Intensified anoxia during the Permian-Triassic transition: evidence from U isotope records in muddy sediments

JUN SHEN[1,2], NOAH PLANAVSKY[2]

[1] *State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Wuhan, Hubei, 430074, P.R. China, shenjun_2009@163.com*

[2] *Department Geology and Geophysics, Yale University, New Haven, Connecticut 06520-8109, U.S.A, noah.planavsky@yale.edu*

Oxygen deficiency is a potential cause of the largest biotic crisis (the ~252 Ma, Latest Permian mass extinction) in the Earth history. Carbonate uranium isotope values were widely used to explore the increasing extent of global ocean anoxia during the Permian-Triassic transition and early Triassic. In this study, we present uranium isotope records from shales deposited during the extinction interval section in both Panthalassic and Paleo-Tethys settings. Positive excursions of $\delta^{238}U$ near the Latest Permian mass extinction were likely caused by the increase the effective U isotope fractionation factor between seawater and marine sediments due to migration of U reduction front from below the sediment-water interface into the water column. The observed significant increases in the effective burial U isotope fractionation near the extinction interval needs to be accounted for when using the carbon U isotope record to reconstruct the ancient oceanic redox conditions. Further, water column U reduction requires high rates of anoxic organic matter remineralization in water column, providing a new empirical constraint that can be used to move forward our understanding of the rates of export productivity that drove anoxia during the extinction interval.