



Early Cretaceous marine isotope records from Siberia

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Surprisingly little isotopic data and hence few palaeotemperature records exist for high northern Cretaceous latitudes. This study presents a detailed, biostratigraphically constrained (at the ammonite zonal level) record of oxygen and carbon isotopes from the early Cretaceous (Volgian -Valanginian) interval from the Yatria River, western Siberia and the Pechora Basin, Russia. Oxygen and carbon isotopic compositions have been determined from well preserved specimens of the boreal belemnite genera Lagonibelus, Cyllindroteuthis, and Acroteuthis. A positive shift in carbon isotope values during the late Valanginian is observed both in the Yatria River and Pechora Basin and appears to correlate with the positive carbon isotope excursion recorded from pelagic Tethyan successions. These most positive carbon isotope values correspond with the most positive oxygen isotope values (and hence coldest palaeotemperatures). Such cool temperatures are possibly consistent with glacial conditions at the poles. The positive carbon isotope excursion if attributable to increased burial of organic carbon, in the absence of widespread Valanginian organic-rich black shale deposition within Tethys, may point to increased storage of organic carbon in coastal areas and/or enhanced preservation within stratified waters in high latitude basins. The observed correlation, between positive carbon isotopes and cool climates may expose the effectiveness of these high latitude carbon sinks and their ability to drawdown atmospheric CO₂, the 'inverse greenhouse' effect.