

The Middle Eocene Climatic Optimum (MECO) in the high latitudes of the North Atlantic: Temperature and Biotic change.

Marcel Polling¹, Alexander J.P. Houben¹, John Firth², Helen Coxall³, James Eldrett⁴, Stefan Schouten⁵, Gert-Jan Reichart⁶, Henk Brinkhuis¹

¹ Biomarine Science, Institute of Environmental Biology, Faculty of Science, Laboratory of Palaeobotany and Palynology, Utrecht University, Utrecht, The Netherlands; Email: M.Polling@students.uu.nl

² United States Implementing Organization, Integrated Ocean Drilling Program, Texas A&M University, College Station, USA

³ School of Earth, Ocean and Planetary Sciences, Cardiff University, Cardiff UK

⁴ Shell UK Ltd., Aberdeen, UK

⁵ Royal Netherlands Institute for Sea Research (NIOZ), Texel, The Netherlands

⁶ Department of Geochemistry, Faculty of Geosciences, Utrecht University

Increasingly high resolution isotope- and novel organic geochemical proxy records have revealed that the long-term cooling trend of the middle Eocene was interrupted by a warming phase designated the Middle Eocene Climatic Optimum (MECO). It is suggested to represent an increase in sea surface temperatures of about 4°C, lasting approximately 400 kyr. The temperature evolution of the MECO is notably well-documented in the Southern Ocean. However, records of temperature- and biotic change during the MECO are largely missing from the higher northern latitudes. Here we document on the sea surface temperature evolution during the MECO reconstructed using TEX86 from Ocean Drilling Program (ODP) site 647 situated in the Labrador Sea. In addition, organic walled remains of dinoflagellates (i.e. dinocysts) were investigated in order to identify environmental change in response to the MECO.