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The use of SHAVE and NWS flash flood reports for impact characterization and prediction

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Surveys have been undertaken in the US to report flash flood events, including details about their magnitude and spatio-temporal extent. The first dataset is National Weather Service (NWS) Storm Data, which consists of trained spotter reports. The second comes from the Severe Hazards Analysis and Verification Experiment (SHAVE) conducted at the National Severe Storms Laboratory (NSSL) in Norman, Oklahoma [Gourley et al., 2010]. The SHAVE dataset is based on a near real-time public survey. This study provides an impact classification and analysis of these datasets to 1) improve our understanding of the different types of flash flood impacts in terms of their magnitudes and spatiotemporal characteristics, and to 2) evaluate the skill of three tools used in the US for flash flood forecasting (Flash Flood Guidance [FFG], Gridded-FFG [GFFG] and the Distributed Hydrological Model-Threshold Frequency [DHM-TF]) to predict these impacts.

SHAVE impacts are analyzed in a spatio-contextual framework based on public responses to the survey questions, as well as GIS-sampled spatial attributes. This analysis showed consistent results, indicating that the impact classification was made correctly and that the SHAVE dataset (even when based on uncertain responses from the general public) is a reliable tool for flash flood characterisation. Then, for two extreme flash floods in Oklahoma, FFG, GFFG, and DHM-TF are evaluated on a YES/NO-forecast basis, but also as function of impacts, thus presenting a first example on the use of these impact-enhanced flash flood datasets.