

Non-sulphidic anoxic conditions in the end-Early Triassic deep sea

TAKAHASHI, Satoshi^{1*}; YAMASAKI, Shin-ichi²; OGAWA, Kazuhiro³; KAIHO, Kunio³; TSUCHIYA, Noriyoshi²

¹Department of Earth and Planetary Science, University of Tokyo, ²Graduate School of Environmental Studies, Tohoku University, ³Graduate School of Science, Tohoku University

This study focuses on an upper Lower Triassic (Spathian) to lowermost Middle Triassic (Anisian) section representing the central Panthalassic deep sea. Analysed organic carbon isotope ratio ($\delta^{13}C_{org}$) records from the section demonstrate that lower values in the Spathian increase by up to 6 ‰ at the Spathian – Anisian transition. This trend accords with the carbonate carbon isotope ($\delta^{13}C_{carb}$) record from shallow water carbonate sections. The end of the Early Triassic trough of $\delta^{13}C_{org}$ consists of black chert deposits sandwiched by black claystone beds in the study section. In these black-coloured beds and underlying siliceous claystone beds, higher concentrations of redox-sensitive elements, such as Mo and V, and coinciding low sulphide sulphur isotope ratios ($\delta^{34}S_{sulphide}$) and previously reported sulphur-bearing organic compounds are present, suggesting anoxic deep water. As enrichment factors of Mo are not higher than the typical sulphidic trend, these anoxic conditions did not become sulphidic. Oxygen-poor conditions coinciding with a carbon isotope trough have been also reported in late Early Triassic strata from shallow-water sections. These coincidences imply global environmental perturbations related to the delayed recovery of life after the end-Permian mass extinction.

Keywords: pelagic deep-sea, oceanic anoxia, trace element, Triassic, carbon isotope