

The lowest Cambrian SSF biostratigraphy in the Maotianshan section, Chengjiang, South China

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Small shelly fossils (SSFs) represent a biostratigraphically important group of fossils for generally fossil-poor Lower Cambrian rocks. Steiner et al. (2007) recently proposed a new SSF biozonation for the Lower Cambrian in South China. We studied in detail the biostratigraphy of the Maotianshan section in the Chengjiang area, Yunnan, South China, that exposes a continuous shallow-marine sequence of Ediacaran to Cambrian System with abundant well-preserved SSFs. We extracted nearly 500 SSFs from the phosphorite bed at the Maotianshan section. Here we report the occurrence and biostratigraphy of SSF from this section.

The Maotianshan section is composed of the upper Ediacaran Dengying Fm, the lowermost Cambrian Zhujiqing Fm (phosphorite; about 50 m), and Lower Cambrian Shiyantou Fm (black shale; about 50 m) in ascending order. The Zhujiqing Fm is composed of 3 units of phosphorite beds; 1) sandstone and fossiliferous phosphorite (about 20 m), 2) 10 cm-thick bedded silty phosphorite with phosphatic fine sandstone (about 20 m), and 3) SSF rich phosphatic packstone (about 5 m) in ascending order.

We collected 36 phosphorite samples from Zhujiqing Fm for acetic acid treatment, and extracted SSFs from 5 horizons. Eight genera of SSFs were identified. The SSFs from the phosphorite bed of this section are classified into two distinct assemblages. The lowest phosphorite yields *Siphogonuchites* sp. (coeloscleritophora sclerite) or *Purella* sp. (monoplacophora?). In contrast, the upper phosphorite beds yield mainly *Paragloborilus* sp. (hyolith) and *Archaeospira* sp. (gastropoda), together with *Paracarinachites* sp. (polypracophora) or *Xianfengella* sp. (gastropoda?). In addition, *Ocruranus* sp. (brachiopoda) and *Eohalobia* sp. (bivalve?) occur throughout the phosphorites at Maotianshan. These two SSF assemblages are correlated with the *Anabarites trisulcatus-Protohertzina anabarica* assemblage and the *Paragloborilus subglobosus-Purella squamulosa* assemblage of Steiner et al. (2007), respectively. According to Steiner et al. (2007), both of the two assemblage zones belong to the lowest Cambrian. The boundary between the two assemblage zones is important because it marks the horizon of the greatest increase in SSF generic diversity during the Early Cambrian. This study confirmed that the phosphorite bed (about 50 m) of the Maotianshan section is much thicker than that (15 m) of the Meishucun section, the stratotype section of the Lower Cambrian SSF biozonation in South China. Thus the Maotianshan section likely has a great potential for establishing detailed zonation of the lowermost Cambrian SSF biostratigraphy, and for documenting the pattern of the early animal diversification in the earliest Cambrian.