

GSA Connects 2022 meeting in Denver, Colorado

Paper No. 191-4

Presentation Time: 2:20 PM

UNUSUAL PRESERVATION OF DINOSAUR TRACKS DURING HIGH FREQUENCY SEA-LEVEL CHANGES IN THE GLEN ROSE FORMATION (ALBIAN, EARLY CRETACEOUS), NORTHERN-CENTRAL TEXAS

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Global greenhouse conditions of the Cretaceous favored episodes of extreme climate fluctuations which may have provided the ideal conditions for track preservation. Numerous track sites were described in the Early Cretaceous of central Texas, but their dating and paleoenvironmental significance still need to be constrained. This project aims to complete a comprehensive study of theropod dinosaur traces and other body fossils in the city of Springtown, Texas, to inform on the stratigraphy and environmental conditions of that site during its emplacement in the Early Cretaceous and in relation to the Glen Rose, Paluxy and Walnut Formations. A detailed lithostratigraphic description of the studied succession will confirm the age of the dinosaur trackbearing section within the stratigraphic framework of the Comanche Series, while geochemical tools will be used to inform on environmental conditions at time of deposition.

In Springtown, the Glen Rose Formation is characterized by a heavily dinoturbated quartz-rich limestone with the uppermost layer of the track surface composed of matrix-supported breccia consisting of large, angular to sub-rounded mudstone clasts (up to 5 cm.) Up section, alternating layers of clay and fine to coarse-grained sandstone with gastropods and plant fossils are interpreted as high-energy, nearshore deposits of the Paluxy Formation. Overlying the siliciclastic beds, the base of the Walnut Formation is marked by the appearance of marly clay containing *Gryphaea marcoui*.

The facies of the Glen Rose Formation suggest a low-energy, shallow marine shoreline setting, however, the overlying breccia indicate tracks were preserved in a higher energy environment where deposits may have been influenced by extreme precipitation events, as flooding immobilizes mud layers upstream and transports it downstream. In the Paluxy Formation, changes in base level linked to sea-level changes impacted the river profile and flow velocity, thus favoring crevasse splay deposits during low sea level as river flow velocity would increase. Stable isotope analysis of bioapatites from vertebrate fossils confirm the depositional environment (marine vs. freshwater) and carbonates improve climate interpretations, furthering our understanding of how paleoenvironmental conditions affected dinosaur ecology.

Session No. 191

[T116. Stratigraphic Paleobiology: Working with the Nature of the Stratigraphic Record to Address Paleobiological Questions](#)
Tuesday, 11 October 2022: 1:30 PM-5:30 PM

Mile High Ballroom 4B (Colorado Convention Center)

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