

B10-O04

ICE FRONT AND FLOW SPEED VARIATIONS OF MARINE TERMINATING OUTLET GLACIERS ALONG THE COAST OF PRUDHOE LAND, NORTHWESTERN GREENLAND

Daiki Sakakibara (*Graduate School of Environmental Science, Hokkaido University, Japan*)

Shin Sugiyama (*Institute of Low Temperature Science, Hokkaido University, Japan*)

sakakibara@pop.lowtem.hokudai.ac.jp

Greenland ice sheet is losing mass as a result of increased melting and ice discharge from marine-terminating outlet glaciers. After retreat, thinning and acceleration of these glaciers are reported in southern Greenland, similar changes are recently observed in the northwestern coast. Thus, it is important to study glacier changes in northwestern Greenland. To this end we analyzed satellite images to measure frontal positions and ice speeds of 19 marine-terminating outlet glaciers along the coast of Prudhoe Land from 1988 to 2013.

Ice front of the studied glaciers retreated by a distance between 0.24 and 5.92 km from 1999 to 2013, with mean and median distance of 0.93 and 0.55 km, respectively. This retreating trend is not clearly correlated with annual PDD sum and summer sea surface temperature. Between 2000 and 2013, 6 glaciers accelerated and 3 glaciers decelerated. In the first half of 2000s, most of the glaciers accelerated by 21–119 %. As observed in other regions of Greenland, ice flow acceleration coincided with rapid frontal retreat. It suggests that observed speedup was driven by back-stress reduction due to the ice front retreat. Fast-flowing glaciers ($>400 \text{ m a}^{-1}$) consistently accelerated over the study period, whereas slowly flowing glaciers decelerated in the late 2000s during the period of relatively warm air temperature. A possible mechanism of the deceleration is the development of a subglacial drainage system under the influence of increasing meltwater input to the bed. In general, the changes in the front positions and ice speed were smaller than those observed in southern Greenland. Nevertheless, assuming the propagation of warming to the northward, these changing rates may increase in the future.