

Master thesis, Supervisor: Jan Handwerker, Andreas Wieser

Evaluation of drop size spectra and comparison to dual-pol radar measurements

Conventional radars measure radar reflectivity at only one polarization, in most case horizon- tally polarized. The additional information of dual-pol measurements provides access to the differences seen at horizontal and vertical polarization, respectively. From these differences estimates on hydrometeor phase, particle size distributions (mainly the reference diameter), and even attenuation can be derived. These estimates proof to be quite sensible on the way how large drops flatten with their diameter.

To evaluate the derived scatter properties from radar measurements, the institute extends its measuring abilities by a multitude of optical disdrometers (Parsivel), which measure drop size distributions and drop velocities at ground level. Three pilot Parsivels were already applied during the MOSES measuring campaign in 2019 in Müglitztal (Saxony, Germany).

Within this **master thesis**, the Parsivel measurements shall be evaluated to derive the properties of measured drop size distributions (rain rate, reflectivity, reference diameter, Parameters from gamma distribution and Marshall-Palmer distribution and moments) including estimates on the reliability of these derived values. These data shall be compared to simultaneous X-Band radar measurements.

As all our radar algorithm are implemented in matlab, this thesis need to make use of this programming environment.