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O16. **Disparate Permian-Triassic carbonate-carbon isotope trends explained by a diagenetic model forced with spatially heterogeneous organic matter fluxes**

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The recognition of a long-term negative carbon isotope trend straddling the Permian-Triassic boundary beds is widely accepted[1,2]. Equally important is the notion that superimposed second-order scatter marks this geochemical record, hindering high-resolution intra- and inter-basinal correlation attempts[1,2]. A more in-depth understanding of the nature (primary vs. diagenetic) of these second-order carbonate-carbon isotope signals will enhance the Permian-Triassic stratigraphic framework, and enhance our understanding of the biogeochemical carbon cycle during this pivotal time period. We present a carbon isotope dataset incorporating bulk carbonate-carbon isotope results of recently discovered Permian-Triassic successions in Iran, complemented with published results from sites in Iran and China. By a combined subsampling and data smoothing approach we found the following: 1) a first-order negative carbon isotope excursion, 2) residual carbon isotope variability superimposed on the first-order trend, and 3) a temporal trend in the residual carbon isotope variability towards higher amplitude fluctuations. A diagenetic model can simulate the observed stochastic residual isotope variability when forced with variable organic matter fluxes and low marine sulfate concentrations. This model is based on the premise that (anaerobic) microbial metabolic pathways can induce calcite nucleation, thereby functioning as a recorder of ambient porewater dissolved inorganic carbon, spiked with their own respiratory-induced carbon isotope signals. We further postulate that diminished benthic faunas, and consequential physical sediment reworking, reduces the spatial dispersion of organic carbon in the sediment. In conclusion our model marries two important aspects of the end-Permian mass extinction; the disruption of benthic (metazoan) geobiological agents and spatially disparate carbon isotope trends. On the other hand, the long-term first-order negative trend is still manifest despite the spatially-variable diagenetic changes.

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2. Tong, J.N., Zuo, J.X., Chen, Z.Q. Early Triassic isotope excursions from South China: proxies for devastation and restoration of marine ecosystems following the end- Permian mass extinction. Geological Journal 42, 371–389 (2007).