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Interdisciplinary approach for disaster risk reduction in Valtellina Valley, northern Italy

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Inside the framework of the European research network Mountain Risks, an interdisciplinary research group has been working in the Consortium of Mountain Municipalities of Valtellina di Tirano (northern Italy). This area has been continuously affected by several mountain hazards such as landslides, debris flows and floods that directly affect the population, and in some cases caused several deaths and million euros of losses.
An aim of the interdisciplinary work in this study area, is to integrate different scientific products of the research group, in the areas of risk assessment, management and governance, in order to generate, among others, risk reduction tools addressed to general public and stakeholders.
Two types of phenomena have been particularly investigated: debris flows and floods. The scientific products range from modeling to mapping of hazard and risk, emergency planning based on real time decision support systems, surveying for the evaluation of risk perception and preparedness, among others.
Outputs from medium scale hazard and risk modeling could be used for decision makers and spatial planners as well as civil protection authorities to have a general overview of the area and indentify hot spots for further detailed analysis. Subsequently, local scale analysis is necessary to define possible events and risk scenarios for emergency planning.
As for the modeling of past events and new scenarios of debris flows, physical outputs were used as inputs into physical vulnerability assessment and quantitative risk analysis within dynamic runout models. On a pilot zone, the physical damage was quantified for each affected structure within the context of physical vulnerability and different empirical vulnerability curves were obtained. Prospective economic direct losses were estimated.
For floods hazard assessment, different approaches and models are being tested, in order to produce flood maps for various return periods, and related to registered rainfalls.
About Civil Protection topics, the main aim is to set up and manage contingency plans in advance; that is, to identify and prepare people in charge to take action to define the activities to be performed, to be aware of available resources and to optimize the communication system among the people involved, in order to efficiently face a prospective crisis phase. For this purpose, a real time emergency plan has been develop based GIS (Geographical Information Systems), DSS (Decision Support Systems), and ICT (Information & Communication Technology).