



URBAS

Prediction and management of flash floods in urban areas

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Federal Ministry of Education and Research BMBF (Germany)
as a part of
RIMAX „Risk management of extreme flood events“

Internet: <http://www.urbanesturzfluten.de>
Internet: <http://www.rimax.de>

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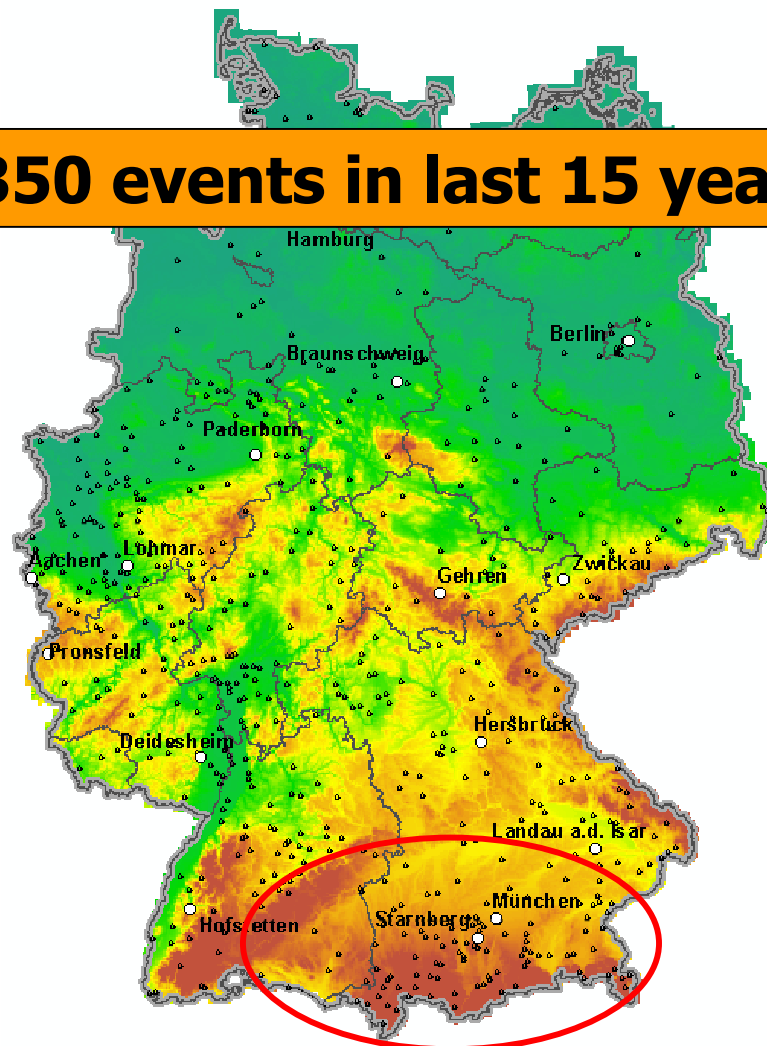




Flash-Floods in Germany: a problem?

- Recorded Flash Flood events with damages in urban areas

350 events in last 15 years



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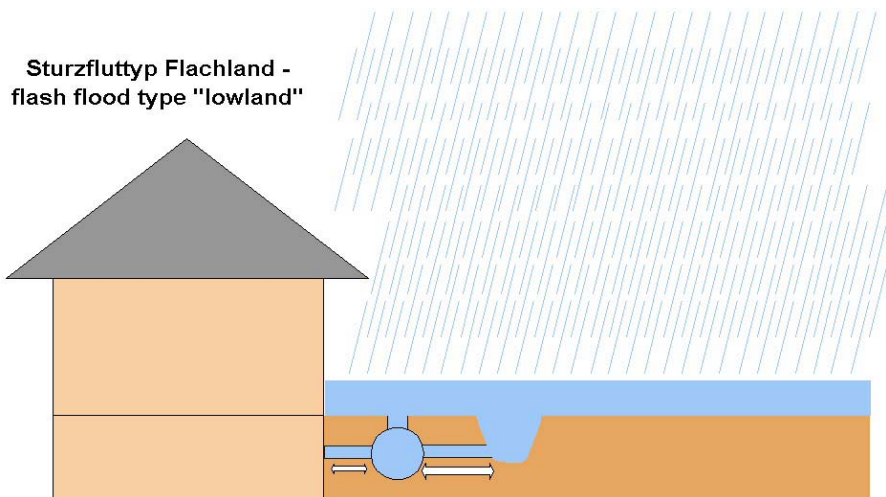
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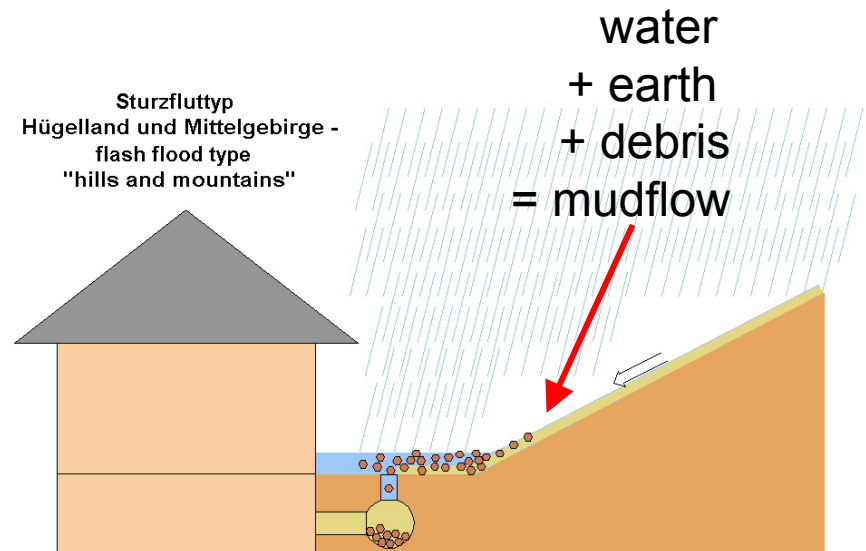
Types of flash floods in urban areas

< 500 km² catchment area and < 6 hours rainfall duration

Lowland



Hills and mountains



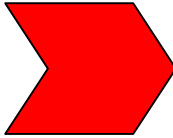
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Challenges, objectives and „products“

- Climate change
 - Phenomena of flash floods
 - Feasible risk management strategies
- 
- New Database events
 - Improved forecast tools
 - Estimation of damage
 - Methods for hazard and risk analyses for municipalities, hazard and risk maps
 - Areas with high flash flood risk in Germany
 - Guidelines for measures

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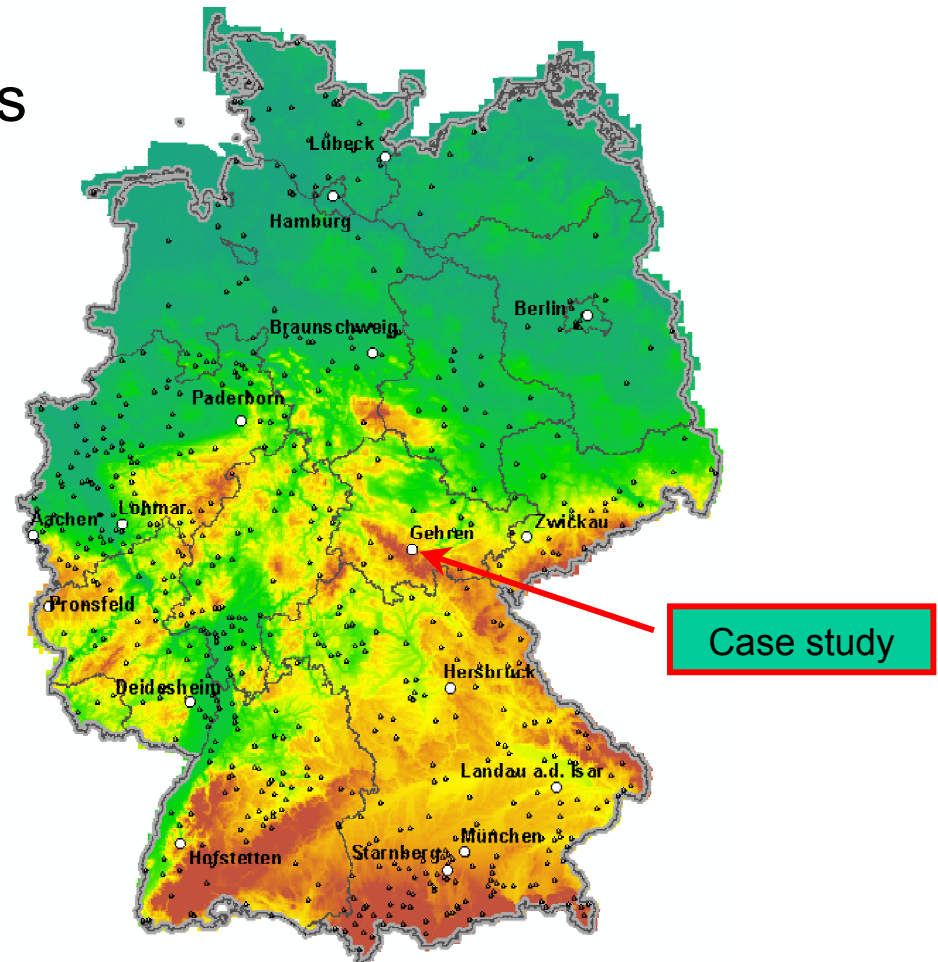
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Case studies

- 15 representative cities
- Interviews with all involved authorities
- Ex post studies and simulations



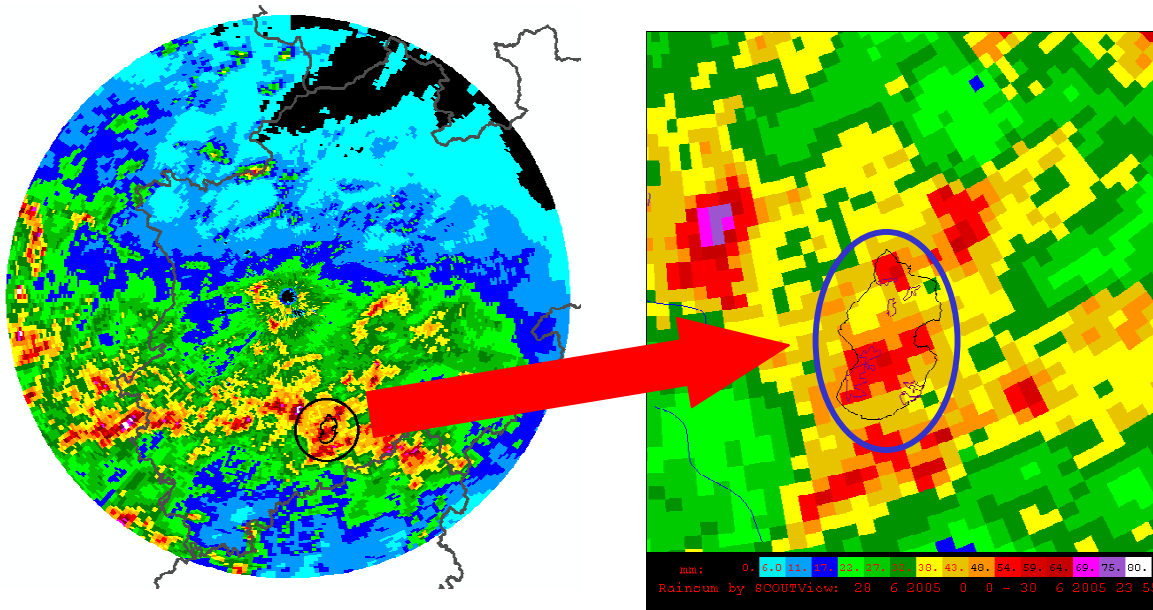
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Case studies: Meteorological situation

- measured precipitation vs. design rain



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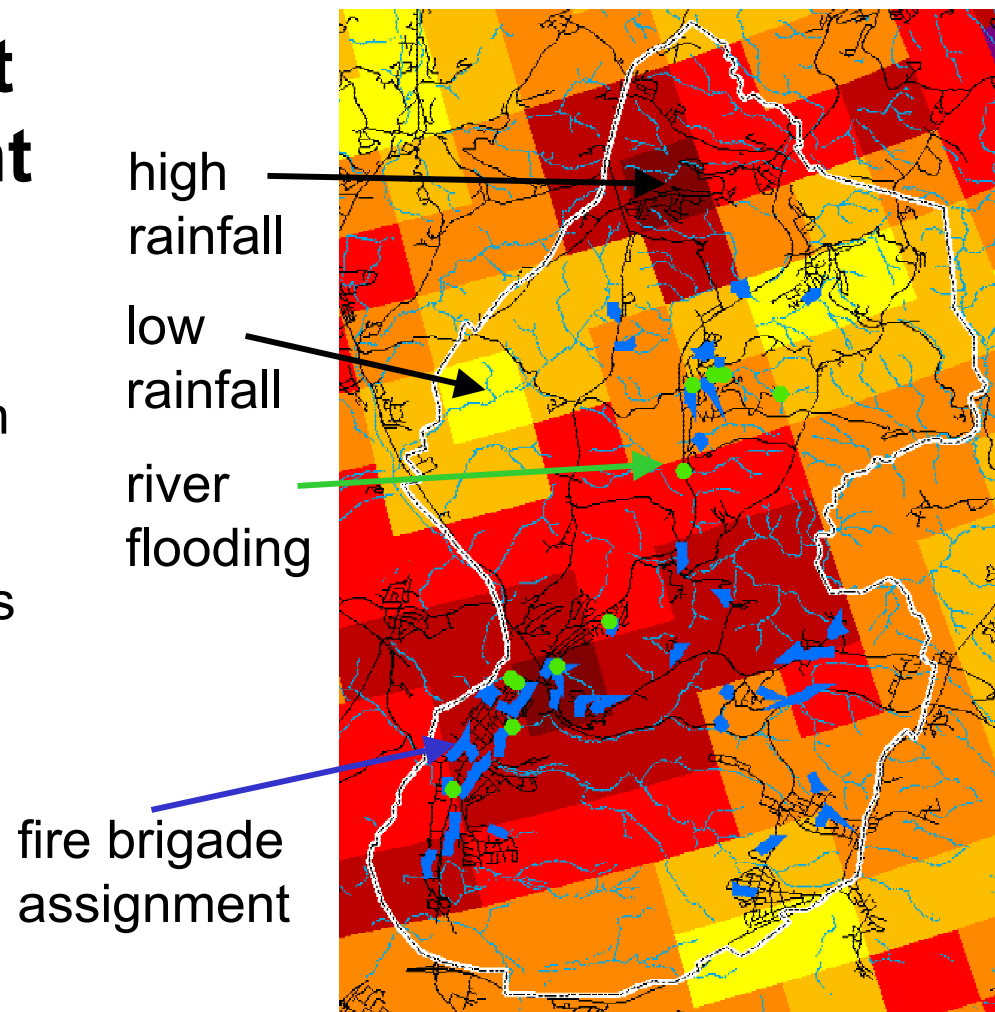


Case studies:

Damage assessment

Disaster management

- at micro scale
- rainfall intensity and fire brigade actions during a flash flood in Lohmar
- organisation, operation of services, mitigation measures



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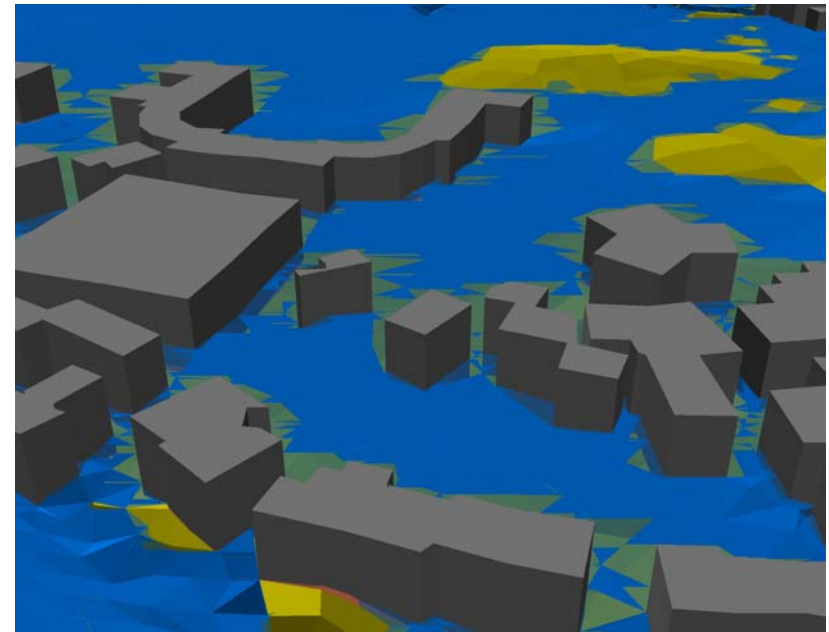
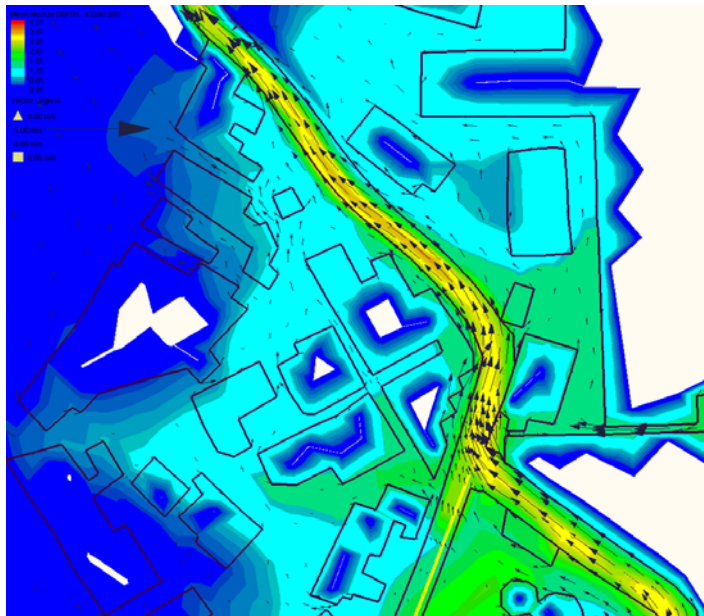


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Case studies: Runoff and flooding

- simulation of sewage/stormwater network, small urban creeks and surface flow by 2 D hydraulic model



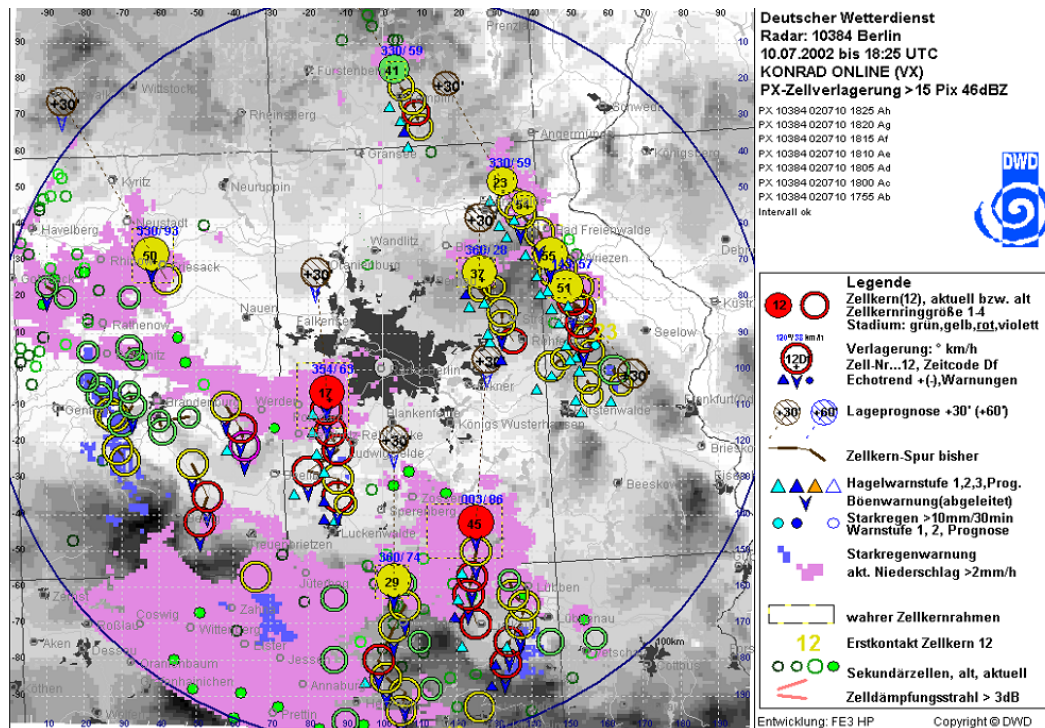
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Improvement of forecast tools and systems for early warning



Radar Network (Nowcasting tool KONRAD) from the German Weather Service

- Improvement of cell tracking methods
- Improvement of detecting methods for flash flood events
- More knowledge about environmental influences

Poster A.Wagner et al.: P 8.8

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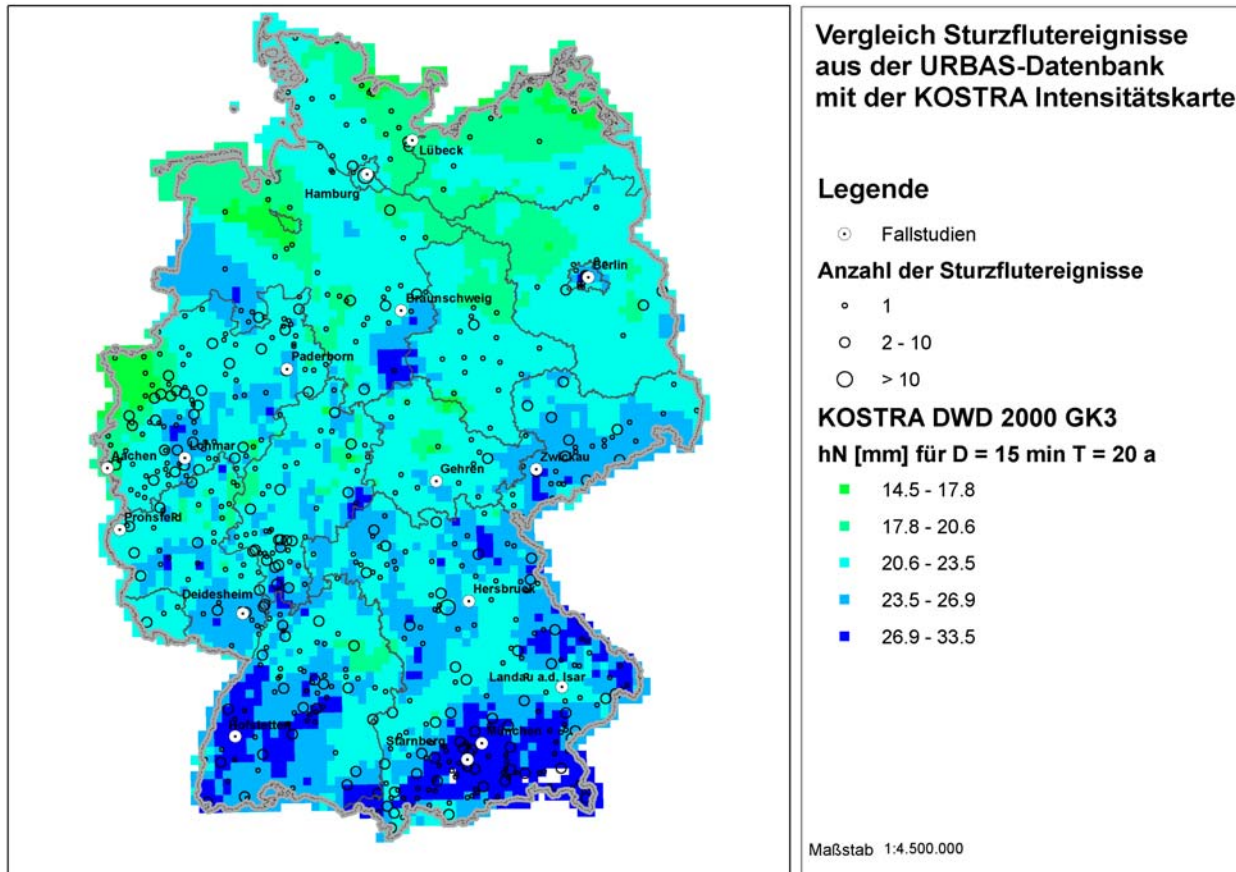
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Results: basis for hazard maps flash flood results and KOSTRA-intensities



- Comparison of flash flood events to KOSTRA
- Good agreement of flash flood events with high precipitation intensities (15 min duration and 20 years return period)

Hazard and risk analyses in urban areas

- Methods for hazard and risk analyses for small and big cities
- Best practice
- Prototypes of hazard and risk maps



Übersicht 1:20000



Bild 1: Durchlass hinter Grootmoorweg 56

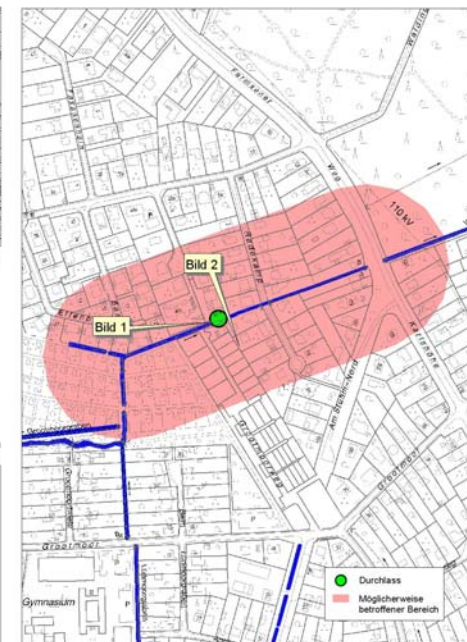


Bild 2: Entwässerungsmulde hinter Neubauten

Hinweise
Durchlass hinter Haus Grootmoorweg 56 erzeugt, wenn verstopft, Rückstau in Entwässerungsmulde hinter der neuen Bebauung. Überschwemmung von Radekamp 18 bis Stuhm-Nord. Durchlass kontrollieren und gegebenenfalls räumen. Wenn notwendig, Sicherung der Grundstücke im Bereich Radekamp 18.

Notizen

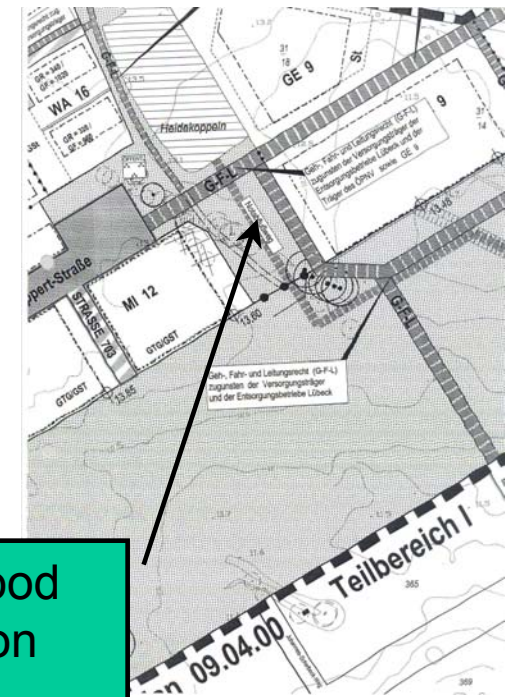
Behörde für Stadtentwicklung und Umwelt -
Amt für Bau und Betrieb
B 523



Präventionsmaßnahme
Wellingsbüttler Grenzgraben -
Grootmoorweg / Radekamp
Maßstab 1:3000

Actions and measures for risk reduction

- Risk reduction
 - town planning
 - technical measures
 - information



Information

e.g. emergency flood
ways and retention
ponds

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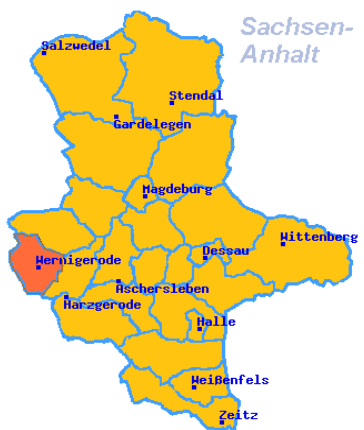


Actions and measures disaster management

Damage reduction

- early warning and alarming
- disaster management
- disaster control

Warnsituation - Alle Warnungen



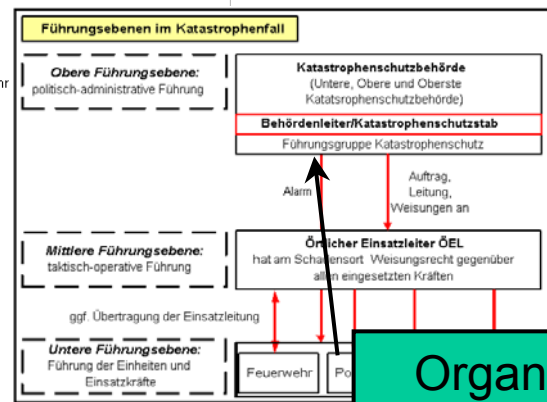
Stand: 03.06.03 16:16 Uhr

- Aktuelle Warnungen:**
- Alle Warnungen
 - Gewitter incl. Begleiterscheinungen
- Zur Deutschlandübersicht**
- Regionale Warnlagebericht**
Wochenvorhersage Wettergefahr
- Aktuelle Wetterdaten**
- Warnung vor extremem Unwetter
 - Unwetterwarnung
 - Vorwarnung zur Unwetterwarnung
 - Warnung vor markantem Wetter
 - Wetterwarnung
 - Seewetterwarnung
 - keine Warnung

Warning by
German Weather
Service

Simplified Decision matrix for warning and alarming in Hamburg

Warnart Warnstufe Gewässer	X	WW	WU	WUEX
0		W	W	A
1	W	W	A	A
2	A	A	A	A



Organisation

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Conclusions

- Urban flash floods are a problem - even in Germany
- The approaches are generally transferable to other regions
- Radar data significantly enhance the knowledge on small scale rainfield structures
- Statistics of 15 years show uneven distribution of extreme events
- First results indicate
 - Possible improvements in warning systems (CONRAD, fire brigade)
 - A required review of hydrologic design events in urban local climate
 - Enhancements for the disaster management chain
 - Consequences for good practice in urban planning
- URBAS results help communities to prepare for climate change



More information on the web ...

<http://www.urbanesturzfluten.de>

<http://www.einfalt.de>

<http://www.rimax.de>

**and thank you for patiently
listening before lunch!**

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