

Global climate impact of modified Antarctic Ice Sheet from two distinct GCMs

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Abstract

Two distinct global coupled climate models have been employed to verify the global climate response to modified Antarctic Ice. These models are driven by similar atmospheric model component-Speedy (Kucharski et al 2006) - but different ocean models, namely CLIO (SPEEDO, Severijns and Hazeleger 2010) and NEMO (ICTP-CGCM, Justino et al 2016). The first experiment focuses on Antarctica ice sheet (AIS) in a configuration that mimics that of the early Miocene on the atmospheric and oceanic circulations. The second resembles the West Antarctic Ice Sheet during the Marine Isotope Stage 31. It has been demonstrated that the global climate response to modified AIS is entirely dependent on the ocean model insofar as the propagation of the anomalous signal in SST and the atmospheric circulation. In Speedy-CLIO coupling, the WAIS leads to global modification of oceanic and atmospheric flow, however, this response is confined to the vicinity of Antarctica mainland in the NEMO ocean model. We argue that different response between the two models is related in particular to the models reliability in reproducing the Meridional Overturning Circulation under present day conditions.

Keywords: GCM, interglacial, Speedy, NEMO

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