



## **Remotely sensed detection of earthquake damage in urban areas: validation techniques**

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After a damaging seismic event, especially if the earthquake epicentre is located in regions where main communication systems should be probably damaged, a fast and draft map of the hit urban areas can be very useful, for example, to planning civil protection interventions. A combination of pre- and post-event optical images classification and InSAR techniques can be used to detect different levels of damage and their distribution. Our goal is to define a validation procedure of the maps derived from satellite processed data and quantify the level of precision reached in the recognition of damaged buildings. To perform a pixel by pixel classification or to assess damage within homogeneous extended area starting from remotely sensed data, different procedures for damage assessment have been successfully tested by comparing remotely change detection features averaged within homogeneous blocks of buildings and ground survey results. In this work we focus on the 1997-1998 Colfiorito, Italy, earthquake sequence. To validate the findings and enhance the capabilities of this methodology we compare remote sensing data with ground truth data collected after seismic events during a survey campaign in the epicentral area. This kind of analysis can provide indications for the correct use of information derived from satellite data, and allow us to realize specific GIS oriented tools with related georeferenced database. Moreover it allows defining protocols and procedures to achieve, in a best way, georeferenced data of post-earthquake precise damage information.