



Accelerating frontal retreat and seasonal variability in North West Svalbard glaciers

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Calving flux is a significant mass balance component for Svalbard glaciers. Calving processes in relation to fjord conditions, glacier velocity and frontal positions are currently poorly understood despite their importance. We present an unprecedented series of data showing ice-front behaviour and surface velocities for NW Svalbard glaciers and discuss the fundamental controls on the calving processes between 1991 and 2008.

Glacier flow speeds, ice marginal position, and the presence and absence of fjord ice were derived from ERS, ENVISAT, ALOS and Landsat scenes, and melt modelling was used to investigate seasonal forcing. During this period many tidewater terminating glaciers in the region have shown accelerating rates of retreat, a few show steady retreat, and some remain stable. Superimposed on the long-term retreat of some glacier fronts, including Kronebreen, the fastest flowing glacier in Svalbard, is a seasonal signal which shows advance of the ice-front in the summer.

By monitoring the terminus velocity and frontal position of outlet glaciers at high temporal resolution, both the magnitude and seasonality of the controlling processes are investigated and used to provide a better understanding of the impact of climate warming on Arctic ice loss.