Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

**Dynamic jamming fronts in iceberg-choked fjords** IVO PETERS, University of Chicago, JASON AMUNDSON, University of Alaska Southeast, RYAN CASSOTTO, University of New Hampshire, MARK FAHNESTOCK, University of Alaska Fairbanks, KRISTOPHER DARNELL, University of Texas Austin, MARTIN TRUFFER, University of Alaska Fairbanks, WENDY ZHANG, University of Chicago — During summertime at the glacier terminus at Jakobshavn Isbræ, Greenland, calving events are followed by rapid motion in the ice mélange in front of the terminus. Understanding the dynamics of ice mélange is important because it acts as a resisting force to calving events. We analyze this motion using time-lapse photography and terrestrial radar images. Large calving events last for approximately 5 minutes, during which $\sim 10^{14}$ J of potential energy is released. Motion in the ice mélange quickly spreads out over at least 16 km down the fjord, and relaxes in about 1 hour. The ice mélange can be viewed as a dense granular system, which is packed close to the jamming point. A jammed ice mélange resists expansion of the glacier terminus much more strongly and reduces iceberg calving, which may therefore play a significant role in glacier evolution. In our images, we observe dynamic jamming fronts, which propagate one order of magnitude faster than the instantaneous speed of the calving iceberg. From the ratio between the speed of the front and the calving iceberg we calculate a compaction that agrees with estimated compaction that we observe directly.

Ivo Peters
University of Chicago

Date submitted: 13 Nov 2014 Electronic form version 1.4