ASSESSING THE EFFECT OF ANOXIA ON CARBONATE PLATFORM ARCHITECTURE THROUGH OUTCROP AND NUMERICAL MODELING: A CASE STUDY OF A PERMIAN-TRIASSIC ISOLATED PLATFORM IN SOUTH CHINA

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ABSTRACT

Marine redox conditions influence the carbonate saturation state of seawater because aerobic respiration of organic matter produces dissolved inorganic carbon (DIC) but little alkalinity, driving saturation state down, whereas most anaerobic respiratory pathways produce at least as much alkalinity as DIC, driving carbonate saturation up. However, the influences of ocean anoxia on carbonate platform architecture remain poorly quantified. The Great Bank of Guizhou, an isolated Permian-Triassic carbonate platform in China, offers an ideal opportunity to assess the influence of redox conditions on platform architecture because it possesses a well-constrained stratigraphic framework spanning an Early Triassic anoxic interval. During Early Triassic time, the platform transitioned from a low-relief bank to a high-relief platform. Elevated saturation state in seawater could account for this transition by causing a high production rate of sediments on the platform or reducing sediment diffusion to the slope. Field mapping and quantitative petrographic analysis and stratigraphic forward modeling will be used to examine the potential influences of high sediment production rates versus reduced sediment diffusion rates on the Lower Triassic platform architecture. Insights from this work will shed light on other Lower Triassic oolite reservoirs, such as the Khuff and Feixianguan formations.

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