



Temporal and spatial variability of high-resolution snow stratigraphy at Summit, Greenland

R. Dadic (1,2,3), M. Schneebeli (1), S. Bourgois (2), A. Ohmura (2)

(1) WSL Swiss Federal Institute for Snow and Avalanche Research, Davos, Switzerland (schneebeli@slf.ch) (2) ETH Zurich, Institute for Atmosphere and Climate, Zurich, Switzerland (3) ETH Zurich, Institute of Environmental Engineering, Zurich, Switzerland (dadac@ifu.baug.ethz.ch)

The snow stratigraphy at Summit, Greenland, was investigated using traditional snow profiles, high-resolution snow micro-penetrometry, translucent profiles and near-infrared photography. Nine snow pits were dug during a period of six weeks from June 30th to August 7th, 2003. The pit depth varied from 1.3 m to 2 m. The profiles show a rapid change of the surface snow layer caused by wind, near surface hoar formation or new snow. Erosion and re-deposition by wind cause in many layers a strong horizontal variability with lens-like stratigraphic features and cross-bedding. The rapidly changing morphology of the snow surface causes many thin distinct layers. Physical properties measured with a high-resolution penetrometer and near-infrared photography often show a trend or strong variation, which is not observable in the traditional snow profile. We suggest that these variations are very relevant for the numerical simulation of a snowpack, as for imposing realistic initial conditions in these models, especially regarding density, thermal conductivity and permeability.