



WORLD
METEOROLOGICAL
ORGANIZATION

WMO HIGH-MOUNTAIN SUMMIT GENEVA, SWITZERLAND, 29–31 OCTOBER 2019

CALL TO ACTION

AVOIDING THE IMPENDING CRISIS IN MOUNTAIN WEATHER, CLIMATE,
SNOW, ICE AND WATER:

Pathways to a Sustainable Global Future

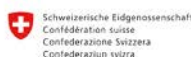
RECALLING:

- (1) The 2030 Agenda for Sustainable Development (hereafter the 2030 Agenda), which recognizes inter alia that economic and social development depends on the sustainable management of our planet's natural resources and confirms the determination of the international community to conserve and sustainably use oceans, seas and freshwater resources, as well as forests, mountains and drylands, and to protect biodiversity, ecosystems and wildlife,
- (2) The United Nations Framework Convention on Climate Change (UNFCCC), which recognizes that developing countries with fragile mountain ecosystems are particularly vulnerable to the impacts of climate change,
- (3) The United Nations General Assembly Resolution A/RES/71/234 – Sustainable Mountain Development, and the findings of the *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (SROCC),

NOTING:

- (1) That mountain regions cover about one quarter of the Earth's land surface and are centres of biological and cultural diversity and of traditional knowledge; that mountain ranges are often shared across countries, and that around 1.1 billion people, including indigenous peoples, live in mountain regions on all continents,
- (2) That high-mountain areas include all mountain regions where glaciers, snow or permafrost are prominent features of the landscape; that river basins with headwaters in the mountains supply freshwater to over half of humanity, and that mountains are being referred to as "the water towers" of the world,

NOTING ALSO the importance of specifically addressing challenges in mountain regions for achieving many targets of the Sustainable Development Goals (SDGs) of the 2030 Agenda, the



Sendai Framework for Disaster Risk Reduction 2015–2030 and the United Nations Declaration on the Rights of Indigenous Peoples,

TAKING NOTE that integrated, actionable and fit-for-purpose multi-hazard early warning and predictive services specific to mountain threats (such as glacier lake outburst floods, floods including flash floods, debris flow, landslides, avalanches, orographic and extreme precipitation events, rain on snow, droughts, fires, foehn-type storms and air pollution) are crucial components of climate change adaptation strategies,

CONCERNED that:

- (1) People living in mountains are among the world's most vulnerable and marginalized, and that one in every two rural mountain dwellers in developing countries is exposed to food insecurity,
- (2) Pressures from the amplification of anthropogenic climate change are causing an unprecedented crisis in the high-mountain Earth system that threatens the sustainability of the planet, with alterations and loss of critical mountain ecosystems and the cryosphere, and jeopardizes the capacity of mountains to support livelihoods, including in lowlands,
- (3) Water security is becoming one of the greatest challenges of the world, and that the uncertainty surrounding the availability of freshwater from mountain rivers, particularly water from the cryosphere, is a significant risk factor for local and downstream agriculture, forestry, food production, hydropower production, transportation, tourism, recreation, infrastructure, domestic water supply and human health,
- (4) The impact of changes in the mountain cryosphere on people and economies has not been adequately articulated in major international policy frameworks such as the Sendai Framework for Disaster Risk Reduction 2015–2030, the Paris Agreement on climate change, the United Nations Declaration on the Rights of Indigenous Peoples, the United Nations Convention on Biological Diversity and the United Nations Convention to Combat Desertification,

MINDFUL of the scarcity of meteorological, hydrological, climate and cryosphere observations in mountain regions, of the fragmentation of available data across many actors, of the criticality of reliable data to support and inform policy and actions, coupled with the potential of space-based observing systems to provide observations of high spatial, spectral and temporal resolutions of the Earth's cryosphere over high-mountain areas,

REAFFIRMING:

- (1) The strategic objectives of the World Meteorological Organization (WMO): to produce meteorological, hydrological and climate information and services supporting actions on sustainable development, with a focus on resilience to climate change; to help reduce loss of life and property from hydrometeorological hazards; and to enhance the socioeconomic value of hydrometeorological services,
- (2) The High-mountain Challenges endorsed by the Eighteenth World Meteorological Congress (Resolution 48 (Cg-18),

REAFFIRMING ALSO the role of the Mountain Partnership as the United Nations multi-stakeholder platform for promoting sustainable mountain development, knowledge sharing and advocacy,

UNDERSCORING that meteorological and hydrological forecast and prediction products, and climate outlooks and scenarios produced by WMO Members are based on the infrastructure of the WMO Integrated Global Observing System (WIGOS), the WMO Information System (WIS), and the Global Data-processing and Forecasting System and that the latter includes World Meteorological Centres, Regional Specialized Meteorological Centres, and National Meteorological and Hydrological Centres, as well as Global Producing Centres for Long-Range Forecasts, Regional Climate Centres and Global Producing Centres for Annual to Decadal Climate Prediction,

CALL TO ACTION

We, the participants in the High-mountain Summit 2019, following engaging presentations and inter- and trans-disciplinary dialogues, **hereby commit to the goal that people living in mountains and those living downstream shall have open access to and use of 'fit-for-purpose' hydrological, meteorological and climate information services** that address their need to adapt to and manage the threats caused by unprecedented anthropogenic climate change, recognizing the importance of mountain regions as home of the cryosphere and source of global freshwater.

To achieve this objective, **we commit, as a matter of the greatest importance, to an Integrated High-mountain Observation, Prediction and Services Initiative with user-centred goals**, building on existing knowledge and activities, with international coordination and multidisciplinary approaches. This initiative will consist of a series of collective, intensive campaigns of analysis and forecasting demonstration projects in key mountain ranges and headwaters around the world, including those with transboundary foci. The initiative will make it possible to co-design solutions, build capacity, support and facilitate investments by actively engaging information users, providers and producers to address the most pressing issues of climate, cryospheric and hydrological change in support of natural hazard risk management and adaptation in mountain regions and downstream.

We urge Governments:

- **To review and update their international development cooperation policies**, together with intergovernmental organizations and donor agencies, as applicable, and **make sustainable mountain development and mountain ecosystem conservation an integral part of such policies**, in order to ensure that mountains remain the water towers of the world, including through the strengthening of transboundary cooperation in open data sharing, forecasting and prediction research and services, policy development, as well as knowledge generation, mobilization, communication and dissemination;
- **To declare a United Nations International Year of Mountains (IYM)**, as a mechanism for the international community to carry out the actions of this Call, with links to the proposed International Year of Snow and Ice, discussed at the twenty-third session of the Intergovernmental Council of the International Hydrological Programme (UNESCO, 2018) and the seventieth session of the WMO Executive Council (2018);
- **To explore an integrated global United Nations mountain framework** for coordinating evidence-backed measures for mountain environments across all thematic domains, such as food, health, climate change, disaster risk reduction, biodiversity loss, water management, and social and economic development;

- **To allocate adequate financial and human resources for a long-term and sustainable operation and maintenance** of the infrastructure needed to provide user-tailored services, addressing changes in mountain cryosphere and environments.

Furthermore, we call upon international, regional and national institutions along the information value chain, including scientific and research networks, academia, policymakers, civil society, funding agencies and the private sector:

- **To support adaptation actions;**
- **To recognize the role of mountain areas and the importance of mountain-specific non-economic** (cultural and spiritual) **and economic activities** (such as energy production, tourism, agriculture and forestry), the weight that these activities have especially in countries in mountainous areas and those critically dependent on the evolution of snow cover, glaciers, permafrost, etc., and to acknowledge that their negative evolution, due to climate change, will have devastating effects on their societies;
- **To actively promote greater awareness of the impacts of climate change on high mountains** and how these affect mountain and downstream populations, in support of adaptation plans to reduce the escalating risks, irrespective of the climate scenario;
- **To strengthen global and regional collaboration in the mountain space** by actively engaging at different levels, including within the Mountain Partnership Framework for Action, in the implementation of the 2030 Agenda for Mountains, and to enhance the sharing of information and best practices;
- **To iteratively reinforce linkages** between policy, scientific research findings, and traditional and indigenous knowledge, taking into account the diversity of needs and vulnerabilities of various social groups living in mountain and downstream environments, with a view to co-producing knowledge, making better use of existing knowledge and making the sustainability of adequate local scientific and technical capacities a pivotal component of any such strategies;
- **To advocate stakeholder-based and user-centred integrated risk management systems**, spanning different administrative levels and sectors, to enable optimal governance decisions that sustain mountain socio-ecological systems as a global asset and address crucial communication gaps such as differences in risk perception that can foster or slow down adaptation activities;
- **To promote the inclusion of mountain-specific indicators in local, national, regional and global reporting mechanisms, review processes and commitments**, such as the National Adaptation Programmes of Action (NAPAs) and Nationally Determined Contributions (NDCs) under UNFCCC; the Voluntary National Reviews (VNRs) of SDGs; the national reviews of the Sendai Framework for Disaster Risk Reduction 2015–2030; and the National Biodiversity Strategies and Action Plans (NBSAP) of the Convention on Biological Diversity. Also, to promote the inclusion of mountain-relevant indicators in periodical review processes of agencies in the United Nations system (such as WMO, UNESCO, FAO and UN Environment) and in the scientific syntheses and assessments that are supported by relevant global research communities and networks such as the International Science Council and the Mountain Research Initiative;

- **To strengthen communication, networking, cooperation and partnerships among** meteorological, climatological, hydrological, cryosphere monitoring and scientific research **institutions**, including National Meteorological and Hydrological Services (NMHSs), climate change research institutions, academia and other relevant actors, with the goal of developing comprehensive and integrated weather, climate and hydrological services tailored to mountain-specific threats and needs, including through leveraging the influence of users of these services;
- **To establish, with a long-term perspective, national and regional frameworks for climate services** to coordinate institutions, partners and users and to enable them to co-design, co-produce, communicate, deliver and use climate services for decision-making, addressing the upstream-downstream impacts of changes in mountain environments;
- **To address the underfunded development of climate services in mountain regions** by substantially scaling up public and private investments in mountain-specific sustained services and by facilitating and enhancing access to funding mechanisms, focusing on enabling scalable pilot actions with the overarching goal of building resilient societies;
- **To address critical gaps in mountain Earth system observations** in order to support integrated predictions and services, giving priority to the strengthening of remote-sensing observations of the mountain cryosphere and to **the development of intra- and inter-operability of data platforms of operational and research programmes and projects**, upon which services are built;
- **To advocate open and free access to and exchange of meteorological, hydrological, climate and cryosphere data** from all programmes and projects in mountain regions;
- **To foster cooperation and capacity building** on data processing and management methodologies for consistent, disaggregated, timely and quality data in a sustainable manner;
- **To foster and support specific education initiatives** at all levels, curriculum-based programmes at secondary and university level, and networks among educational institutions, with the goal of preparing early career professionals to meet the needs of users, stakeholders and policymakers in mountainous regions facing evolving challenges, and thus foster broad climate literacy.

PROPOSED ROADMAP

To achieve these goals, we commit to:

- Launching an initiative to pursue an Integrated High-mountain Observation, Prediction and Services Project, building on existing initiatives and fostering exchanges and interactions between populations, users, science and services, and input to policymakers. The initiative will cover key mountain ranges and headwaters of the world to support the management of and adaptation to the risk of natural hazards, which are carried downstream by large rivers, affecting large segments of the Earth's human population and ecosystems. The WMO Research Board, in collaboration with the Global Cryosphere

Watch (GCW), is urged to take a leading role in coordinating activities across WMO sponsored and co-sponsored research programmes;

- Pursuing a consortium of national and international institutions and networks representing policy, practice, scientific research, academia and funding agencies, to support the proposed Integrated High-mountain Observation, Prediction and Services Project and to organize coordinated observation and prediction campaigns within the scope of a Year of Mountain Prediction (YMP), potentially in conjunction with the United Nations International Year of Mountains;
- Expanding the scope of the WMO Global Data-processing and Forecasting System (GDPFS) to include Mountain Specialized Centres and to initiating a pilot High-mountain Analysis and Forecasting Demonstration Project, with a view to establishing global mountain Earth system forecasting and prediction systems, as called for by the Eighteenth World Meteorological Congress (Resolution 48 (Cg-18)), by building on the WMO cascading prediction architecture and on the experience of the Severe Weather Forecasting Demonstration Project. Within the framework of WMO, high-mountain regions could be an effective test bed for developing new techniques, as the regions are complex while limited geographically;
- Accelerating and enhancing the development of existing WMO Programmes to include mountain-focused components and to support NMHSs and other institutions in the development of climate, cryospheric and hydrological information and prediction products and services, such as the World Hydrological Cycle Observing System (WHYCOS) with its regional components, the WMO Global Hydrological Status and Outlook System (HydroSOS), the Global Cryosphere Watch in conjunction with the Polar Space Task Group, and Regional Climate Centres (RCC), to support decision-making in water management in climate-sensitive mountain river basins;
- Pursuing the development of a framework for an integrated global cryosphere data and information system to foster sustainable access to cryospheric data, information and products, through standardization following the FAIR Guiding Principles for scientific data management and stewardship, and to developing and/or strengthening existing knowledge hubs such as the Hindu Kush Himalaya (HKH) Cryo-hub for sharing data and information. Focusing on the discoverability of existing observations through the Observing Systems Capability Analysis and Review (OSCAR) Tool of WMO should be the first step;
- Fostering collaboration with and amongst space agencies focusing on a coordinated approach to enhancing the monitoring of the cryosphere in high-mountain areas and supporting relevant applications and services, with the engagement of the Coordination Group for Meteorological Satellites (CGMS) and the Committee on Earth Observation Satellites (CEOS);
- Building on existing mechanisms, such as the Alpine Convention, the Carpathian Convention, the Andean Mountain Initiative and the Africa Mountain Partnership Champions Committee, and to anchoring these in the relevant institutional frameworks such as the East African Community, the High Andean Wetlands Regional Initiative, the Interstate Commission on Sustainable Development and the HKH Call to Action.