Interreg

North-West Europe

Co-funded by the European Union

Institute of Hydraulic Engineering and Water Resources Management (IWW)

RWTH AACHEN UNIVERSITY

FlashFloodBreaker

Climate and environment

Transmission of flash flood simulation results into decision-relevant information

FlashFloodBreaker
Integrated simulation of pluvial fluvial flood events

Visualization of simulation results using the Pedestrian-Instability-Index

Motivation and Aim:
Improvement of the current state of the art of pluvial flood hazard maps by increasing the focus on the risk to human lives instead of water depth and velocity

Methods:

- Extraction of local, time-independent maxima from simulation results for comparison with predefined thresholds for pedestrian stability
- Classification into areas where and where not a pedestrian instability would have occurred
- Simulation of 15 heavy rainfall events to identify trends regarding repeatedly designated hazardous areas

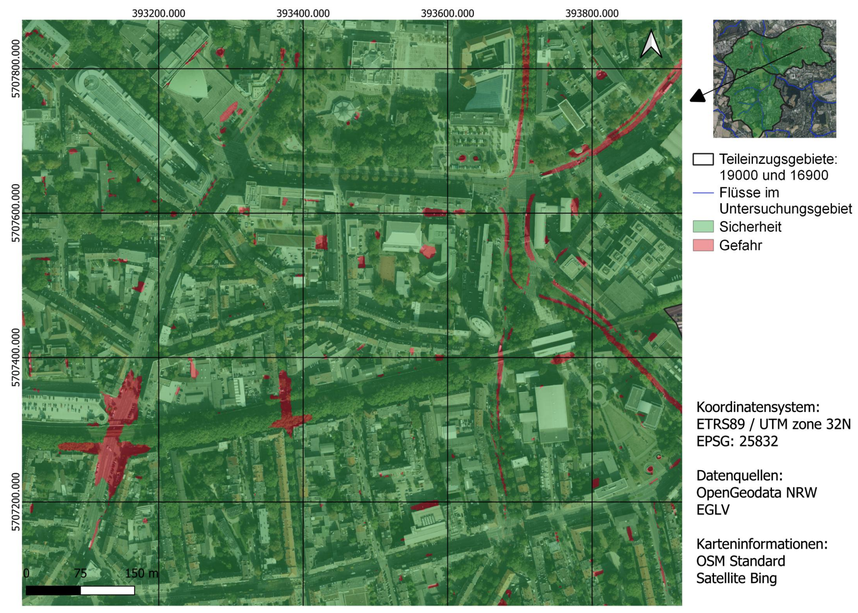

Fig. 1: Classification of areas where a hazard occurred and areas where no hazard occurred, July 2021

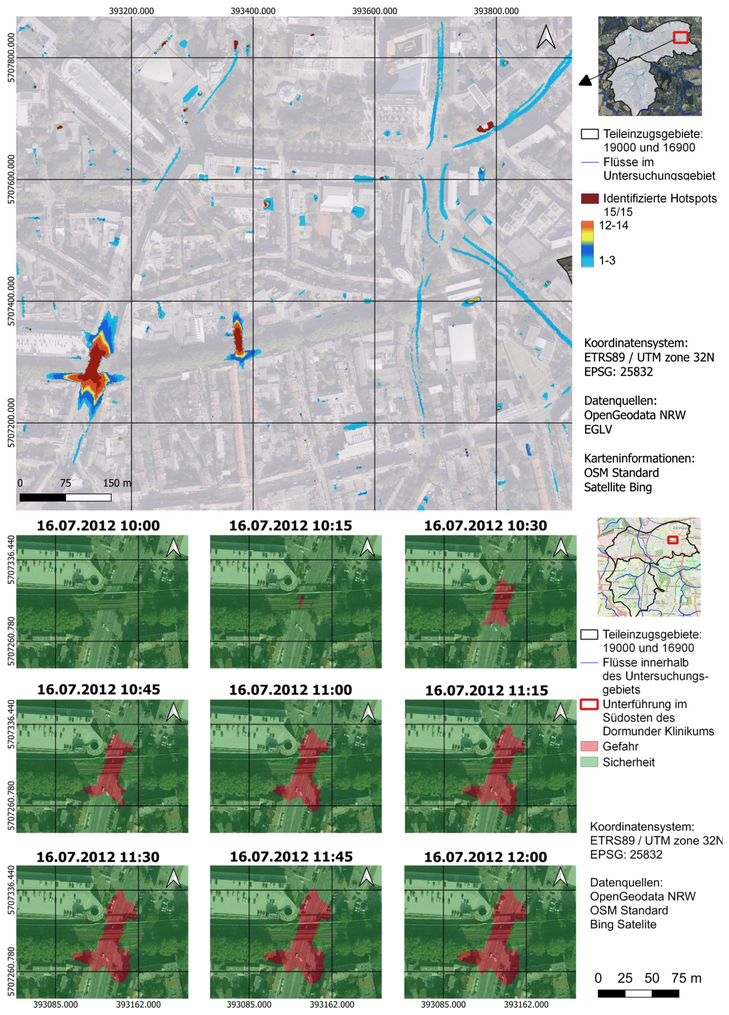

Fig. 2: Identification of trends (15 simulations) through the analysis of recurring areas as hazard zones

Results:

- Certain areas, particularly hazards caused by water depths, appear to occur consistently. In all 15 simulations of various rainfall events, a hazard emerged in the areas colored in red (Hotspots)
- A threshold analysis revealed that the chosen thresholds for different population groups have a significant impact on the hazard maps
- An evaluation of the chosen computational grid resolutions (3 and 2 Meters) indicated that a more precise modeling of the study area increases computational demand by 299%, while only achieving a 0,3% improvement in result accuracy
- The temporal analysis of the formation of such a hazard zone revealed that its development is not always dependent on the intensity of the event and that other parameters, such as the exact location of the rainfall, also influence its formation

Conclusion:
The visualization of simulation results using the Pedestrian-Instability-Index offers great potential for the design of hazard maps and enables a wide range of analyses on various parameters

Outlook:
Identification of imminent hazards through real-time simulations

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