



Sedimentology and carbonate $\delta^{13}\text{C}$ of the late Carboniferous to early Permian carbonate slope successions in South China

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ABSTRACT

The Late Paleozoic Ice Age (LPIA) recorded the large-scale transition from global icehouse to greenhouse conditions since the development of vascular plants. Continental glaciation sustained development in the southern hemisphere on Gondwana, the contraction and expansion of the ice sheets in the middle and high latitudes also triggered the high-frequency fluctuations of glacio-eustasy in the lower latitudes. The stratigraphic records can reflect global sea level changes during the waxing and waning of the ice sheets, especially the low latitude area. Reliable $\delta^{13}\text{C}_{\text{carb}}$ values of the marine is also a useful information can reflect the variations of the paleoclimate and paleocean. The South China block was located in the low-latitude area during the late Carboniferous to early Permian and preserved well successions of carbonate rocks, potentially recording a global seawater geochemical signal. Three carbonate slope profiles (Naqing, Shanglong and Narao sections) in Luodian Basin, Guizhou Province were selected for detailed sedimentology and carbonate carbon isotope study. Seven lithofacies were identified in the study sections, they were thin-bedded homogeneous lime mudstone facies, laminated calcisiltite facies, laminated wackestone facies, thin- to thick-bedded massive bioclastic packstone facies, medium- to very thick-bedded massive grainstone facies, medium- to very thick-bedded massive floatstone facies and thick- to very thick-bedded massive rudstone facies. Multiple slump deposits were developed in the three sections during the Asselian to early Sakmarian, indicating a significant change in sea level. The $\delta^{13}\text{C}_{\text{carb}}$ values in the study profiles is sustained at about 5–6‰ near the C/P boundary. Above the C/P boundary, the occurrence of significant $\delta^{13}\text{C}_{\text{carb}}$ negative excursion (about 1.5–3‰), indicating that the global carbon cycle fluctuated during that period.

Key words: Late Paleozoic Ice Age (LPIA), South China, late Carboniferous, early Permian, Sedimentology, $\delta^{13}\text{C}_{\text{carb}}$