# Influence of rainfall spatial variability on hydrological modelling: case study on an urban catchment

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The added value of considering rainfall spatial variability in hydrological modelling remains an open question from both scientific and operational points of view. This study addresses this topic through the modelling of the Boulogne-Billancourt catchment using weather radar images with a high spatial resolution (250 m x 250 m radar pixels), resolution which for the time being remains uncommon. Radar images are measured by a C-band weather radar at a temporal resolution of 5 min. The Boulogne-Billancourt catchment is of 5.6 square kilometres and is located in the south-western suburb of Paris (France). It is an urban catchment with areas subject to flooding. Runoff is simulated by means of a distributed model regrouping a hydrological model and a hydraulic model. The model calibration and validation has been done in a previous study. The influence of rainfall spatial variability has been evaluated by considering two different rainfall spatial resolutions: measured radar data (resolution of 250 m x 250 m), taken as reference, and radar data averaged at 1 km x 1 km.

20 rainfall events have been studied. Both rainfall inputs have been used to force the distributed model and the obtained discharges were compared by computing two values: the Nash-Sutcliffe criterion and the relative absolute deviation between the peaks. This comparison enables to evaluate only the influence of rainfall spatial variability. The originality of this study is that it seeks to link the obtained results to the variability of the considered rainfall events. For this, the temporal and spatial variability of each event has been characterised through a geostatistical analysis, based on the climatological variogram.

This study has highlighted the benefit of radar images with high spatial resolution given their ability to capture small-scale variability.