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Dealing with natural hazards in the Barcelonnette region - a multi-disciplinary collaboration from understanding to management

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The Barcelonnette area, part of the Ubaye-Valley in the South French Alps, is highly exposed to natural hazard (mudslides, debris flows, torrential floods, river floods, avalanches and rockfalls); La Valette, Poche, Super-Sauze, Faucon are examples of well-known risk settings studied by scientists for several decades.
In the framework of the Mountain Risks network, young researchers are working on different steps and aspects of the protection of the communities. It requires the collaboration of experts from different disciplines assembling the "living with risk" chain that has to cover the identification of the hazard, the risk assessment, risk management and the socio-economic and political decision-making. On the example of the Barcelonnette region, this work demonstrates such a multi-disciplinary cooperation within the Mountain Risks project.
Starting with a multi-hazard analysis on a medium-scale level (1:10.000-1:50.000) for an overview over the hotspots in the basin a link is established to the local level analyses going into more detail. To forecast potential landslides in black marls and to assess the risk it is important to know the mechanisms leading to failure and the mechanisms determining subsequent movement. With respect to the Super-Sauze and La Valette mudslides detailed monitoring of hydrological features (i.e. high resolution temperature observations, large and medium scale infiltration experiments), displacement monitoring for short and long term kinematics analysis (i.e. image correlation technique applied on terrestrial oblique optical image, aerial and terrestrial laser scanning survey, differential global positioning system), small-scale testing in the laboratory (i.e. standard geotechnical, flume and centrifuge tests) and numerical modelling are performed to understand the mechanisms that might trigger and control the landslide. Integration and interpretation of these multi-source data allow to constrain conceptual models which are essential features to be taken into account in physically-based and probabilistic modeling approaches. Applications of run-out models to quantify different types of hazards are provided. Probabilistic methods for the determination of run-out output, like extension, depth and velocity, can be used as input into vulnerability assessment and quantitative risk analysis at the scale of 1:10.000 (municipality planning and regulatory zoning).
The main challenge of a successful collaboration is to adapt and to communicate the results in coordination with the needs and wishes of the stakeholders. It is tried to support the relation and contents worked on between scientists and stakeholders not only by means of a direct contact with key actors but also by a questionnaire investigating the doubts, questions and necessities of the general public. The final step is the visualisation of the results on an internet platform enabling the user to access a complete dynamic dataset realized as user-friendly interface and web-services.