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EXPLORATORY RESEARCH PROJECT 2019

Multi-risk Interactions Towards Resilient and Sustainable Cities (MIT-RSC)

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Project Overview and Objectives

MIT-RSC **aims at developing of an integrated risk assessment framework for measuring impacts of multiple natural hazards in urban areas**, based on the comprehensive analysis of their direct and indirect interrelations and consequences. Such a framework is intended to constitute a useful decision-support tool, providing a singular standardised metric to measure aggregated urban risks, and to accurately investigate the potential impact of pre- and post-disaster strategies.

The developed framework will be tested and used by the Lisbon Metropolitan Region, which will also disseminate it through other public and private operators boosting thus the project's impact.

Tasks and Methodology

The MIT-RSC project includes six tasks, which are directly associated with three sub-objectives:

- **Creation of three risk evaluation modules**, each of which dedicated to one of the three components of risk: a hazard model, an exposure module, and a vulnerability module;
- **Development of pre- and post-disaster modules** to account for disaster risk management practices;
- **Technical validation** of the draft version of the framework and application to the Lisbon Metropolitan Region.

Hazard Module

Involves modelling the potential hazardous events from the combination of five variables related with their frequency, intensity and impact:

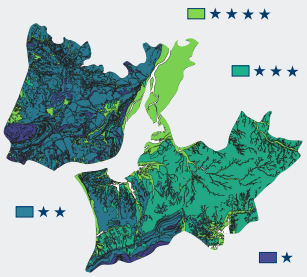
H1: Probable Maximum Event (PME)

H2: Frequent Event (FE)

H3: Annual Exceedance Probability of the PME

H4: Annual Exceedance Probability of the FE

H5: Spatial Scale of the assessment



Exposure Module

Identification and characterisation of the elements at potential risk, including population and buildings. CENSUS 2011 has been used as main data source.

Vulnerability Module

Classification of the 449,573 buildings located within the Lisbon Metropolitan Area according to four levels of vulnerability to earthquake, flood and landslide events.

Implementation

When established and validated, **the new multi-hazard assessment and risk mitigation framework will be integrated into a Geographic Information System (GIS) tool developed in the open-source software QGIS**. Since it will be made freely accessible to end-users, this tool will constitute an integrated open data platform with the ability to combine updatable georeferenced cartography with the full range of outputs produced in the MIT-RSC project, including fragility, sociodemographic, risk, and disaster management results.

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