Submitted Abstract

ID IMC22-FSAbstr- 298

First Author First Name Last Name	 Yves (1,2) Bühler
Submitting Author First Name Last Name	 Yves Bühler
Correspondence	buehler@slf.ch
Co-Authors **>> E-Mails will be not listed**	Stoffel, Andreas (1,2); Marty, Mauro (3); Eberhard, Lucie (1,2); Bührle, Leon (1,2)
Organisations	1: WSL Institute for Snow and Avalanche Research SLF, Switzerland 2: Climate Change, Extremes and Natural Hazards in Alpine Regions Research Center CERC, Switzerland 3: Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland
Country	Switzerland
Region	Western Europe
Title	Remote Sensing Tools For Spatial Continuous Snow Depth Mapping – Results From 10 Years Of Investigations At Slf In Davos.
Keywords	Snow Depth, Remote Sensing, Drone, Satellite, Variability
Type	List Of Focus Session
Focus Session ID	36

Abstract

Snow depth, its distribution and the amount of water stored in the snowpack are key parameters for a wide range of applications such as snow avalanche mitigation, hydropower generation, and ecological questions. Despite its crucial importance, operational snow depth measurements are sparse and limited to point locations (e.g., automated weather stations and observations). However, thus cannot capture the high spatial variability of the snowpack, and therefore considerably limiting its significance.

Recent studies proofed the ability of photogrammetric methods to map spatially continuous snow depth over large regions with very high spatial resolution. Around Davos, Switzerland we acquired, terrestrial, drone based, airborne and spaceborne (very high-resolution satellites – VHR) photogrammetric measurements since several years. We achieve snow depth accuracies with a root mean square error (RMSE) in the range of a few cm (UAS) and 0.15 m (piloted airplane) to around 0.5 m (satellites). In this talk we give insights in the performed snow depth mapping campaigns and an overview on the results and their validation. Then we demonstrate how these datasets can be applied in practice, for example to monitor avalanche mitigation measures, to evaluate potential locations for automated weather stations or to document extreme avalanche events. During the past years, photogrammetric snow depth mapping developed from a very experimental state to a key tool for snow and avalanche research at SLF.