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A Community Effort to Inform IPCC-AR5 of Reasonable Ice Sheet Contributions to Sea Level

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While acknowledging rapid ice-sheet changes, the IPCC-AR4 stated that the "...understanding of these effects is too limited to assess their likelihood or provide a best estimate or an upper bound for sea level rise." Through workshops and conversations, a coordinated effort has emerged that seeks to address this weakness in ice sheet models on a schedule to inform the next IPCC Assessment Report. This effort's goal is to provide quantitative estimates of ice sheet contributions to sea level for the 21st and 22nd century, along with appropriate uncertainties. Confidence in these estimates will be gained by subjecting a number of models to a common set of scenarios to reduce the impact of unrealistic characteristics of any single model from affecting the predictions.

Because the IPCC-AR4 clearly stated that there upper estimates could not be considered upper bounds, many of the first experiments are intentionally extreme in their physical realism to help determine the upper bound of possible future ice sheet response. Subsequent experiments representing more likely scenarios will then be run to help lower the upper bound. All models will quantify their calculated ice sheet responses relative to a control run of the same model. This "normalization" process will help minimize unrealistic aspects of any single model and attempt to isolate the impact of the difference in forcing between the experiment and the control runs.

The effort includes regional models as well as whole ice sheet models. The interactions are expected to be two-way: regional models will be used to help provide more reasonable forcings for selected whole ice sheet model experiments and whole ice sheet models will be used to define boundary fields that will enable regional models to refine the predicted responses of particularly dynamic areas. Another anticipated benefit is that the results of this effort will help inform the implementation of dynamic land ice into a fully coupled CCSM.