

A new survey tool to assess pluvial damage to residential buildings

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Pluvial floods have caused severe damage to urban dwellings in Europe and elsewhere in recent years. These type of flood events are caused by storm events with exceptionally high rainfall rates, which lead to inundation of streets and buildings and are commonly associated with a failure of the urban drainage system. Therefore, pluvial floods often happen with little warning and in areas that are not obviously prone to flooding. With a predicted increase in extreme weather events as well as an ongoing urbanization, pluvial flood damage is expected to increase in the future.

So far little research was done on the adverse consequences of pluvial floods, as empirical damage data of pluvial flooding is scarce. Therefore, a newly developed survey tool to assess pluvial flood damage as well as the results of a comparison between two international pluvial flood case studies are presented. The questionnaire used in the two study areas was developed with the aim to create a harmonized transnational pluvial flood damage survey that can potentially be extended to other European countries. New indicator variables have been developed to account for different national and regional standards in building structure, early warning, socio-economic data and recovery. The surveys comprise interviews with 510 households in the Münster area (Germany) and 349 households in Amsterdam (the Netherlands), which were affected by the heavy rainfall events on July 28 2014. The respondents were asked more than 80 questions about the damage to their building structure and contents, as well as on topics such as early warning, emergency and precautionary measures, building properties and hazard characteristics.

A comparison of the two surveys revealed strong similarities concerning damage reducing effects and the popularity of precautionary measures, besides significant differences between the mean water levels inside the house as well as the median of the building structure and content damage. A comparison between the relative damage contributions for different entry points of water into the house indicates an effect of regional distinctions in building topology on the total damage. The results of this comparison give important insights for the development and transferability of pluvial flood damage models.