Geophysical Research Abstracts, Vol. 8, 06157, 2006
SRef-ID: 1607-7962/gra/EGU06-A-06157

A new numerical scheme for a two-dimensional shallow ice-flow model applied to an alpine glacier

M. Schäfer, E. Le Meur

LGGE Grenoble, France (schaefer@lgge.obs.ujf-grenoble.fr)

A two-dimensional ice-flow model based on the Shallow-Ice Approximation (SIA, zeroth-order) is used to investigate the dynamics of the Glacier of Saint-Sorlin, France. A new numerical scheme with a higher implicitness than the Alternating-Direction-Implicit (ADI) scheme previously used for this glacier is now applied.

Again, the approach takes advantage of the particular geometry of the glacier allowing for a correct application of the SIA. The wealth of field measurements for this glacier makes various simulations possible (validation of the model, parameter optimization,...).

First, the new numerical scheme is presented with the impact on the final linear system to solve (software package LAPACK, the CPU requirement increased compared to the ADI scheme). Then, limits and problems of the ADI scheme are highlighted by simulations on a synthetic glacier. Finally, various simulations are revised with the new numerical scheme and compared to the preceding ADI-based ones.