



## **Climate sensitivity under present and Late Cretaceous background conditions**

Gerrit Lohmann (1,2), Igor Niezgodzki (3), Gregor Knorr (1), Jaroslaw Tyszka (3), and Paul Markwick (4)

(1) Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany (gerrit.lohmann@awi.de), (2) University of Bremen, Bremen, Germany., (3) Institute of Geological Sciences Polish Academy of Sciences, Research Centre Cracow, Poland, (4) GETECH, Leeds, United Kingdom

We investigate the impact of different levels of CO<sub>2</sub> for the Late Cretaceous and present configuration. For identical preindustrial CO<sub>2</sub> concentrations (278 ppm), we find that the Cretaceous shows a more zonal and warmer climate at low latitudes relative to the present day configuration, which can be partly attributed to enhanced drying and warming in the subtropics. When changing the CO<sub>2</sub> levels (4x278 ppm), temperature changes are most pronounced at high latitudes, especially for the respective winter season. The low-latitude response for quadrupling the CO<sub>2</sub> level is about +9°C for both the Late Cretaceous and present configuration, with a stronger warming over land than over sea. At high latitudes, the present background climate shows a higher sensitivity relative to the changes in the Late Cretaceous configuration, caused by a colder climate background with more sea ice in the present configuration. Finally, we discuss the climate under a 6x280 ppm for the Late Cretaceous with a year-round ice-free Arctic Ocean and annual mean values of 15°C north of 60°N.