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The Capitanian/Wuchiapingian mass extinction and Kamura Event from tropical to Boreal zones (China, South Primorye [Russia], and Spitsbergen)

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The mass extinction near the end of the Capitanian Stage (Guadalupian Series) affected many faunal groups in a step-wise fashion, and it was notable for extinctions of the large fusulinacean foraminifera, colonial corals and giant bivalves. In China, the mass extinction is defined by the total loss of fusulinids and is associated with major, 6‰ negative $\delta^{13}C_{carb}$ excursion and the onset of Emeishan large igneous province volcanism. The extinction is dated to the intra-Capitanian *J. altudaensis* conodont Zone [1]. The carbon isotope record of China reveals a somewhat younger positive plateau of unusually heavy values near the end of the Capitanian. This has been recognized across the Paleo-Pacific Ocean where it is known as the 'Kamura Event' [2], a supposed interval of global cooling during which $\delta^{13}C_{carb}$ reached +6‰ prior to an abrupt negative shift immediately prior to the stage boundary. At the type section of the Kamura Event on Kyushu Island, the characteristic positive and stable $\delta^{13}C_{carb}$ values are recorded in the lower part of the *Lepidolina* fusulinid Zone. The 'Kamura Event' has recently been recognized in South Primorye, Russia [3]. The Permian of South Primorye is characterized by terranes that were accreted in the Siberian Craton during the Mesozoic. They consist of volcanoclastic and carbonate rocks of the Chandalaz Formation, and siliciclastic deposits of the Lyudyanza Formation. Seventy-five samples have been analyzed and reveal a negative shift about 4‰ (to $\delta^{13}C_{carb}$ 0.16‰) in the upper part of the *Metadoliolona lepida-L. kumaensis* Zone of the Chandalaz Formation in the Senkina Shapka section. We correlate this with the *J. altudaensis* Zone negative shift in China, which marks the extinction level. Above this level at Senkina Shapka, $\delta^{13}C_{carb}$ shifts to higher values and reaches + 4‰ to +5‰. We interpret this to be the manifestation of the 'Kamura Event' heavy plateau in Russia. The disappearance of corals occurred before the negative shift, but large fusulinids are found in the middle part of the heavy interval. $\delta^{13}C_{carb}$ values from this part of the Senkina Shapka section are comparable with those from the lower part of a second section through a Capitanian sphinctozoan reef at Nakhodka. The negative shift that marks the termination of the 'Kamura Event' has been identified in the upper part of the Nakhodka section. This shift coincides with the appearance of the siltstone in the section and is correlated with Guadalupian/Lopingian boundary. Small foraminfera at Nakhodka indicate a Capitanian age for the pre-reefal part of the section. The diagnostic species are: *Linendothyra polita* (Sosnina) and

Neoendothyra consueta Sosnina. The age is considered middle-upper Permian (?). In the South China the Kamura event occurred at the level of *altudaensis* conodont Zone and shows the 6‰ fall of δ^{13}Ccarb. The fall of bio-productivity trigged by Emeishan volcanic activity is considered as a primarily reason of the event [4]. New data obtained from the cool-water Kapp Starostin Formation of Spitsbergen reveals an intra-Capitanian extinction that coincides with a -3‰ shift in $\delta^{13}C_{carb}$. There, a cool-water fauna of sponge spicules, brachiopods, bryozoans and solitary rugose corals, typical for Boreal Realm, suffers losses on a par with those in the tropics [4]. The first extinction level is illustrated by disappearance of 87% of brachiopod species. In Spitsbergen, the near total loss of carbonates near the Capitanian extinction level is consistent with a death-by-acidification scenario, which is more likely to be manifest in the cool waters of the mid to high latitudes. There is also a role for anoxia in the extinction scenario. In China and South Primorye, carbonate deposition continued after the extinction, ruling out long-term acidification as a cause.

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References:

[1] Bond D.et al. 2010. Palaeogeography, Palaeoclimatology, Palaeoecology 292: 282–294

[2] Isozaki Y. et al., 2007. In: Global and Planetary Change 55: 21–38

[3] Kossovaya O. and Kropacheva G. 2013 .In: Palaeozoic Climate Cycles 376:

[4] Bond D.P.G. et al., 2015 Geological Society of America Bulletin127, 9/10, 1412-1421/