Geophysical Research Abstracts
Vol. 16, EGU2014-11338, 2014
EGU General Assembly 2014

Reducing uncertainties in Antarctic ice sheet mass loss projections

Frank Pattyn (1) and Gaël Durand (2)

(1) Universite Libre de Bruxelles, Laboratoire de Glaciologie CP160/03, Brussels, Belgium (fpattyn@ulb.ac.be, +32-2-650-2226), (2) CNRS, LGGE, Grenoble F-38041, France; Univ. Grenoble Alpes, LGGE, Grenoble F-38041, France

Climate model projections are often aggregated into multi-model averages of all models participating in an Intercomparison Project, such as CMIP. Several authors have questioned whether this is the best use of the information and whether the community is ready to move beyond the 'one-model-one-vote' approach, based on the intrinsic quality of each of the models.

Ice sheet models are not as far developed as climate or ocean models. Many of these models are still struggling over basic thermo-mechanical issues related to ice deformation, while at the same time disproportionate efforts are made on the interaction with the atmosphere, basal hydrology, sliding, sediment deformation, ice/ocean interaction, calving, grounding-line migration, etc. We can therefore reasonably question whether averaging all model results at equal weight is the best strategy and to which extent coupling of ice sheet models that are lacking the representation of crucial physical processes, to other components of the climate system could lead to spurious errors.

We now have tools available to test parts of the response of marine ice sheet models to perturbations of climatic and/or oceanic origin. Results show that the type of model as well as the way boundary conditions are implemented greatly affects the response of each ice sheet system. Based on MISMIP experimental output as well as the experimental response of Antarctic glaciers and drainage basins to ocean perturbations (e.g. Favier et al., 2014), we provide a guidance for the evaluation of model-response to perturbations on Century time scales.