P4.13 Toward the optimal resolution of rainfall estimates to obtain reliable urban hydrological response: X-band polarimetric radar estimates applied to Rotterdam urban drainage system

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Weather observations are conventionally performed by single polarization C-band weather radars with a temporal and spatial resolution of 5 min and 1 Km, respectively. However, for urbanised areas, these spatial and temporal resolutions may not be sufficient to detect, monitor, and obtain accurate rainfall rate estimates of fast-evolving weather phenomena. It is also known that, due to the high percentage of imperviousness and low rate of vegetation interception, the reaction of urban drainage catchments to a storm event is much faster than rural ones. Due to land use characteristics of urban areas and also to the small scale of urban catchments (i.e., few hectares up to few square kilometres), it is not uncommon that the time lag between rainfall and runoff peaks is of the order of few minutes. Therefore, to describe fast runoff processes and short response times, urban hydrological modelling requires high resolution rainfall data. In this work, a S-band vertical profiler (TARA) and a X-band horizontal scanner polarimetric weather radars (IDRA) are used to characterize physical processes and obtain accurate rainfall rate estimates of severe thunderstorms at high temporal and spatial resolutions. Moreover, the impact of deep convection; i.e., high rainfall rates, over urban areas, will be addressed to analyse the hydrological response time of urban drainage systems. A small-scale convective storm case from January 03rd 2012 was observed by both, IDRA and TARA from the Dutch national meteorological observatory CESAR. It is expected the new insights will be revealed based on the polarimetric and the high-resolution capabilities from both radars. Rainfall rate estimates obtained from IDRA at elevation scan of 0.50 degrees will be used to analyse urban hydrological response times under different resolutions of rainfall input (from 1 min temporal and 30 m spatial resolutions to upscale 5 min and 1 km) and different hydrodynamic model settings for the rainfall-runoff process, in a highly impervious urban drainage system belonging to Rotterdam urban area.