



Duration of the Carbon Isotope Excursion in the Zhuya Group (Patom Basin, South Siberia)

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Probably the largest negative $\delta^{13}\text{C}$ anomaly in Earth history called the “Shuram” excursion (SE) had taken place in the Ediacaran period. Determining the duration of SE is needed to resolve its nature and for the stratigraphic correlation of Ediacaran rocks. The cyclostratigraphic method allows to precisely determine the accumulation rates of ancient deposits (the theoretical error is up to 10,000 years), but the testing of the accuracy of the cyclostratigraphic method usually based on biostratigraphy and geochronology meets difficulties for the Precambrian deposits. The reliability of cyclostratigraphic estimates of the SE duration can be determined by the convergence of cyclostratigraphic results obtained from distant sections on different continents and in sections representing different depositional environments. Recently limitations on the SE duration have been obtained in Australia, California, Oman, and China. Recently limitations on the SE duration have been obtained in Australia, California, Oman, and China. Here we present the first cyclostratigraphic estimates of the SE duration from the Zhuya Group of the Patom basin in South Siberia.

Two sections of the Zhuya Group were studied, both recording the decrease of the $\delta^{13}\text{C}$ values up to -12 ‰ in the nadir point and then increase till -9 ‰. In both sections, the cyclicity of variations in magnetic susceptibility (MS) was studied. The first section (57 m, Nikolskoe Fm.) represents sediments deposited on the slope of the carbonate platform. Spectral analysis of the MS variations revealed peaks above 95% significance level on the period lengths of 11.5, 1.73, 1.04, 0.67, 0.51 m with ratios 1/6.6 /11/17/22.3 respectively. This cyclicity is interpreted as a reflection of orbitally forced climate changes, where the longest-period variations correspond to short eccentricity cycles (100 ky). Then, the studied interval lasted approximately 500 ky, and the duration of the entire Nikolskaya Fm., corresponding to the lower third of the SE, is about 2.5 My.

The second section belongs to the Torgo Fm. in the Berezovskaya depression, which is the epicontinental part of the Patom Basin. MS variations in the studied 14.2 m interval shows significant peaks at period lengths of 2.3, 0.74, 0.51, 0.38, 0.28, 0.27, 0.25, 0.20 m with ratios 1.00/3.13/4.52/6.10/8.03/8.48/9.19/11.52. In this section, we also interpret the longest-period of the MS variations as a reflection of cycles of short eccentricity (100 ka). Then, the duration of the studied interval is 613 ky. and the SE duration in the whole 200 meters of the Torgo Fm. is

estimated as 8.6 My.

The obtained preliminary results are in good agreement with those from Australia (ca. 8 My), Oman (7.7 +/- 0.2 My), North America (8.2 +/- 1.2 My), and China (9.1 +/- 1 My). Thus, the influence of Milankovitch's orbital cycles on the formation of carbonate deposits of the Late Precambrian seems to be quite convincing, and the cyclostratigraphic estimate of the duration of the SE about 10 Ma is more and more reliable.

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