Glacier-Ocean Interactions on Short Timescales: can observations of tidal and calving impacts on near-terminus ice flow inform us about controls on terminus stability?

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Objectives:
- Observe change in surface deformation at the glacier terminus to gain a better understanding of the controls of ice dynamics during short-term perturbations

Scientific Questions
- 1. How do short-term perturbations at the glacier’s calving front affect the terminus stability
   - How does velocity vary through a calving event?
   - How does the mélangé affect velocity and/or strain rate at the terminus?
   - Can we constrain the spatial extent of tidal influence on terminus dynamics?
- 2. How do GPRI observations compare with satellite based Synthetic Aperture Radar (SAR) and GPS measurements?

Methods:
- Two week field study at Jakobshavn Isbrae in August 2012
- Instruments: GPRI-II, Tide Gauge, time-lapse cameras, Satellite SAR
• Results:
  – Of the 12 calving events that occurred during the field study, only 1 caused significant change in the glacier’s stability;
    • Velocities increased for the lower 4.5 km of the glacier increased by as much as 33%
    • Speed-up remained high but gradually returned to pre-event values over more than 10 days.
  – JI velocities showed diurnal variability 180° out of phase with tidal modulations, the amplitude of the variability increased following the calving event

• Future Work
  – Improve unwrapping techniques
  – Develop a robust atmospheric correction
  – Derive strain rates to gain a better understanding of the controls on ice dynamics near the glacier terminus