NiviLux GmbH
info@nivilux.ch
https://www.nivilux.ch

SnowImager

The *SnowImager* is a field measurement instrument that uses near-infrared (NIR) imaging to determine physical snow parameters. It enables fast, accurate, and standardized retrieval of two-dimensional specific surface area (SSA) images and a vertically resolved density profile with millimetre-scale resolution.

How it works – Data Acquisition

The SnowImager uses near-infrared illumination and cameras inside a light-tight housing to capture the near-infrared reflectance of a snow profile by holding the device directly against it. Two images of the same snow profile are recorded: first an open image, then a second image with a cover plate that places multiple vertical slits of different widths in front of the wall. The device stores the images and metadata for post-processing.

Foldable unit (displayed)
Unfolded: 440 × 500 × 330 mm;
Folded: 440 × 500 × 110 mm;
Weight: ~6.7 kg.

Non-foldable unit
440 × 470 × 330 mm;
Weight ~5.0 kg.

Key Features

- Standardized 2-D SSA maps
- Standardized vertical density profiles
- Millimetre-scale resolution
- Clear layer boundaries
- Detection of thin ice crusts
- Field-tested in extreme conditions
- Fast setup and simple operation
- SnowImagerPro software for post-processing

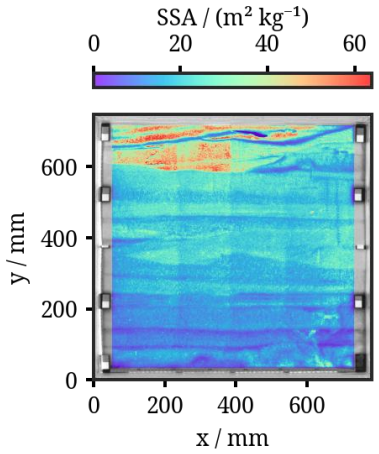
Components

1) NIR Illumination
2) Upper Camera
3) Lower Camera
4) Reflectance Targets
5) Target Folding Handle
6) Unfolding Handle

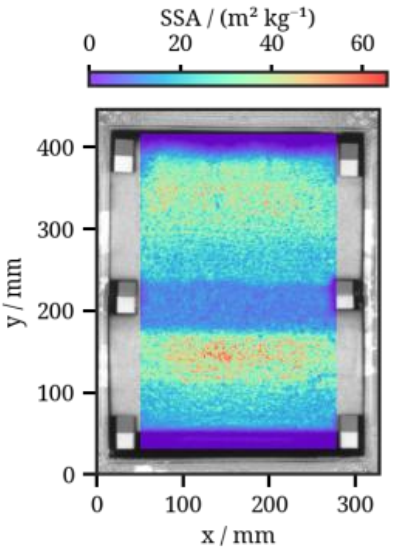
How it works – Data Processing

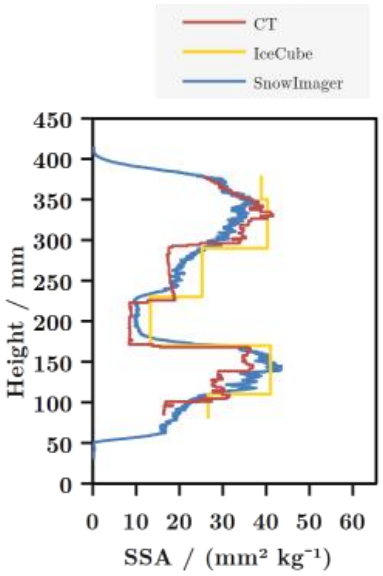
With the SnowImagerPro software, the open near-infrared reflectance images are converted into a two-dimensional SSA image and a vertical SSA profile by horizontally averaging at each depth. The slit image is then compared to the open image, using the known SSA to determine snow density. For high-density snow, light penetrates only shallowly, so lateral spreading is limited and the reflectance within the slits remains almost the same as in the open image. For lower-density snow, the penetration depth increases, light spreads laterally, and the reflectance within the slits decreases. From these slit-dependent reflectance patterns and the SSA information, snow density is obtained as a continuous vertical profile representing variations in the ice volume fraction with depth.

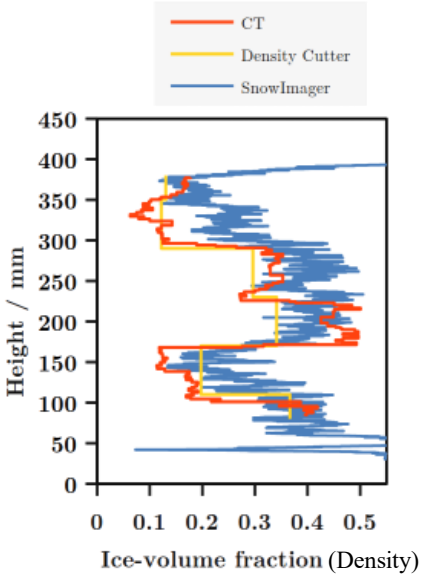
Data Products



- High-resolution SSA imaging reveals detailed snow stratigraphy
- Thin ice crusts and subtle layer transitions are clearly resolved
- Vertically averaged SSA and density profiles
- Ice volume fraction and density are directly proportional and both can be derived with SnowImagerPro
- Good agreement between SnowImager, µCT, and IceCube / Density Cutter reference measurements
- The standardized workflow ensures reproducible and comparable measurements across different field sites







For purchase options, field deployments, or collaborative projects, please contact: info@nivilux.ch

Developed and supported by:

DAVOS INSTRUMENTS AG

SLF

Innovation project supported by

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Innosuisse – Swiss Innovation Agency

graubünden