

International Interdisciplinary Collaboration Essential to Linking the Changing Antarctic Ice Sheets with Global Coastlines

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International collaboration together with innovative technology have produced tremendous leaps in our understanding of the Antarctic Ice Sheet. Before the International Geophysical Year we did not know how much water was locked in the Antarctic Ice Sheet. Before the launching of the modern suite of international satellites that measure the ice sheet elevation, velocity and mass we had no good constraints on how quickly the ice could change. Before we were collected and shared data on the structure of the ice sheet, the age of the ice and the temperature of the surrounding oceans we did not have good constraints on what might drive rapid change. Now we have the framework of warming oceans can trigger rapid change at grounding lines of marine ice sheets and warming atmospheres may lead to rapid collapse of buttressing ice shelves. Increasingly we are seeing the impact of the changing Antarctic ice along the coastlines around the globe. Our challenge has expanded from discovery of new frontiers to understanding how fast the ice will retreat and how fast the sea levels will rise. The ongoing work at US-UK effort at Thwaites Glacier is an example of international collaboration targeting a vulnerable, rapidly changing marine outlet glacier. Looking at the Antarctic system as a whole, it is essential that we as the international community work collaboratively to understand the Antarctic ice-ocean-atmosphere-solid earth system. Our recent interdisciplinary work over the Ross Ice Shelf has built a framework for addressing ice sheet stability from a systems framework that enables new discoveries and eventually improved projections of how sea level will change at coastlines from Mumbai to Manhattan.

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