

Trace metals and isotopes in Estonian black shales: Cambro-Ordovician shallow water anoxia on the Baltica shelf?

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We present high-resolution whole rock and pyrite geochemical and multi-stable isotopic data for a Cambro-Ordovician shallow-marine black shale sequence in NW Estonia. The magnitude and relative timing (constrained by biostratigraphic framework) of a positive shift in carbon and sulfur isotopes is similar to the SPICE event archived in other settings of this age.

Organic-rich shales have elevated levels of bio-essential trace elements (Ni, Se, Cu, Zn, Co and Mo) in both pyrite and whole rock samples. We propose these enrichments were a response to periodic, and possibly widespread, water column anoxia.

The implications of shallow water anoxia for the deposition of metal-rich shales across the region, and local environmental conditions on the Baltica shelf will be discussed.