

Earth-Observation based mapping and monitoring of exposure change in the megacity of Istanbul: open-source tools from the MARSITE project

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Abstract

The EU FP7 MARSITE project aims at assessing the “state of the art” of seismic risk evaluation and management at European level, as a starting point to move a “step forward” towards new concepts of risk mitigation and management by long-term monitoring activities carried out both on land and at sea.

Spaceborne Earth Observation (EO) is one of the means through which MARSITE is accomplishing this commitment, whose importance is growing as a consequence of the operational unfolding of the Copernicus initiative. Sentinel-2 data, with its open-data policy, represents an unprecedented opportunity to access global spaceborne multispectral data for various purposes including risk monitoring.

In the framework of EU FP7 projects MARSITE, RASOR and SENSUM, our group has developed a suite of geospatial software tools to automatically extract risk-related features from EO data, especially on the exposure and vulnerability side of the “risk equation” [1]. These are for example the extension of a built-up area or the distribution of building density. These tools are available open-source as QGIS plug-ins [2] and their source code can be freely downloaded from GitHub [3].

A test case on the risk-prone mega city of Istanbul has been set up, and preliminary results will be presented in this paper. The output of the algorithms can be incorporated into a risk modeling process, whose output is very useful to stakeholders and decision makers who intend to assess and mitigate the risk level across the giant urban agglomerate.

Keywords – Remote Sensing, Copernicus, Istanbul megacity, seismic risk, multi-risk, exposure, open-source

References

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