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## Assessment of pluvial flood exposure and vulnerability of residential areas

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### Abstract

Floods are a large problem around the world but the understanding of flood risks is hampered by a lack of data and knowledge about flood losses at different scales. The objective of this study was two-fold 1) to assess available temporally and spatially distributed data of rain events and flood damages during those events, regarding the usefulness of these data to quantify precipitation-related hazards and consequences, and 2) to assess the potential for deriving reliable damage functions based on the information compiled under objective 1. The study examined 2140 individual observations of insurance payouts for residential buildings caused by 49 different rainfall events in Sweden. Radar data were used to extract daily precipitation amounts and to capture the spatial and temporal distribution of the rainfalls. This study demonstrates that including the duration of a rainfall, as opposed to only the aggregated amount of daily precipitation, is highly important in estimating the extent of damage. Furthermore, higher rainfall intensities increased the number of damaged properties but had less influence on the mean damage cost per property. In order to draw conclusions from damages at the micro level, both availability and detail level of data must be improved.

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Keywords: Insured flood losses; flood damage; pluvial flood damage; data availability; flood risk assessment

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### Introduction

Floods are the most common natural hazard in the world [1]. It causes serious losses in terms of lives and damage to buildings and infrastructure [2]. One of the most important indicators of the consequences of such hazards is the level of economic losses which is usually

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