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A level set method for modeling the evolution of glacier geometry

A. Pralong (1), M. Funk (1)
(1) VAW, ETH Zurich, CH-8092 Zürich, Switzerland

A level set method is proposed for modeling the evolution of a glacier surface subject to a prescribed mass balance. This leads to a simple and versatile approach for computing the evolution of glaciers: the description of vertical fronts and overriding phenomena presents no difficulties, topological changes are handled naturally and steady state solutions can be calculated without integration over time.
A numerical algorithm is put forth as a means of solving the proposed model of glacier surface evolution. It is evaluated by comparing different numerical solutions of the model with analytical and published numerical solutions. The level set method appears to be a reliable approach for dealing with different glaciological problems.