

MASCDB: a database of images, descriptors and microphysical properties of individual snowflakes in free fall

Jacopo Grazioli (1), Gionata Ghiggi, (1), Anne-Claire Billault-Roux (1) Alexis Berne (1)

(1) Laboratoire de Télédétection Environnementale, EPFL, Lausanne, Switzerland

Snowfall information at the scale of individual particles is rare, difficult to gather, but fundamental for a better understanding of solid precipitation microphysics.

We present a dataset, MASCDB, (and a dedicated python software) of in-situ measurements of snow particles in free fall collected by a multi-angle snowflake camera. The dataset, includes gray-scale (255 shades) images of snowflakes, co-located surface environmental measurements, a large number of geometrical and textural snowflake descriptors as well as the output of previously published retrieval algorithms. Noteworthy examples include: hydrometeor classification, riming degree estimation, identification of melting particles, discrimination of wind-blown snow, as well as estimates of snow particle mass and volume.

The measurements were collected in various locations of the Alps, Antarctica and Korea for a total of 2'555'091 snowflake images (or 851'697 image triplets).

MASCDB aims to accelerate reproducible research on precipitation microphysics and to address longstanding scientific challenges on snowflake research.

Given the large amount of snowflake images and associated descriptors, MASCDB can be exploited by the computer vision community for the training and benchmarking of image processing systems. MASCDB can be accessed on Zenodo (DOI: <https://doi.org/10.5281/zenodo.5578920>), while the pymascdb package at <https://github.com/ltelab/pymascdb>.