

## Supplemental material for

“The International Mountain Conference, Innsbruck, Austria, September 2019 (IMC2019): A Synthesis with Recommendations for Research”, by Martin F. Price, Wolfgang Gurgiser, Irmgard Juen, Carolina Adler, Susanne Wymann von Dach, Georg Kaser, Stefan Mayr, and contributing IMC2019 moderators, published in *Mountain Research and Development* 42(1), 2022. (See <https://bioone.org/toc/mred/42/1>)

### APPENDIX S1 IMC2019 program

based on <https://www.uibk.ac.at/congress/imc2019/program/>

Workshop	Title
1.1.A	Climate information for impact modeling
1.1.B	Climate modeling in Mountain regions
1.1.C	Past climate change – proxies and modeling
1.1.D	Climate change in Mountain regions: Bringing together methodologies and knowledge systems
1.2.A	Challenges in Quantifying and Simulating the Land-Atmosphere Exchange in Mountain regions
1.3.B	Challenges and potentials of demographic change in Mountain regions
1.3.C	Social inclusive development in Mountain regions analyzed along gender, generation and diversity as driver for adaption to structural changes
1.3.D	Sustainability of urban agglomerations in Mountain regions, especially in developing nation contexts
1.4.A	Mining the mountains – impact on environment and human societies
1.4.B	Mountain trails, trade routes & migration
1.4.C	Subsistence strategies for Mountain regions
2.1.A	Communicating Ecosystem Services from Mountains
2.1.B	Cultural ecosystem services – conflicts and limits
2.1.C	Long-Term Ecological Research (LTER) Sites as monitoring networks – opportunities and challenges
2.2.A	The future of Mountain forests
2.2.B	Mountain grasslands under global change
2.2.C	Towards a global understanding of the functional ecology of Mountain soils
2.2.D	Mountain biodiversity and ecosystems under global change
2.3.A	Mountain socio-hydrology in a changing climate
2.3.B	Consequences of climate change for the cryosphere
2.3.C	Lakes in Mountain regions as integrative landscape elements: ecosystem services and threats
2.4.A	Remote sensing techniques and data for natural hazard research
2.4.B	Natural hazards assessment – potential, limits and uncertainties of process models and interactions of processes with protection structures and buildings
2.4.E	Natural hazards’ risk governance under changing framework conditions

2.4.F	Climate risk assessment: from climate impact research to adaptation planning
3.1.A	Mobility and Transport
3.1.D	Integrative approaches to adaptation and transformation research in Mountain systems
3.1.E	Renewable Energy: Impacts on Mountain environments and people
3.2.A	Adapting tourism destinations to changing availability of resources
3.2.B	DMOs, Destination Governance and management of events
3.3.A	Adapting Mountain agro-food systems to climate change
3.3.B	Buffering socio-economic vulnerabilities of agro-food systems in Mountain regions
3.3.C	Transforming the societal framework to foster the sustainability of Mountain agro-food systems
3.4.B	Initiatives for inclusive local development in Mountain regions
3.4.C	Enhancing transformation of strategies for Mountain regions towards sustainable pathways
3.4.F	Education for Sustainable Mountain Development
<b>Think Tank</b>	<b>Title</b>
2.3.D	Distal impacts of hydrospheric and cryospheric changes in Mountain regions
3.1.F	How prevent future conflict over the use and management of water in mountain regions?
3.3.D	Integrating agricultural and tourism supply chains for boosting marginal Mountain areas
3.4.G	Scientific support for the coherent monitoring and implementation of Post-2015 UN Frameworks in global Mountain regions
OTHER TOPICS	open for Specific Research Posters not directly related to a workshop

## IMC2019 Workshop Reporting Guide for moderators

Martin Price, Christian Körner, Georg Kaser, Susanne Wymann von Dach, Wolfgang Gurgiser

### Preface

The following guidelines concerning workshop reporting should serve as supporting material rather than present limitations or burdens. Besides the moderators' preparation<sup>1</sup>, a relaxed and flexible workshop atmosphere<sup>2</sup> seems to be the most important basis for generating fruitful workshop output. Thus, we suggest the moderators do not try to process one question after the other (as listed below) but rather document the workshop discussions and try to answer some of the applicable questions after the workshop.

#### I. Meaning and objectives of the workshop reporting:

- The workshop outputs will be used as the basis for a preliminary synthesis to be presented on the last morning of IMC2019.
- IMC2019 workshop outputs, conclusions and perspectives will help to identify new insights as well as knowledge gaps and to update mountain research strategies and agendas (likely to shape the pathway towards an IMC2022). The synthesis team aims at submitting a resulting paper to the *Journal Mountain Research and Development*.

#### II. Visibility:

- Each workshop output (including moderators' and participants' names) will be published on the conference website.

#### III. Questions to the moderators:

##### A. General questions to 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.*
- 2) 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)
- 3) 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 in the output section.*

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<sup>1</sup> Getting in touch with the workshop participants in advance might be useful to communicate your intended workshop structure (mainly how you plan to structure the discussions). Furthermore, potential overarching questions (e.g. which type of data do you use in your research) could already be asked and answered by the participants before the conference starts. The mail contacts of your workshop participants are easily accessible: Login to [conftool](#) and click "Information for Session Chairs and Moderators"

<sup>2</sup> We provide you with some simple methods to "break the ice" in the trainings workshops for moderators. If you can't participate but would need some ideas, please contact [imc2019@uibk.ac.at](mailto:imc2019@uibk.ac.at) and we provide some ideas explicitly adjusted for your workshop.

B. Ideas for questions to potentially be answered by the moderators after the workshop in the reporting:

- 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?

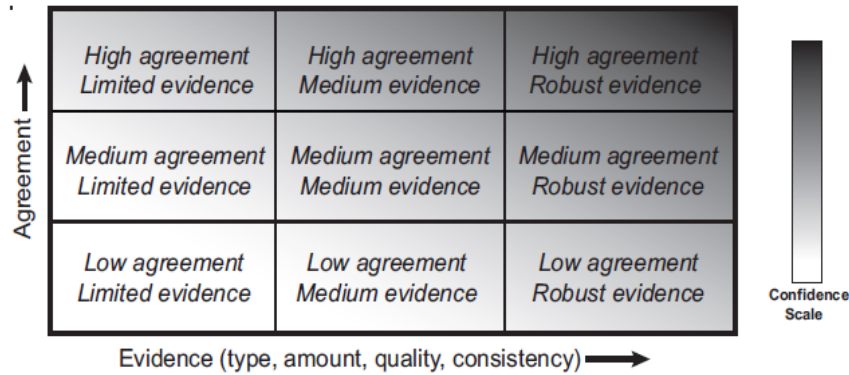
IV. Guidelines for reporting:

- Please submit the form (page 5 onward) on the same day of your workshop to [imc2019@uibk.ac.at](mailto:imc2019@uibk.ac.at) – many thanks for your valuable contribution and prompt efforts!
- You can provide your report in the form of bullet points. You do not need to present a fully developed report.
- In case you discuss uncertainties related to evidence (see question 3), please use the IPCC terminology to characterize these uncertainties (see section VI.A below.)
- Be as precise and specific as possible and avoid reporting on trivialities (e.g. existing knowledge that has already been accepted for many years) in your workshop outputs – examples are provided below (see section VI.B);
- Please note that moderators' feedback on the functioning of their workshop will be collected via online survey (not to be published online)

V. Supporting Information

A. IPCC Terminology on uncertainty:

[Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties](#). Please make use of the full range of uncertainty language if applicable.



**Figure 1:** A depiction of evidence and agreement statements and their relationship to confidence. Confidence increases towards the top-right corner as suggested by the increasing strength of shading. Generally, evidence is most robust when there are multiple, consistent independent lines of high-quality evidence.

Table 1. Likelihood Scale	
Term*	Likelihood of the Outcome
<i>Virtually certain</i>	99-100% probability
<i>Very likely</i>	90-100% probability
<i>Likely</i>	66-100% probability
<i>About as likely as not</i>	33 to 66% probability
<i>Unlikely</i>	0-33% probability
<i>Very unlikely</i>	0-10% probability
<i>Exceptionally unlikely</i>	0-1% probability

B. Subjective (!) examples of desirable content-rich statements and undesirable trivial messages (no/little information gain) from the field of ecology:

Desired statements:

- It was found that there is a direct correlation between population density within 5 km of montane forests and the degree of their destruction
- The workshop evidenced that precipitation is the key driver of livestock related erosion

- It was revealed that the interaction of climatic warming and increased late winter snowpack (precipitation) shifts the isoline of snow duration much less than if warming is considered alone. The likelihood of ski resorts to run out of snow in temperate zone mountains is confined to elevations below 2200 m.

Undesirable messages:

- The workshop suggested a clear need for more social science involvement
- The workshop participants found that land use is an important aspect of mountain research
- There is a need for more remote sensing data
- Aquatic sciences (catchment related questions) need to interact with terrestrial ecologists

While each point is valid, we do not need workshops or a conference for such statements.

## Workshop Output Form to be submitted (max. 4 pages)

**Title of workshop:**

**Prepared by**

<b>Moderators</b>	
<b>Participants*</b>	

\* 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.

<b>Methodological issues and advancements</b>	<b>Thematic issues</b>		
	System knowledge	Transformation knowledge	Target Knowledge

- 2) 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)
- 3) 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 in the output section.*

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?

**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						
Regional						<i>Which region?</i>
Scattered case study-based knowledge						<i>Where?</i>
Knowledge about past states/trends						
Knowledge about current situation						
Knowledge about future states/trends/thresholds						
Knowledge about the system						
Knowledge about shaping pathways to more sustainable development (transformation knowledge)						
Knowledge about envisaged goals (target knowledge)						



## Further Comments

**APPENDIX S3** Alphabetic list of IMC2019 moderators contributing to the paper

<b>Name</b>	<b>Institution</b>
Michael Bahn	University of Innsbruck
Astrid Björnsen Gurung	Swiss Federal Research Institute WSL
Thomas Dax	Bundesanstalt für Agrarwirtschaft und Bergbauernfragen
Stefano Duglio	University of Torino
Jan-Thomas Fischer	Austrian Research Centre for Forests
Leopold Füreder	University of Innsbruck
Rainer Kurmayer	University of Innsbruck
Ingrid Machold	Bundesanstalt für Agrarwirtschaft und Bergbauernfragen
Markus Mailer	University of Innsbruck
Thomas Marke	University of Innsbruck
Ben Marzeion	University of Bremen
Graham Matthew McDowell	University of British Columbia
Michael Meyer	University of Innsbruck
Martina Neuburger	University of Hamburg
Lindsey Nicholson	University of Innsbruck
Kurt Nicolussi	University of Innsbruck
Theresia Oedl-Wieser	Federal Institute for Less Favoured and Mountainous Areas
Mike Peters	University of Innsbruck
Kristin Richter	NORCE Norwegian Research Centre AS
Mathias Rotach	University of Innsbruck
Johannes Rüdisser	University of Innsbruck
Fernando Ruiz Peyré	ÖAW, Institute for Interdisciplinary Mountain Research
Martin Rutzinger	Austrian Academy of Sciences
Markus Schermer	University of Innsbruck
Uta Schirpke	University of Innsbruck
Stefan Schneiderbauer	eurac research
Robert Steiger	University of Innsbruck
Dr. Rike Stotten	University of Innsbruck
Joerg Szarzynski	United Nations University
Ulrike Tappeiner	University of Innsbruck
Kenichi Ueno	University of Tsukuba
Georg Wohlfahrt	University of Innsbruck
Stefan Mayr	University of Innsbruck