

The Carbon isotope stratigraphy of the upper part of the Iwaizaki limestone in the middle permian.

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The largest mass extinction event of marine life started immediately before the Guadalupian-Lopingian boundary (G-LB), i.e., at the end of Capitanian. Previous studies were carried out mostly for fossiliferous strata deposited in low latitudes, e.g. Texas, Penglaitan in China, Kamura and Akasaka in Japan etc. The coeval global sea-level drop and the extinction of tropical fauna in the late Capitanian was documented; nonetheless, the response of animals in the mid-latitude is almost unknown to date. The Iwaizaki limestone in NE Japan represents a shelf sequence deposited on the northeastern extension of South China, likely in higher latitudes within the tropic/subtropics. The limestone is composed of reef (Unit 3-7 by Kawamura & Machiyama, 1995) and the overlying collapsing-reef facies (Unit 8). The Capitanian large-tested fusuline genus *Lepidolina* occurs from the upper part of Unit 7 to lower part of Unit 8. Strontium isotope ratio of limestone stays in extremely low values of 0.7068-0.7069. These confirm that the interval of upper Unit 7 and the entire Unit 8 correspond to Capitanian. It is confirmed that G-LB horizon itself is not contained in Iwaizaki limestone. This study, however, clarified the extinction pattern of shallow marine fossils during the late Capitanian by observing 200 thin sections, and measured carbon isotope ratio at 42 horizons for that interval, i.e. in the Unit 7 and 8.

The main extinction of well-adapted tropical fauna, such as large-tested fusuline (*Lepidolina*), occurred particularly during the deposition of Unit 8. On the other hand, isotope ratios of organic carbon for Unit 8 range in -25.4 to -22.3‰. A preliminary reported isotope ratio of inorganic carbon from the same section was about +4‰ (Zakharov et al., 2000); thus the gap between the two is about 26~29‰. The isotopic fractionation was probably induced by normal photosynthesis in the shallow marine setting under which the Iwaizaki limestone was deposited. The relatively high values of both inorganic and organic carbon isotope ratios likely recorded the "Kamura event" (Isozaki et al., 2007, 2011). So far, the evidence for the "Kamura event" was limited solely to the strata deposited in tropical settings, such as the Iwato and Akasaka limestones in Japan, and the Velebit limestone in Croatia. This study first suggests that the collapse of warm-water reef community in the relatively high latitude domain was related also to a global cooling. The Capitanian Chandalez limestone of the Senkina Shapka section in Primorye, Far East Russia, was deposited probably next to the Iwaizaki limestone, and its carbon isotope signature is also under analysis.

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