Improving rain rate estimates from ground –based weather Radar using Artificial Neural Networks

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In many hydrological applications, rainfall estimation over a catchment area is a main key issue. Accurate and reliable measurements of the spatial and temporal distribution of rainfall are very important in hydrology. Radar data can provide insight in the spatial variation of precipitation and can also detect large areas of rain and estimate rainfall rates. However, radar rainfall estimation can be prone to errors because of attenuation and ground clutter. Since estimation of rainfall by radar data correction need to pass long processes that they are not easy and have errors therefore has been proposed to use the ANN for estimation of rainfall.

At this study, the potential of X-band radar systems for rainfall estimation over an urban area in the Netherlands was discussed. Rainfall estimates will be derived from radar data by performing an ANN application to the raw radar data, and applying the traditional error correction. Finally measurements of rainfall from radar were compared against measurements from 4 tipping bucket rain gauges for a rainfall event. In general, the analysis demonstrated that the radar follows the general trend of the rain gauge measurements but the radar measurements need to be calibrated and corrected for errors. Furthermore recent research has shown that ANN techniques can be successfully used for the precipitation estimation from radiometric measurements. Also shows that the ANN method in radar estimation has better result than radar data with error correction methods.