Analysis of snow fall speed measurements in Kiruna, Sweden

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Accurate knowledge of the microphysical properties of ice, snow crystals and snow particles, such as size, area, shape, and fall speed is useful for meteorological forecast and climate models.

Measurements of these microphysical properties of natural snow have been carried out in Kiruna, north of the Arctic Circle in Sweden, using our ground-based in-situ instrument D-ICI, which takes high-resolution side- and top-view images of snow crystals, ice crystals, aggregates, and other hydrometeors covering sizes from $50\,\mu$m to 4 mm. The image data allow to determine particle size, area, area ratio, aspect ratio, shape, and fall speed of individual particles. Here, data from several snowfall seasons between 2015 and 2018 are analysed. In particular, snow fall speed in relation to the other microphysical properties is studied. There seem to be very little correlation between fall speed and size. To understand this further, we are looking at the fall speed–size relationship for individual shapes and its variation between different snow events. In addition, fall speed dependence on the other measured properties is analysed. The results from this study in Kiruna will help to improve our understanding of precipitation in cold climate.