Geophysical Research Abstracts
Vol. 21, EGU2019-13868, 2019
EGU General Assembly 2019
© Author(s) 2019. CC Attribution 4.0 license.

Added value of a regional climate model (MAR) for simulating the surface mass balance of the Antarctic ice sheet compared to a general climate model (ACCESS1.3)

Christoph Kittel (1), Charles Amory (1), Cécile Agosta (2), Alison Delhasse (1), and Xavier Fettweis (1)

(1) Laboratory of climatology, SPHERES, ULiège, Liège, Belgium (ckittel@uliege.be), (2) Laboratoire des Sciences du Climat et de l'Environnement (IPSL/CEA-CNRS-UVSQ UMR 8212), CEA Saclay, Gif-sur-Yvette, France

Due to their ability to produce climate projections, General circulation models (GCM) are often used to provide estimates of the surface mass balance (SMB) of the Antarctic ice sheet that can be used to constrain ice sheet models. However, GCM still benefit from a poor representation of polar climate specificities such as stable boundary layers, polar clouds or interactions between snow-covered surfaces and the atmosphere. In this study, we highlight the importance of downscaling GCM outputs from the Fifth Climate Model Intercomparison Project (CMIP5) with a regional climate model to provide accurate estimates of the Antarctic SMB. For that purpose, the regional climate model MAR is forced by 6-hourly outputs from ACCESS1.3 that is currently considered as one of the best GCM from CMIP5 over the Antarctic ice sheet. Estimates of the SMB computed by MAR and ACCESS1.3 are evaluated against SMB observations. Even if the temporal variability of the SMB is forced by the driving GCM, the comparison shows that MAR improves the spatial variability of the Antarctic SMB, emphasizing the added value of using a polar RCM for downscaling GCM outputs at high latitudes.