Strategies of High-Resolution Cyclostratigraphic Correlation - An Example of Lower Permian Lacustrine-Fluvial Deposits, Southern Bogda Mountains, Greater Turpan-Junggar Rift Basin, NW China

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ABSTRACT

The main objective is to use geochemical data of shale to improve high-resolution correlation of fluvial-lacustrine cycles within and across grabens. Rapid lateral facies and thickness changes make cycle correlations uncertain at the best. Accurate environmental interpretation is critical to cycle definition and correlation. In this study, geochemical attributes will be used to substantiate and modify environmental interpretations of shales from sedimentary and stratigraphic observations. As a result, cycles defined by environmental changes will be more accurate to facilitate high-resolution correlation. In addition, specific geochemical parameters, such as organic carbon isotope, can be used directly as stratigraphic markers. Preliminary studies of 142 shale samples from lower Permian Lucaogou and Hongyanchi Formation in Tarlong-Taodonggou area have identified effective proxies to correlate the cycle at a 1-10-km scale. Organic geochemical proxies, such as total organic carbon, pristane/phytane ratio, and abundance of gammacerane, C35 hopane, and β-carotane have been used to improve interpretation of depositional environments and climate conditions, and further the cycle correlation. This proposal seeks funds for organic geochemical analyses of 70 samples in Tarlong and Zhaobishan sections to improve the cycle correlation at a 1-100-km scale. We propose a process-response approach emphasizes correlation of depositional cycles and their inherent changes with respect to controlling processes, not to specific cycle types and characteristics alone. This approach can effectively differentiate local autogenic from regional allogenic cycles, and minimize miscorrelation of time-equivalent but laterally-variable cycles at intra- and inter-graben scale.

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