



A new species of *Omeisaurus* (Dinosauria: Sauropoda) from the Middle Jurassic of Yunyang, Chongqing, China

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ABSTRACT

A new species of *Omeisaurus*, *O. puxiani* sp. nov., from the Middle Jurassic of Southwest China is reported. The holotype consists of partial articulated vertebrae, forelimb, hind limb and other materials of an individual. Comparative study and cladistic analysis show that this new taxon belongs to *Omeisaurus*, and bears a unique combination of character states, such as all presacral vertebrae opisthocoelous, complex pneumatic fossa system in middle cervical centra, lateral fossae of dorsal centra divided by secondary septa, end of anterior caudal neural spines expanding posteriorly, edge of humerus deltopectoral crest turning posterolaterally and ratio of length of ulna to humerus of 0.69. The previously reported single middle cervical (S66) from the same locality and horizon can be referred to this new species. The discovery of *Omeisaurus puxiani* enriches the diversity of the genus of *Omeisaurus* and provides additional information to help understanding the evolutionary history of this genus in Eastern China.

Abbreviations No. 208 HEGT: Chongqing Laboratory of Geological Heritage Protection and Research, No. 208 Hydrogeological and Engineering Geological Team, Chongqing Bureau of Geological and Mineral Resource Exploration and Development Chongqing, Chongqing, China; **GSC:** Chongqing Institute of Geological Survey, Chongqing, China; **IVPP:** Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing, China; **ZDM:** Zigong Dinosaur Museum, Zigong, Sichuan, China

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Introduction

Sauropod dinosaurs were the largest terrestrial animals once walked on our Earth. They appeared in Early Jurassic, and achieved a global distribution throughout Middle Jurassic to Late Cretaceous (Weishampel et al. 2004). Sauropods had relatively small skulls, extremely elongate necks and tails, as shown in the early diverging clade of Mamenchisauridae (Young and Chao 1972; Ouyang and Ye 2002; Russell and Zheng 1993; He et al. 1988; Suteethorn et al. 2012; Ren et al. 2018; Mannion et al. 2019). Mamenchisauridae is the most taxonomic diverse and specific abundant sauropod lineage in the Middle and Late Jurassic in East Asian, especially in the Sichuan Basin in southwestern China, represented by *Mamenchisaurus* from the upper member of Shaximiao Formation and *Omeisaurus* from the lower member of Shaximiao Formation (Young and Chao 1972; Ouyang and Ye 2002; He et al. 1988). The first species of *Omeisaurus* was discovered in the Zigong area of Sichuan Basin by C. C. Young in 1939, and seven species have been reported until now, although the validity of some species are questionable (Young 1939, 1958; Dong et al. 1983; He et al. 1988; Jiang et al. 2011; Fang et al. 2004; Tan et al. 2018).

In 2016, a new Middle Jurassic dinosaur quarry was discovered in Pu'an Town, Yunyang County, Chongqing Municipality (Fig. 1).

Among the abundant sauropod materials, a middle cervical vertebra has been assigned to an undetermined species of *Omeisaurus* (Tan et al. 2018). Here we describe a partial articulated new sauropod specimen from the same locality. Comparative study and cladistic analysis show that the new specimen is a member of *Omeisaurus* and different from other known species. Therefore, a new species of *Omeisaurus*, *O. puxiani* sp. nov., is established, and the previously reported middle cervical vertebra (collection number (S66) (Tan et al. 2018)) can be assigned to this new species.

Geological setting

Geotectonically, Pu'an Town, Yunyang County, Chongqing Municipality is located in the southwest of the Yangzi Block (Gu and Liu 1997). In this area, the red beds are well exposed, and the outcrops are generally continuous. The new taxon is yield from the Shaximiao Formation. This Formation is divided into lower and upper members (Stratigraphic table of Sichuan 1978, unpublished), which are generally equivalent to the Lower Shaximiao Formation and Upper Shaximiao Formation, respectively (Peng et al. 2005). The age of the Shaximiao Formation was originally regarded as Middle Jurassic (Sha et al. 2010; Li et al. 2010; Li et al. 2018), but its upper member could be Late Jurassic (Peng et al. 2005; Huang 2018). The specimen in this study was recovered from the lower