Tectonics forced the Middle Jurassic Ice Age

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It has been controversially debated whether ice-house conditions existed within the generally warm climate of the Jurassic. Periodically cool episodes at that time have been suggested by the finding of glendonites in circum-Arctic basins (Price, 1999; Rogov & Zakharov, 2010) and stable isotopic results (e.g. Korte & Hesselbo, 2011). Here, we present high-resolution oxygen-isotope data from marine calcitic fossils from different European basins that document strong temperature fluctuations during the Pliensbachian-Bajocian period, highlighting the Late Pliensbachian cold and the Toarcian Oceanic Anoxic 'supergreenhouse' Events. Moreover, the new data show that very high seawater temperatures in the late Toarcian are followed by a rapid and strong cooling during the latest Toarcian to early Aalenian. This Early-Middle Jurassic Boundary Event was driven by significant changes in ocean currents linked to the tectonic uplift of the North Sea Dome. The latter blocked the Viking Corridor and stopped the transport of equatorial warm waters to northern Polar Regions and allowed cold Arctic waters to penetrate southwards to palaeolatitudes as low as 45°. The strongly decreased heath transport to higher latitudes possibly caused the observed shift to ice-house conditions in the Middle Jurassic European realm.

[1] Korte C. & Hesselbo S.P. 2011, *Paleoceanography* **26**, PA4219 [2] Price G.D. 1999, *Earth-Sci. Rev.* **48**, 183-210 [3] Rogov M.A. & Zakharov V.A. 2010, *Earth Sci. Front.* **17**, 345-347