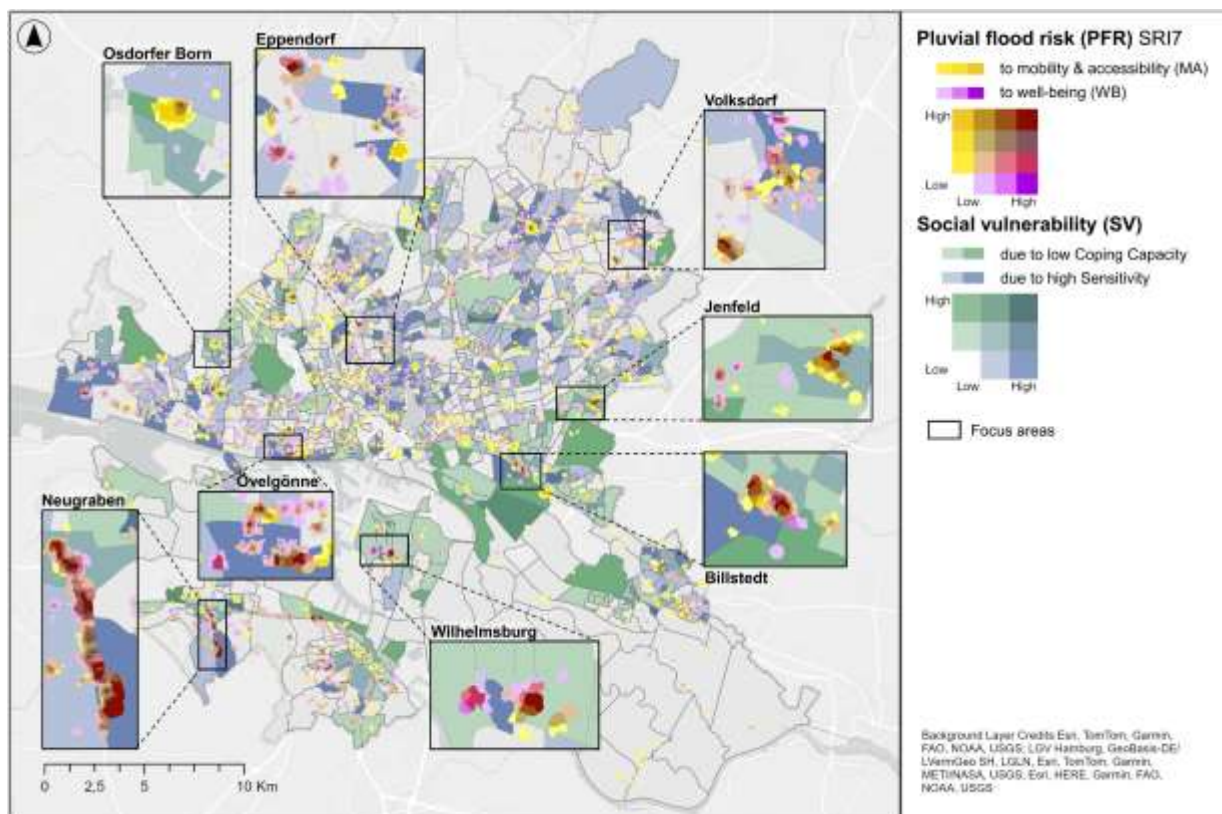


PRESS RELEASE

Study maps the human side of flood risk

A building-scale assessment combines flood modelling with social vulnerability analysis to help identify where people may be most affected, and where support is needed most.



Flood risk and social vulnerability across Hamburg. Source: von Szombathely et.al., 2026
<https://doi.org/10.1016/j.crm.2026.100893>

When heavy rain hits a city, knowing where water will accumulate is only part of the picture. Who lives in the affected buildings? How might flooding disrupt their lives? And where could additional support make the greatest difference?

A recent study led by Malte von Szombathely at the University of Hamburg brings these questions together through a city-wide, high-resolution assessment of urban flood risk. By examining flood hazards alongside exposure and social vulnerability, the framework offers a more detailed picture of the potential consequences for people, property, and everyday mobility. One finding highlights why this broader perspective matters: areas with high flood

hazard do not necessarily coincide with areas of high social vulnerability. A map showing where flooding could occur cannot, on its own, reveal who is most at risk. Understanding that risk also means looking at who is exposed and the conditions that may make them more vulnerable.

The assessment models a specified 100-year rainfall scenario of 36 millimetres per hour and maps risk at the scale of individual buildings, revealing local hotspots and inequalities that broader maps can overlook. Even within the same neighbourhood, the potential consequences of flooding can differ. These small-scale patterns help show where a closer look may be needed.

The framework also distinguishes between two ways flooding can affect daily life. One risk index assesses potential harm to people and property. A second examines restrictions on entering or leaving buildings and accessing critical infrastructure. Together, they help planners consider both direct harm and the disruption of movement and access during a flood. Social conditions are central to the assessment. Indicators including age, income, and education help identify where social vulnerability may compound flood exposure. Bringing these factors into the analysis makes vulnerable populations more visible in adaptation planning.

“Our study reveals who is most vulnerable, building by building, so cities can target their adaptation efforts where they are needed most. By making the data, methods, and findings FAIR, we enable other cities to build on this work rather than start from scratch”, said Malte von Szombathely, the lead author of the study.

Developed in close cooperation with Hamburg city planners, the framework can help planners identify hotspots; examine the factors driving risk; and inform priorities for flood resilient infrastructure, community preparedness, and social support. The approach also offers a basis for assessments in other cities. It uses freely available, high-resolution data, supporting its potential application elsewhere. Transfer would require adaptation to local conditions and input from local city administration and city planners. The underlying methods and assumptions are explained in detail in a peer-reviewed article led by Anastasia Vogelbacher from the Hamburg University of Technology that was published earlier this year: <https://doi.org/10.5194/nhess-26-2765-2026>.

For cities planning how to prepare for flooding, the study offers a practical starting point: connect information about the water with information about the people it could affect. That fuller picture can help direct attention and resources to where they may be needed most.

More about the study:

The study, “Urban pluvial flood risk mapping: a high-resolution assessment for the city of Hamburg” was published open access in Climate Risk Management. The full article is available at: <https://doi.org/10.1016/j.crm.2026.100893>

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Press Contacts

Vinodh Ilangovan

Communication & Dissemination Deputy

Vinodh.Ilangovan@tib.eu

TIB – Leibniz Information Centre for
Science & Technology

Anne Fouilloux

Project Coordinator

Anne.Fouilloux@lifewatch.eu

LifeWatch ERIC



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