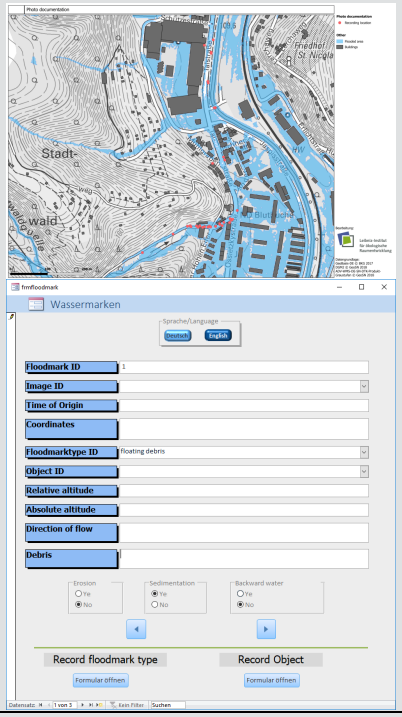
FACTSHEET RISK ASSESSMENT AND MAPPING ACTIVITIES

Heavy rain hazard map based on event documentation with FloodDocumenter for the City of Meißen (Germany)

Where was it implemented?

Germany, Saxony, Meißen

Map example:



Problem/background

Parts of the city of Meißen were affected by an intensive heavy rainfall event on May 27th 2014 that caused damages in the range of more than 4 million €. Future events of a comparable intensity in other parts of the city are possible. Currently there exist no information on the spatial distribution of water levels and flow velocities resulting from a heavy rain event. To help especially the city planning department when dealing with new developments, hazard maps are recognised as useful tools during the planning process.

To the time of the event there was no tool existing to document the effects and flow situation caused by the event. Such information is very valuable for preparing against future events as well as for the validation of hydrodynamic simulations.

Description of methodological background and outcomes

FloodDocumenter is a desktop database developed with Microsoft Access. It enables the user to document flood- or watermarks (table “watermarks”), that means all kind of traces of a past observed event that give hints where the water was flowing, which direction it took and how fast it was flowing. The primary information source are currently digital images connected to a table where information is stored about date and time of the photo, the geographic location as well as the viewing direction (table “images”).

Area and event characterisation

Area type Rural and urban	**Topography** Hilly
Land cover/land use distribution 30 % forest, 30 % cropland, 40 % built-up	**Event** Observed
Receptors Buildings and streets visualised in map	**Flood type** Flash flood with mud/debris component

Specifications of method/measure and data demands and outputs

Level of complexity	1
Adressed SPRC element	S/P/R/C
Method group	Empirical approach
Spatial scale(s) of application	Local, regional
Time scale/resolution	No timely dynamics
Input datasets (type and scale/resolution)	Terrestrial images
Output datasets (type and scale/resolution)	Point map with observations

<table>
<tr><th colspan="2">Description of implementation</th></tr>
<tr><td>Implementation
3/2018 to 6/2019</td><td>Users (reported/designated)
City planning department</td></tr>
<tr><td>Initiator/responsible
IOER/RAINMAN</td><td>Involved stakeholders
City planning department
Civil security department
Building department</td></tr>
<tr><th colspan="2">Lessons-learned</th></tr>
<tr><td>Main success factor:
The method documents the “real world situation” with flow patterns and damages as observed. There are no doubts possible compared to computer-based simulation methods.
Images and the containing information can be analysed long after the event has happened and traces of the event in the field have disappeared.</td><td>Main challenge:
Can be time consuming if some hundreds of images need to be recorded and described in the database.
Without coordinate information in the images, a good knowledge of the local situation is needed to find the location of an image.</td></tr>
<tr><td>Synergies/beneficial aspects:
The information in the images can be used to validate and calibrate hydrodynamic models.
Images of past events and their effects are very useful to communicate what might happen in the future.</td><td>Conflicts/Constraints:
The methods gives no direct information the dynamics of water levels and flow velocities, it only shows maximum levels.
The method is not able to “look into the future” and integrate the effects of potential hazard reduction measures.</td></tr>
<tr><th colspan="2">Key message to others starting with a similar task</th><th>Contact</th></tr>
<tr><td colspan="2">„Use this method to document what happened in the past and what should be avoided for the future. Images are very good storytellers and you can use them for risk communication.”</td><td>Dr. Axel Sauer
Leibniz Institute of Ecological Urban and Regional Development (IOER)
a.sauer@ioer.de</td></tr>
<tr><th colspan="3">References</th></tr>
<tr><td colspan="3">Heinke, J. (2018) Entwicklung von Software-Werkzeugen zur räumlich differenzierten Erfassung und Dokumentation der Folgen und Auswirkungen von Starkregenereignissen. Bachelorarbeit, HTW Dresden. Gutachter: Prof. M. Oczipka, Dr. A. Sauer.</td></tr>
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