



Mass loss of the Greenland peripheral glaciers and ice caps from satellite altimetry

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At its rapidly warming margins, the Greenland Ice Sheet is surrounded by (semi-)detached glaciers and ice caps (GIC). Although they cover only roughly 5% of the total glaciated area in the region, they are estimated to account for 15-20% of the total sea level rise contribution of Greenland. The spatial and temporal evolution of the mass changes of the peripheral GICs, however, remains poorly constrained. In this presentation, we use satellite altimetry from ICESat and Cryosat-2 combined with a high-resolution regional climate model to derive a 14 year time series (2003-2016) of regional elevation and mass changes. The total mass loss has been relatively constant during this period, but regionally, the GICs show marked temporal variations. Whereas thinning was concentrated along the eastern margin during 2003-2009, western GICs became the prime sea level rise contributors in recent years. Mass loss in the northern region has been steadily increasing throughout the record, due to a strong atmospheric warming and a deterioration of the capacity of the firn layer to buffer the resulting melt water.