

## Dataset for ground-validation of precipitation measurements in high-latitudes and Arctic region



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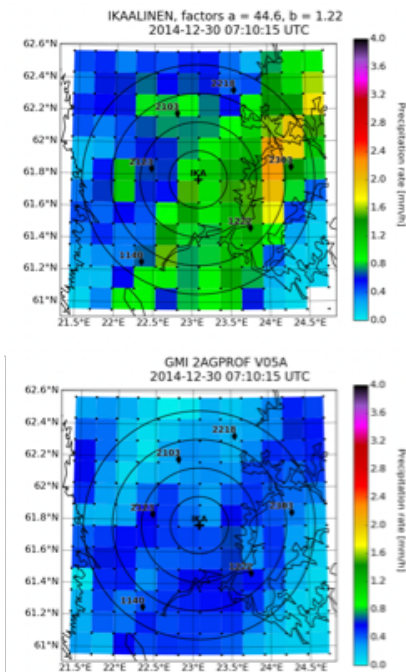
*DS precipitation in the high-latitudes (R – UHEL; D 4.2.1; T-4.2)*

*Document version number: 1*

The dataset is based on coordinated ground-based observations of precipitation microphysical properties and ground-based radar observations. This way the dataset allows for comprehensive characterization of precipitation, especially winter precipitation, at the measurement site and to extend those measurements spatially by means of weather radar measurements to facilitate validation of satellite based observations.

The dataset consists of particle size distribution, fall velocity, particle shapes and masses as retrieved from the observations collected at the SMEAR II site in Hyttiälä. Additionally, weather and cloud radar, microwave radiometer and lidar data are collected. These data are used for the validation of cloud and precipitation satellite observations by NASA Cloudsat and GPM and upcoming ESA EarthCare missions.

The ground-based remote sensing data is combined with ground-based precipitation measurements to derive precipitation and cloud products. For example, for winter precipitation, which is notoriously difficult to measure quantitatively, ground-based observations are used to guide the conversion from radar reflectivity to precipitation rate. The cloud products are derived using ACTRIS Cloudnet algorithms.



**Figure 1.** Comparison of the NASA Global Precipitating Measurement Microwave Imager snowfall product (bottom panel) with the ground-based radar observations tuned by the snow measurements carried out in Hyttiälä (top panel). The measurements

were taken on 30 December 2014 at 07:10:15 UTC.

### References

von Lerber, A., D. Moisseev, D.A. Marks, W. Petersen, A. Harri, and V. Chandrasekar, 2018: Validation of GMI snowfall observations by using a combination of weather radar and surface measurements. *J. Appl. Meteor. Climatol.*, <https://doi.org/10.1175/JAMC-D-17-0176.1>