



Monitoring of east Greenland marine-terminating glaciers, 2013-2017

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Numerous studies have documented rapid mass loss from the Greenland ice sheet (GrIS) during the last decade. A key component of this mass loss is attributed to thinning, acceleration and retreat of fast-flowing, marine-terminating outlet glaciers. Crucially, these outlet glaciers allow the GrIS to respond very rapidly to climatic change. Understanding these glaciers is therefore essential for accurately predicting near-future mass loss and sea-level rise from the GrIS, but large uncertainties remain over their behaviour and controlling factors (e.g. air and ocean temperatures, sea ice, basal topography, fjord geometry, glacier velocity, width and catchment area).

Glaciers on Greenland's east coast provide a particularly marked example of differing responses to climatic change, with some glaciers retreating rapidly and others demonstrating decades of limited change (e.g. Stearns et al., 2005; Seal et al., 2011; Carr et al., 2017). East Greenland therefore affords an excellent opportunity to investigate glaciers displaying end-member responses to climatic change and may allow us to determine which factor(s) promote rapid dynamic change and which encourage stability. This project utilises a variety of recently acquired remote sensing and/or publically available data to assess changes in the dynamics of east Greenland (~67 – 76o) outlet glaciers for the period 2013-2017. Here, we use a combination of optical (Landsat-8) and radar (Sentinel-1) data to assess seasonal and inter-annual terminus change for all marine-terminating outlet glaciers (>1 km) along Greenland's east coast. This data is supplemented by publically-available velocity measurements (e.g. MEaSURES/GoLIVE) where available. Changes in glacier dynamics will be assessed with respect to external (e.g. atmospheric and oceanic temperatures) and glacier-specific (e.g. basal topography) controls in the next phases of the project.