



Landslide risk assessment and post-crisis management along the coast of Pays d'Auge, Normandy, France

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The coastal slopes of the Pays d'Auge plateau (Calvados, Normandy, France) are regularly affected by landslides triggered by rainfall. The study area between Trouville and Honfleur is subjected to slow continuous displacements (5-10 cm.y⁻¹) since several centuries. This low velocity pattern is perturbed by episodes of acceleration with metric displacements and the development of large cracks and scarps. Four major events have occurred (1982, 1988, 1995 and 2001) in the last thirty years.

These landslides are located along a very touristic coastal area where an increasing land pressure is observed. The landslides have induced direct damages to infrastructures (roads, buildings) and indirect damages to the economical activity.

Impacts of landslide hazard can be evaluated for several assets. The main example is the Departemental road connecting major municipalities which is damaged by the landslides at several places (progressive subsidence, crack development and sometimes brutal failures). As indirect consequences, these damages require annual repairs of several thousands euros and the closure of shops associated to the destruction of touristic accomodations. Since the event of 1982, about thirty houses have been destroyed and the economic activity of the municipalities were directly affected.

The objective of this work is to present the risk assessment carried along the coast through the classification of the elements at risk and the evaluation of the stakeholders' responses to the damage since 30 years.

The methodology consists (1) in identifying the changes in landcover and in the elements at risk (location, type, function, damages), (2) in analysing the direct and indirect consequences observed in the past (period 1982-2001) in terms of building destruction, road deformation, cost depreciation of assets and economic losses and in (3) proposing an assessment of the future potential consequences by using a semi-quantitative model. To carry out the assessment, each element at risk has been categorized according to direct and indirect damages (human, structural, functional) and the possible degree of loss have been estimated by computing a value index for each element.

Finally, strategies for management and the planning policies adopted by stakeholders (implementation of risk plans, construction of mitigation works, conversion of land use) since the event of 1982 are described, and their efficiency are evaluated.