

EGU2020-14513

<https://doi.org/10.5194/egusphere-egu2020-14513>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Estimating snow line elevation using publicly available webcam images and Sentinel-2 snow cover maps

Céline Portenier¹, Martina Hasler¹, Simon Gascoin², and Stefan Wunderle¹

¹Institute of Geography and Oeschger Centre for Climate Change Research, University of Bern, Bern, Switzerland
(celine.portenier@giub.unibe.ch)

²Centre d'Etudes Spatiales de la Biosphère, Toulouse, France

Publicly available webcam images offer an enormous potential to study the variability of snow cover on a high spatio-temporal scale. Such cameras allow detailed analyses of snow cover on steep slopes due to their oblique view on the mountains and can provide snow cover information even under cloudy weather conditions. Our webcam-based snow cover monitoring network comprises several hundreds of webcams and enables to gather snow cover information over a large area with a minimum amount of manual user input. This information can serve as a reference for improved validation of satellite-based approaches, as well as complement satellite-based snow cover retrieval, in particular under cloudy weather conditions. Here, we present a framework to estimate the regional snow line elevation in the Swiss Alps. The snow line elevation is an important indicator of snow cover in mountainous regions and can be used, for example, as an input for hydrological modeling or to study the seasonality of river discharge. We compare and combine snow line retrieval from Sentinel-2 snow cover maps and webcam-based snow cover information to analyze regional differences in the spring snowmelt period. Since cloud cover is an important factor that affects the quality of satellite-based snow cover products, the combination with snow information from webcams can improve the accuracy and can fill temporal gaps, especially during recurrent cloud cover. Furthermore, we present a method to detect cloud cover in webcam images and discuss limitations of webcam-based snow cover monitoring.