

Paleoproterozoic carbon isotope excursion: updating the evidence from the Fennoscandian Shield

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A positive carbon isotope excursion in marine dissolved inorganic carbon is one of the major global events affecting the surface environments of the Paleoproterozoic Earth. This excursion, known as the Lomagundi-Jatuli isotope event, is clearly global in character. It started before 2200 Ma and ended after 2100 Ma. Through the operation of the global carbon cycle, the Lomagundi-Jatuli isotope event is considered to have been connected to the oxygenation of the atmosphere.

Possibly the most complete stratigraphic successions of sedimentary carbonate rocks from that time period have been preserved in the Fennoscandian Shield. During the past few years, a wealth of new carbon isotope data from these sequences has been published, and especially the termination of the excursion is well covered. Important new data represent successions in the Onega Basin (e.g. Črne et al., 2014) and the Pechenga Belt (e.g. Salminen et al., 2013). The carbon isotope records from these sections are here compared to unpublished data from the Peräpohja Belt in northern Finland. Characteristic to all these successions is a generally decreasing trend in their carbon isotope ratios. Available isotopic age constraints provide strong support for a conclusion that the termination occurred at the same time in separate basins surrounding the Archean core of the Fennoscandian Shield at about 2100 Ma. Furthermore, the carbon isotope records from the Pechenga Belt and the Onega Basin indicate that the positive excursion was followed by a minimum, possibly related to erosion of earlier organic-rich sediments accumulated during the Lomagundi-Jatuli isotope event.

References:

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