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**Ice sheet-ocean interactions and sea level change**

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Mass loss from the Greenland and Antarctic ice sheets has increased rapidly since the mid-1990s. Their combined loss now accounts for about one-third of global sea level rise. In Greenland, a growing body of evidence points to the marine margins of these glaciers as the region from which this dynamic response originated. Similarly, ice streams in West Antarctica that feed vast floating ice shelves have exhibited large decadal changes. We review observational evidence and present physical mechanisms that might explain the observed changes, in particular in the context of ice sheet-ocean interactions. Processes involve cover 7 orders of magnitudes of scales, ranging from mm boundary-layer processes to basin-scale coupled atmosphere-ocean variability. We discuss observational needs to fill the gap in our mechanistic understanding.