

Geist, T., E. Lutz u. J. Stötter (2003): Airborne laser scanning technology and its potential for applications in glaciology. In: International Archives of Photogrammetry and Remote Sensing, 34(3/W 13), Dresden, 101-106.

Abstract

Glaciers are important sources for water supply and valuable indicators for climate change processes. In several countries glaciers have already been monitored for many years by public authorities or research institutions. International services exist with the aim to compile and to make available collected data. Changes in glacier geometry and glacier mass balance are the key issues for glacier monitoring. Traditionally aerial photogrammetry played a key role in supporting glacier fieldwork. In recent years the utilisation of modern remote sensing techniques for glacier monitoring was pushed forward and international projects and initiatives were launched. Airborne Laser Scanning has been established as a standard method for the acquisition of precise and reliable digital elevation data. However, only a few attempts have been made yet to utilise airborne laser scanning in glaciology.

This paper gives an overview on the possibilities and expectations on Laser Scanning Technology for glacier monitoring and the ongoing investigations in the frame of the EC funded OMEGA project. In this project 10 data acquisition flights covering two glaciological years are being carried out at a study glacier in Austria (Hintereisferner) and three data acquisition flights at a study glacier in Norway (Engabreen). Due to the dense coverage with data points accurate high-quality DEMs for the whole area of a glacier can be built effectively in short time. The potential of LS DEMs derived from airborne laser scanning for mapping glacier boundaries and morphological features is shown. A certain focus is laid on the multitemporal analysis of the laser scanner data which enables to quantify changes of glaciers both in area and volume. Future work is outlined, including comparison of the laser scanner data with data from other sources, glacier mass balance estimates, glacier movement studies and glacier surface classification.