



## **Filling the Gap - The Potential of Terrestrial Images to Monitor the Snow Cover Distribution in Mountains**

**S. Schmidt** (1), B. Weber (2) and M. Winiger

(1) Department of Geography, University of Bonn, Germany, (2) Institute of Photogrammetry, University of Bonn, Germany

In alpine environments spatio-temporal patterns of snow accumulation and snowmelt are mainly influenced by topography. Despite interannual variation of weather conditions, seasonal snow patterns remain relatively stable over the years. Such long-term patterns substantially control vegetation and permafrost distribution, as well as hydrology. For quantitative analyses of snow cover distribution and the interaction between snow cover and ecological, hydrological and geomorphological processes, data with high spatial and temporal resolution are required. The presented study shows a comparison of conventional approaches, based on point measurements and satellite images, and terrestrial images to record the snow cover distribution in the Loetschentäl. ASTER-satellite images with a spatial resolution of 15 m and a low repetition rate are able to detect meso-scale snow cover patterns. But they cannot detect the high variation of snow melt patterns as well as the snow cover distribution on steep slopes. By the use of a few point measurements the high variation of snow cover patterns, which are not influenced by topography, cannot be indicated. We used terrestrial images that are characterised by a spatial resolution of 10 m and a temporal resolution of 5 days, enabling analyses of the impact of topography on snow coverage depletion. A semi-automatic image processing technique was developed to calculate the orientation parameters for each image and assured high position accuracy. The comparison of all three methods showed the importance of approaches with high spatial and temporal resolution for analysing interactions of snow cover, permafrost, and vegetation. The approach presented here, the use of terrestrial images, will fill the gap of resolution of conventional approaches and seasonality of snow cover in alpine environments.