

Greenland Ice Sheet's 'Committed Contribution' to Sea Level

At the edges of the Greenland Ice Sheet are fast-flowing glaciers that flow into the ocean. When the ice front of these glaciers retreat, through iceberg calving and submarine melt, the ice sheet responds on quick timescales, due to the instantaneous speed up of the ice near the edge, and on longer timescales as the ice dynamics slowly readjust to the initial changes.

The slow readjustment of the ice sheet thickness and velocity spreads upstream over time. Therefore, even if climate change (e.g., atmospheric and oceanic warming) was to cease, the ice sheet will continue to respond to changes we have already observed, and will contribute to sea level rise. This contribution is known as “committed sea level rise,” which we quantify in this study using a numerical ice sheet model of the Greenland Ice Sheet.

We find that glacier retreat between 2007 and 2015 has a lasting impact on ice sheet dynamics by the end of the century and that this should be accounted for in projections of sea level rise.



An image taken during an air campaign for the OMG mission in Greenland, shows the edge of a glacier surrounded by a layer of ice, pieces of which have broken off during calving events.