

Subaqueous tracks of marine tetrapods – indications to trackmakers based on new surfaces from the Middle Triassic of Guizhou Province, China

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Abstract:

Tracks documenting subaqueous activity of terrestrial or semi-aquatic tetrapods are common in the Mesozoic record. Numerous examples of swimming dinosaurs or other tetrapods, in particular turtles, phytosaurs and crocodylomorphs are known. Marine forms, however, rarely left their imprints on the bottom of shallow water while buoyant, drifting or actively swimming, touching the ground with distal parts of digits, or during bottom walking. China nothosaur foraging tracks have been reported from Middle Triassic marginal marine deposits (Guanling Formation) of Yunnan Province. Recently a large surface with similar traces was found in this unit. Associated foot impressions and trackways show strong morphological similarities with the feet and limb performance of placodonts. Characteristic are four robust digits (probably II–V), showing proportions $IV = III > II > V$ and a broad trackway pattern with outwardly rotated imprints positioned opposite to each other, suggesting swimming activity of the trackmaker. According to digit proportions, with a relatively short digit IV, and the large trackway width, it is likely that the traces were left by the forefeet of placodont sauropterygians. The latter are common and well-known from finely preserved skeletons from the Guanling and Xiaowa formations (Anisian–Carnian) of the area. Further candidates such as saurosphargids and turtles are also considered, even if the skeletal evidence of the latter, restricted to rare findings, does not appear before the Carnian. Other groups such as thalattosaurs, nothosaurs, ichthyosaurs or archosaurs can be excluded because of different limb posture, digit proportions or the presence of fin-like autopodia.

Keywords: Guanling Formation, placodonts, saurosphargids, turtles, nothosaurs