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Flash floods in Bavaria

Recording, Exploring, Evaluating - The Project HiOS

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Outline

1. Introduction – Flash Flood in Bavaria in 2016 and the HiOS Project
2. **H**ydrodynamic **R**ainfall-**R**unoff **M**odelling HRRM
3. GIS & Geostatistics
4. Conclusions & Outlook

1. Introduction – Flash Flood in Bavaria in 2016 and the HiOS Project

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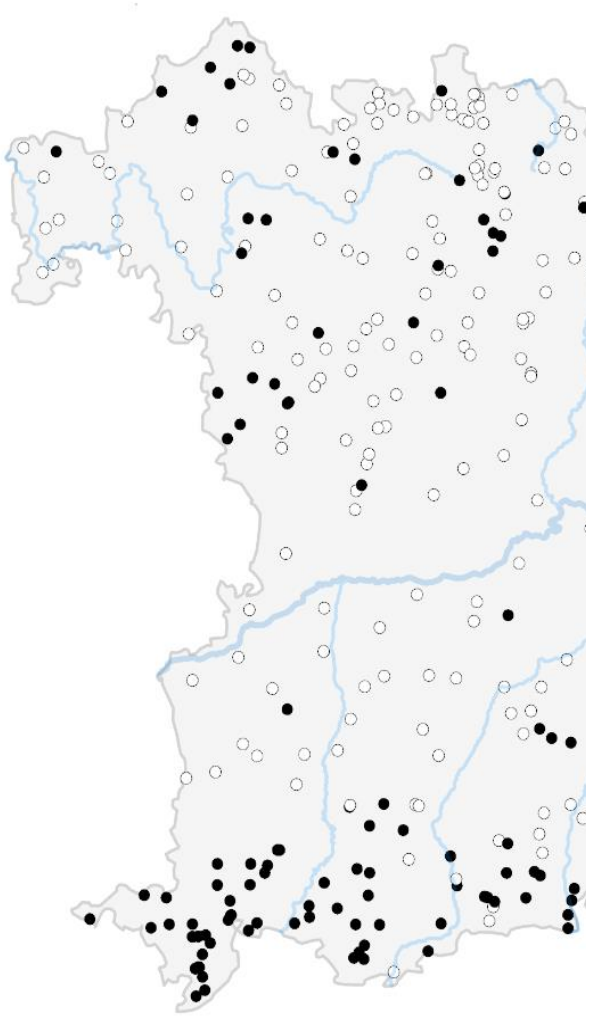

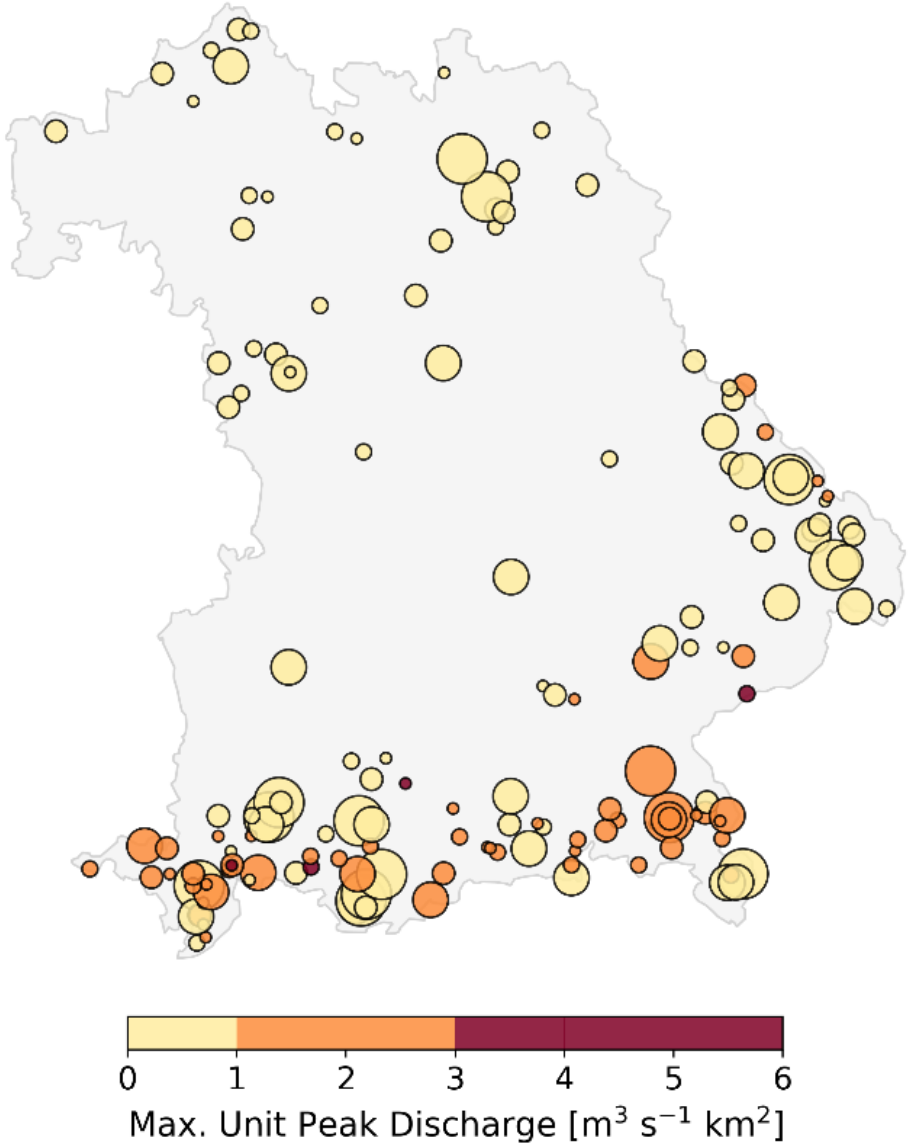

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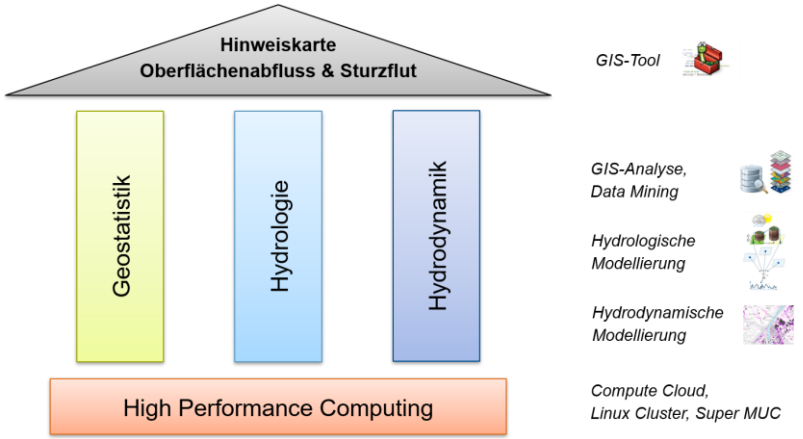
1. Overview of the HiOS Project

Project goals

- Development of a method for mapping surface runoff and flash floods by investigating triggering factors in a GIS application for Bavaria (*reference map*)
- Hazard investigation of 80 Bavarian municipalities for 4 precipitation scenarios based on coupled hydrological-hydrodynamic simulations (*hazard maps*)
- Development of a technical guideline for the hydrological and hydrodynamic simulation of surface runoff and flash floods

⇨ Interaction of the three fields **Geostatistics**, **Hydrology** and **Hydrodynamics**



2. **H**ydrodynamic **R**ainfall-**R**unoff **M**odelling

HRRM

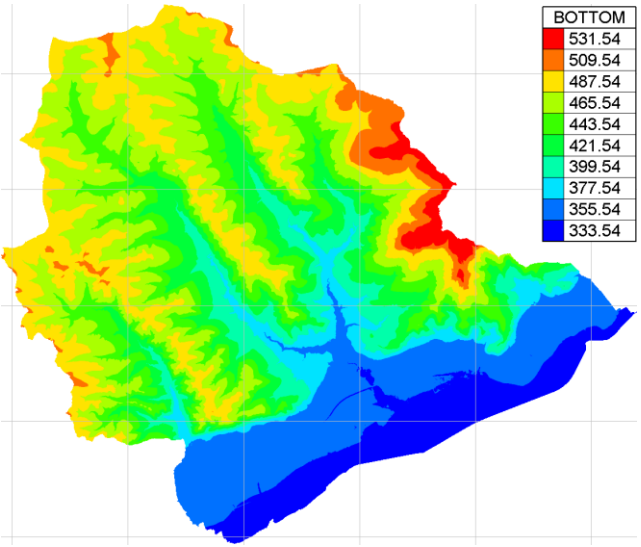
using the

SCS-CN–Method

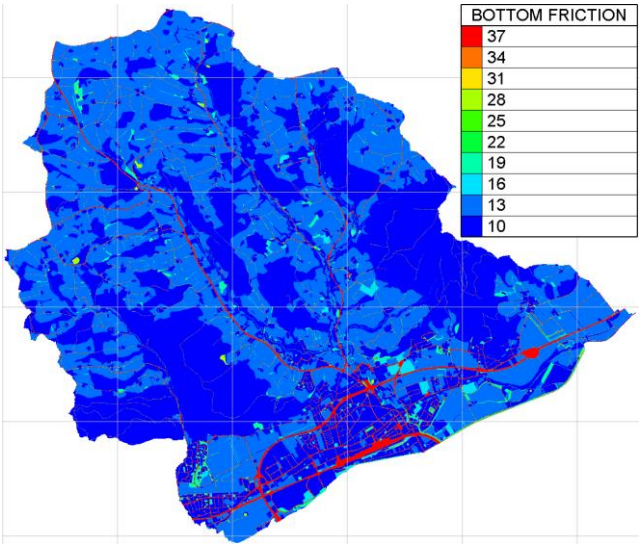
implemented in TELEMAC-2D

Inputdata Simbach a. Inn

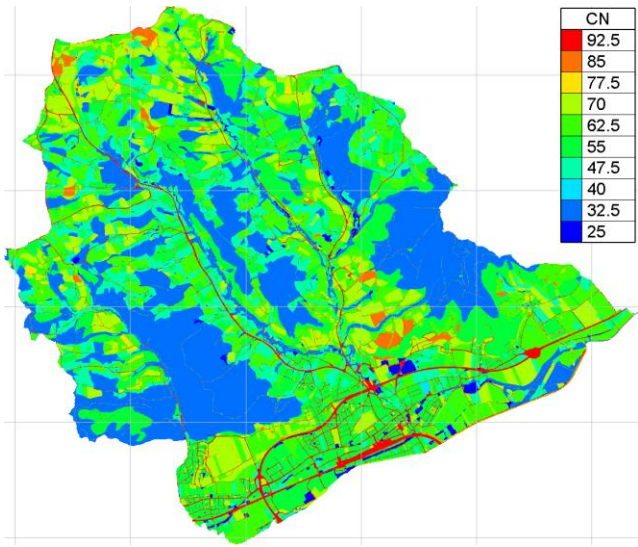
DEM [masl]



Bottom Friction kst [$m^{1/3}/s$]



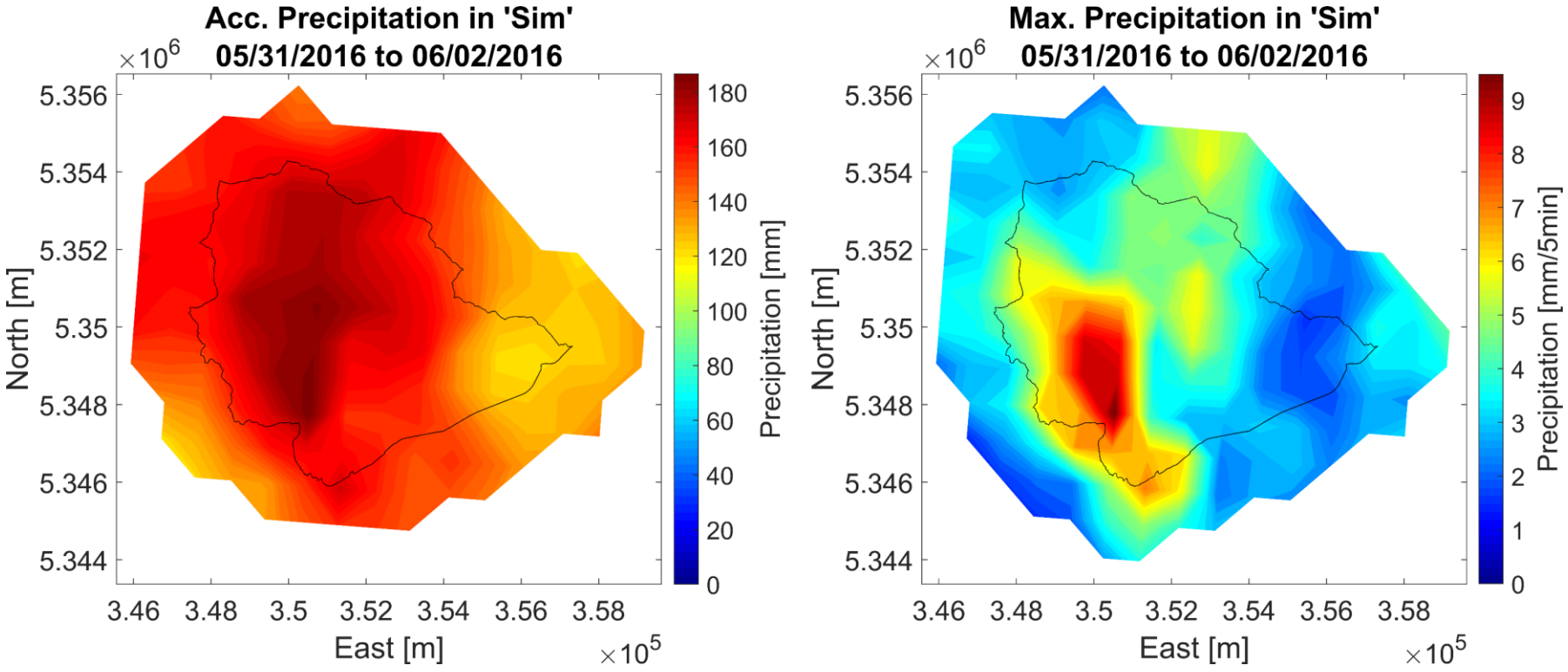
CN-Values [-]



2. HDRRM using SCS-CN-Method

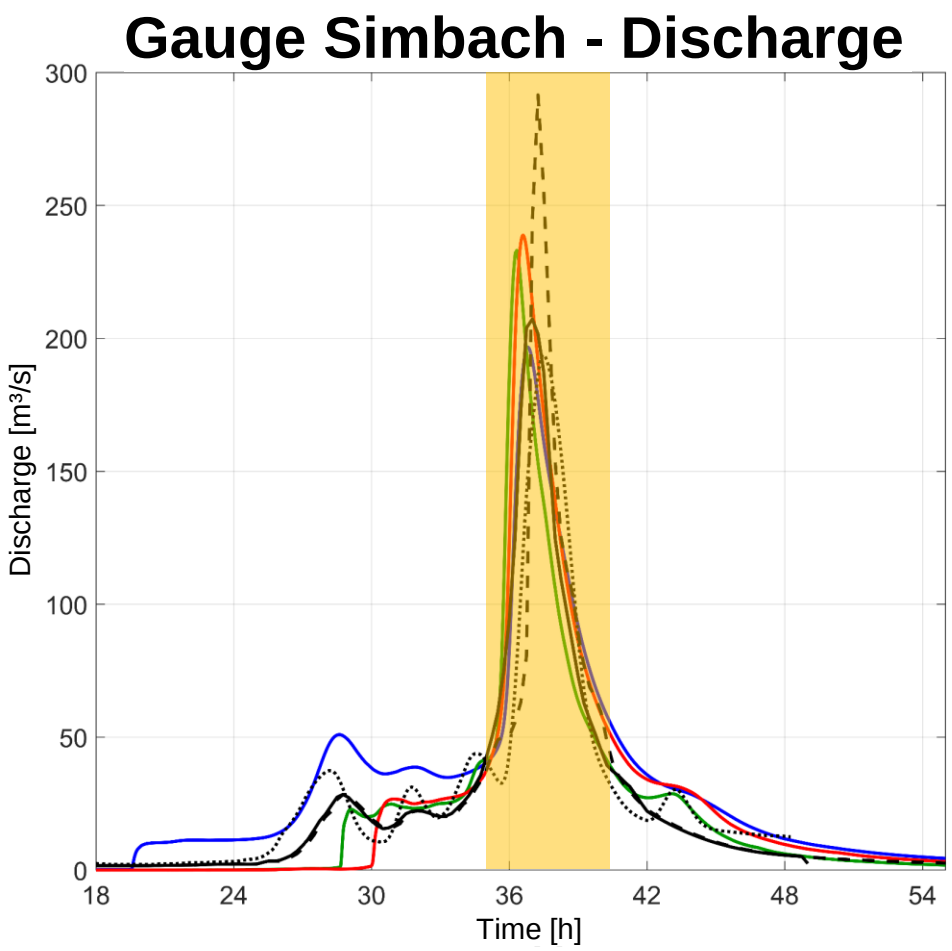
Max: $\sum$ = 188,6 mm I = 9,68 mm/h

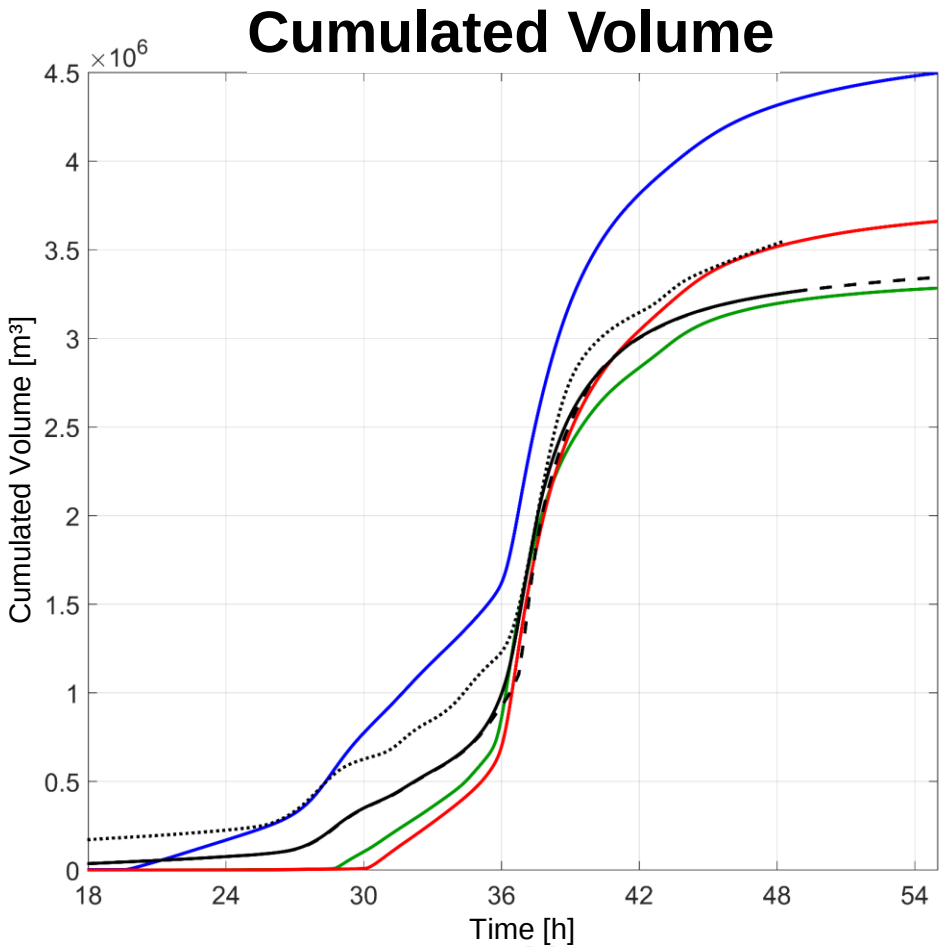
Min: $\sum$ = 122,5 mm I = 1,48 mm/h



Accumulated (left) and maximum precipitation (right) during the flash-flood event in Simbach a. Inn from 31.05.2016 00:00 to 02.06.2016 00:00

2. HDRRM using SCS-CN-Method





ConstKST_NoCN | FullKST_ModCN | HalfKST_CN | NASIM | Reconstructed | Stage-discharge relationship

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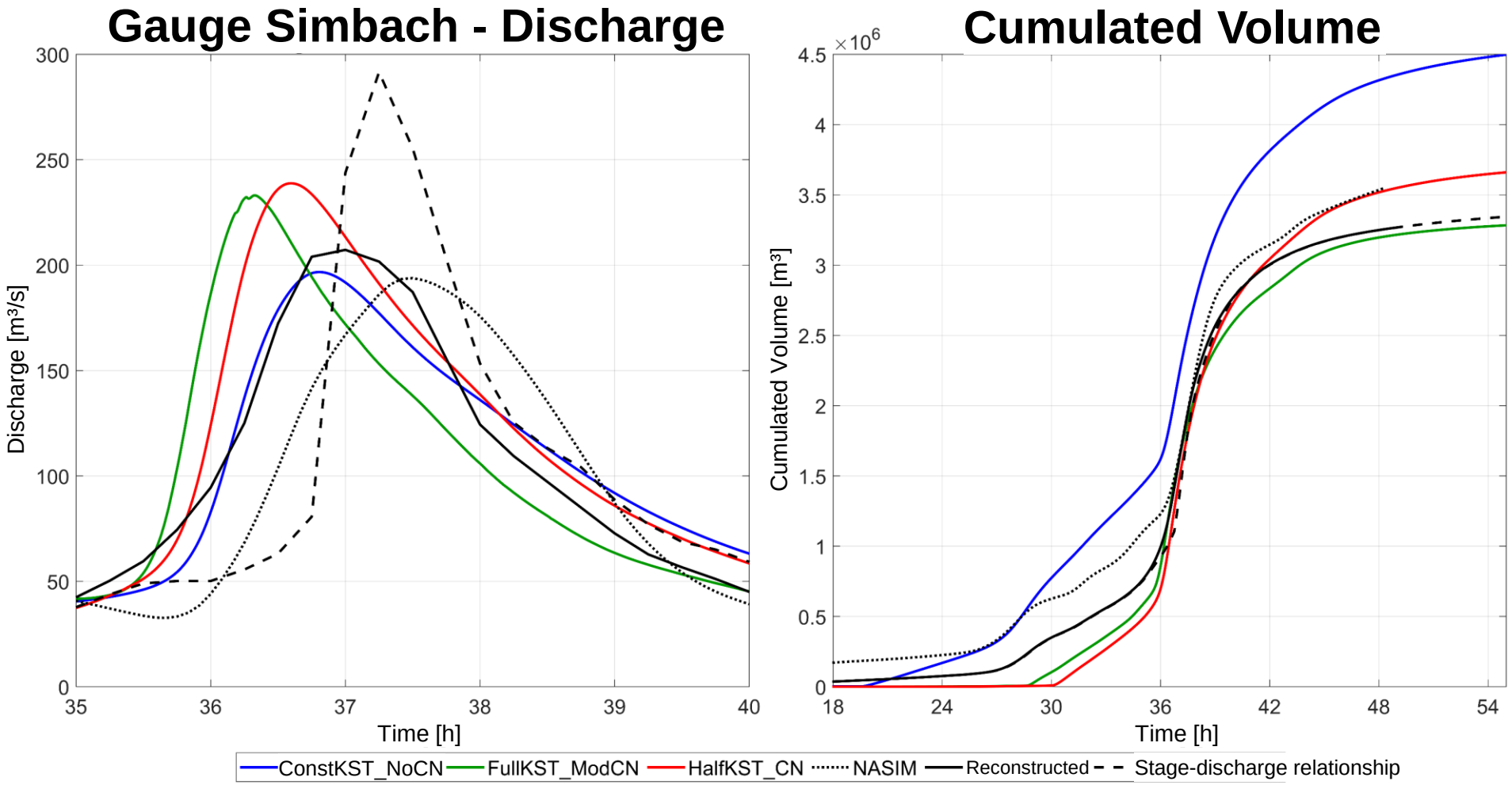

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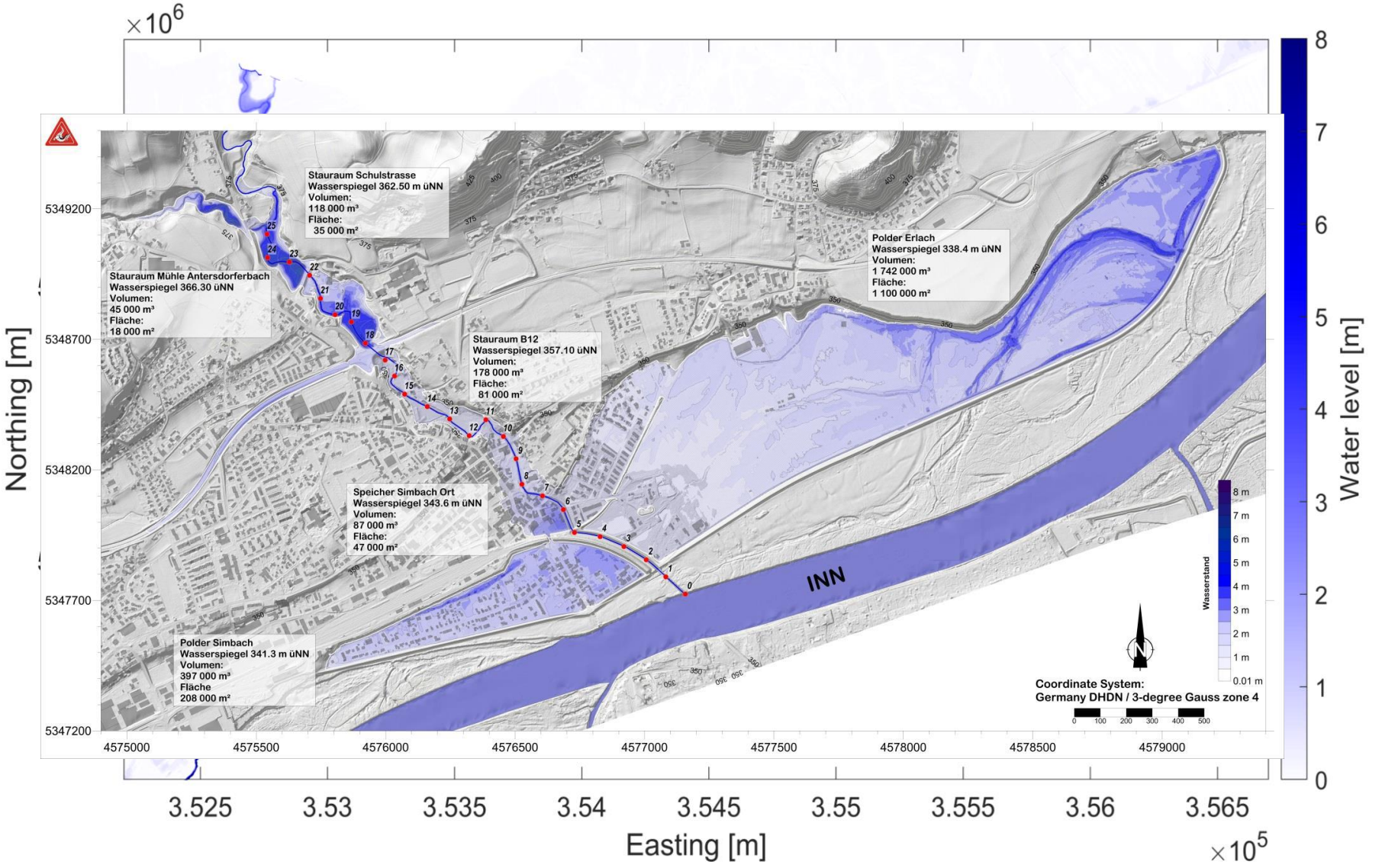

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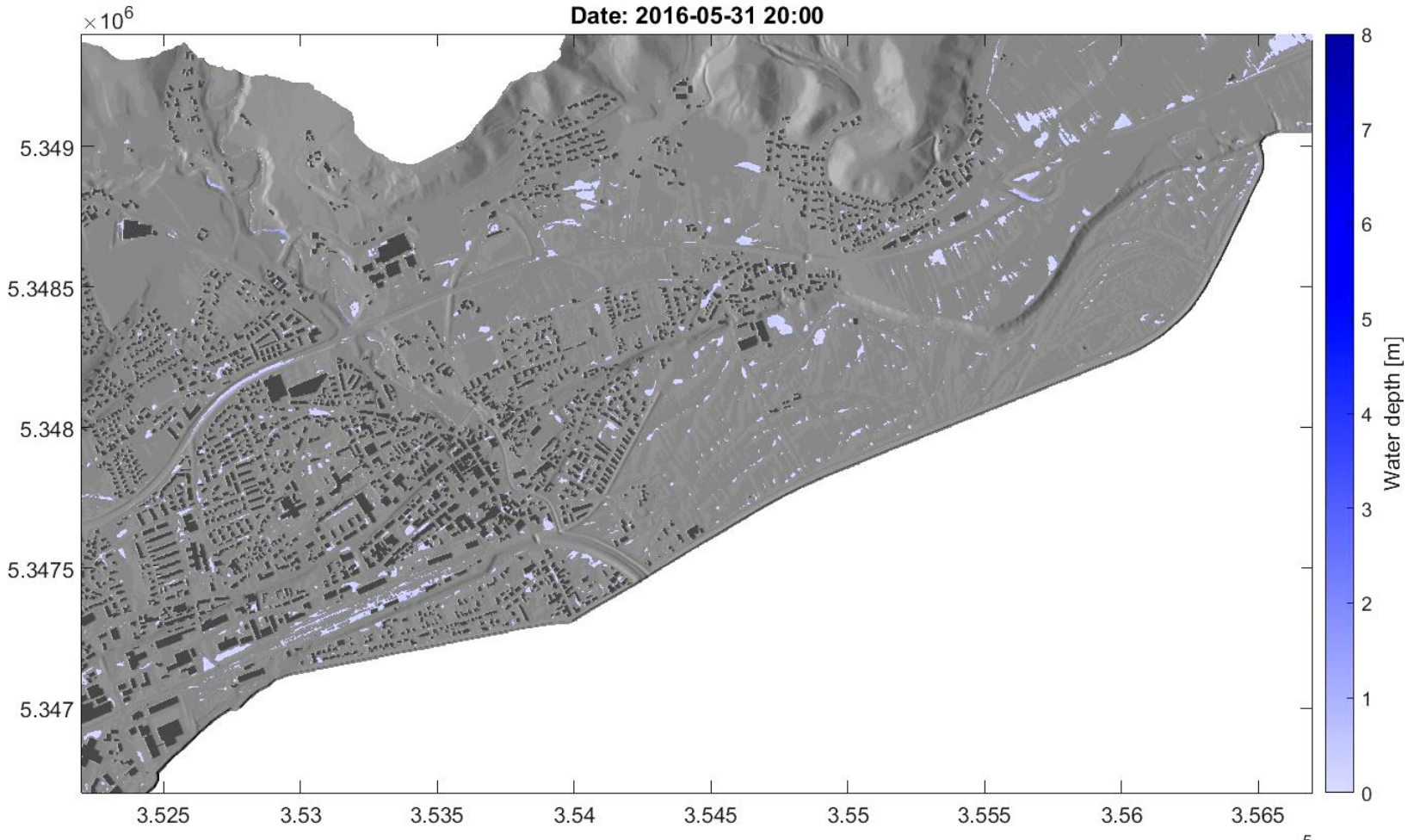
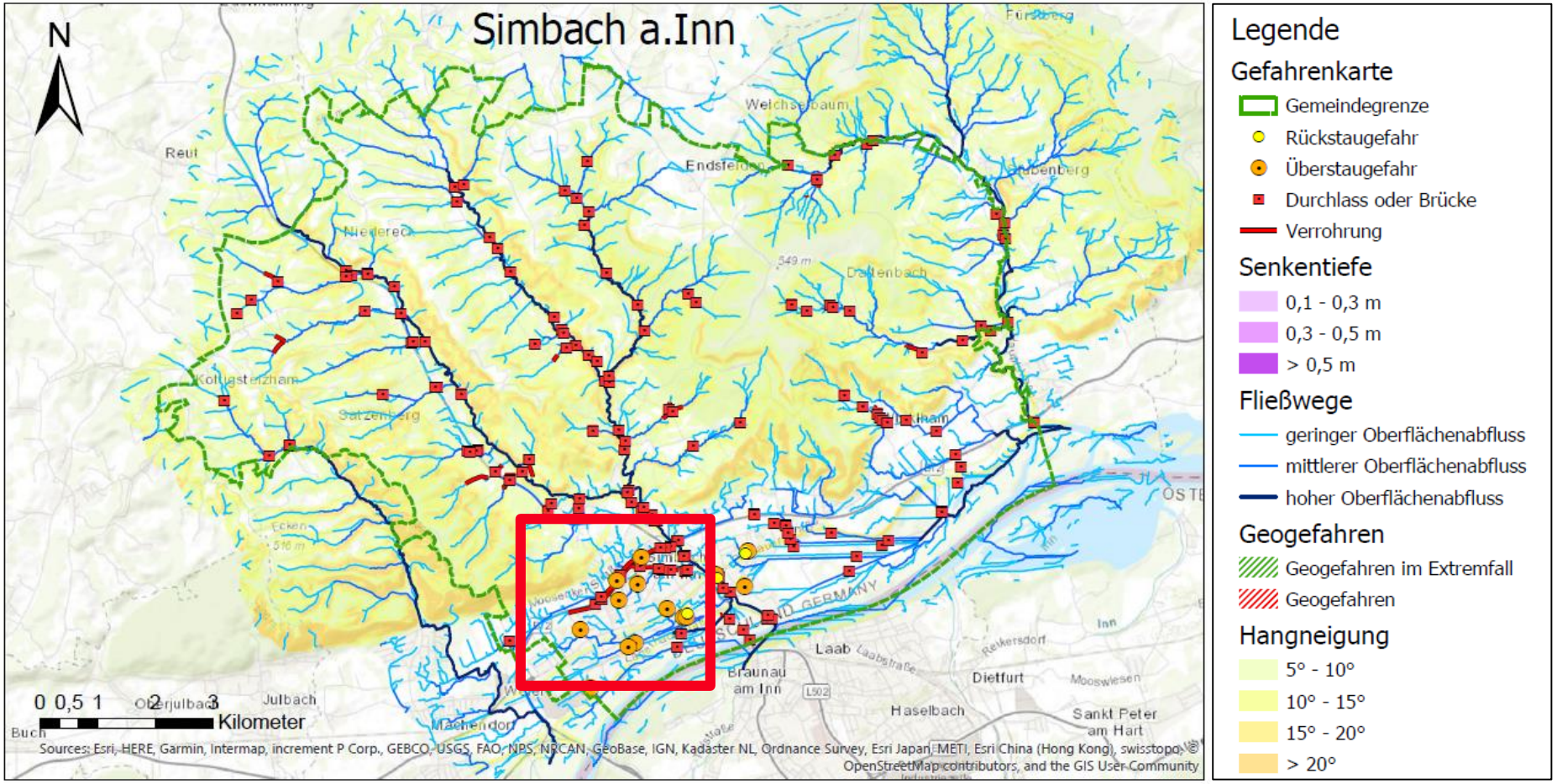


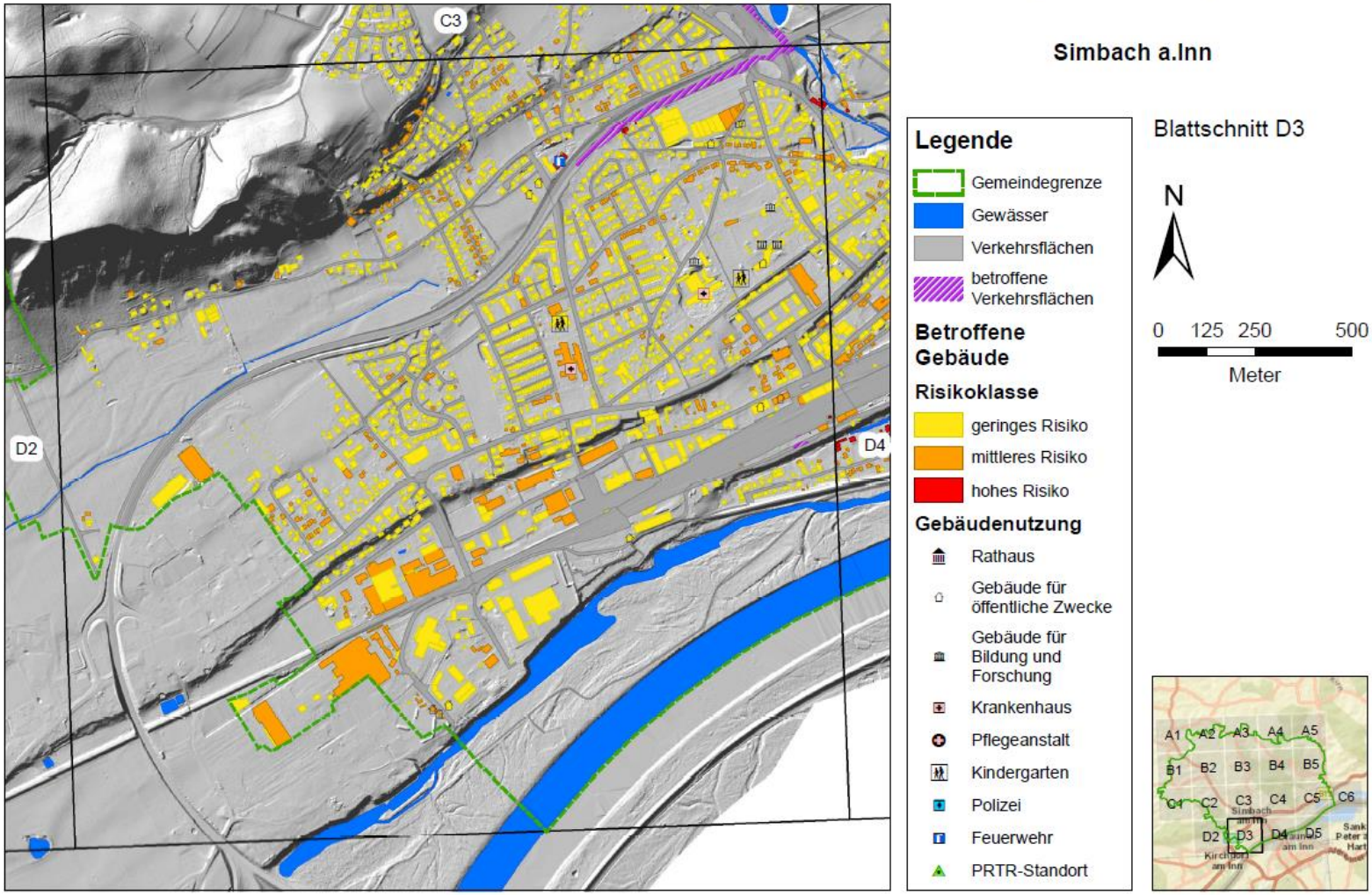
TELEMAC-2D		
CPU time / sim. time / nodes		
Simbach a. Inn	19 h (56 cores) 35 h sim. time	3.6 mio. nodes for 14.6 km², distance: 2 m

3. GIS & Geostatistics

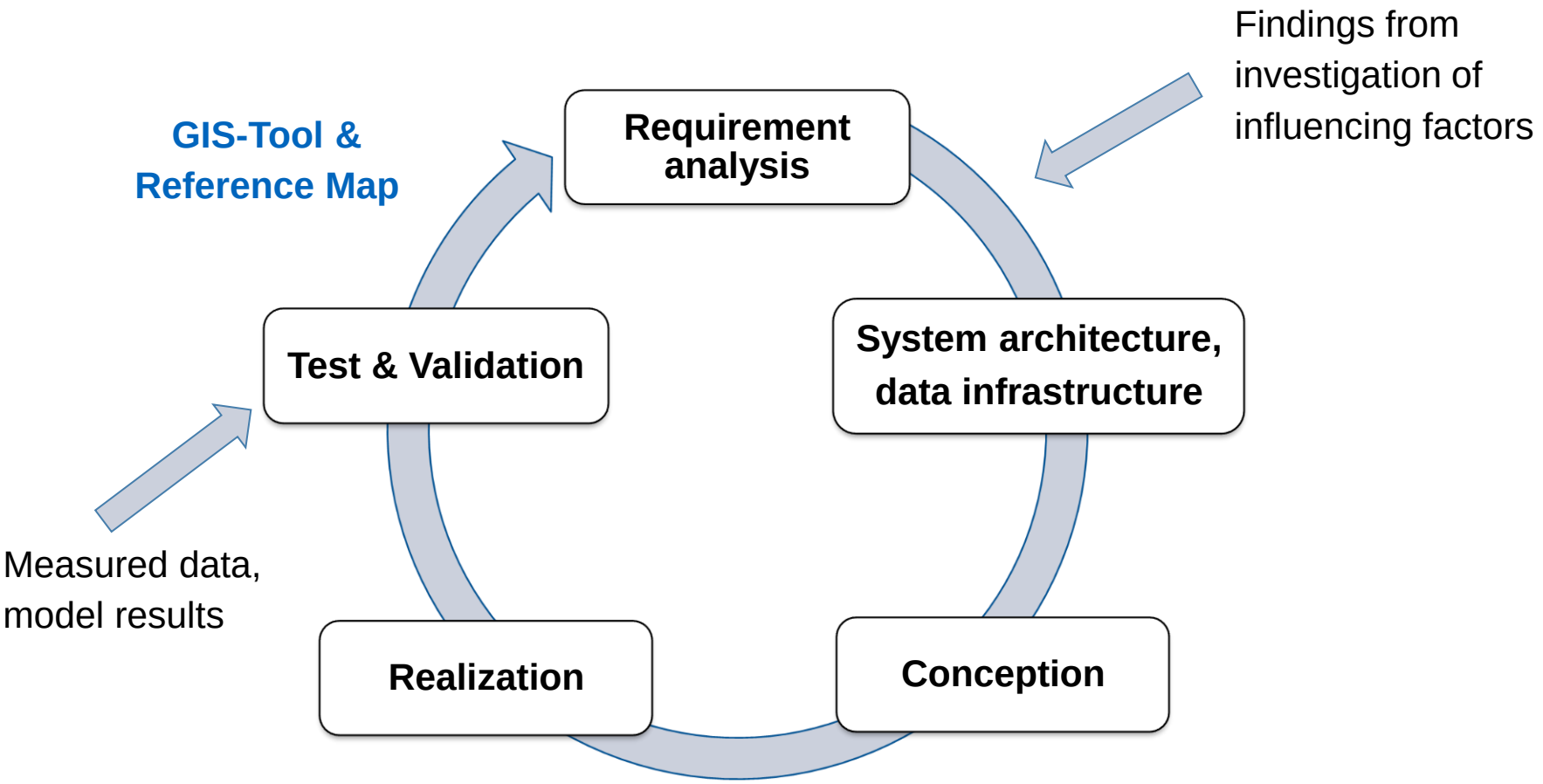
Presentation of Hazard Layers



Presentation of Hazard Layers



Next steps for creating reference maps for > 2000 municipalities in Bavaria



several iterations

Thank you for your attention!
Visit us on
www.hios-projekt.de/en

4. Conclusion & Outlook

- HDRRM using SCS-CN-Method offers great potential in combination with high resolution rainfall data (5 min. / radar)
- Coupling model with sewer system can reduce inundation in settlements (for lower return periods)

- A Rainfall Runoff Model is still needed for larger catchments
- A prototype flash flood reference map has been developed → will be applied for more than 2000 municipalities in Bavaria (07/2020)