



Calving Front Machine (CALFIN): A Calving Front Mask Dataset for West Greenland, 1972-2018

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We present Calving Front Machine (CALFIN), a dataset of calving front polygon masks for glaciers along West Greenland. The dataset provides masks generated from Landsat imagery over the period 1972 to 2018. This dataset is unique in scope and provides new constraints on glacial evolution over the time period. The current iteration thus offers the modeling community a new opportunity to explore previous trends and validate existing models to enable more accurate predictions moving forward.

This dataset is generated by the Calving Front Machine Tool (CALFIT). CALFIT automatically generates the vectorized calving fronts from raw Landsat imagery. The method used by the tool incorporates a neural network utilizing deep learning in the form of the U-Net architecture. Additional post-processing techniques allow our method to achieve high accuracy, automated, and useful segmentation of raw images into calving front masks. Furthermore, temporal averaging and simplified front propagation is utilized to account for gaps in Landsat imagery. This method allows for masking that is uniquely robust to clouds, illumination differences, sea ice, and data coverage gaps.

At this stage, we seek feedback from the community and welcome any critiques or questions regarding the dataset and/or our methods. This work was conducted as a collaboration between NASA's Jet Propulsion Laboratory and the University of California, Irvine.