Application of Earth observation and 3D geospatial data in disaster monitoring

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Abstract: (250 to 500 words: for each heading use the bullet points or narrative - the submission including graphics should not exceed one page)

Problems - Issues / Challenges-Needs
Geospatial data and information are becoming a crucial support in disaster response and risk management. Besides the answer on “what happened”, the information on where it happened as well as the spatial extent of the event is of the utmost importance. Two main challenges related to geospatial information support in disaster response and risk management are addressed in this presentation: (1) the complexity and dynamics of built and natural environment require three-dimensional geospatial data models, with the additional temporal dimension to better monitor, control, and manage the dynamics; (2) technological advances have driven the evolution and reduced the costs involved in developing and processing of geospatial data and information.

Solutions - Methods / Results - Findings
Recent advancements in Earth observation and geoinformatics offer several solutions that can be applied to emergency response systems. We will demonstrate the use of a combination of 3D city and landscape models and flood detection data from satellite images. The flooded areas can be detected using free and open data from the European Union’s Copernicus program. Our application uses Sentinel-1 SAR imagery and produces a spatial layer of water bodies immediately after the images are available. The advantage of using radar data compared to aerial and optical satellite imagery is the ability to provide reliable results at night and in cloudy weather conditions, usually present in case of floods. The result of processing is a vector layer delivered via a web geospatial information system (GIS) and as a service. It can be later combined with a georeferenced 3D city and landscape model produced from other data sources, e.g. laser scanning, giving the water depth information, very important for disaster response action planning and damage assessment.

Novelty - Value / Relevance to …
The fully automatic real-time water bodies detection system, developed together with Space-SI and GeoCodis, is operational for the area of Slovenia and has been demonstrated in several European and African regions. The inclusion of 3D city models is relevant for damage assessment, disaster response planning, and damage prevention.

Forum statement
Real time EO data processing and 3D modelling are essential tools in disaster risk management in built environment.

Keywords: (up to 5 keywords)
Earth observation; Copernicus; Sentinel; 3D modelling; Geoinformatics

Graphics: (please use the gray area bellow for representative graphics or graphical summary: select the gray area bellow and paste your graphics)