Geophysical Research Abstracts
Vol. 21, EGU2019-8170, 2019
EGU General Assembly 2019

Transient simulation of climate variability during the Last Glacial Maximum and the Holocene with an energy balance climate model

Elisa Ziegler and Kira Rehfeld

Heidelberg University, Institute of Environmental Physics, Department of Physics, Heidelberg, Germany (eziegler@iup.uni-heidelberg.de)

Projected changes in climate are likely to affect not only its mean state but also its variability. As such, improving our understanding of the spectrum of climate variability and how different feedbacks in the climate system influence it is of vital importance. We perform a process-based examination of variability with respect to changing orbital insulation, ice coverage, and land/sea distribution during the Last Glacial Maximum and the Holocene. To this end, we adapt a two-dimensional energy balance model [1] to run transient simulations. The model is forced by carbon dioxide and solar insolation changes for the last Glacial cycle. We evaluate the model's ability to reproduce changes in local to global, seasonal to millennial temperature distributions during the Last Glacial Maximum and the Holocene. We compare the simulated states and the transient evolution to those obtained by comprehensive coupled climate models. Finally, we test the mean-state dependence of temperature variability over a large range of model configurations and discuss implications for future climate.

References

[1] Kelin Zhuang, Gerald R. North, Mark J. Stevens, *A NetCDF version of the two-dimensional energy balance model based on the full multigrid algorithm*, SoftwareX, Volume 6, 2017, Pages 198-202, ISSN 2352-7110, https://doi.org/10.1016/j.softx.2017.07.003.