

How does the local context influence flood impacts?

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Flood hazard and vulnerability depend on factors spanning over multiple scales, from the object level (e.g., building exposure, private precautionary measures) up to the regional scale (e.g., climatic conditions, construction standards). In micro-scale flood impact assessment, the regional factors are generally reflected in the choice and parametrization of a particular damage model, while the object-level factors are reflected in the model input data. In this study, we explore the influence of factors acting at an intermediate scale, referred to as the “local context”. Examples of such factors include the degrees of surprise and of overwhelming at the municipality level.

The Vesdre catchment in Belgium was considered as a case study. It was severely affected by the 2021 summer floods in north-west Europe. We focus on six municipalities in this catchment, which are assumed to be in the same “regional context” (same climate, similar landscape, similar macro-economic characteristics). In these six municipalities, field interviews have been conducted to collect information on hazard characteristics (e.g., inundation depth, flood duration), building vulnerability features (e.g., construction type), coping capacity (early-warning, precautionary measures) as well as flood impacts (types of building damages and monetary losses). The respondents are about 300 private households, with roughly half of them having provided data on monetary losses.

We used logistic regression to classify the monetary losses induced by damage to building and content. Results show that the building footprint area, the inundation depth, and the municipality are important determinants of monetary losses (area under the ROC curve above 0.84). The significant influence of municipality hints at a possible role of the local context in worsening or alleviating flood impacts. Though, the municipality being a significant determinant of monetary losses does not reveal the underlying causal link. Therefore, we are currently exploring the influence of variables characterizing the local context. These variables include proxies for the degree of surprise and the degree of overwhelming of the communities. The former is evaluated as the ratio of the number of affected buildings in a municipality to the number of buildings situated in a flood hazard area in the same municipality, while the latter is taken as the ratio of the number of affected buildings in a municipality to the total number of buildings in the same municipality. Results will be presented and discussed at the symposium.