Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Meltwater-plume dynamics under an evolving ice shelf ANDREW WELLS, University of Oxford — Recent observations and models suggest that melting at the base of floating ice shelves can significantly impact ice sheet flow, with consequences for sea level rise. As a simplified analogue of ice-shelf basal melting, I consider a theoretical model of the melting of a two-dimensional stationary ice-shelf above a warmer glacial ocean. Melting rates are controlled by a turbulent buoyancy-driven plume of meltwater that is coupled to an ice-water free boundary that evolves as a result of melting. The evolving slope of the ice-shelf base provides a feedback on flow and heat transfer in the meltwater plume, with potential consequences for the stability of ice shelves and other systems featuring a coupling of melting and buoyancy-driven flow.

Andrew Wells
University of Oxford

Date submitted: 31 Jul 2012 Electronic form version 1.4