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Mass balance of the Antarctic Ice Sheet from CryoSat altimetry

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For two decades, satellite radar altimetry has provided measurements of Antarctic Ice Sheet elevation change. These observations have, however, been restricted by the latitudinal limits of satellite altimeter orbits, and the reduced performance of conventional radar systems over steep ice sheet margins. ESA's CryoSat-2 mission was designed to overcome some of these limitations, offering coverage to within 2 degrees of the pole and a novel SAR interferometric altimeter aimed at delivering better performance over more complex terrain. Here we use data acquired during the first 3 years of CryoSat operation to map elevation and mass changes of the Antarctic Ice Sheet between 2010 and 2013. We achieve near continuous coverage encompassing $\sim$90 % of the grounded ice sheet, which provides a comprehensive estimate of ice sheet mass balance. We find that ice sheet mass balance continues to be dominated by mass losses into the Amundsen Sea, with ice streams in this region maintaining thinning rates of 4-8 m/yr near their grounding lines.