



The flow-elevation feedback of ice sheets

Anders Levermann (1)

(1) Potsdam Institute for Climate Impact Research, Potsdam, Germany (anders.levermann@pik-potsdam.de), (2) LDEO, Columbia University, USA, (3) Potsdam University, Potsdam, Germany

The temperature-dependence of the ice softness within an ice sheet generally changes with the depth within the ice sheet. However this elevation dependence is much weaker than the lapse rate of the surrounding atmosphere. As a consequence an ice sheet will get softer if its surface elevation is declining. This constitutes a self-amplifying feedback that may enhance ice sheet decay. Here we discuss this feedback conceptually and provide some quantitative estimate for its temporal evolution within Greenland's ice dynamics. This may be particularly relevant in light of recent estimates of the ice-free period on Greenland within the last 1.25 million years.