

AN APPROACH TO RAINFALL ESTIMATION BASED ON EXPLICIT DSD CALCULATION THROUGH POLARIMETRIC RADAR MEASUREMENTS

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Most of the currently used methods for rainfall estimation by meteorological radars are based upon analytical relations involving either the horizontal reflectivity Z_H or both Z_H and Z_{DR} (differential reflectivity). These relations are typically the result of statistical regressions over experimental data or simulated parameters related to the drop size distribution (DSD). Due to their statistical origin, they are not able to completely represent the wide natural variations of DSD in space and time.

DSD parameters can be expressly calculated from polarimetric radar measurements, leading to a method for rainfall rate estimation strictly related to the physics of precipitation. Some assumption on the form of the DSD is still necessary (Ulbrich, 1983) as well as an accurate clutter suppression algorithm. The process implies an additional integration to find the rain rate once the DSD is known and takes much more time than usual techniques, but latest computer processors make it suitable for operational purposes as well.

The effectiveness of the method proposed has been tested on two flood like events, through a comparison with rain gage measurements in the Friuli-Venezia Giulia region (North-East of Italy). The description of the method developed as well as first results are discussed in the paper.