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Methodology to improve process understanding of surface runoff causing damages to buildings by analyzing insurance data records

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Several case studies in Switzerland highlight that many buildings which are damaged by floods are not located within the inundation zones of rivers, but outside the river network. In urban areas, such flooding can be caused by drainage system surcharge, low infiltration capacity of the urbanized landscape etc. However, in rural and peri-urban areas inundations are more likely caused by surface runoff formed on natural and arable land. Such flash floods have very short response time, occur rather diffusely and, thus, are very difficult to observe directly. In our approach, we use data records from private, but mostly from public insurance companies. The latter, present in 19 out of the total 26 Cantons of Switzerland, insure (almost) every building within the respective administrative zones and, in addition, hold a monopoly position. Damage claims, including flood damages, are usually recorded and, thus, data records from such public insurance companies are a very profitable data source to better understand surface runoff leading to damages.

Although practitioners agree that this process is relevant, there seems to be a knowledge gap concerning spatial and temporal distributions as well as triggers and influencing factors of such damage events. Within the framework of a research project, we want to address this research gap and improve the understanding of the process chain from surface runoff formation up to possible damages to buildings.

This poster introduces the methodology, which will be applied to a dataset including data from the majority of all 19 public insurance companies for buildings in Switzerland, counting over 50'000 damage claims, in order to better understand surface runoff. The goal is to infer spatial and temporal patterns as well as drivers and influencing factors of surface runoff possibly causing damages. In particular, the workflow of data acquisition, harmonization and treatment is outlined. Furthermore associated problems and challenges are discussed. Ultimately, the improved process understanding will be used to develop a new modeling approach.