



## **Comprehensive spatiotemporal glacier and ice sheet velocity measurements from Landsat 8**

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Combining newly developed software with Landsat 8 image returns, we are now producing broad-coverage ice velocity measurements on weekly to monthly scales across ice sheets and glaciers. Using new image-to-image cross correlation software, named PyCorr, we take advantage of the improved radiometric resolution of the Landsat 8 panchromatic band to create velocity maps with sub-pixel accuracy. Landsat 8's 12-bit radiometric resolution supports measurement of ice flow in uncrevassed regions based on persistent sastrugi patterns lasting weeks to a few months. We also leverage these improvements to allow for ice sheet surface roughness measurements. Landsat 8's 16-day repeat orbit and increased image acquisition across the Greenland and Antarctic ice sheets supports development of seasonal to annual ice sheet velocity mosaics with full coverage of coastal regions. We also create time series for examining sub-seasonal change with near real time processing in areas such as the Amundsen Sea Embayment and fast flowing Greenland outlet glaciers. In addition, excellent geolocation accuracy enables velocity mapping of smaller ice caps and glaciers, which we have already applied in Alaska and Patagonia. Finally, PyCorr can be used for velocity mapping with other remote sensing imagery, including high resolution WorldView satellite data.