

Why is it so difficult to make projections of the contribution of the ice sheets to future sea level rise?

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Much of the uncertainty associated with projections of future sea level rise is associated the two great ice sheets of Greenland and Antarctica. Ice sheets offer several challenges to the modelling community that are less keenly felt in other aspects of climate change projection. These include the recent realization that much of the mass loss currently observed in the ice sheets is triggered by oceanic change rather than, as previously assumed, a warming atmosphere. For ice-sheet projections to be accurate, global climate models must be able to simulate these changes in the Polar oceans, which is a difficult task given the lack of oceanographic observations in the area. Key ice-sheet processes, such as the migration of the grounding line (separating floating ice shelves from ice grounded on bedrock), often operate on spatial scales of kilometres and accurate modelling is not only computationally challenging but requires very detailed knowledge of properties such as bedrock elevation and rheology. While great strides have been made in recent years to develop models capable of making projections, much remains to be done. The interest in 'high end' sea level rise projections as opposed to 'most likely' is, of course, important for decision makers managing responses to sea-level rise, and raises interesting issues related how models are evaluated and how projections from different models are reconciled.

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