U ISOTOPE VARIATION IN MARINE CARBONATES ACROSS THE PERMIAN-TRIASSIC BOUNDARY. F. F. Zhang[1], S. J. Romaniello[1], T. J. Algeo[2,3], A. D. Herrmann[4], A. D. Anbar[1,5], [1]School of Earth & Space Exploration, Arizona State University, Tempe, AZ 85287-6004, United States, [2]Department of Geology, University of Cincinnati, Cincinnati, Ohio 45221-0013, U.S.A., [3]State Key Laboratories of Biogeology and Environmental Geology and Geological Processes and Mineral Resources, China University of Geosciences, Wuhan 430074, China, [4]Department of Geology & Geophysics, Louisiana State University, Baton Rouge, LA 70803, U.S.A., [5]Department of Chemistry & Biochemistry, Arizona State University, Tempe, AZ, United States (e-mail: fzhang48@asu.edu, F.F. Zhang)

The ~252-Ma Permian-Triassic boundary (PTB) represents the largest mass extinction event in Earth history, characterized by ~90% marine and ~80% terrestrial species-level mortality [1-3]. Despite extensive prior work, many aspects of this crisis remain poorly understood, including the timing, extent, and intensity of ocean anoxia [4]. Previous work by Brennecka et al. [5] showed evidence for widespread ocean anoxia based on a negative shift in the uranium (U) isotopic composition of marine carbonates deposited at the time of the extinction. However, Brennecka et al. [5] studied only a single stratigraphic section from South China (Dawen). Further work is needed to determine whether the U-isotope signal identified in that study is characteristic of the global ocean during the PTB transition. There are two principal concerns: (i) Dawen was located in a semi-restricted marine basin in the eastern Paleo-Tethys, and its degree of watermass exchange with the global ocean is uncertain; and (ii) changes in sediment lithology at the extinction horizon may have resulted in unexpected local diagenetic shifts in U isotopes.

To address these concerns, we have analyzed the U isotopic composition of well-preserved marine carbonates from two other sections: Kamura (Japan), which was located in the open Panthalassic Ocean, and Zal (Iran), which was located in the west-central Tethys. The paleogeographic distribution of these sections will allow us to test for variation in U isotopes across the Tethys Ocean and between the Tethys and Panthalassic oceans. In addition, the new sections in Japan and Iran exhibit little to no change in lithology at the PTB, providing a test of lithologic influences on the U-isotope signal at Dawen. U isotope analysis of these new sections has the potential to provide new insights into the PTB mass extinction, advancing our understanding of this critical period of Earth history. Besides bulk samples analysis, sequential extractions have been used to possibly separate phases containing pristine and altered $^{238}U/^{235}U$ signatures. This study also serves a broader goal: investigation of the U isotopic composition of correlative stratigraphic intervals in three widely separated sections is a test of the validity of U isotopes in marine carbonates as a proxy for average global-ocean redox conditions.

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