



Supra-glacial Lake Evolution in the Russell Glacier Catchment of the Greenland Ice Sheet

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Supra-glacial lakes form during the summer melt season in the ablation zone of the Greenland ice sheet. The presence of supra-glacial lakes promotes increased ice mass loss through lowering of the ice sheet surface albedo and through lubrication of ice flow if they drain. The mass balance of the Greenland ice sheet has been negative for a number of years and, if future climate warming is consistent with IPCC projections, increased mass loss through increased abundance of supra-glacial lakes may be expected.

We present the initial findings of a model of supra-glacial lake evolution in the Russell Glacier catchment in western Greenland throughout seasonal cycles of surface melting. The model employs elevation measurements recorded using interferometric synthetic aperture radar data to determine the course of water routing and ponding across the ice sheet surface. Ice sheet run-off is determined at 25 km resolution using the Modèle Atmosphérique Régionale (MAR) Climate Model forced with ERA-Interim reanalysis output. The resulting water drainage network and supra-glacial lake distribution are compared to optical satellite imagery derived from the MODIS satellite, and the skill of the model predictions of supra-glacial lake locations is assessed.