TIAN Shifeng, CHENG Zhongqiang and HUANG Chunju, 2013. Milankovitch Cyclicity and Sea-level Changes Recorded in the Aftermath of the End-Permian Mass Extinction: Case Study of the Earliest Triassic of the Meishan Section, South China. *Acta Geologica Sinica* (English Edition), 87(supp.): 923.

Milankovitch Cyclicity and Sea-level Changes Recorded in the Aftermath of the End-Permian Mass Extinction: Case Study of the Earliest Triassic of the Meishan Section, South China

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The Earliest Triassic Yinkeng Formation is exposed at the well-known Meishan section, South China, which contains the Global Stratotype of Section and Point (GSSP) for the Permian-Triassic boundary (PTB). It records centimeter-scale rhythmic alternations comprised mainly by marlstone and limestone. Detecting cyclic sedimentation patterns and temporal periodicities offer geoscientists better understanding the origin of sedimentary sequences and their driving mechanisms. Seven types of couplet embedded in five types of bundles were recognized based on occurrence and thickness of the lithologic units, suggesting that their formation was controlled by cyclic processes. The various orders of cycles observed correlate well with other Early Triassic counterparts recorded in South China. Here, we present new cyclostratigraphic results based on lithologic thickness and carbonate content of the Yinkeng Formation. Power spectra of carbonate content show that the ratio of major wavelengths recognized throughout the formation is similar to that of the 100 kyr short eccentricity, 33 kyr obliquity, and 21 kyr precession cycles, indicating that astronomical signals are recorded in the earliest Triassic rhythmic succession. Consistence between pronounced lithologic rhythmicity and sea-level changes obtained from Fischer plot indicates that high-frequency climatic cycles may have driven sea-level changes immediately after the PTB mass extinction. Furthermore, the 4^{th}-order sea-level changes interpreted from the sedimentary record match well with 100 kyr short eccentricity component of carbonate content, reflecting that the 100 kyr short eccentricity-induced climate changes may have likely controlled the deposition of 4^{th}-order sequences recognized from rhythmic successions.

Key words: Orbital cycles, limestone-marl alternations, carbonate content, Fischer plot, Yinkeng Formation

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