universität freiburg

Kolloquium - Boden, Wasser, Luft

04. Februar 2026, 16 ct - 18 Uhr
Hörsaal Fahnenbergplatz, Friedrichstr. 39

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Universität Lausanne

From rainfall extremes to flood risk: how a changing climate and urban growth transform hydrometeorological dynamics

Improving the resilience of future cities to urban flooding requires drainage systems that remain effective under future extremes. Achieving this depends on understanding how urban growth and climate warming jointly shape storm intensity and flood risk.

Using weather radar observations and numerical climate-model simulations, we quantified how cities modify short-duration extreme rainfall, identifying a robust association between urban expansion and rainfall intensification that is primarily thermodynamic in origin, linked to urban heat and dry island effects. These responses emerge across diverse cities and climatic settings.

We then assessed the compound influence of urbanization and climate change and demonstrated that their combined effect can substantially exceed estimates derived from climate change alone.

Building on these findings, we developed modeling strategies to generate synthetic extreme storms for future urban and climate scenarios that explicitly embed projected intensification.

Coupled with hydrodynamic flood models, these storms enable robust assessments of future pluvial flood hazards and provide actionable evidence to inform the design of flood-resilient cities.

Veranstaltet von den Professuren für
Hydrologie, Umweltmeteorologie, Bodenökologie, Umwelthydrosysteme und Biochemische Systemmodellierung
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