

ペルム紀／三畳紀境界の完全連続深海層序の復元と黄鉄鉱を用いた海洋深層環境の解明

Reconstruction of Permian-Triassic ocean redox conditions based on laminae preservation and pyrite framboids from the pelagic Panthalassic Ocean

水谷 茜¹、*高橋 聡¹、石田 潤¹、山本 信治¹、池田 昌之²、尾崎 和海³、齋藤 めぐみ⁴、鈴木 希実⁴、多田 隆治¹

Akane Mizutani¹, *Satoshi Takahashi¹, Jun Ishida¹, Shinji Yamamoto¹, Masayuki Ikeda², Kazumi Ozaki³, Megumi Saitoh⁴, Nozomi Suzuki⁴, Ryuji Tada¹

1.東京大学理学系研究科地球惑星科学専攻、2.静岡大学、3.東京大学大気海洋研究所、4.国立科学博物館地学研究部

1.Department of Earth and Planetary Science, University of Tokyo, 2.Shizuoka University, 3.Atmosphere and Ocean Research Institute.University of Tokyo, 4.Division of Paleoenvironment and Paleoecology Department of Geology and Paleontology National Museum of Nature and Science

Widespread oceanic anoxia has been implicated as an important factor in the Permian -Triassic mass extinction and the delayed recovery of Early Triassic marine ecosystems. This study investigates the composite columnar section of the deep-sea Permian-Triassic boundary section preserved in the accretionary complex in Northeast Japan. This columnar section consists of the Upper Permian bedded chert and siliceous claystone, and overlying the end-Permian to earliest Triassic black claystone. The mass extinction horizon places in the base of the black claystone, and top of the reconstructed black claystone corresponds to 226.7 kilo year after the extinction event based on sedimentation rate estimated by Takahashi et al. (2014). The careful observation of polished cross sections identified thinly laminated structures in the end-Permian to earliest Triassic claystone interval. Our observation on the polished specimen revealed small and well sorted framboids (average diameters are 4 μm and their standard deviations are 1.1 μm) suggesting that sulfidic water column prevailed during the end Permian mass extinction and subsequent time interval corresponding to the overlying 30 cm. Well preserved laminae occur within the same stratigraphic interval, suggesting stagnant benthos activity due to anoxic bottom water condition under sulfidic water column. On the other hand, well preserved laminae appear again in the overlying earliest Triassic horizon, but size of pyrite framboids are not so small (average diameters are more than 7 μm), suggesting anoxic but non-sulfidic water column condition. These facts indicate water column sulfidic episodes sustained for less than 50 kilo years in the pelagic Panthalassa.

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