

Sulfur isotope profiles in the pelagic Panthalassic deep sea during the Permian-Triassic transition

Satoshi Takahashi^{1*}, Kunio Kaiho², Rie Hori³, Paul Gorjan⁴, Takahiro Watanabe², Satoshi Yamakita⁵, Yoshiaki Aita⁶, Atsushi Takemura⁷, Bernhard K. Sporli⁸, Takeshi Kakegawa², Masahiro Oba²

¹Department of Earth and Planetary Science, University of Tokyo, ²Graduate school of Science, Tohoku University, ³Graduate school of Science and Engineering, Ehime University, ⁴Department of Earth and Planetary Science, Washington University, ⁵Faculty of Education and Culture, University of Miyazaki, ⁶Faculty of Agriculture, Utsunomiya University, ⁷Geoscience Institute, Hyogo University of Teacher Education, ⁸Geology, School of Environment, The University of Auckland

Mesozoic accretionary complexes in Japan and New Zealand contain Panthalassic low latitude and southern mid-latitude deep-water sedimentary rock respectively. These sedimentary rocks record environmental changes in the pelagic Panthalassic Ocean during the transition associated with the severe Permian-Triassic mass extinction. This study presents sulfur isotope records of sulfide from continuous deep-sea Permian-Triassic boundary sections located in northeast Japan (the Akkamori section-2, the most continuous section amongst other previously reported deep-sea sections) and North Island of New Zealand (the Waiheke-1 section, providing the first sulfur isotopic record from a southern hemisphere deep-sea section). Both sections show sharp minus 15 permil drops of the sulfur isotope ratio coupled with a negative shift of organic carbon isotope ratio. Similar decreases in sulfur isotope ratio of carbonate-associated sulfates by minus 10 permil accompanied with a negative shift of inorganic carbon isotope ratio at the end-Permian mass extinction horizon have been reported in some shallow water Paleotethyan sections. These sulfur isotope changes suggest that a massive release of ³²S-enriched sulfur from the H₂S-rich water to the oxic surface-waters coincided with the end-Permian mass extinction.

Keywords: Mass extinction, Panthalassa, Pelagic deep sea, Permian, Triassic, Sulfur Isotope