

## Cascading hydrogeomorphic processes and compound hazards in mountain catchments under environmental change

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### Instrument

Joint seminar / conference involving early-stage researchers

### Description

The proposed seminar aims to identify the current gaps in knowledge regarding compound and cascade hydrogeomorphic hazards and to suggest new frameworks to study the complex feedbacks and interactions between hillslopes and fluvial processes. Linking the expertise that is available across subdisciplines and institutions, the seminar will give unique opportunities for a successful international collaboration.

An understanding of how mountain catchments respond to environmental changes, and specifically to climate change, is of fundamental research interest and vital for successful hazard assessment and management of the connected risks.

The topics of the seminar are relevant worldwide since according to the United Nations Office for Disaster Risk Reduction (2018), floods and landslides account for about 70% of economic losses due to natural hazards in the period 1998-2017; and the interest and reference to the concept of multi-hazard has been widely shown, for example, within the general development of the International Decade of Natural Disaster Reduction (IDNDR) and the following permanently installed International Strategy for Disaster Reduction (ISDR).

UNIL and UNIPD research groups provide complementary disciplinary expertise and know-how and their combined efforts will extend current thinking into new paradigms to study the functioning of mountain catchments, including the complex feedbacks and interactions between hillslopes and fluvial processes.

### Activities

The four-day seminar event will include a mixture of invited keynote talks, group discussions, and round tables of multi-disciplinary collaborative groups. Additionally, field visits are planned in areas of the Dolomites affected by weather-related hazards with cascading hydrogeomorphic effects and strong hillslope-channel coupling. Expected outputs are:

- the nurturing of a strategic inter-disciplinary vision in integrated catchment analysis;
- the development of new ideas coming from the combination of different approaches;
- the improvement of the existing level of collaboration between the two institutions in the realm of climate-driven natural hazards processes and modelling in mountain catchments characterized by multiple feedback and feedforward domino effects.

Expected deliverables are:

- a document summarizing future activities and main outcome of the seminar;

- a joint opinion/review paper that, starting from the state of art on these topics (i.e. cascade hydrogeomorphic processes and multi-hazard), could convey the main outcomes of the seminar.

**Potential for  
follow-up  
activities**

This collaboration is meant to share experiences and research results between Swiss and Italian scientists and to identify opportunities for bi-national research collaboration. The present project addresses several priority research topics and will sow the seed for further joint initiatives and collaborations, such as preparing joint publications, or the applications for Joint Projects.

The seminar and its main outcomes will be disseminated using UNIL and UNIPD websites and social media. Besides, we will try to reach and communicate the main outcomes to a wide audience in Northern Italy and Swiss-French region, through newspapers and TV channels.

The outcomes of the seminar will be published in an international journal (e.g. "Geomorphology" or "Geophysical Research letters").