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# A sedimentological and isotopic evaluation of late Jurassic - early Cretaceous Arctic climates

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This study examines sedimentary successions from Svalbard, the Pechora Basin and the Boyarka River (Taimyr Peninsula), Siberia that contain rocks of late Jurassic and early Cretaceous age. Geographically the sites are located on the edge of the Arctic Ocean. The Jurassic and Cretaceous are commonly viewed as times of high CO2 levels and is hence a possible analogue for future greenhouse climates. Among the more compelling pieces of evidence for an ancient greenhouse climate are isotopic signatures consistent with unusually high sea surface temperatures preserved by planktonic foraminifera inhabiting the equatorial zone and evidence of temperate forests inside the Arctic and Antarctic circles. However, increasing complexity emerges with respect to the longevity of this purported period of warmth. Little isotopic data and hence few palaeotemperature records, however, exist for the Arctic. This study presents the first detailed, biostratigraphically constrained (at the ammonite zonal level) record of oxygen and carbon isotopes from the Late Jurassic - early Cretaceous (Callovian -Valanginian) interval. Oxygen and carbon isotopic compositions have been determined from well preserved specimens of the boreal belemnite genera Lagonibelus, Cylindroteuthis, and Acroteuthis. Data indicate a shift to cooler temperatures from the late Volgian through into the late Valanginian, with some warmer phases recognised within the earliest Berriasian and earliest Valanginian. The Svalbard successions also contain within the shales anomalous pebbles (? dropstones) and in their uppermost (Valanginian) part glendonites. These isotopic data are consistent also with cool ocean temperatures and are used to evaluate the existence of possible ice cover at high latitudes during the Cretaceous.