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Engineering tools for building damage assessment under flood action – case study Saxony (Germany) 2004

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Realistic prognoses of damage caused by flood impact is an important, yet scientifically and methodically unsolved task, despite of its importance for disaster prevention or catastrophe management. Until now, primary and secondary damages resulting from flood events can only be roughly estimated (and their prediction shows large variations) which exacerbates systematic and directed relief efforts.

Following a procedure being originally developed for earthquake risk analysis it will be checked, whether methodical fundamentals can be adopted or have to be modified, and which parameters must be derived from damage surveys, data collection and/or field studies.

As an essential improvement to earlier studies, the influence of the building parameters are considered in addition to the inundation level. A differentiation and arrangement of the respective buildings into vulnerability classes allows the impact-dependent allocation of characteristic structural damages or humidity penetration ratios and, finally, enables the determination of the damage extent and the resulting total costs. As can be shown by case studies of the cities Eilenburg and Doebeln (river Mulde region in the province Saxony), both damage extent and damage distribution caused by the August 2002 flood can be interpreted on the basis of provided tools and data layers.

A key element of the procedure lies in the preparation of the required or, respectively, usable data in terms of damage functions. In addition to the inundation height as a measure of flood impact, the impact of structural parameters (building type, material of structural and non-structural elements, and the number of stories) will be considered.