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Early and Middle Jurassic climate changes: implications for palaeoceanography and tectonics

Christoph Korte (1), Stephen P. Hesselbo (2), Clemens V. Ullmann (1), Micha Ruhl (3), and Nicolas R. Thibault (1)

(1) University of Copenhagen, Denmark (korte@ign.ku.dk), (2) Camborne School of Mines, University of Exeter, UK, (3) University of Oxford, UK

The occurrence of 'ice ages' within the overall warm Jurassic Period has been the subject of much controversy. It has been suggested on the basis of occurrence of glendonites in circum-Arctic basins that cold episodes took place in the Jurassic (Price, 1999; Rogov and Zakharov, 2010). Here we present new high-resolution oxygen isotope datasets from marine calcitic fossils of different European basins that indicate strong temperature fluctuations during the Pliensbachian-Bajocian time span. The already reported cold Late Pliensbachian episode comprises at least three pronounced oxygen isotope 'Ice Age' cycles. The subsequent well known Toarcian Oceanic Anoxic 'supergreenhouse' Event is followed by very warm seawater temperatures in the late Toarcian. A very pronounced cooling occurred during the latest Toarcian to early Aalenian (Early-Middle Jurassic Boundary Event). This episode resulted in substantial expansion of Arctic climates to palaeolatitudes as low as 45° and in distinctly cooler seawater temperatures in lower latitude European seas. We propose that the extensive cooling at the Early-Middle Jurassic Boundary Event was driven by substantial changes in oceanic current patterns initiated by uplift of the North Sea Dome preventing the transport of heat to Polar Regions via the Viking Corridor.

Literature

Price, G. D. (1999). The evidence and implications of polar ice during the Mesozoic, Earth-Sci. Rev., 48, 183-210.

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