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Use of high-resolution X-band weather radar for real rainfall estimation

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Obtaining reliable precipitation observations is important for hydrological simulations and weather forecasting. Radar data can provide insight in the spatial variation of precipitation and can also detect large areas of rain and estimate rainfall rates. Weather radar systems nearly always operate in S-, C- or X-band. Since X-band systems require smaller antennas than those at C- or S- band, they are particularly suitable for monitoring small hydrological working. However, radar rainfall estimation can be prone to errors because of attenuation and ground clutter.

At this study, the potential of X-band radar systems for rainfall estimation over an urban area in the Netherlands was discussed. A methodology was presented for removing ground clutter and attenuation from X-band radar measurements and 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.