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The Role of Boundary Conditions in the Middle Miocene Climate Evolution

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Since the beginning of the Cenozoic era (65 million year (MA) ago) the climate has underwent a stepwise transition from the former Greenhouse climate into an Ice House climate with altering warm and cold periods. One major step was the transition from the warm Paleocene/Eocene climate (55 Ma years ago) to the Eocene/Oligocene boundary (34 Ma ago) with the first Ice sheet formation in Antarctica. Another cooling took place during the Miocene period (23 to 5 million years ago). For the Middle Miocene (15 Ma ago) proxy data of sea surface temperature suggest a flatter than today equator-to-pole temperature gradient, and warmer high latitudes.
We investigate the climate of the Middle Miocene using the Community Earth System Model COSMOS-ASO. The boundary conditions for the GCM are plate tectonics reconstructions of the global topography while the land cover and vegetation are kept as they are today. Atmospheric CO_2 concentration is set to present day (360ppm) values as recent studies suggest a range from 150 up to 500ppm.
A control simulation with present day conditions is performed for comparing the Middle Miocene to our modern climate. After several hundreds of years of integration we can address some questions. How does the climate evolve under Middle Miocene boundary conditions? Which processes are most important for a different climate state? Can the climate of this simulation be compared to proxy data?