

# HIGH MOUNTAIN SUMMIT

## MOUNTAIN WEATHER, WATER, AND CLIMATE: PATHWAYS TO A SUSTAINABLE GLOBAL FUTURE

(V 27102019)

The long-term goal is to ensure that people that live in mountains, and those that are influenced by mountain Earth system processes downstream, have access to, and use fit-for-purpose hydrological, meteorological, and climate information and knowledge that reflect the importance of mountain regions as a home of the cryosphere, and as a source of global freshwater and ecosystem services for the world.

### Summit Co-chairs

- [Carolina Adler](#), Executive Director, Mountain Research Initiative (Switzerland)
- [John Pomeroy](#), Canada Research Chair in Water Resources & Climate Change; Director, Centre for Hydrology; Director, Global Water Futures Initiative (Canada)

Day 1	29 October 2019	
07:30 - 09:30	Registration and Poster setup	Main lobby
09:30 - 10:20	<a href="#">Opening Session</a> Welcome addresses Drivers for action	Salle Obasi
10:20 – 10:40	Break	
10:40 - 12:30	<a href="#">Segment 1</a> Drivers for action	Salle Obasi
12:30-12:45	Group photo	
12:45 – 14:30	Lunch - Self-funded	
	Informal poster discussions	Main lobby
14:30 – 15:50	<a href="#">Segment 2 (part 1)</a> Stakeholders and needs –panel presentation Chair: Christian Huggel (Switzerland)	Salle Obasi
15:50 - 16:10	Break	
16:10 – 17:30	<a href="#">Segment 2 (part 2)</a> Stakeholders and needs – discussions and conclusions	Salle Obasi
18:00 – 20:00	Reception hosted by Switzerland Speakers: <ul style="list-style-type: none"><li>• P Binder (Switzerland)</li><li>• K Steffen (Switzerland)</li><li>• E Manaenkova (WMO)</li><li>• W Zhang (WMO)</li></ul>	Restaurant Attic (9 <sup>th</sup> floor)

Day 2		30 October 2019		
09:00 – 10:20	<a href="#">Segment 3</a> - panel Closing the capacity gap on user-oriented and fit-for-purpose prediction and services Chair; Samuel Morin (France)			Salle Obasi
10:20 – 10:40	break			
10:40 – 12:00	<a href="#">Segment 4</a> - panel Enhance mountain surface and remote sensing observations and access to data, coupled to integrated mountain prediction systems Chair: Michel jean (Canada)			Salle Obasi
12:15 – 13:45	Side Event ICIMOD Side Event “Cryosphere and Society in Hindukush-Himalaya”			Salle C2
12:00 – 14:00	Lunch - self-funded			
	Informal poster discussions			Main lobby
1400 - 1520	Segment 5 Research, innovation and synthesis: towards an integrated mountain prediction system Co-chairs: Carolina Adler, (Switzerland) John Pomeroy, (Canada)			Salle Obasi
15:20 -15:40	Break			
1540 – 17:00	Segment 5 Breakout: Research, innovation and synthesis: towards an integrated mountain prediction system	Segment 3 Breakout: Closing the capacity gap: Service delivery strategy and engagements	Segment 4 Breakout: Closing the capacity gap : Enhance mountain surface and remote sensing observations and access to data	
	Salle C1	Salle Obasi	Salle B	
17:15 – 18:30	Side Event: Third Pole Environment (TPE) - WMO/Global Cryosphere Watch (GCW) Side Event: Roadmap to integrated mountain cryosphere observation and information system - open to all participants. Chaired by: Tandong Yao – co-chair, Third Pole Environment programme; Árni Snorrason – chair, Global Cryosphere Watch .			Salle C2

<b>Day 3</b>	<b>31 October 2019</b>	
09:00-10:20	Reports <ul style="list-style-type: none"> <li>• Presentations of conclusions from Segments 1, 2, 3, 4, 5</li> <li>• Synthesis of results</li> </ul>	Salle Obasi
10:20 – 10:40	Break	
10:40 – 12:00	Bringing it all together : <ul style="list-style-type: none"> <li>• Presentation of the Call for Action</li> <li>• Interventions from participants</li> </ul>	Salle Obasi
12:00 – 14:00	Lunch - Self-funded	
	Closure of poster presentations	Main lobby
14:00 – 15:30	<a href="#">Segment 6</a> High Level Segment Adoption of the Summit Call for Action	Salle Obasi
15:30 – 16:00	Closure of Summit	Salle Obasi

## OPENING SESSION AND SEGMENT 1

### DRIVERS FOR ACTION - THE SOCIETAL BENEFITS AND URGENCY OF COORDINATED AND SUSTAINABLE HYDRO-METEOROLOGICAL AND CLIMATE SERVICES IN HIGH MOUNTAIN REGIONS, AND LINKAGES TO THE POST-2015 AGENDA FOR GLOBAL POLICY

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- Opening:
  - Welcome the participants to the High Mountain Summit;
  - Introduce program and working arrangements;
  
- Recommended high level messages from key partners;
  - Present a “Charge to the Summit” including the need and urgency for action, the interest in societal engagement, etc.
  - Highlight the current science as foundation for action (e.g. IPCC reports), and the role of WMO, of UN organizations, and of the engaged partners.
  - Position the Summit outcomes in the framework of the post-2015 agenda for global policy, i.e. the 2030 UN Agenda, UNDRR (Sendai framework) and UNFCCC Paris Agreement;
  - Urge international coordination for action for ensuring that high mountains receive the necessary and comparable level of attention and resources for policy, investments, and projects at local, national, regional and global levels;
  - Emphasize the need for transformative policies and strategies for adaptation to climate change in mountain regions;

#### SCHEDULE

##### 09:30 - 10:20 - High Level Opening and Segment 1 (part 1)

##### *Speakers (10 min each):*

- Alain Berset - Head of the Federal Department of Home Affairs of Switzerland - 10 min;
- Petteri Taalas - Secretary-General of WMO - 10 min;
- Shamila Nair-Bedouelle - Assistant Director-General for Natural Sciences, UNESCO -10 min;
- Dongyu Qu - Director General, FAO (video address) – 5 min;
- Ewald Rametsteiner - Deputy Director, Forestry Department, FAO – 5 min

##### Panel members:

- Agnes Kijazi - Third Vice-President of WMO, Permanent Representative of Tanzania;
- Elena Manaenkova, Deputy Secretary General of WMO
- Wenjian Zhang, Assistant Secretary General, WMO

## **10:40 - 12:30: Segment 1**

### **Opening remarks:**

Agnes Kijazi - Third Vice-President of WMO, Permanent Representative of Tanzania; to introduce co-chairs of the Summit

### **Session Co-chairs**

- Carolina Adler (Switzerland)
- John Pomeroy (Canada)

### **Speakers:**

- John Pomeroy - accept charge of the Summit
- Andreas Fischlin - Vice-Chair WG II, IPCC (Switzerland)
- Qin Dahe – Chair, Advisory Committee of China Meteorological Administration and Chair, Chinese National Committee for International Association of Cryospheric Sciences (CNC-IACS) (China)
- Konrad Steffen - Director, Swiss Federal Institute for Forest, Snow, and Landscape Research WSL (Switzerland)
- David Molden - Director General, International Centre for Integrated Mountain Development (ICIMOD)
- François Pythoud - Special Envoy for International Sustainable Agriculture at the Swiss Federal Office for Agriculture, Mountain Partnership Steering Committee
- Caroline Aubry-Wake - PhD student, University of Saskatchewan (Canada)
- Carolina Adler - reflect on the input from Segment 1 speakers, and introduce the Call for Action.

## SEGMENT 2: STAKEHOLDERS AND NEEDS:

### IDENTIFY STAKEHOLDER NEEDS FOR SOCIALLY RELEVANT, URGENTLY NEEDED KNOWLEDGE AND INFORMATION IN SUPPORT OF RISK REDUCTION IN MOUNTAIN AND DOWNSTREAM REGIONS, ADAPTATION TO CLIMATE CHANGE, AND SUSTAINABLE DEVELOPMENT OF MOUNTAIN REGIONS;

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High mountain and downstream societies feel the impacts of climate change, now; therefore, adequate hydro-meteorological and climate services are urgently needed.

#### **Main topics for discussion:**

- Examples of value chains for sectoral hydro-meteorological information/services for mountain regions; sectors include: agriculture, tourism, water resources, energy, disaster risk reduction, and early warning systems;
- A user perspective on needs, barriers, and enabling factors for accessing hydro-meteorological and climate information and support services; accessibility and availability of data, information, and knowledge;
- Urgency of policy action, including inter-agency governance and collaboration, locally, nationally, and across-borders;
- Climate and cryosphere literacy: what does it take? Who are the actors?
- Financing mechanisms and consultative processes facilitating capacity development, aligned with needs;

**Moderator/Chair:** Christian Huggel (Switzerland)

#### ***Speakers and panel members:***

- Marcelo Reynoso (Argentina) - keynote
- Mandira Shrestha (ICIMOD) - keynote
- Karen Price (CARE Peru)
- Dirk Hofmann (Bolivian Mountain Institute)
- Anil Mishra (UNESCO IHP)
- Manfred Kaufmann (SDC)

This segment will include presentations, panel discussions, discussions (plenary and group), and conclusions with recommendations.

#### **Expected outcomes:**

- Emphasizing the urgency of action and response at scale, including through funding;
- Recommendations on improving the effectiveness of user consultation processes linked to institutional mandates, and building cases for evolving mandates and resource allocations;

- Urging the development of policy and monitoring tools aligned with international policy frameworks (Sendai Framework for Disaster Risk Reduction, Sustainable Development Goals (SDGs), etc.), focusing on impacts of changes in mountain regions (national, regional, and trans-regional); e.g. Mountains specific indicators for relevant reporting mechanisms and review processes (e.g. mountain hazards, etc.);
- Recommendations for institutional arrangements to enable enhancing capacities of relevant institutions, for addressing high mountain specific response and adaptation needs, in conjunction with local communities (co-ownership and co-design);
- Proposals for pilot projects aligned with the recommendations of the Summit, reflecting the full value chain, the need for sustainability of capacity building, and user engagements;
- Propose practical pathways to climate and cryosphere literacy (e.g. through UNESCO, Mountain partnership, and other international mechanisms).

## SEGMENT 3: CLOSING THE CAPACITY GAP:

### PREREQUISITES FOR CLOSING THE CAPACITY GAP ON USER-ORIENTED AND FIT-FOR-PURPOSE PREDICTION AND SERVICES FOR WEATHER, HYDROLOGY, AND CLIMATE, IN CHANGING MOUNTAIN ENVIRONMENTS

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The long-term goal is to ensure that people that live in mountains, and those that are influenced by mountain Earth system processes downstream, have access to and use fit-for-purpose hydrological, meteorological, and climate services that reflect the importance of mountain regions as a home of the cryosphere, and as a source of global freshwater and ecosystem services for the world.

#### **Key topics recommended to be addressed by the panel members:**

- Recognize the economic, recreational, scientific research, environmental, education, and cultural values of mountain cryosphere, its potential as a resource, and the hydrometeorological and climate services required;
- Highlight the critical science gaps for closing the gap on the provision of seamless Earth system hydro-meteorological and climate services, from nowcasting to decadal prediction systems for mountain regions, access to cryospheric monitoring and modeling capabilities.
- Evaluate the necessary mountain specific hydro-meteorological climate services, from a service delivery perspective, e.g. identify specific services needed, the actors involved in their design and delivery, how they will be delivered, and the resources necessary to support their delivery;
- Assess the practicalities of interagency collaboration, governance, regarding early warnings and climate information for mountain-specific threats;
- Examine lessons learned on user engagement and an improved framework of engagement, and feedback mechanisms;
- Discuss the role of funding agencies in closing the capacity gaps;
- Recommend pilot projects on high mountain hydro-meteorological and climate services;

**Chair:** Samuel Morin (France)

#### **Panel Members:**

- Mathias Rotach (Austria) - keynote
- Agnes Kijazi (Tanzania)
- Barbara Tapia (Chile)
- Ghulam Rasul (ICIMOD)
- Jan Daňhelka (Czech Republic)
- Daniel Kull (WB-GFDRR)

This segment will include presentations, panel discussions, discussions (plenary and group), and conclusions with recommendations.



**The participants are invited to consider the following outcomes:**

- Emphasize mountains as a region with specific processes requiring specific mechanisms to provide weather, water, climate services, and the need to sustain specific and enhanced mountain observing infrastructure;
- Highlight the scientific questions which need to be addressed to enable the development of services relevant to mountain region activities and communities.
- Urge international coordination in the field of climate, weather, cryosphere and hydrological monitoring and creating climate services for mountainous regions;
- Propose a framework for engagement with users (e.g. Climate Outlook Forums (COFs), User Consultation Interfaces, etc),
- Propose specific activities as part of the pathway to closing the information and capacity gap: accelerate the development of programmes supporting national hydrological and meteorological services and other institutions in developing climate and hydrological products and services for decision-support in adaptation and water management, for climate-sensitive mountain regions and basins, e.g. the Global Cryosphere Watch (GCW), mountain focused Regional Climate Centres, Regional Specialized Meteorological Centres, WMO Global Hydrological Status and Outlook System (HydroSOS), etc.
- Identify contributions to international policy framework, e.g. development of reporting tools (cataloging mountain hazards, etc).

## SEGMENT 4: OBSERVATIONS, DATA AND PREDICTIONS:

### ENHANCE MOUNTAIN SURFACE AND REMOTE SENSING OBSERVATIONS AND ACCESS TO DATA, COUPLED WITH INTEGRATED MOUNTAIN PREDICTION SYSTEMS, AS THE FOUNDATION FOR SUSTAINABLE SERVICES AND RESEARCH

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#### **Key topics recommended to be addressed by the panel members:**

1. Foster innovation in services provided to users through cooperation between scientific and operational institutions, nationally and internationally, on observations, data exchange, data assimilation and predictions.
2. Summary of critical gaps and opportunities in mountain Earth system observations, in-situ and space, with a focus on cryosphere;
3. Barriers and opportunities for the discovery and utilization of available and new sources of data from mountain Earth system observations from research and operational programmes, the indigenous and local knowledge, including across borders;
4. Open access to data: standardization, interoperability, data policies, as prerequisites to enhancing the capability of integrated mountain prediction systems;
5. The use of space observations and the innovation required in addressing the data gaps and supporting Earth system prediction for mountain regions.
6. Leverage investments and cooperation at national and regional level to ensure the availability of data and information in support of national, local, regional programmes.
7. Develop/sustain scientific and technical capacity.

**Plenary Session Chair:** Michael Jean (Canada)

#### **Panel members:**

- Bertrand Calpini (Switzerland) – keynote
- Tandong Yao (China) - keynote
- Fabrizio Battazza (Italy)
- Yolanda González Hernández (Colombia)
- Øystein Godøy (Norway)
- George Kordzakhia (Georgia)

This segment will include presentations, panel discussions, discussions (plenary and group), and conclusions with recommendations.

#### ***The participants are invited to contribute to the following outcomes:***

- *Commitments for coordinating and enhancing mountain observations of weather, climate, water, and cryosphere, including by leveraging current and future investments.*

- *Commitments to develop and adopt open access data policies, standards, and interoperability, and discoverability of observations through internationally available mechanisms (e.g. WMO OSCAR, OSCAR Surface, etc)*
- *Engagement of space agencies to enhance the space-based monitoring of mountain cryosphere, and meet the needs of relevant user-driven applications;*
- *Urge the international community to work towards an integrated mountain prediction systems, by building on existing mechanisms and engagements, e.g. recommend Regional Specialized Meteorological Centres for high mountain forecasting as a new type of Global Data Processing and Forecasting System (GDPFS) Centres, and propose a pilot project.*
- *Recommend an Integrated Mountain Prediction project, around key mountain ranges and headwaters, to address the front lines of climate, cryospheric and hydrological change, and natural hazard risk in mountain regions and downstream, building on synergies with existing efforts;*
- *Foster innovation through cooperation at national and international level between scientific and operational entities, using investment mechanisms as leverage.*

## SEGMENT 5: RESEARCH, INNOVATION AND SYNTHESIS

### LEVERAGE CURRENT SCIENCE DEVELOPMENTS TO IMPROVE THE MOUNTAIN EARTH SYSTEMS SCIENCE AND PREDICTIVE CAPABILITY NEEDED FOR CLOSING THE SERVICE AND INFORMATION GAPS IN INTEGRATED HIGH MOUNTAIN OBSERVATIONS AND PREDICTIONS, AND LEADING TO IMPROVED POLICY-RELEVANT ADVICE TO ADDRESS CLIMATE RISKS AND FOR SUSTAINABLE MOUNTAIN DEVELOPMENT

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#### Session key questions:

1. Can you reflect on what are the foundations of and the research, innovation and design needs for *integrated observational and prediction capability in high mountains*?
2. The way we prioritize needs will impact on the development of monitoring and predictive tools. What do you think should be the specific priorities, and a key message for the research community to consider?

#### Context:

For example, the Year of Polar Prediction has been an important model for designing and planning operational-oriented field experiments ensuring both advancement in the understanding of polar processes and an enhancement of operational procedures in World Meteorological Centers. Is this model valid for the high mountain framework or should a more regional oriented solution be elaborated?

High mountain regions feature interactions among different components of the *Earth System* (e.g. cryosphere, biosphere, hydrology, chemistry) and hence they require *integrated services*. At the same time, these opportunities are constrained by diverse and often competing needs for end-user information (e.g., mapping the risk for landslides or other hazards, evaluating water availability, monitoring and predicting ecosystem's status).

#### Panel 1 (Lead: John Pomeroy)

- Maria Cristina Facchini (Italy) - keynote
- Xin Li (China)
- Richard Essery (UK)
- Roy Rasmussen(US, M)
- Chris Marsh (Canada, M)
- Mariano Masiokas (Argentina)

#### Panel 2 (Lead: Carolina Adler)

- Elisa Palazzi (Italy) - keynote
- Árni Snorrason (Iceland)
- Peter van Oevelen (GEWEX)
- Shawn Marshall (Canada)
- Cunde Xiao (China )
- Daniel Viviroli (Italy)

## SEGMENT 6: HIGH LEVEL SESSION:

### ADOPT THE CALL FOR ACTION ON HIGH MOUNTAIN WEATHER, CLIMATE, AND WATER, AND IDENTIFY A ROADMAP OF ACTIONS AND ENGAGEMENTS, WITH SPECIFIC ACTIONS

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- Policy and advocacy: Year of the Mountain; towards a UN mountain convention;
- Commitment to enhance cryosphere and high mountain observations and data access;
- Strengthening the capacity for hydro-meteorological, climate, and prediction services for mountain regions (enhance mandates; pilot projects from WMO programmes),
- Integrated Mountain Prediction project
- Commitment to cryosphere literacy
- Commitment for funding to ensure capacities and institutional support at scale

#### Chair:

- Elena Manaenkova - Deputy Secretary-General of WMO

#### Speakers:

- H.E. Gulmahmadzod Davlatschokh Kurbonali, Chairman of the Committee on Environmental Protection of the Republic of Tajikistan
- Mr. Vardan Melikyan, Deputy Minister of Environment of the Republic of Armenia

#### Panel members:

- Carolina Adler (Switzerland)
- John Pomeroy (Canada )
- Daniel Kull, World Bank - Global Facility for Disaster Recovery and Reconstruction (GFDRR)
- François Pythoud - Special Envoy for International Sustainable Agriculture at the Swiss Federal Office for Agriculture
- Onno Ruhl (Aga Khan Agency for Habitat (AKAH))
- Francis Colledge (UK Met – DFID)
- Agnes Kijazi - Third Vice President of WMO, Permanent Representative of Tanzania with WMO
- Wenjian Zhang - Assistant Secretary General of WMO