

# Impact of interactive ozone on climate simulation in an Earth system model: the case of Antarctica in mid-Holocene

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Paleoclimate simulations are important for the validation of state-of-the-art climate models. In the fifth Coupled Model Intercomparison Project (CMIP5) for the Intergovernmental Panel on Climate Change/Fifth Assessment Report (IPCC/AR5), the value of stratospheric ozone in paleoclimate simulations was set to the 1850 CE level. However, this setting may not be appropriate because ozone distribution is influenced by solar insolation, and could affect surface climate. We examined a mid-Holocene (6 k years before present) simulation using Meteorological Research Institute Earth System Model (MRI-ESM1, Adachi et al., 2013) that includes interactive ozone chemistry. The simulation results show the retreat of Antarctic sea ice and an improvement of the Southern Hemisphere cold bias, which is seen in all CMIP5 models. The warming in our model has a similar mechanism to the cooling impact of the Antarctic ozone hole on the present climate (Son et al., 2008; 2010), but is opposite in sign.

Key words: Ozone, Paleoclimate, Earth System Model, Sea ice, Stratosphere-Troposphere coupling

## References

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