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Seasonal and inter-annual trends of Greenland tidewater glaciers

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Large-scale changes have been reported in many areas of the Greenland ice sheet in the past decade and most of these changes are attributed to dynamic mass loss of marine terminating outlet glaciers. Therefore, iceberg calving is suspected to be one of the main contributors to Greenland overall mass loss, but no ice sheet wide studies exist at the moment quantifying this process with sufficient spatial or temporal coverage.
In order to quantify and understand this highly dynamic component of mass loss, we have compiled a comprehensive record of termini positions for every tidewater glacier wider than 1 km around the Greenland ice sheet between 2000 and 2010, resolving both their seasonal and inter-annual fluctuations.
In summary, Greenland tidewater glaciers experienced large and widespread retreat in the period 2000-2010. Retreat is dominant around the entire ice sheet. Only 8 of 200 outlets show minor advance compared to their frontal position in 2000. In total, the measured 200 outlets retreated more than 260 km. Annual rates show a strong variation, with maximum retreat in 2002/03 (-44 km) and 2004/5 (-43 km) and an overall advance in 2006 (+3 km).
Seasonal and interannual variations around the ice sheet show regional trends that indicate changing contributions of SMB and dynamics to the overall mass loss in the different regions around the ice sheet at different times.