ASSESSING CHANGES IN ALLUVIAL ARCHITECTURE IN RESPONSE TO ABRUPT GLOBAL WARMING AT THE PALEOCENE/EOCENE BOUNDARY WITHIN THE POISON CANYON FORMATION (CO, USA)

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The Paleocene–Eocene Thermal Maximum occurred ~56 Ma, and represents the most dramatic instance of rapid global warming of the Cenozoic. Well-exposed Paleogene-age strata in Laramide basins present a tremendous opportunity to test allogenic fluvial response to rapid global warming. Modifications to the hydrologic cycle, influencing the spatiotemporal distribution of rainfall during this time, are thought to have impacted fluvial sedimentation in terrestrial basins. This study aims to evaluate the nature of a climate–sedimentation link across the Paleocene/Eocene boundary in Huerfano Basin in southern Colorado.

The Paleocene/Eocene boundary is identifiable in terrestrial strata by a conspicuous negative carbon isotope excursion. Preliminary carbon isotope data from bulk organic matter in the Poison Canyon Formation record a ~3-4‰ excursion, consistent with geochemical records in the Piceance and Bighorn Basins. Chemostratigraphy will provide a basis for targeted detrital zircon U-Pb age analyses to underpin maximum depositional ages of the fossil-poor strata.

Within this temporal framework sedimentologic shifts will be quantified with detailed lithofacies descriptions, measurement of channel geometries from bar clinoforms, and characterization of grain-size variability. Mapping of fluvial sand-body stacking patterns will reveal avulsion history and channel mobility. This will yield a statistically meaningful dataset to compare with existing records from the Piceance and Bighorn Basins. This study will reinforce climate change as a viable mechanism for the generation of large fluvial sand-bodies. Such case studies are critical for developing process–based models that predict the stratigraphic arrangement, stacking density, and interconnectedness of preserved amalgamated channel sand-bodies in terrestrial basins.

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