

The Late Ordovician Hirnantian isotopic carbon excursion in the Baltic Basin: relationships between sedimentary facies and magnitude of isotopic excursion

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Palaeozoic carbonate $\delta^{13}\text{C}$ studies have predominantly focused on bulk rock analysis in the chemostratigraphic correlations and palaeoenvironmental interpretations. Most of the attention has been paid to positive $\delta^{13}\text{C}$ excursions that point to possible global or regional events that have perturbed the carbon cycle.

Correlating different drill core sections using lithology does not always match with accompanying chemostratigraphy, and many studies of modern and ancient carbonates have shown that bulk rock $\delta^{13}\text{C}$ values vary along onshore-offshore profiles. Such facies influenced $\delta^{13}\text{C}$ variations are also seen in the records of the Hirnantian Isotopic Carbon Excursion (HICE) from the Baltic Basin at the end of the Ordovician Period. These facies

controlled differences in $\delta^{13}\text{C}$ values have prompted more detailed studies in carbonate rocks and highlighted the need to place the isotopic data into a depositional context.

Currently, work is being done on lithologically heterogeneous carbonate material with distinct components in the HICE recording intervals of Estonian drill cores. Preliminary results of component-specific $\delta^{13}\text{C}$ data derived from grainstones and packstones of the Porkuni Regional Stage show that $\delta^{13}\text{C}$ can vary up to 4‰ with some components having values up to 3‰ higher than bulk rock values. Such data can give more insight into carbon cycle dynamics and help to more accurately understand depositional settings.

Keywords: chemostratigraphy, carbon isotopes, component analysis, Hirnantian.