

# **SEDIMENT ROUTING CORRIDORS TO THE PERMIAN BASIN – TESTING THE CONTRIBUTION FROM APPALACHIAN OR GONDWANAN SEDIMENT SOURCES**

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## **ABSTRACT**

This study will constrain the provenance and regional sediment transport pathways of siliciclastic deposits of the Bone Spring and Brushy Canyon Formations in the Delaware Basin, west Texas. Previous work suggested Ancestral Rocky Mountain (ARM) uplifts situated to the north and west of the Delaware Basin were main sediment sources for Permian ergs, and these aeolian deposits were reworked and deflated into the basin. Recent detrital zircon U-Pb geochronologic data from the northern Delaware basin margin challenge this interpretation, demonstrating minor sediment contribution from Peri-Gondwanan regions to the east and south. This study will evaluate how spatial variability in sediment provenance may be linked to dilution and mixing of basin margin sediment sources. Specifically, we will compare the provenance of Permian ergs in Oklahoma with the Leonardian Bone Spring Formation. Potential outcomes include:

- (1) Bimodal sediment mixing within the Bone Spring Fm. showing peri-Gondwanan source in the south closer to the thrust front and Appalachian source along the northern margin.
- (2) Absence of peri-Gondwanan sources suggesting a transport barrier along the southern margin.
- (3) Homogenous sediment provenance suggesting mixing occurred further inland along the sediment transport pathway.

If the Bone Spring Formation was sourced from margin ergs, it supports future research using marine environments of the Western Sahara as suitable analogs. Bimodal sediment provenance may have implications for reservoir rock mechanics, as reservoir sediment maturity and mineral composition is variable between sediment sources and has implications for diagenetic processes.