

Mineralogical and geochemical study of pelagic sedimentary rocks in the Permian / Triassic boundary of the Mino Terrane, central Japan

*Shinya Uemura¹, Tetsuji Onoue²

1. Graduate School of Science and Technology, Kumamoto University, 2. Division of Natural Science, Faculty of Advanced Science and Technology, Kumamoto University

The ca. 251 Ma Permian–Triassic boundary (PTB) records the largest biotic catastrophe in the Phanerozoic. A considerable amount of work for the PTB event has been done on the Tethyan platforms and peri-Pangean shelves, and some possible causes have been proposed to explain the extinction event: oceanic anoxia, meteorite impact, flood basalt volcanism and global warming. Sano et al. (2012) reported the stratigraphic variations of TOC, $\delta^{13}\text{C}_{\text{org}}$ and the number of Permian radiolarian species in the PTB siliceous rock section of the Mino terrane, central Japan, and inferred that a reducing condition suddenly developed at the end-Permian, resulted in the extinction event of Permian radiolarians. In order to infer the environmental conditions in the deep Panthalassic Ocean at the PTB, we examine the geochemical and mineral compositions of the exactly the same section of Sano et al. (2012).

The study section, namely NF1212F, consists of Upper Permian chert (Changhsingian) and Lower Triassic (Induan) black claystone intermittently with thin chert beds. A total 25 claystone samples were obtained from the section following the sample number of Sano et al. (2012). Powder x-ray diffraction (XRD) analysis shows that the claystones below the PTB contained quartz, magnetite, illite and chlorite, while all the claystone above the boundary only contained quartz and illite. The result of XRF and ICP-MS analysis reveals that redox-sensitive trace-element (vanadium [V], chromium [Cr], molybdenum [Mo], and uranium [U]) increase in uppermost Permian chert beds. This trend suggests that strong reducing conditions developed before the end-Permian mass extinction. The increasing trend in Mo/U ratio from 150 cm to 25 cm below the PTB indicates shift from anoxic to euxinic conditions. This stratigraphic interval represents ca. 100 kyr based on the $\delta^{13}\text{C}_{\text{org}}$ correlation with Meishan section in South China, or ca. 200 kyr based on the sedimentation rate of bedded cherts estimated by Algeo et al. (2011).

Keywords: Permian-Triassic boundary, bedded chert, Mino terrane, Panthalassa ocean, ocean anoxia