



The Role of Ocean Gateways in Mid-Miocene Climate Simulations

M. Krapp

Max-Planck Institute for Meteorology, Ocean in the Earth System, Hamburg, Germany (mario.krapp@zmaw.de)

Tectonic movement alters the topography of the earth's surface, which is a major boundary condition for atmospheric as well as oceanic circulation. Modifications of primary ocean gateways are important drivers for the global climate through changes in the ocean circulation and the associated heat transports. During the Cenozoic era (the last 65.5 million years), gateways like the Drake Passage between Antarctica and South America opened, while others like the Tethys Pathway between Africa and Eurasia and the Isthmus of Panama between North and South America closed. At the same time global mean surface temperature dropped considerably. Unfortunately, knowledge about the temporal evolution and the dimensions of the sill depths is sparse. Therefore, their impact on the ocean circulation and the heat transport remains uncertain.

We investigate the climate influence of altered ocean gateways during the Cenozoic using a state-of-the-art coupled Earth System Model (COSMOS). We present a control simulation, which is the response of the complex model to Mid-Miocene boundary conditions 15 million years ago. A comparison to proxy data is shown, and we also discuss preliminary results of sensitivity experiments with modified sill depths in key regions.