

# WAIS Workshop 2012, Abstracts

## **Analyzing the Sensitivity of Grounding-Line Dynamics in Response to Periodic Forcing**

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Ice sheets undergo various cyclical external forcing. Numerous efforts have analyzed the response of the grounding line to different forcings, e.g., buttressing (Dupont and Alley 2005), sedimentation (Alley et al. 2007), basal melting (Walker et al. 2008), oceanic warming (Walker et al. 2009), orbital-scale climate cycling (Parizek et al. 2010), basal friction (Pattyn et al. 2012). It has been shown that numerical modeling plays a key role in analyzing grounding-line dynamics accurately, (Vieli and Payne 2005, Gladstone et al. 2010, Docquier et al. 2011, Pattyn et al. 2012). Here we analyze grounding-line dynamics under periodic forcing of system parameters, such as basal conditions or climate forcing. Simple 1D experiments are performed by finite-element models (FEMs), where the grounding line is determined within the partially grounded elements using the FEM basis functions. Preliminary results exhibit asymmetric advance/retreat of the grounding line. Combined perturbations may lead to smaller or larger oscillations depending on the phase. Different bed topographies are also considered to analyze various ice sheet geometries.