



## **Flood and landslide multiple hazard and the effect on the road network (Southern Italy)**

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Intense and/or prolonged rainy periods can lead to the development of territorial crisis during which landslides and floods simultaneously trigger on wide areas. During these crises the possibility to manage the emergency phases and ensure the maintenance of man activities which are usually carried out in the hit area is mainly tied to the road network efficiency.

Unfortunately, in areas characterized by rugged morphology, long road tracks pass through unstable lands which are frequently affected by landslide phenomena. At the same time, on coastal areas the road network is most intensely exposed to the action of rivers, especially if the bridges crossing them are not enough wide to convey also ordinary river floods.

This situation can be easily recognized in many areas all around the world: in the present work we present the methodological approach and an exemplificative case study on a test area located in Calabria (South Italy). Here, also because of a low efficiency of the road network, during heavy rainfall periods, landslides and floods cause several traffic interruptions which hinder or set back the movements of people and stuffs and, in the most severe cases, make difficult emergency management actions.

Data concerning damage caused to the road network by landslides and floods have been extracted from a wide archive containing data on historical landslides and floods occurred through the past centuries all over the region. For the selected study area these data have been uploaded in a GIS, in order to obtain the phenomena/damage distribution during the most severe rainfall events occurred through the past century. Data concerning triggering rainfall, extracted from a regional rainfall database, have been treated in order to schematize some main models of rainfall/phenomena distribution which occurred in the past and can be used for preventive measures.

The results of this activity can be exploited for practical purposes, to define scenarios and strategies for risk management, to suggest priorities in policy towards disaster mitigation and preparedness and to predispose defensive measures and civil protection plans ranked according to the type's situation to cope with.