



## Supplement of

## **Greenland Ice Mapping Project: ice flow velocity variation at sub-monthly to decadal timescales**

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Figure S1. Glacier IDs used for terminus positions distributed through the Greenland Ice Mapping Project (Moon, Joughin, Joughin, & Black, 2015). The numbers shown here correspond to the IDs used in Figure 7.



Figure S2. Monte Carlo simulations to detect a trend in speed in the presence of noise. A synthetic velocity vector is used with  $v_x=100 \text{ m/yr}$  in 2000, increasing by a prescribed trend in m/yr (x-axis) and sampled at each year where we have data. The y-component of velocity is assumed to be zero. To this trend, we add zero-mean Gaussian random noise ( $\sigma_x$ ,  $\sigma_y$ ). The mean errors for our data set are  $\sigma_x = 2.9$  and  $\sigma_y = 6.1 \text{ m/yr}$ , while the mean errors in along- and across- flow directions are 3.7 and 5.6 m/yr, respectively. The speed is most sensitive to noise directed along flow, so we have also included an example with x,y errors reversed, which in this case would be the worst case flow-direction for this level of error. For each trend value and noise level, we generated 10,000 realizations of synthetic data and counted how many time a non-zero trend would be detected when a value of p=0.05 is applied.

Moon, T., Joughin, I., Joughin, J., & Black, T. E. (2015). MEaSUREs Annual Greenland Outlet Glacier Terminus Positions from SAR Mosaics, Version 1. http://doi.org/http://dx.doi.org/10.5067/DC0MLBOCL3EL