Abstract Submitted
for the CUWIP21 Meeting of
The American Physical Society

A Statistical Physics Description of Glacier Calving Behavior in Ice-Shelf Evolution PAIGE BRADY, University of California, Davis, SAMUEL KACHUCK, University of Michigan Ann Arbor — Ice-shelves provide buttressing forces for massive ice sheets, preventing land-based glacier ice from entering the ocean. The collapse of an ice-shelf due to calving could cause additional ice to enter the oceans and contribute to global sea-level rise, motivating a need for estimates of the likelihood of these types of events. However, significant challenges persist in incorporating the dynamics of calving glaciers into large-scale ice sheet simulations. In this study we introduce passive tracers with fiber bundles of random strengths into a one-dimensional shallow-shelf model to simulate the strains and stresses which lead to discrete fracturing and calving behaviors. These tracers advect along with the ice until the fiber bundles reach a critical elongation based on randomly distributed strengths, then break, initiating a calving event in the shelf. We will discuss preliminary results from this model that reproduce the style of calving at Erebus ice-tongue in Antarctica, including reproducing and quantifying the average number of calving events for Erebus. We propose that this model will be successful in estimating average long-term ice-shelf calving events, as well as determining whether there is a condition under which normal calving becomes a catastrophic collapse.

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Date submitted: 04 Jan 2021 Electronic form version 1.4