

Newly discovered Liexi fauna reveals early stage of great Ordovician biodiversification event

July 18 2022, by Li Yuan

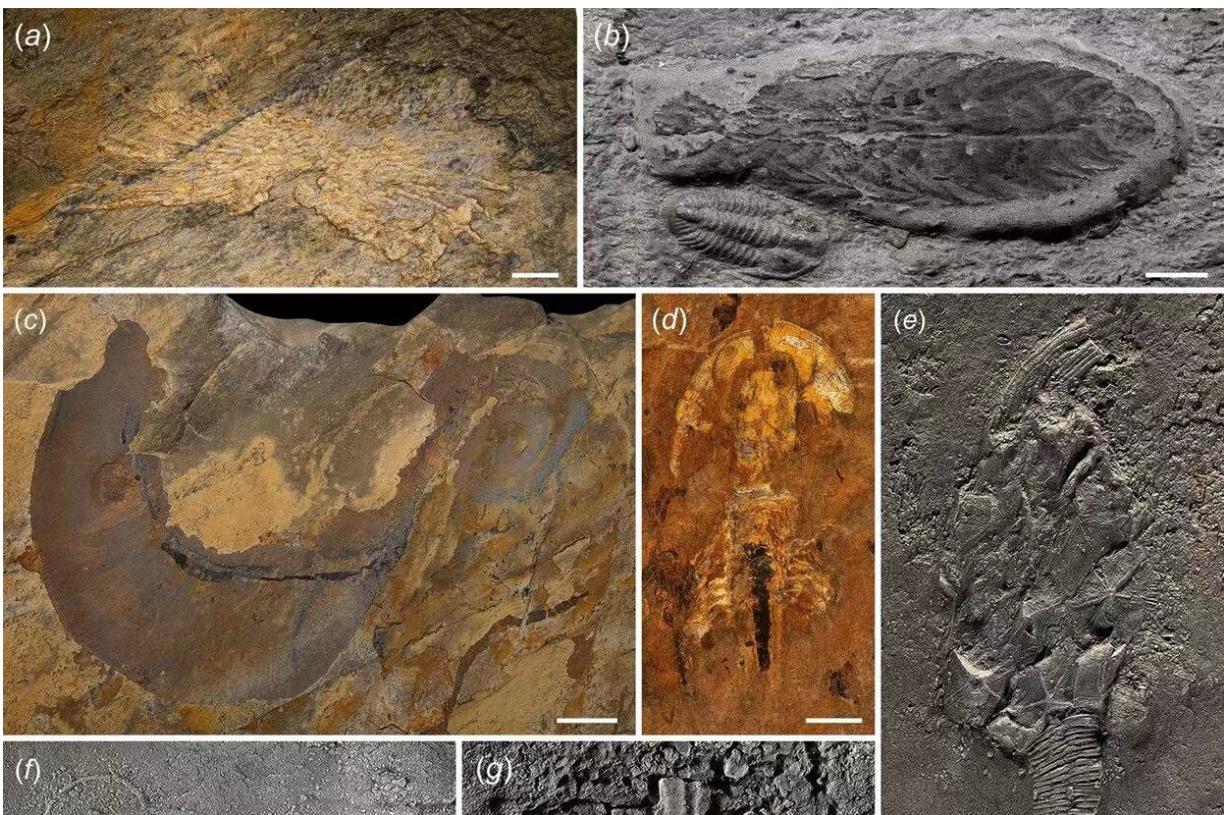


Fig. 1 Fossils from the Liexi Fauna. Credit: NIGPAS

From the beginning of the Ordovician, marine life began its great radiation outward, which was characterized by the rapid appearance of

new orders, families, and genera, together with the replacement of existing groups.

The Great Ordovician Biodiversification Event (GOBE) constructed the essential framework for Paleozoic evolutionary faunas. During the GOBE, Cambrian faunas dominated by arthropods were replaced by Paleozoic faunas represented by filter feeders and reef-forming organisms.

Recently, a joint research team from the Nanjing Institute of Geology and Paleontology of the Chinese Academy of Sciences (NIGPAS), Hunan Museum, and Central South University has reported a new Lagerstätte, Liexi [fauna](#), from the Lower Ordovician of Yongshun County, Hunan Province. This discovery helps advance our understanding of the early GOBE.

This study was published in *Proceedings of the Royal Society B* on July 13.

The GOBE was originally studied and defined using skeletonized taxa rather than non-mineralized taxa. Exceptionally preserved Lagerstätte accurately reflects the living community, providing new evidence for understanding the Ordovician marine world. However, only a few Ordovician Lagerstätten have been discovered, especially from the Lower Ordovician.

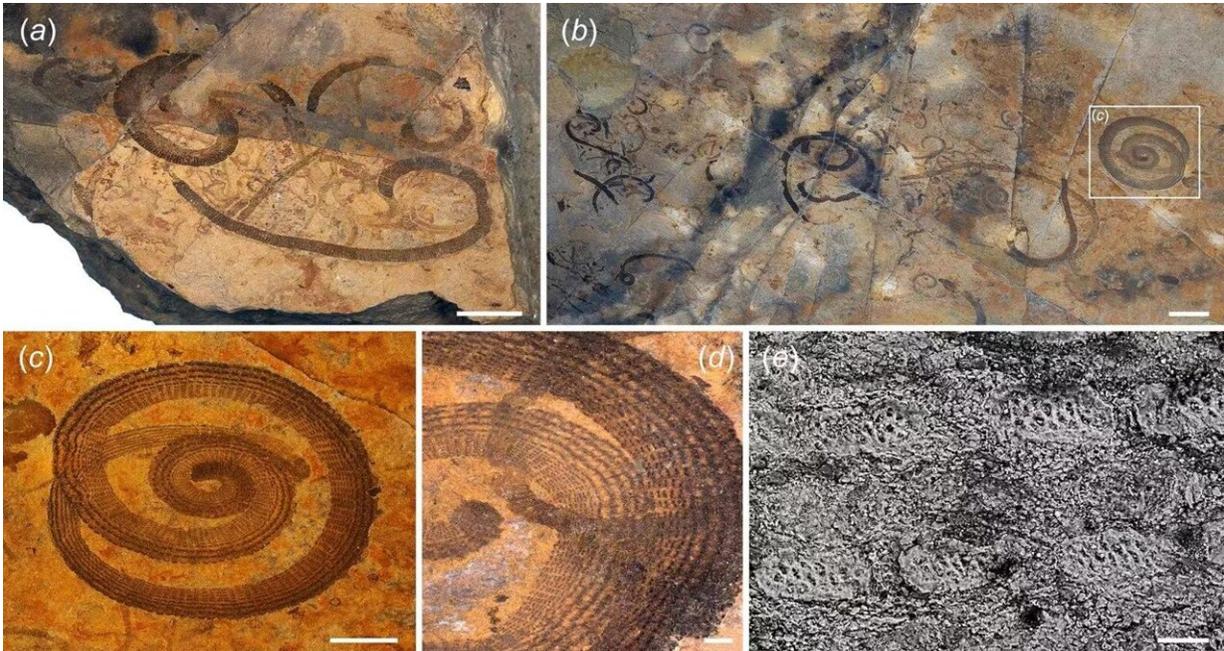


Fig. 2 Paleoscolecidan worms from the Liexi Fauna. Credit: NIGPAS

The Liexi fauna was discovered in the Madaoyu Formation of the Lower Ordovician. The conodont and graptolite assemblages indicate a mid-Florian, Early Ordovician age, making it slightly younger than the Fezouata Biota from Morocco and the Afon Gam Biota from North Wales. The Liexi fauna probably preceded the GOBE's primary diversification by ~5–10 Myr.

Most of the documented fossiliferous Early Ordovician Lagerstätten globally are thought to have occurred in high latitude regions, such as the Fezouata Biota, which was located near the South Pole during the Early Ordovician, and the Afon Gam Biota, which was located at a paleolatitude of 60 °S. During the Early Ordovician, South China was thought to be a typical tropical paleogeographical setting. In contrast to some other Ordovician Lagerstätten preserved in restricted or anoxic environments, the depositional environment of the Liexi fauna is thought

to have been offshore from the lower shoreface, following the paleogeographic setting.

The Liexi fauna includes up to 11 phyla of marine animals. It is characterized by abundant, diverse biomineralized fossils along with the exceptional preservation of some non-mineralized tissues and groups. In addition to a rich array of paleoscolecidans and diverse trilobites (including some with digestive tract preservation), the fauna also contains graptolites, extraordinarily complete echinoderms, exceptionally preserved sponges, possible *Ottoia*, machaeridian polychaetes, and other rare biomineralized specimens, signaling a flourishing Early Ordovician marine fauna.

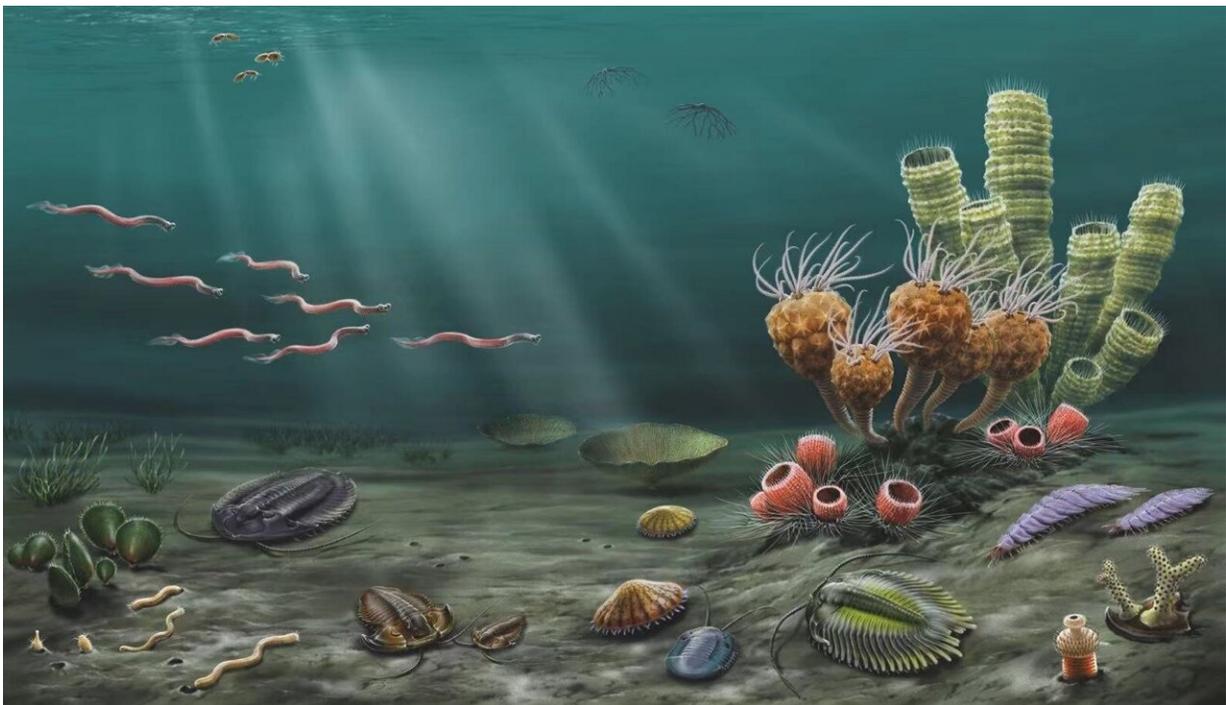


Fig. 3 Ecological reconstruction of the Liexi Fauna. Credit: NIGPAS

Based on these discoveries, the researchers have proposed a biologically complex and complete marine ecosystem with diverse organisms and varied lifestyles, including endobenthic, sessile benthic, mobile benthic, nektonic, and planktic taxa.

This reconstructed complex ecosystem provides new evidence for significant biotic turnover from Cambrian faunas to Paleozoic faunas, by showing a mixture of Cambrian relics and Ordovician new arrivals.

More information: Xiang Fang et al, The Liexi fauna: a new Lagerstätte from the Lower Ordovician of South China, *Proceedings of the Royal Society B: Biological Sciences* (2022). [DOI: 10.1098/rspb.2022.1027](https://doi.org/10.1098/rspb.2022.1027)

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