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News and Highlights

A New Dinosaur Fauna is Discovered in Yunyang, Chongqing, China

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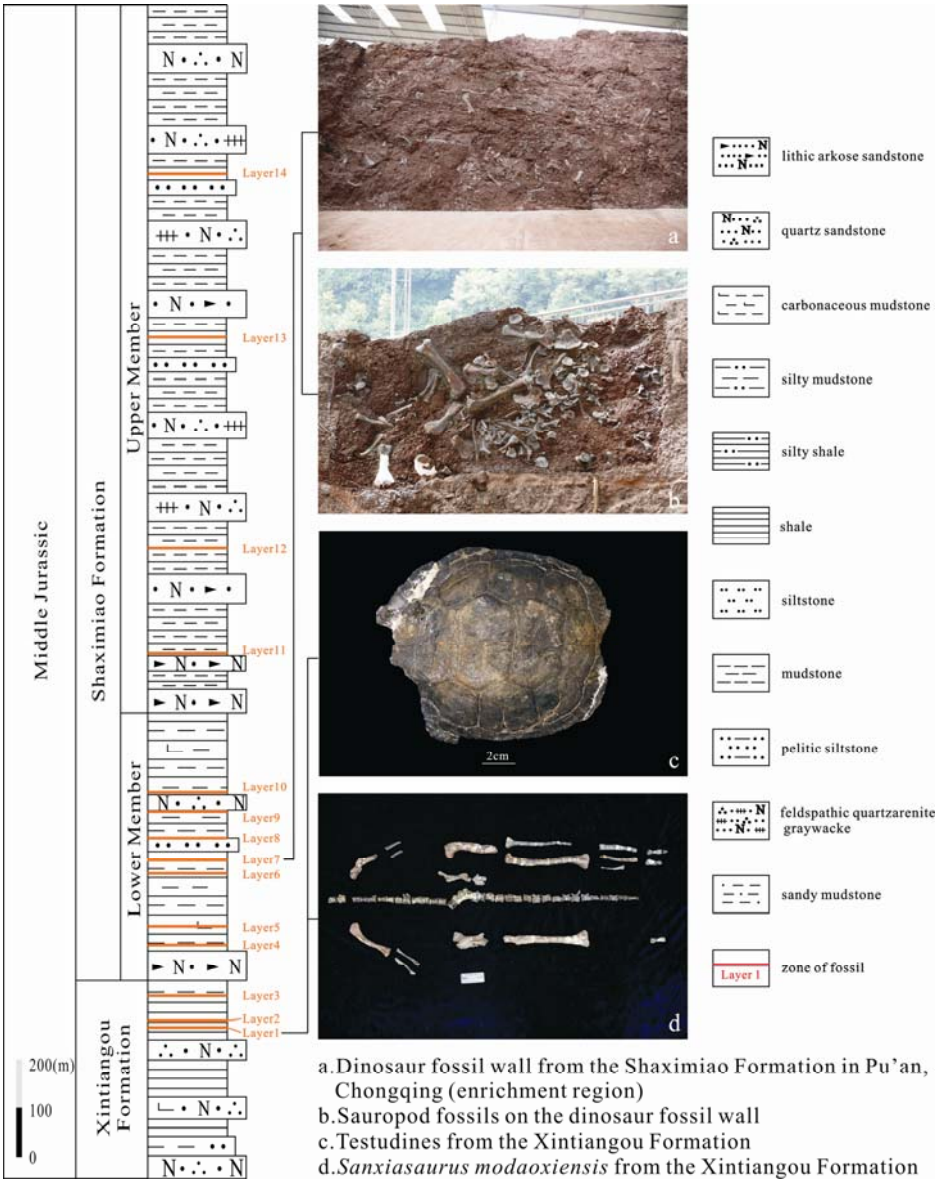
The 2019 Annual Symposium on Yunyang Dinosaur Fossil Protection and Research was held in Chongqing on December 16, 2019. It was proposed in the symposium that the dinosaurs discovered from the early Middle Jurassic Xintiangou Formation in Yunyang, Chongqing could represent a new dinosaur fauna. Previously, only a few dinosaurs have been reported from the Xintiangou Formation. Moreover, the Xintiangou dinosaurs are playing an important role in studying the evolutionary sequence of dinosaurs, and have the potential to fill the gaps during the Early-Middle dinosaur turnover.

The Yunyang dinosaur fossils were discovered in 2015. The discovered dinosaur fossil outcrops are 18.2 km long, occupy about 54 km^2 and expose stratigraphically continuous strata that span the Middle and Late Jurassic period. The fossils are mostly yielded from the Middle Jurassic Shaximiao Formations (Bajocian-Bathonian) and Xintiangou Formation (Aalenian) (Fig. 1a), and there are a total of 14 fossil layers found. During the excavation within the Shaximiao Formation, a 150-meter-long and 6-10-meter-high in-situ fossil wall with an area about 1,000 m^2 is left, and about 5,000 dinosaur fossils are exposed on the surface of the fossil wall (Fig. 1a and b).

The Yunyang dinosaur fossils



a. Dinosaur fossil wall from the Shaximiao Formation in Pu'an, Chongqing (enrichment region)
b. Sauropod fossils on the dinosaur fossil wall
c. Testudines from the Xintiangou Formation
d. *Sanxiasaurus modaoxiensis* from the Xintiangou Formation

Fig. 1. Stratigraphic section of the sedimentary sequence of the type locality and the fossils found from corresponding strata.

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show a rich diversity. Various fossils have been discovered from the Shaximiao Formation, including sauropods, theropods, ornithopods, stegosaurs, mammal-like reptiles, and bivalves. The fossils from the Xintiangou Formation include sauropods, theropods, basal neornithischians, as well as plesiosaurs, turtles (Fig. 1c), fishes (including *Ceratodus*, *Lepodotus* and *Hybodus*), mammal-like reptiles, crocodyliformes, bivalves, and relics fossils. Sedimentary studies have found that the main fossil burial layer of the Shaximiao Formation represents a transitioned phase from the delta front to the shallow lake lacustrine sedimentary environment, whereas the sedimentary environment of the Xintiangou Formation was lacustrine, which indicates that it was generally arid and hot when the formation was formed.

The typical Jurassic dinosaur faunas in China include Early Jurassic *Lufengosaurus* Fauna, Middle Jurassic *Shunosaurus* Fauna and Middle-Late Jurassic *Mamenchisaurus* Fauna. The Yunyang dinosaurs span a long time period, and notably the Xintiangou dinosaur fauna is, chronologically, later than the *Lufengosaurus* Fauna but earlier than the *Shunosaurus* Fauna. The studies of Yunyang dinosaurs will help solve some key questions of dinosaur evolution, such as the extinction of the basal sauropodomorphs and the beginning of sauropod gigantism. Two new species of dinosaurs from the Xintiangou Formation have been named (Fig. 1d).

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