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Surface velocity variations of glaciers on Kenai Peninsula, Alaska, 2014-2019

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We characterize the spatiotemporal variations surface velocity of glaciers on the Kenai Peninsula, Alaska, using intensity offset tracking on a set of repeat-pass Sentinel-1 data and TerraSAR-X data. We derived 92 velocity fields and generated time-averaged annual and seasonal surface velocity maps for the period October 2014 to December 2019, as well as time series surface velocity profiles along centerlines for individual glaciers. We find considerable spatial and seasonal variations in surface velocity in the study area, especially a pronounced average spring speedup of 50% averagely compared to annual mean velocity. Ice velocities varied systematically between glaciers with different terminus types. Generally, the pixel-averaged velocity of tidewater and lake-terminating glaciers are up to 2 and 1.5 times greater than those of the land-terminating glaciers, respectively. For Bear glacier, with the analysis of surface velocity profile and the terminus change, we state this glacier retreat and accelerate. While the time-series result shows the velocity speedup of the Bear glacier synchronizes well with the ice-damaged lake outburst flood (GLOF) events.