

News and Highlights**A Large Dinosaur Assemblage has been Discovered in Pu'an,
Yunyang County, Chongqing, China**HAO Ziguo^{1,2,*}, FEI Hongcai^{1,2}, HAO Qingqing³ and LIU Lian^{1,2}¹ *Chinese Academy of Geological Sciences, Beijing 100037, China*² *Editorial Office of Acta Geologica Sinica (English Edition), Geological Society of China, Beijing 100037, China*³ *Editorial Office of Geology and Exploration, Institute of Mineral Resources Research, China Metallurgical Geology Bureau, Beijing 101300, China*

In June 2017, the Chongqing Municipal Government and Chinese scientists announced the discovery of a world-class dinosaur assemblage in Pu'an, a town of Yunyang County, Chongqing. This group of skeletons was buried in the Jurassic Ziliujing Formation Da'anzhai member and the lower and upper members of the Shaximiao Formation. The Da'anzhai member of the Ziliujing Formation is mainly bioclastic shale interbedded with thin to medium-thick bioclastic limestone, with shale interbedded with quartz siltstone in the lower part, and medium-thick lithic sandstone, sandy shale and mudstone in the middle part, and coquina sedimentary rocks in the upper part. The upper member of the Shaximiao Formation is thick to massive, medium-coarse grained to medium-fine grained feldspar quartz sandstone, feldspar quartz greywacke and purple mudstone, and the lower member is silty mudstone with thin coarse-medium grained to fine feldspathic quartz sandstone, feldspar sandstone and siltstone. The fossil exposure is about 5 km in length along the strike of the strata, and the area with the most concentrated fossil skeletons is represented by a fossil wall 150 m long, 2–4 m thick and 6–8 m high. The dinosaur fossils in this area are mostly sporadic, belonging to isolated depositional pockets, not the site of the actual dinosaur deaths.

The famous Chinese dinosaur experts Xu Xing, Dong Zhiming and Dai Hui consider that the local reasons for the dinosaur deaths were related to flood or mudslide catastrophes. In this scenario, during the disaster flood and debris flows carried the dinosaur corpses downstream to arrive at the lake delta; the corpses would then be deposited when the water velocity decreased. These fossils were buried about 180 million to 160 million years ago, when the Yunyang region was the huge ancient Bashu

lake area, with a superior natural environment and flourishing animals and plants.

Preliminary excavation suggests that these dinosaur fossils are characterized by: (1) a large time span from the late stage of the Early Jurassic, through the Middle Jurassic to the Late Jurassic; (2) a wide distribution, with multiple outcrops within 5 km of rock strata (Fig. 1); (3) a rich species diversity including at least five dinosaur subgroups of sauropodomorpha, sauropod, theropod, ornithomimid and stegosaurs, and also other reptiles such as plesiosaurs (Fig. 2); (4) a short transportation distance accompanied by rapid burial, with typical burial phenomena of isolated depositional pockets, including large numbers of individuals, concentrated distribution, low association and poor sorting; and (5) the potential to fill gaps in the evolutionary development of the dinosaurs. In particular, these newly-discovered abundant dinosaur and plesiosaur fossils in the Ziliujing Formation of dinosaur fossil area No. IV will be likely to fill global gaps in the record of dinosaur and plesiosaur evolution from the late stage of the Early Jurassic to the Middle Jurassic.

Acknowledgement

Thanks are given to Jeff Liston for substantial improvement of the English used.

* Corresponding author. E-mail: haoziguo@126.com



Fig. 1. Photograph showing the excavation site of the group of dinosaur fossils in Laojun village, Pu'an Town (from the website http://4gsjb.cqnews.net/html/2017-06/28/content_42087087.htm, photographed by the journalist Liu Song).

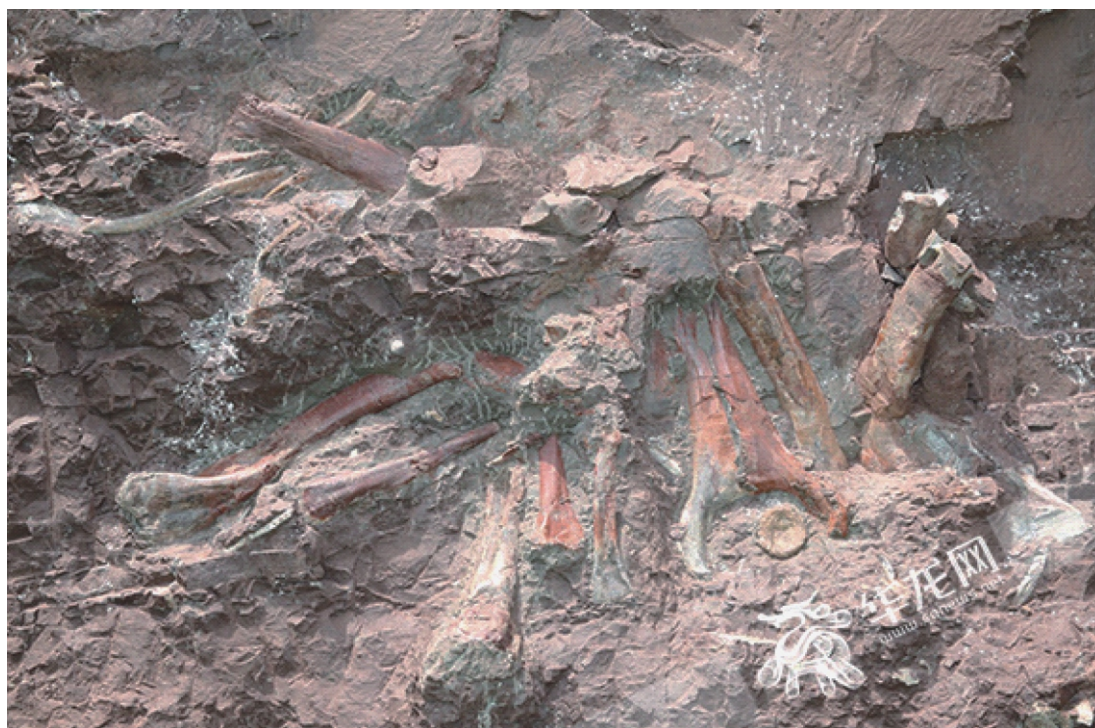


Fig. 2. Photograph showing a dinosaur skeleton *in situ* (from the website http://4gsjb.cqnews.net/html/2017-06/28/content_42087087.htm, photographed by the journalist Liu Song).