Snow characterization by facet number and size from snow pit wall photographs

Mathias Gergely1 Martin Schneebeli2
1. WSL Institute for Snow and Avalanche Research SLF, Davos Dorf, Switzerland; 2. Institute of Environmental Physics, Heidelberg University, Heidelberg, Germany

Faceted snow within a natural snowpack often weakens its stability, with depth hoar being a prime example for a persistent weak layer. Traditionally, possible weak layers are detected by hand measurements of snow properties like snow hardness, density, grain size and grain shape. In recent years, several techniques have been developed to determine snow grain size by diffuse reflectance measurements at near-infrared wavelengths in the laboratory and in the field. However, it has not been possible to gather additional information about grain shape. Here, we present first steps towards a possible measurement method to detect facet number and size within the snow. The method involves taking a picture of a snow pit wall with a flash without additional natural or artificial lighting to guarantee directional lighting within a small angle of incidence. After filtering, number, size and distribution of specular highlight pixels then indicate regions of faceted or rounded snow. We find a qualitative agreement between our measurements and expected results for three snow types: Depth hoar, faceted crystals and small rounded grains from wind-pressed snow.