

INVESTIGATING FLOW VARIABILITY OF HELHEIM GLACIER AND POTENTIAL CORRELATIONS WITH OCEANIC FORCINGS

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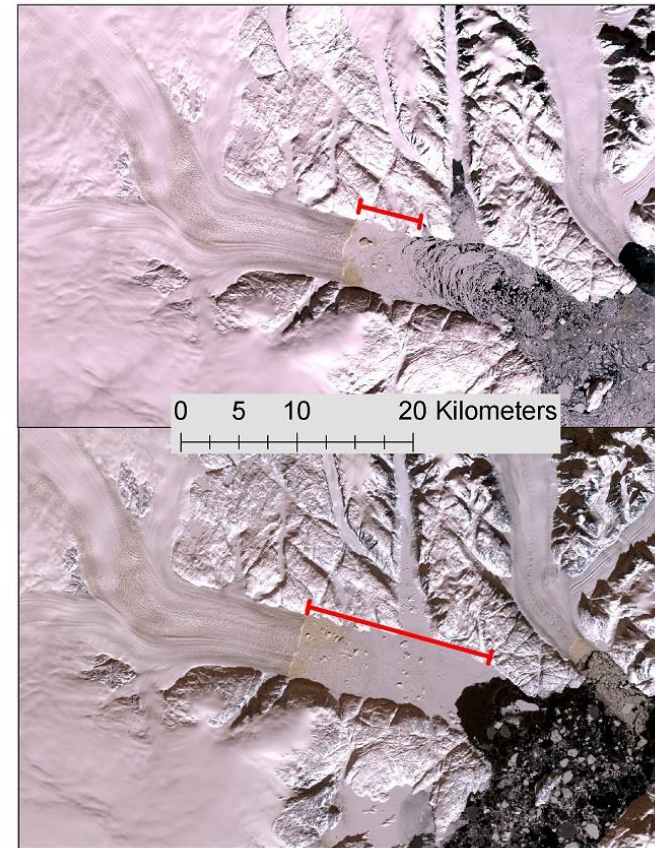
Questions:

1. How do the spatial patterns of glacier acceleration and iceberg calving vary over time?
2. Does the presence of an ice mélange have an influence on calving frequency and intensity on tidewater glaciers?

Greenland Ice Sheet/Ocean

Interactions:

Ice mélange – variability, sensitivity to circulation within fjord



Methods

1. Remotely sensed imagery

2008 through 2011 – used MODIS to derive:

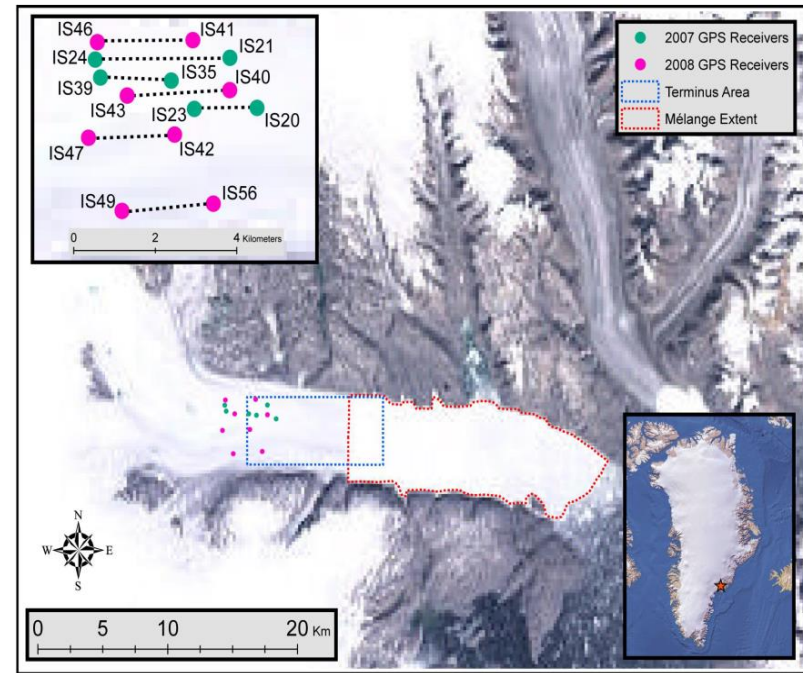
- A. Terminus area – Automated + user defined
- B. Terminus length – manually measured
- C. Mélange extent – manually measured, binary classification

2. Verifying results – ASTER and Landsat

3. Flow dynamics – GPS receivers

Results

- 1. Binary logistic regression – mélange not a strong predictor of calving events.
- 2. More mélange present than absent during study period
- 3. Mélange presence and/or absence not correlated with glacier advance or calving events
- 4. For each year, the terminus lengths are all longer when mélange is absent than when it is present.
- 5. Calving corresponds with increases in strain rate
 - 1. Strain rate responds differently to uneven calving events



How does this study help GRISO?

- investigate the mechanism that weakening of mélange impacts glacier acceleration and calving on Helheim Glacier
- investigate the role of calving on flow dynamics