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Macrofossils from the Permian-Triassic Boundary Strata at Mingtang Section in the Great Bank of Guizhou, Southwest China

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The Permian-Triassic mass extinction is the most severe biotic mass extinction in Phanerozoic with over 90 % of marine species wiped out within 200,000 years. Although tremendous species were eliminated, the extinction pattern varies in paleogeography. Brachiopoda was one of the most abundant and diverse post-extinction survivors, which were observed widespread in South China. The brachiopod fossils though the Permian and Triassic transitional succession provide useful clues not only for the definition and correlation of the Permian and Triassic boundary, but also for the understanding of the great mass extinction and subsequent recovery.

The Mingtang section in Luodian County, Guizhou Province was situated at the northern margin of the Great Bank of Guizhou during the Permian-Triassic transitional time. The Great Bank of Guizhou was initiated as an isolated carbonate platform in the deep Nanpanjiang Basin probably due to a local tectonic event in the latest Permian. A series of Permian-Triassic sections from the platform interior to the marginal basin have been extensively studied to elaborate the great transitional event, especially the recovery process in the aftermath of mass extinction in recent years, but no study has dealt with the macrofossils in the area.

The Permian-Triassic boundary strata at the Mingtang Section are composed of the Dalong Formation of the gray-black thin-bedded siliceous mudstone and grayish yellow thin-bedded mudstone and basal Luolou Formation of interbedded grayish yellow thin-bedded mudstone and limestone. Nine brachiopod species of 7 genera are identified in Bed 3 and lower part of Bed 4, i.e. *Edriosteges poyangensis* (Kayser), *Neochonetes substrophomenoides* (Huang), *Cathaysia* cf. *sinuata* Chan, *Orthothetina rubber* (Frech), *Paryphella orbicularis* (Liao), and *Orthothetina* sp. in Bed 3, and *Cathaysia chonetoides* (Chao), *Paryphella nasuta* Liao, *P. transversa*

Liao, *P. orbicularis* (Liao), *P. triquetra* Liao, and *Paracruithyrus pigmaea* (Liao) in Bed 4. The ammonoid *Pseudogastriceras* sp. was found in Bed 3 but abundant bivalve *Claraia* spp. occurred in the rocks 30 cm above the brachiopod fossil bed in Bed 4. The brachiopods at the section are characterized by small, thin-shelled fossils and most of them are only about 10 mm long and similar to those from the siliceous facies in South China. Since no conodonts have been retrieved from the Permian-Triassic boundary rocks at the section, the boundary could be defined only based upon the macrofossils such as ammonoids, brachiopods and bivalves. According to the distribution of macrofossils, Bed 3 clearly belongs to the Permian because of the Permian-type ammonoids and the upper part of Bed 4 is the Triassic due to the abundant occurrence of *Claraia*. The brachiopods in the lower part of Bed 4 are the Permian-type but they also extend into the lower part of the Triassic in many sections of South China. In comparison of the distribution of macrofossils at Mingtang section with the sequence of 3 mixed-fauna beds at Meishan section, the brachiopods *Paracruithyrus pigmaea* (Liao), *Paryphella orbicularis* (Liao), *P. triquetra* Liao, *P. nasuta* Liao and *P. transversa* Liao in Bed 3 and lower Bed 4 at Mingtang section also occurred in Beds 26-27 at Meishan section and the abundant occurrence of *Claraia* in the upper part of Bed 4 is correlated well with Bed 29 at Meishan section. The GSSP of Permian-Triassic boundary is defined in the middle of Bed 27 between 27b and 27c. Consequently, the Permian and Triassic boundary is placed between Bed 3 and Bed 4 at Mingtang section.

Key words: brachiopods, mixed-fauna beds, Permian-Triassic boundary

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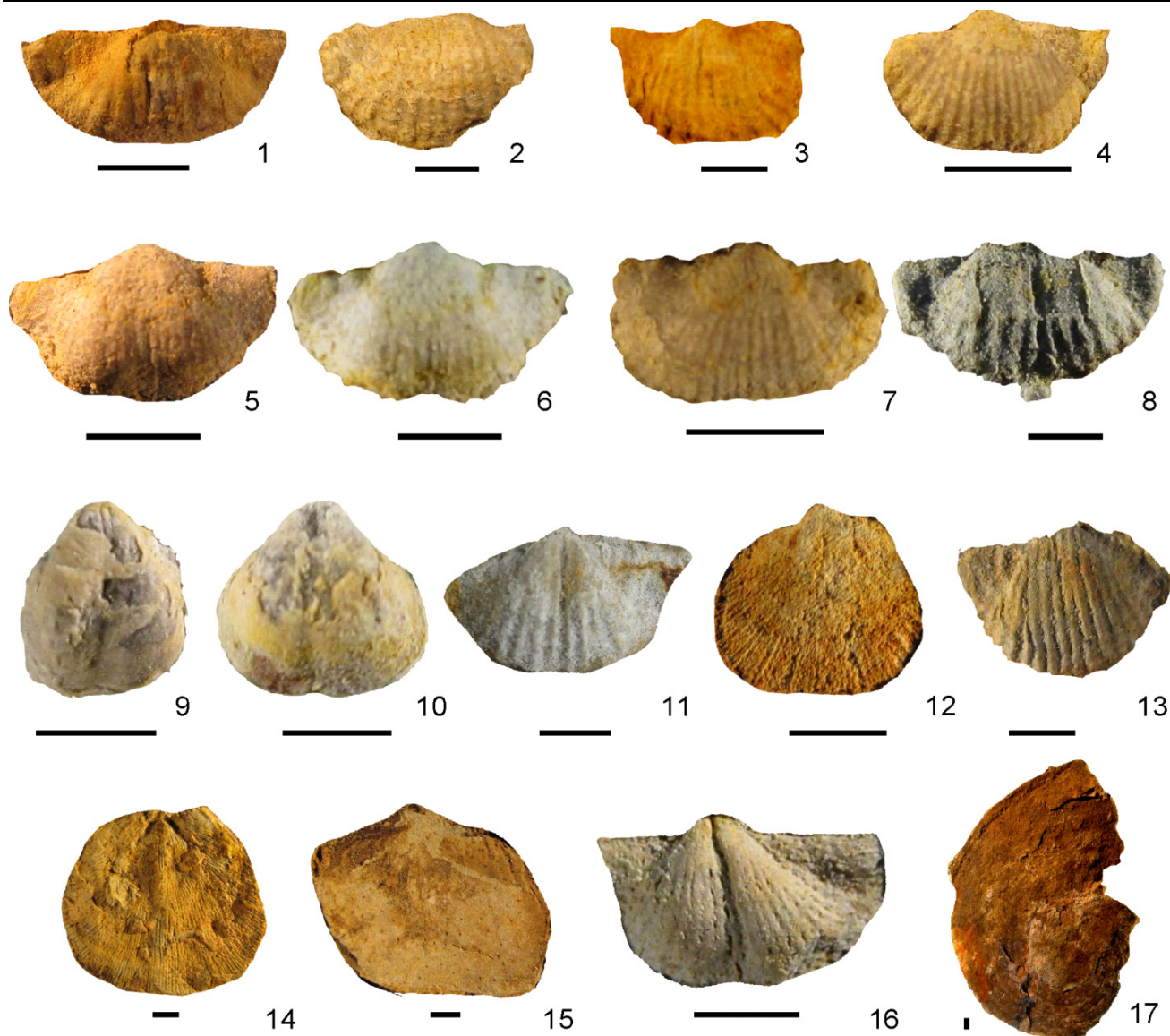


Fig. 1. Illustrations of macrofossils at Mingtang section

Bar scale is 2.5 mm. 1, 2, 13. *Paryphella orbicularis* (Liao), 1, ventral valve, CUG MTB01, Bed 4. 2, ventral valve, CUG MTB02, Bed 4. 13, ventral valve, CUG MTB03, Bed 3. 3, 4, 7. *Cathaysia chonetoides* Liao, 3, ventral valve, CUG MTB04, Bed 4. 4, ventral valve, CUG MTB17, Bed 4. 7, ventral valve, CUG MTB05, Bed 4. 5, 6. *Paryphella triquetra* Liao, 5, ventral valve, CUG MTB07, Bed 4. 6, ventral valve, CUG MTB08, Bed 4. 8. *Paryphella nasuta* Liao, ventral valve, CUG MTB09, Bed 4. 9-10. *Paracruithyris pigmaea* (Liao), 9, ventral valve, CUG MTB10, Bed 4. 10, ventral valve, CUG MTB11, Bed 4. 11. *Paryphella transversa* Liao, ventral valve, CUG MTB06, Bed 4. 12. *Orthothetina* sp., ventral valve, CUG MTB13, Bed 3. 14. *Orthothetina ruber* (Frech), ventral valve, CUG MTB14, Bed 3. 15. *Edriosteges poyangensis* (Kayser), ventral valve, CUG MTB15, Bed 3. 16. *Neochonetes substrophomenoides* (Huang), ventral valve, CUG MTB16, Bed 3. 17. *Pseudogastrioceras* sp., lateral valve, CUG MTA01, Bed 3.

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