Interreg

North-West Europe

Co-funded by the European Union

Institute of Hydraulic Engineering and Water Resources Management

RWTH AACHEN UNIVERSITY

FlashFloodBreaker

Climate and environment

Hydrodynamic simulations of pluvial and fluvial flooding in the Emscher catchment area

FlashFloodBreaker
Integrated simulation of pluvial fluvial flood events

Impact of Buildings on 2D Pluvial Flood Simulations using TELEMAC-2D

- Increased **intensity** and **frequency** of **flooding** due to climate change
- **Urban areas** are endangered due to **impermeable** surfaces
- Creating **flood risk maps** for better precaution and warning of stakeholders
- Software: QGIS, BlueKenue, TELEMAC-2D
- Parameters: DTM, Manning's Roughness Coefficient, Curve Number
- Two precipitation events: **90mm block rain**, storm rainfall **event July 14 2021** (RADOLAN)
- 4 building representation methods:
  1. Building Block (**BB**)
  2. Building Hole (**BH**)
  3. Building Resistance (**BR**)
  4. Level of Detail 2 (**LoD2**)
- 3 study areas: urban city center, rural area, commercial district

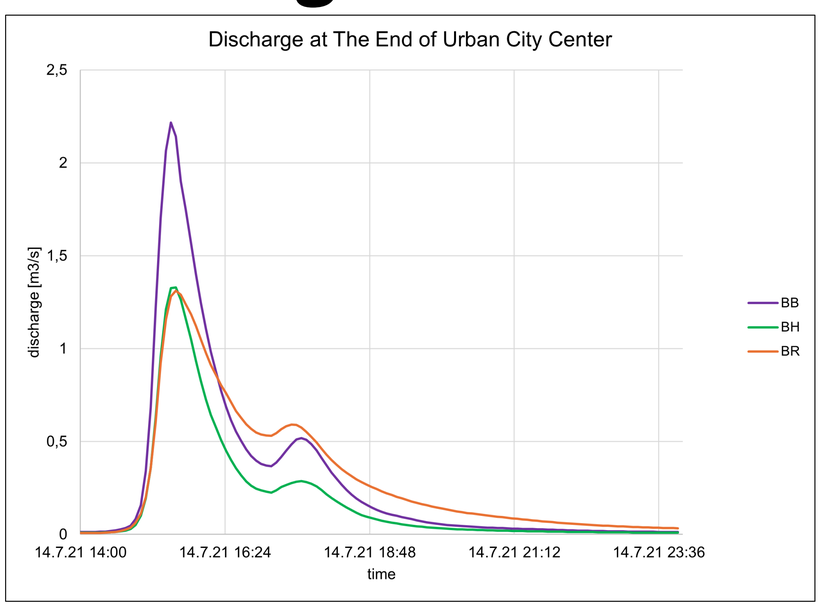

Fig. 1: Discharge over time at the end of the urban study area

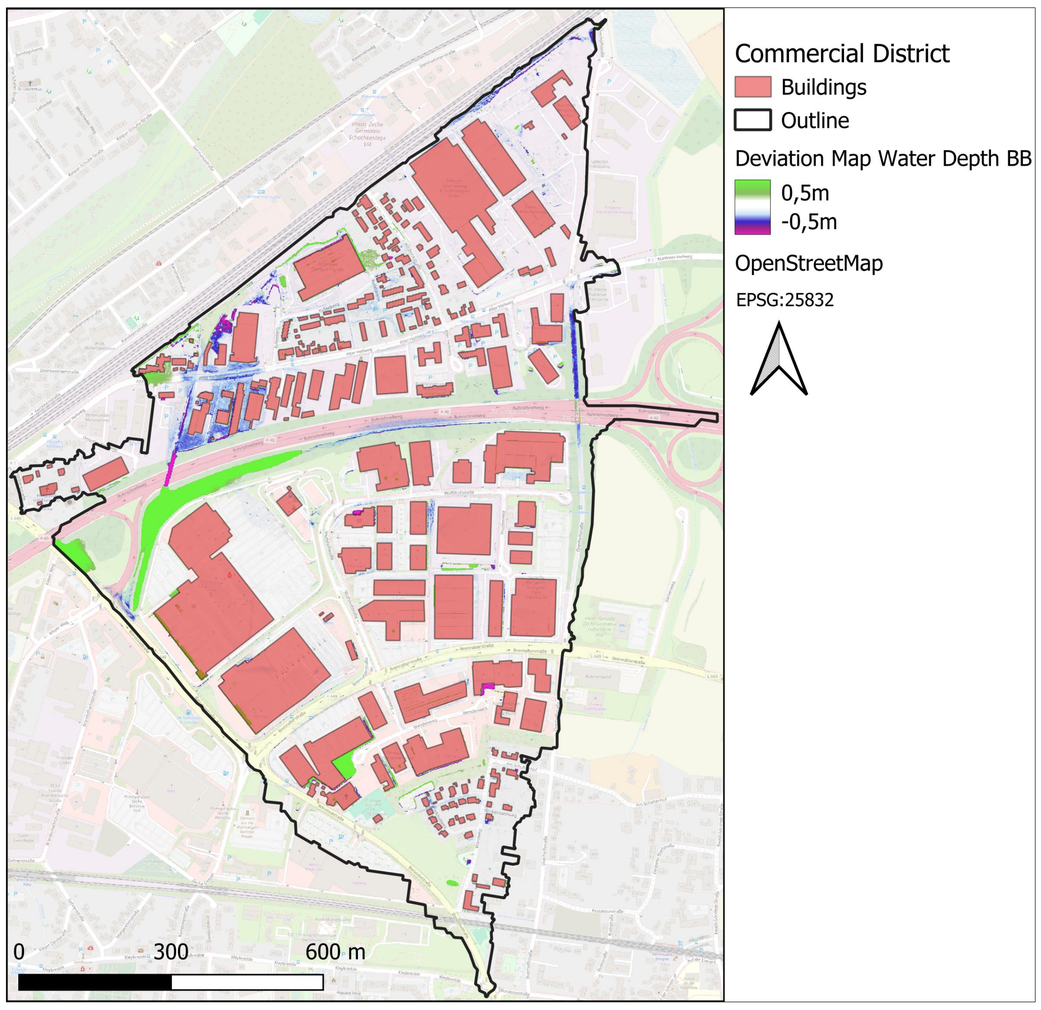

Fig. 2: Commercial district study area

Results

- **Pairing** of **BB/LoD2** and **BH/BR** methods
- BB > LoD2 > BR > BH
- BB ~ LoD2

- **BH** introduces **holes** in mesh > **less** total **rainfall**
- **BR** generates artificial basins (**ponding**)
- **BR** shows **delay in runoff** due to increased roughness
- **BH** generates **50% less discharge** than BB

- **Pre-processing** effort **highest** for **BH**
- **Computational** effort **lowest** for **BH**, approximately the same and threefold for BB/LoD2/BR
- **Definitive conclusion** regarding the **most suitable method could not be drawn**

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