Workshop Output WS 2.4.B

Title of workshop: Natural hazards assessment - potential, limits and uncertainties of process models and interactions of processes with protection structures and buildings

Prepared by

Moderators	**Fischer, Fuchs, Gems, Hübl, Keiler, Schneider-Muntau**
Participants*	**16**

* Workshop participants that have submitted contributions to the workshop

General questions to please be answered in the workshop reporting

1) What was the focus of the workshop? Methodological issues and advancements or thematic issues (systems knowledge, transformation knowledge, target knowledge). Please check and fill in the matrix in the output section.

Methodological issues and advancements	**Thematic issues**		
	System knowledge	Transformation knowledge	Target Knowledge
x			

1) Which key points were discussed in the workshop as a whole? (This should be more a synthesis and not simply a summary of the key points in each presentation)

(a) process models and tools as essential information for natural hazards and risks assessment – value, reliability, uncertainties
(b) forcing of observation and measurement techniques to enhance process understanding and quality of model results
(c) possibilities and limitations in early warning and protection systems
(d) need for adapted / new protection structures to cope with extreme events and ecological, economic sustainability
(e) strategies to understand process-building-interaction and to enhance approaches for vulnerability analysis

Synthesis:

(a) There are lots of models for different hazard types on the market, needing lots of different input parameters. Challenges are (a) to find the right model for the specific application, but also (b) to decide on the individual input parameters needed. Therefore, practitioners often rely more on expert judgments than on “scientific” information.
(b) Quality assessment of modeling – how to overcome this challenge?
(c) To use possibilities to compare different models within the same case study to better understand the model output.
(d) How to deal with uncertainties on the process side facing challenges of climate change, how do these uncertainties bias our planning of measurements, landuse planning and also communication?
(e) Ensemble modeling: how do individual uncertainties affect the overall robustness of results? Probabilistic vs. deterministic vs. empirical approaches: how to deal with challenges? Is the concept of frequency and magnitude still up-to-date? Shall we

overcome the “old” concept of return periods? How do frequencies and magnitudes change when new data becomes available? Is there a better way to define design events (But: IPCC terminology is not applicable in specific natural hazard management!)

(f) Early warning and protection systems: How to deal with very short lead time in mountain regions (small catchments, typical mountain hazards in comparison to low-land flooding) to issue reliable alerts? Very short reaction time, action such as eg. evacuation has to be drilled. What about legal responsibilities when alerting, or when alert fails? Are there possibilities of collaboration between scientific and non-scientific applications so that the overall dataset can be improved?

(g) There is a wide variety of different types of protection measures available. If national guidelines are available, are overload cases taken into account?

(h) A better understanding of exposure and vulnerability is needed; we need enhanced understanding of the effects of natural hazards on the built environment and on infrastructure. Detailed and standardized loss and damage documentation is needed to enhance our understanding of vulnerability indicators. Combination of physical, social, economic and institutional vulnerabilities is needed (see also Keynote Lecture by Irasema Alcántara-Ayala).

(i) Observation data: How to deal with lack in observational data, also in remote mountain regions? How to deal with changes in data availability, leading to changes in underlying time series? Suggestion: to establish some scientific study catchments (cooperations, open use policy, open data policy) over the alpine arch or – more general – for different mountain regions world-wide.

2) What is your opinion on the current state of knowledge concerning your topic(s) (focusing on mountain regions)? *Please check and fill in the matrix on the following page.*

Overall assessment of the state of:

What is your personal opinion on the current state of knowledge concerning the topic(s) addressed in your workshop. Please tick the appropriate field. Brief explanations are appreciated.

State of knowledge	Very good	Good	Poor	Very poor	Not appropriate	*Comments*
Global		x				
Regional	x					*Depending on the individual study sites of the participants.*
Scattered case study-based knowledge	x					*Depending on the individual study sites of the participants.*
Knowledge about past states/trends		x				
Knowledge about current situation		x				
Knowledge about future states/trends/thresholds		x	x			
Knowledge about the system					x	*??? Definition of system is dependent on the discipline and the perspective. Not clear.*
Knowledge about shaping pathways to more sustainable development (transformation knowledge)		x				*This is fundamental to the workshop topic.*
Knowledge about envisaged goals (target knowledge)		x				

Ideas for questions to potentially be answered by the moderators after the workshop in the reporting (please delete what is not useful):

1) Were there any new insights and/or findings presented? If yes, which ones?
2) What was the main message/consensus of your workshop?
3) Were major uncertainty issues identified and discussed? If yes, which ones?
4) Was there any significant controversy (if so, what?) that requires new data (or further exploration of existing data) to resolve the issue? (explain)
5) Were new research questions raised? If yes, would working on these questions need to involve other disciplines (which ones)?
6) Did the workshop identify research topics (e.g. environmental drivers other than climate) that are, in your opinion, currently greatly underrepresented in mountain research, but should urgently be addressed?

Further Comments from the Audience

Workshop format:

(a) relevance of selected discussion topics

Interesting topic, very timely and relevant

(b) workshop format

Problem with flash talks à 3 mins. to deliver topic and message to the audience.

To few time to go into details

To broad and general questions and answers