

A Step Back in Time: Oldest Record of Alaskan Dinosaurs from the Upper Jurassic Naknek Formation, Peninsular Terrane

Druckenmiller, Patrick ¹; May, Kevin ¹; Blodgett, Robert B. ^{*3}; McCarthy, Paul ²; Fowell, Sarah ²

(1) University of Alaska Museum, University of Alaska Fairbanks, Fairbanks, AK.

(2) Department of Geology and Geophysics, University of Alaska Fairbanks, Fairbanks, AK.

(3) Consulting Geologist, Anchorage, AK.

Geological mapping by petroleum geologists in the 1970s resulted in the serendipitous discovery of a dinosaur tracksite on the Alaska Peninsula near Black Lake. Although the site has been known for over 35 years and represents one of the first documented dinosaur finds in the state, a formal study of the site has never been conducted, in part due to its remote location. Fieldwork in 2010 led to the rediscovery of the Black Lake tracksite, thereby permitting detailed paleontological and geological data to be collected for the first time. The track-bearing unit occurs in the Indecision Creek Sandstone Member of the Upper Jurassic Naknek Formation in the Peninsular terrane of southern Alaska. The tracks occur at the upper surface of a 7.5 m thick, greenish-grey, medium-grained, trough cross-bedded sandstone package. This package occurs at the top of a series of coarsening-upward successions that are interpreted as shallow marine offshore to upper shoreface successions. Overlying the track-bearing sandstone is a succession of coastal plain deposits consisting of fine- to medium-grained sandstones, siltstones, mudstones and coals that transition upward into shallow marine deposits. The Indecision Creek Member is temporally constrained by the presence of *Buchia mosquensis* (Buch) in both of the under- and overlying shallow marine strata, indicating a late Kimmeridgian-middle Tithonian age. Estimates of paleolatitude for the Peninsular terrane in the Late Jurassic vary from middle to high latitudes; however, marine invertebrate assemblages found in the upper Naknek Formation indicate relatively cool settings consistent with a high paleolatitude.

The prints are exposed in outcrop as true tracks on a near-vertically inclined bedding surface. At least 18 individual prints were visible at the time of discovery, but approximately one-third of the track-bearing surface has subsequently been lost due to erosion. The prints are uniformly sized and have a maximum length of 17 cm. Complete prints are tridactyl, the digits are relatively long and narrow, and impressions of the digital pads and claws can be discerned. Based on overall size and morphology, the tracks are referred to a *Carmelopodus*-like ichnotaxon, attributable to a small- to medium-sized bipedal theropod dinosaur. The Black Lake tracksite is the first record of Jurassic dinosaurs in Alaska. It is also the oldest documented occurrence of this group in the state, predating by some 50 million years dinosaur tracks from the Nanushuk Formation of northern Alaska.