The Capitanian (Permian) Kamura Cooling Event: the beginning of the Paleozoic-Mesozoic transition

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The Capitanian (late Guadalupian) high positive plateau interval of carbonate carbon isotope ratio (delta value) was lately recognized in a mid-Panthalassan paleo-atoll limestone in Japan and was named the Kamura event. This unique episode in the late Middle Permian indicates a high productivity in the low-latitude superocean likely coupled with resultant global cooling. This event ended by the Guadalupian-Lopingian (Middle-Late Permian) boundary (ca. 260 Ma); however, its onset time has not been confirmed. By further analysis for the Wordian (middle Gudalupian) to lower Capitanian interval in the same limestone at Kamura in Kyushu, the present work identified that the delta values started to rise over +4.5 permil and reached the maximum of +7.0 permil within the Yabeina (fusuline) Zone of the early Capitanian. Thus the total duration of the Kamura event is estimated ca. 3-4 million years, given the whole Capitanian ranging for 5.4 million years. This unique cooling event lasting 3-4 million years occurred clearly after the Gondwana glaciation period and in the middle of the warming trend toward the Mesozoic. This cooling may have been a direct cause of the end-Guadalupian extinction of low-latitude, warm-water adapted fauna including the large fusulines (Verbeekinidae) and bivalves (Alatoconchidae) plus rugose corals (Waagenophyllidae). The Kamura event marks the first sharp excursion of delta values in the volatile fluctuation interval across the Permian-Triassic boundary, that lasted for nearly 20 million years from the late Middle Permian until the early Middle Triassic. Thus this event is regarded as the prelude of the major climate-mode change from the Late Paleozoic icehouse to the Mesozoic-Cenozoic greenhouse regime.