

Middle Permian seawater $^{87}\text{Sr}/^{86}\text{Sr}$ record from mid-Panthalassan paleo-atoll carbonates

KANI, Tomomi^{1*}, HISANABE, Chihiro¹, ISOZAKI, Yukio²

¹Kumamoto University, ²The University of Tokyo

We report a detail secular change of the Late Guadalupian (Permian) seawater $^{87}\text{Sr}/^{86}\text{Sr}$ ratio with the unique Permian minimum interval detected in mid-Panthalassa (superocean) paleo-atoll carbonates. The analyzed two sections at Akasaka and Kamura (Japan) occur as exotic blocks within the Jurassic accretionary complex. Both sections span across the Guadalupian-Lopingian (G-L) boundary characterized by the major crisis of large-tested fusulines and rugose corals. The two sections are separated from each other for 500 km at present, thus were likely derived from different paleo-seamounts formed in mid-Panthalassa.

The detected intervals of the minimum and the following increase in $^{87}\text{Sr}/^{86}\text{Sr}$ are common between the two sections. The new data of the lowest ratio (0.706808) in the Capitanian (Late Guadalupian) *Yabeina* (fusuline) Zone at Akasaka give the minimum $^{87}\text{Sr}/^{86}\text{Sr}$ ratio ever reported not only from the Paleozoic but also from the entire Phanerozoic. The extremely low values lower than 0.70690 were detected from 18 samples in the *Yabeina* Zone and the overlying barren interval. In particular, the extremely low values continued up to the topmost barren interval immediately below the G-L boundary. The newly detected Sr record likely represents the general trend of the Capitanian seawater in mid-Panthalassa. This find suggests that the seawater chemistry at least that related to Sr isotope fluxes changed its general trend from the long-term Paleozoic decrease to the Mesozoic increase, immediately before the G-LB extinction event. The rapid increase during the Late Permian-Early Triassic interval suggests that a large amount of radiogenic terrigenous clastics have been shed into Panthalassa possibly through rift-related new drainage systems in Pangea. The initial breakup of Pangea may have started around the G-L boundary, considerably before the final opening of the Atlantic in the Jurassic.

Keywords: Permian, Sr isotope, limestone