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Supervised habit classification of PHIPS stereo-microscopic ice crystal images

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Clouds play a major role in the global radiative budget. Microphysical properties, such as the shape (or habit), of individual ice crystals define their optical properties and consequently affect the cloud radiative effect. Therefore, a better understanding of ice crystal morphology is crucial in improving climate modelling.

With the Particle Habit Imaging and Polar Scattering (PHIPS) instrument, a unique airborne measurement probe that simultaneously captures optical and microphysical properties of single ice crystals, we collected a large dataset of high resolution in-situ stereo-microscopic images of natural ice crystals.

Over 100,000 stereo images from multiple field campaigns have already been manually classified. To automate classifying our images, we apply deep learning methods to our data and use convolutional neural networks (CNNs).

A description of our classification system of ice crystal morphology will be given. In addition, preliminary performance results of the CNN models will be shown.

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