



Assessment of systemic vulnerability in landslide and flood prone areas

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This paper deals with the conceiving, the development and the subsequent validation of an integrated numerical model for the assessment of the systemic vulnerability in complex and urbanized areas subject to landslide and flood risk. The proposed model, which is based on the studies of Tamura et al. (Eu. J. Oper. Res., 2000) and Pascale et al. (Ad. Geo., 2007), considers the vulnerability not as a characteristic of a particular element at risk, but as a peculiarity of a complex territorial system, in which the different elements are reciprocally linked in a functional way. Therefore, it allows pointing out, in selected areas, the elements which mostly experience a functional loss making the whole system critical. This characteristic makes the proposed model effectively able to support a correct territorial planning and a suitable management of the emergency following natural disasters which trigger or mobilize again mass movements. This model, anchored in a GIS system, has been characterized by the following phases:

1. The first phase was aimed at the topological characterization of the studied territorial system and the assessment of the scenarios in terms of spatial landslide and flood hazard.
2. The second phase has been characterized by the analysis of the direct consequences of a scenario event on the system;
3. The third phase has been focused on the definition of the assessing model of the systemic vulnerability in areas subject to landslide and floods;
4. The forth phase aimed at the description of possible trigger of further risks begin-

ning from a particular event;

5. The fifth phase aimed at spatial analysis of the critical elements of the system.

The proposed model has been applied with good results on the territory of the city of Potenza, which is well known for being characterized by a critical hydrogeological context.