

## CO<sub>2</sub> sensitivity experiments to study the climate of the mid-Pliocene Warm Period: results from Antarctica and the Southern Ocean

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The mid-Pliocene Warm Period (mPWP), 3.3-3 million years ago, was a period of sustained warmth before global cooling occurred and a shift to repeated glacial cycles. It was also the most recent time in the history of Earth when atmospheric carbon dioxide levels were similar to those of present day. The study of this period is thus of much importance, given the growing concerns over future climate change associated with anthropogenic emissions of greenhouse gases. Recently, an increasing number of climate models have been used to investigate the mPWP climate, most contributing to the Pliocene Model Intercomparison Project (PlioMIP), while a large collection of proxy data from both terrestrial and marine sources have been made available. Reconciling model results and proxy data remains an important issue.

In our study, we use the mid-resolution MIROC4m coupled atmosphere-ocean general circulation model and apply ice sheet configuration, land-sea mask, orography and biome distribution from PRISM data sets, as set forth in the second phase of PlioMIP. We conduct a series of experiments which include a range of atmospheric carbon dioxide levels given the spread in values suggested by different sources of proxy data and show how various aspects of the climate in the southern polar region respond. We also compare sea surface temperature anomalies with proxy values derived from PRISM data sets.

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