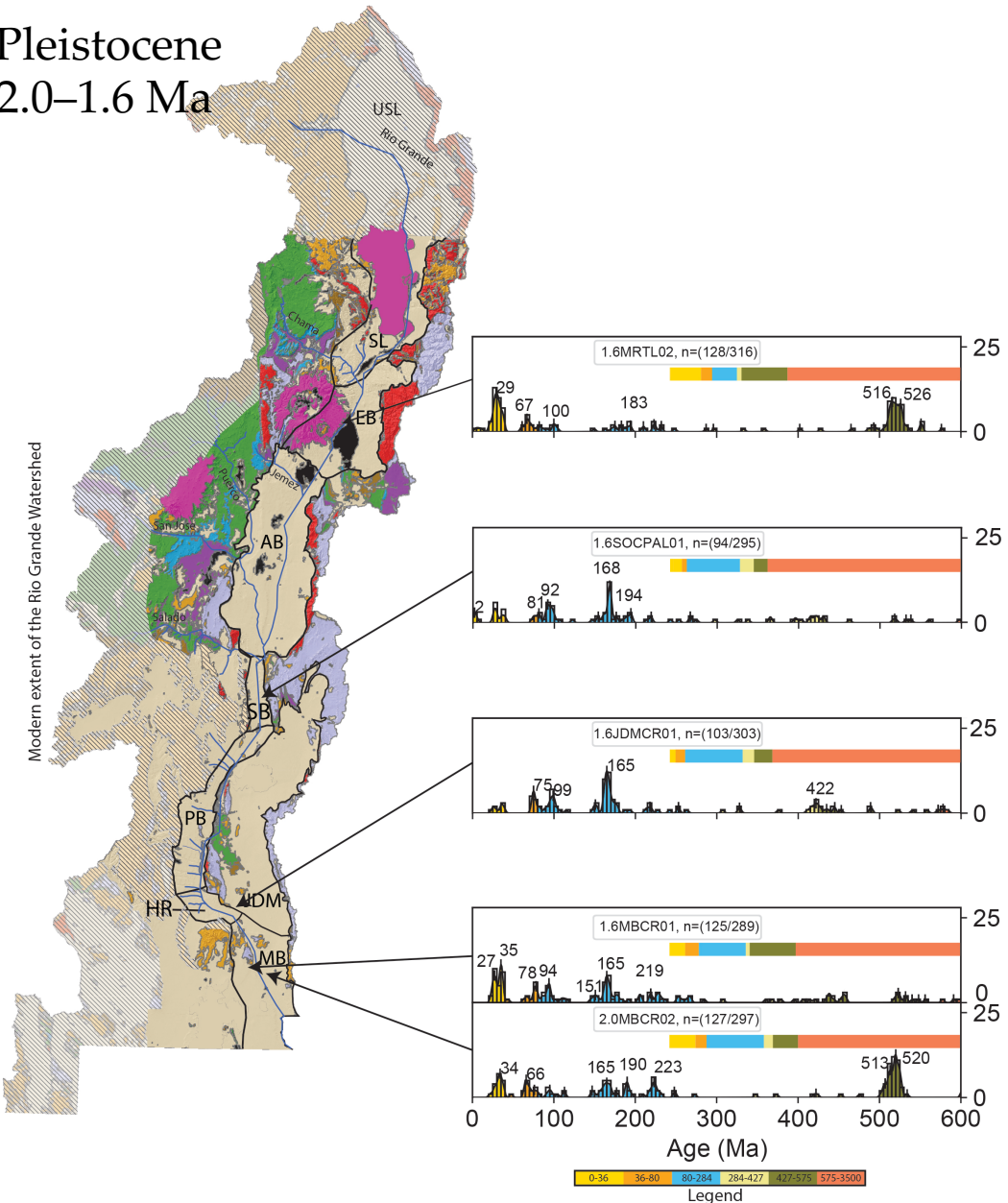


## Late Pliocene 3.1–2.6 Ma

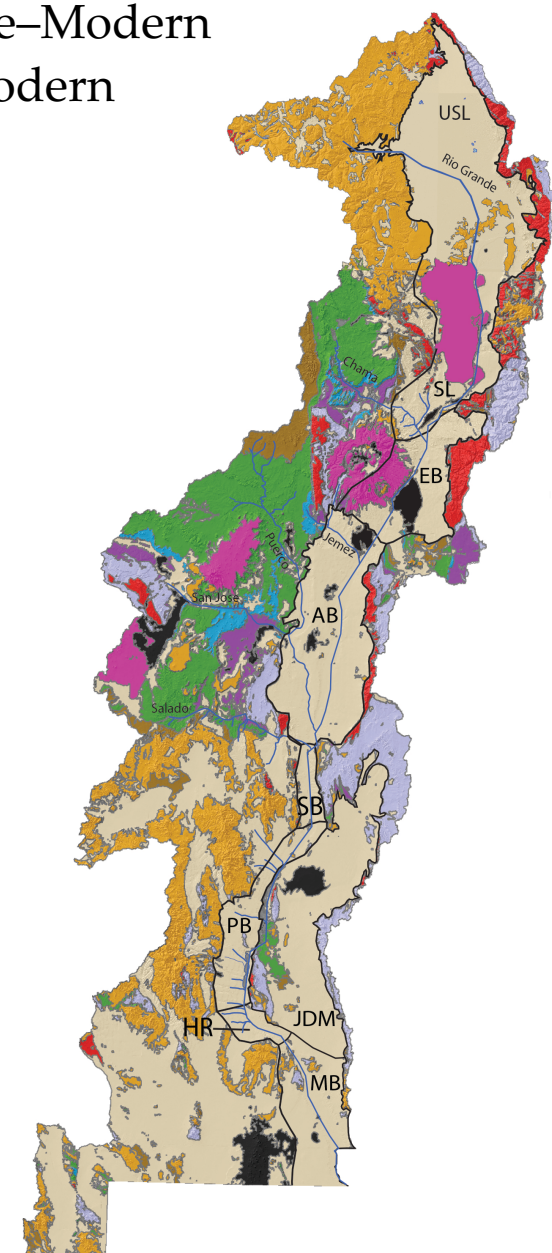


# REGIONAL MODEL OF DRAINAGE EVOLUTION

## Pleistocene 2.0–1.6 Ma



## Pleistocene–Modern 1.6 Ma–Modern



## SUMMARY AND CONCLUSIONS

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- Generalized peak ages across the Rio Grande fluvial system are 34, 167, 519, 1442, and 1686 Ma.
  - Peak ages overlap in age with late Cenozoic volcanic field sources, recycled Cordilleran arc sources, Cambrian intrusions in southern Colorado and New Mexico, A-type granite sources, and the Mazatzal province.
- Variations of percent zircon occurrences spatially and temporally
  - Increased occurrences of zircons that overlap with late Cenozoic volcanic fields at the oldest stratigraphic (~5.0–4.0 Ma) horizons across the Rio Grande rift.
  - Increased contributions of recycled Cordilleran arc derived zircons are limited to the northern basins of the rift at the oldest stratigraphic intervals (~5.0–4.0 Ma), and increase in occurrence at the youngest stratigraphic horizons (2.0–1.6 Ma) in the central and southern portion of the Rio Grande rift.
- Provenance trends from this study are interpreted to reflect headward encroachment of the Rio Puerco and Rio San Jose by the late Pliocene to drain the Mount Taylor volcanic field by 3.1 Ma.
- Upsection trends of decreased occurrences of zircons derived from late Cenozoic volcanic fields at the youngest (1.6 Ma) stratigraphic horizons support closure of the upper San Luis basin following emplacement of the Taos Plateau volcanic field

# ACKNOWLEDGEMENTS

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