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Carbon and oxygen isotopes record of Upper Triassic limestone in the Kardolina section, Slovakia

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Triassic / Jurassic (T/J) boundary of approximately 201.3 million years ago is known as a stratigraphic boundary recorded one of the big five Phanerozoic mass extinctions. Catastrophic processes such as widespread eruption of the Central Atlantic Magmatic Province (CAMP) flood basalts and extraterrestrial impacts have been proposed to account for the mass extinction event. This paper reports the results of carbon and oxygen isotopes analysis from the uppermost Triassic limestone in the Kardolina section, Slovakia. The Kardolina section is crops out on a steep western slope of the Mt Palenica in the Belianske Tatry Mts as the most continuous section from the uppermost Triassic (Rhaetian) Fatra Formation. The Fatra Formation is shallow marine carbonate sequence and is overlain with a sharp contact by marine shale of the lowermost Jurassic (Hettangian) Kopieniec Formation. The Rhaetian age of the Fatra Formation was determined by foraminifera fossils. Several excursions of carbon and oxygen isotopes exist in the Fatra Formation. The large negative carbon isotope excursions (CIE) were found in at least four stratigraphic levels. Although the Fatra Formation is composed of packstone and grainstone, the CIE occurred during the deposition of non-fossiliferous lime-mudstone or ostracod lime-mudstone. The largest negative CIE occurs just before the T/J boundary. The cause of this negative CIE at the vicinity of T/J boundary remains uncertain. However it is assumed that the Kardolina section was exposed on the ground by sea-level fall, and subjected to diagenesis of terrestrial water. The large CIE may possibly be associated with sea-level change of the Kardolina section.

Keywords: carbon and oxygen isotopes, limestone, Triassic/Jurassic boundary, Rhaetian, carbon isotope excursion, sea-level change