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Trends and projections in ice sheet mass balance

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In recent decades, the Antarctic and Greenland Ice Sheets have been major contributors to global sea-level rise and are expected to be so in the future. Although increases in glacier flow and surface melting have been driven by oceanic and atmospheric warming, the degree and trajectory of today's imbalance remain uncertain. Here we compare and combine 26 individual satellite records of changes in polar ice sheet volume, flow and gravitational potential to produce a reconciled estimate of their mass balance. **Since the early 1990's, ice losses from Antarctica and Greenland have caused global sea-levels to rise by 18.4 millimetres, on average, and there has been a sixfold increase in the volume of ice loss over time. Of this total, 41 % (7.6 millimetres) originates from Antarctica and 59 % (10.8 millimetres) is from Greenland. In this presentation, we compare our reconciled estimates of Antarctic and Greenland ice sheet mass change to IPCC projection of sea level rise to assess the model skill in predicting changes in ice dynamics and surface mass balance.** Cumulative ice losses from both ice sheets have been close to the IPCC's predicted rates for their high-end climate warming scenario, which forecast an additional 170 millimetres of global sea-level rise by 2100 when compared to their central estimate.

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