



Sensitivity of Pine Island and Thwaites Glaciers to ocean-induced melt investigated using a new physically-based melt parameterisation

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Ongoing changes on both Pine Island and Thwaites Glaciers are generally considered to be driven by ocean-induced melt along the undersides of their respective ice shelves. In ice-flow studies to date, melt has usually been prescribed using simple parametrisations that, for example, relate the melt rate directly to the ice draft. Alternatively, ocean circulation models can be used to calculate the melt distribution in a coupled approach. Such coupled ice-ocean model runs are however very time consuming and therefore not suitable for performing large-scale parameter studies. Here we present an alternative methodology that falls in-between these two approaches. We use a new, physically-based parametrisation of melt that has been derived from plume theory to link melt with the geometry of the ice shelf base and the ocean temperature. The sensitivities of Pine Island and Thwaites Glaciers to ocean-induced melting are then estimated using the hybrid flow model Úa.