



## **Rapid flood loss estimation driven by social media based inundation maps**

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During and shortly after floods information about affected areas and consequences of inundations are scarce. Rapid loss estimates provide important information for disaster response, recovery and reconstruction planning. Water level observations at gauges, remote sensing based flood masks, and volunteered geographical information are useful data sources in this respect. In particular, photos shared via social media with geo-location tags are valuable information as the photo contents may allow estimating the inundation depth, for instance from a park bench which is partially flooded. From a set of suitable photos in combination with ground elevation data, the inundated area, water surface, and consequently the inundation depth can be approximated via spatial interpolation and used immediately for loss estimation.

This research investigates the quality of social media based inundation depth maps and the suitability of these maps for the estimation of flood loss. A probabilistic flood loss model which uses information from 3D city models to describe building characteristics is used to estimate the direct damage to residential buildings on the micro scale. For the case of the June 2013 flood in Dresden (Germany) a set of social media based inundation depth estimates are available which are combined with digital elevation models of different spatial resolution (5 m, 10 m, and 25 m) to produce a set of inundation depth maps. A high quality inundation depth map based on aerial images and terrestrial surveying is used as a reference map. The sensitivity of flood loss estimates towards the social media based inundation maps and the reference map is analyzed. The results show that social media may provide useful quantitative information for the rapid mapping of inundation depths and estimation of flood losses. In particular, this information source may close the information gap when other data, e.g. water level observations or remote sensing based flood masks are lacking.