**Supplementary material**

**Glacier speed-up as a possible precursor to volcanic eruptions at Mount Veniaminof, Alaska**

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Figure S1. Velocity standard deviation (SD) as a percentage of the mean velocity for each pixel for Cone Glacier. The background is a Sentinel-2 true colour satellite image from 25 March 2017.

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Figure S2. Time-series of monthly velocity and air temperature for 10 points along a profile line (approximating the centreline) extending from the terminus of Cone Glacier, over the icefall, and into the accumulation zone (see point locations in Fig. 1c). Greyed areas reflect eruptions at Mount Veniaminof in 2018 and 2021. R2 values are based on plots in Figure S3.

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Figure S3. Correlation between velocity and air temperature for multiple points (labelled 1–10) on the surface of Cone Glacier (see point locations in Fig. 1c). The solid lines and white dots (and associated R2 values) show the relationships for the entire November 2017 to January 2022 period. The dashed lines and coloured dots (and associated R2 values) show the relationships for just for the period of presumed quiescence between the eruptions (i.e. April 2019 until December 2020).

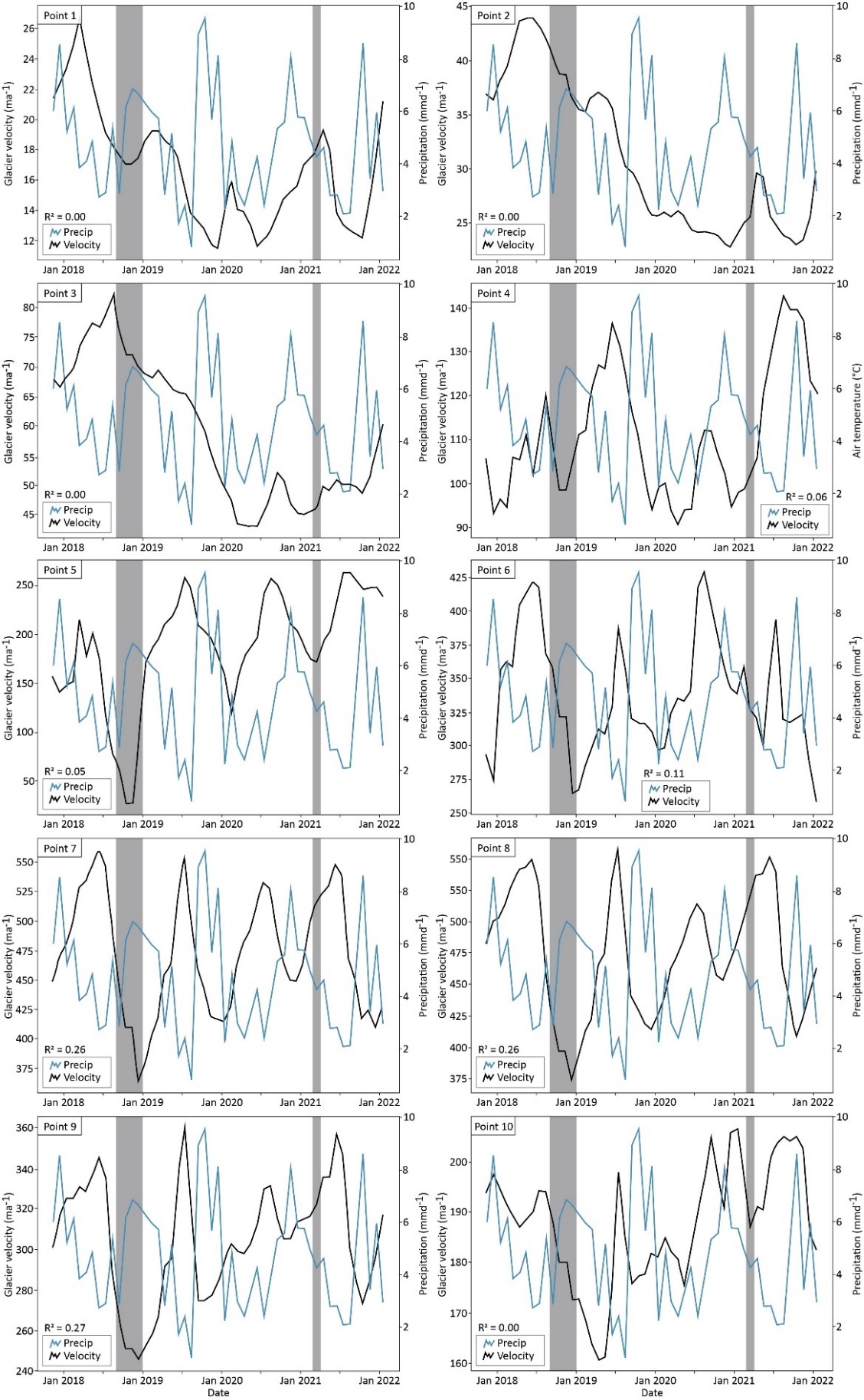


Figure S4. Time-series of monthly velocity and precipitation for 10 points along a profile line (approximating the centreline) extending from the terminus of Cone Glacier, over the icefall, and into the accumulation zone (see point locations in Fig. 1c). Greyed areas reflect eruptions at Mount Veniaminof in 2018 and 2021. R2 values are based on plots in Figure S5.

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Figure S5. Correlation between velocity and precipitation for multiple points (labelled 1–10) on the surface of Cone Glacier (see point locations in Fig. 1c). The solid lines and white dots (and associated R2 values) show the relationships for the entire November 2017 to January 2022 period. The dashed lines and coloured dots (and associated R2 values) show the relationships just for the period of presumed quiescence between the eruptions (i.e. April 2019 until December 2020).