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Utilising social media contents for flood inundation mapping

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Data about the hazard and its consequences are scarce and not readily available during and shortly after a disaster. An information source which should be explored in a more efficient way is eyewitness accounts via social media. This research presents a methodology that leverages social media content to support rapid inundation mapping, including inundation extent and water depth in the case of floods. It uses quantitative data that are estimated from photos extracted from social media posts and their integration with established data. Due to the rapid availability of these posts compared to traditional data sources such as remote sensing data, areas affected by a flood, for example, can be determined quickly. Key challenges are to filter the large number of posts to a manageable amount of potentially useful inundation-related information, and to interpret and integrate the posts into mapping procedures in a timely manner. We present a methodology and a tool ("PostDistiller") to filter geo-located posts from social media services which include links to photos and to further explore this spatial distributed contextualized in situ information for inundation mapping. The June 2013 flood in Dresden is used as an application case study in which we evaluate the utilization of this approach and compare the resulting spatial flood patterns and inundation depths to 'traditional' data sources and mapping approaches like water level observations and remote sensing flood masks. The outcomes of the application case are encouraging. Strengths of the proposed procedure are that information for the estimation of inundation depth is rapidly available, particularly in urban areas where it is of high interest and of great value because alternative information sources like remote sensing data analysis do not perform very well. The uncertainty of derived inundation depth data and the uncontrollable availability of the information sources are major threats to the utility of the approach.