Mapping seismic intensity using twitter data; A Case study: The February 26th, 2014 M5.9 Kefallinia (Greece) earthquake

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In this paper we present an innovative approach for the development of seismic intensity maps in minimum time frame. As case study, a recent earthquake that occurred in Western Greece (Kefallinia Island, on February 26, 2014) is used. The magnitude of the earthquake was M=5.9 (Institute of Geodynamics - National Observatory of Athens). Earthquake's effects comprising damages in property and changes of the physical environment in the area.

The innovative part of this research is that we use crowdsourcing as a source to assess macroseismic intensity information, coming out from twitter content. Twitter as a social media service with micro-blogging characteristics, a semantic structure which allows the storage of spatial content, and a high volume production of user generated content is a suitable source to obtain and extract knowledge related to macroseismic intensity in different geographic areas and in short time periods. Moreover the speed in which twitter content is generated affects us to have accurate results only a few hours after the occurrence of the earthquake.

The method used in order to extract, evaluate and map the intensity related information is described in brief in this paper. At first, we pick out all the tweets that have been posted within the first 48 hours, including information related to intensity and refer to a geographic location. The geo-referencing of these tweets and their association with an intensity grade according to the European Macroseismic Scale (EMS98) based on the information they contain in text followed. Finally, we apply various spatial statistics and GIS methods, and we interpolate the values to cover all the appropriate geographic areas.

The final output contains macroseismic intensity maps for the Lixouri area (Kefallinia Island), produced from twitter data that have been posted in the first six, twelve, twenty four and forty eight hours after the earthquake occurrence. Results are compared with other intensity maps for same earthquake, which have been published by other institutions around the world, as well as with previous earthquake isoseismal maps for the same area.