

Origin and Paleoclimatic Implications of Silt in the Pennsylvanian Bird Spring Formation (Arrow Canyon, Nevada)

Augsburger, Gregory A.¹; Soreghan, Lynn¹; Soreghan, Mike J.¹ (1) Geology, University of Oklahoma, Norman, OK.

The Bird Spring Formation (southern Nevada) records predominantly carbonate deposition along a distally steepened ramp of the Cordilleran margin during the late Paleozoic (Carboniferous-Permian). The Bird Spring Formation accumulated in a region isolated from fluvial-deltaic input, but contains very fine-grained quartzose silt locally intercalated with carbonates. These clastics have been attributed to eolian transport. We are investigating sedimentologic attributes, provenance, and stratigraphic distribution of the siliciclastic fraction to assess climate change during the late Paleozoic.

The study focus spans ~40 m of Middle Pennsylvanian (Desmoinesian) time. Common facies include: Barren dolomitic mudstone, heterozoan wackestone/packestone, photozoan wackestone/packestone, and photozoan grainstone. Many have recognized cyclicity of inferred glacioeustatic origin in this interval, however the expression of cyclicity appears to be variable, with both deepening-upward and shallowing-upward sequences. Subaerial exposure surfaces are rare, suggesting submerged conditions even during (glacial) lowstands. Siliciclastic content consistently peaks directly above inferred sequence boundaries in shallowing-upward sequences, implying a nonrandom control on siliciclastic influx, with greatest influx coincident with inferred lowstands. Potential sources for the siliciclastic component include the remnant Antler orogen to the west, which persisted into the Pennsylvanian, and uplifts of the westernmost Ancestral Rocky Mountains to the east. We are currently acquiring detrital zircon data to provide further constraints on potential source regions, which will provide insight on atmospheric circulation.

Eolian contributions at lowstands imply significant shifts in aridity at the glacial-interglacial scale. Future provenance analyses will enable assessment of atmospheric circulation models on a glacial-interglacial scale. Such high-frequency climate shifts could produce substantial effects on reservoir heterogeneity in analogous productive sections.