FLOOD EXPOSURE AND VULNERABILITY ESTIMATION METHODS FOR RESIDENTIAL AND COMMERCIAL ASSETS IN EUROPE

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Exposure

➢ A model for estimating residential building height.
➢ It is a basis of obtaining useful floor space area, which is then used to estimate exposure.

Vulnerability

➢ A Bayesian Network (BN)-based damage model based on post-disaster surveys from Germany, the Netherlands and Italy.
➢ Separate estimates for building structure (brloss) and contents (crloss)
➢ Five predictors: water depth (wst), velocity (v), return period (rp), floor space area of building (fsb), regional income level (NUTS2_income)

Damages

➢ Validated for case study of 2010 coastal flood in France (Xynthia)
➢ Compared with 10 alternative models.

➢ Validated for three case studies of past floods in France, Saxony (Germany) and Italy
➢ Compared with six alternative models.

➢ Damage modeling and validation for both sectors for SaferPlaces case studies: Cologne, Pamplona & Rimini is in progress

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Residential sector

Standard exposure values per floor space area

Residential buildings
Household contents

Commercial sector

Commercial exposure in SaferPlaces case studies

A BN-based damage model based on post-disaster surveys from Germany
➢ Separate estimates for building structure (brloss) and equipment/machinery (erloss)
➢ Five predictors: water depth (wst), inundation duration (d), precautionary measures index (pre_ratio), regional GVA per capita (NUTS3_GVApC), regional GFCF per employee (NUTS2_GFCFpe)

Commercial assets in the country by sector are disaggregated by regional gross value added and footprint area of buildings with a particular function (based on OpenStreetMap)

Validated for three case studies of past floods in France, Saxony (Germany) and Italy
➢ Compared with six alternative models.

Validated for 2010 coastal flood in France (Xynthia)
➢ Compared with 10 alternative models.

Using our exposure estimates for both sectors resulted in better performance of most flood models than JRC exposure estimates

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SAFERPLACES – Improved assessment of pluvial, fluvial and coastal flood hazards and risks in European cities as a mean to build safer and resilient communities

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