Glacier flow velocity changes near the border of Alaska-Yukon detected by the Sentinel-1B SAR images

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Recently, diverse spatial and temporal changes in the flow velocity of mountain glaciers have been reported by data analysis of synthetic aperture radar images. Near the border of Alaska, USA, and the Yukon, Canada, numerous surge-type glaciers are present, which are known to exhibit orders-of-magnitude speed-up together with km-scale terminus advance every several decades; the exact recurrent interval depends on each glacier. It is well known that glacier surges often initiate in winter, but its mechanisms remain unclear, in contrast to those for spring-summer speedups that are widely known on normal glaciers. Comprehensive velocity measurements are relatively scarce during winter season, especially in the middle to upper reaches of mountain glaciers, and further measurements are needed to better understand glacier dynamics.

The spatial and temporal velocity changes of mountain glaciers near the border of Alaska-Yukon from 2006 to 2011 were investigated using ALOS / PALSAR data (Abe and Furuya, 2015). Abe and Furuya (2015) reported that, at many of the quiescent surge-type glaciers around the St. Elias Mountains, upstream accelerations occurred from autumn to winter and then propagated towards downstream.

In this study, we applied offset tracking to Sentinel-1B / C-band SAR data on glaciers near the border of Alaska-Yukon to examine their spatial and temporal velocity changes. As a result, we have confirmed winter acceleration on the Anderson, Chitina and Klutlan glaciers, which is consistent with the finding by Abe and Furuya (2015).

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