



# METEOWORLD

DECEMBER  
2019

## Latest WMO climate science informs negotiations at the United Nations Climate Change Conference

The annual United Nations Climate Change Conference (COP25) took place in Madrid from 2 to 13 December. In the opening session, UN Secretary-General António Guterres cited the latest climate data released by WMO.

“Do we really want to be remembered as the generation that buried its head in the sand, that fiddled while the planet burned?” he asked delegates, as he renewed his appeal for urgent climate action.

“The latest, just-released data from the World Meteorological Organization show that levels of heat-trapping greenhouse gases in the atmosphere have reached another new record high,” he said. “Global average levels of carbon dioxide reached 407.8 parts per million in 2018. Not long ago, 400 parts per million was seen as an unthinkable tipping point.”

“The signs are unmissable,” continued Mr Guterres. “The last five years have been the hottest ever recorded. The consequences are already making themselves felt in the form of more extreme weather events and associated disasters, from hurricanes to drought to floods to wildfires.”

Ahead of COP25, WMO issued its *Greenhouse Gas Bulletin* on the state of atmospheric concentrations of leading long-lived greenhouse gases, including carbon dioxide, methane and nitrous oxide. All hit new records in 2018.

More information: [bit.ly/WMO-climate-science-cop25](http://bit.ly/WMO-climate-science-cop25)

## WMO addresses high-level segment of United Nations Climate Change Conference

The high-level segment of the United Nations Climate Change Conference (COP25) opened on 10 December with renewed warnings from WMO Secretary-General Petteri Taalas and United Nations Framework Convention on Climate Change Executive Secretary Patricia Espinosa about the urgency of climate action.

“This year marks the 25th UN Climate Change Conference,” said Ms Espinosa. “Each year at COP we are told that the window of opportunity could close soon. The window of opportunity is closing now,” she said. “My message is this: We need your decisions. We need your leadership. We are out of time.”

A key objective of COP25 is to raise overall ambition with respect to the full operationalization of the Paris Agreement, which aims to keep a global average temperature rise this century well below 2 °C



WMO Secretary-General Petteri Taalas addressing the high-level segment of the UN Climate Change Conference on 10 December

and to drive efforts to limit the temperature increase even further to 1.5 °C above pre-industrial levels.

“Global warming continues. The average global temperature has risen by about 1.1 °C since the pre-industrial era and the ocean by half a degree. Two hundred and twenty million people suffered from heatwaves last year. We have started seeing growth in hunger once again. Now we have more than 800 million people suffering from lack of food,” Mr Taalas said in his address to delegates.

“The warming of the oceans has given more energy for tropical storms. Tropical Cyclone *Idai* hit Mozambique and was the strongest cyclone hitting the southern hemisphere in 100 years. Hurricane *Dorian* hit the Caribbean islands and the Bahamas lost 24% of its GDP in one day,” he said.

Mr Taalas urged COP25 delegates to focus on the business opportunities provided by the transformation to renewable energy and a low-carbon economy rather than short term economic costs.

More information: [bit.ly/WMO-COP25-highlevel](http://bit.ly/WMO-COP25-highlevel)

## Decade of exceptional global heat and high-impact weather marks close of 2019

The WMO *provisional statement on the State of the Global Climate in 2019* was released at the United Nations Climate Change Conference. It reports that the global average temperature in 2019 (January to October) was about 1.1 °C above the pre-industrial period.

With this, 2019 marks the end of a decade of exceptional global heat, retreating ice and record sea levels driven by greenhouse gases from human activities. Average temperatures for the five-year (2015–2019)



WMO Secretary-General Petteri Taalas at the release of the WMO provisional statement on the State of the Global Climate in 2019.

and ten-year (2010–2019) periods are almost certain to be the highest on record. It is also on course to be the second or third warmest year on record, states the report.

Concentrations of carbon dioxide in the atmosphere hit a record level of 407.8 parts per million in 2018 and continued to rise in 2019. CO<sub>2</sub> stays in the atmosphere for centuries and the ocean for even longer, thus locking in climate change.

“On a day-to-day basis, the impacts of climate change play out through extreme and ‘abnormal’ weather. And, once again in 2019, weather and climate related risks hit hard. Heatwaves and floods which used to be ‘once in a century’ events are becoming more regular occurrences. Countries ranging from the Bahamas to Japan to Mozambique suffered the effect of devastating tropical cyclones. Wildfires swept through the Arctic and Australia,” said WMO Secretary-General Petteri Taalas.

The report is made possible through information sourced from a large number of National Meteorological and Hydrological Services (NMHSs) and associated institutions, as well as regional climate centres, the World Climate Research Programme, the Global Atmosphere Watch and Global Cryosphere Watch. It also devotes an extensive section to weather and climate impacts on human health, food security, migration, ecosystems and marine life. This is based on input from a wide range of United Nations partners including the Food and Agriculture Organization of the United Nations, the United Nations High Commissioner for Refugees, the International Organization for Migration, the Intergovernmental Oceanographic Commission of UNESCO and the United Nations Environment Programme, the United Nations Office for Disaster Risk Reduction, the United Nations Conference on Trade and Development, the World Food Programme and the World Health Organization.

The *provisional State of the Global Climate* report provides an authoritative source of information for the United Nations climate change negotiations and complements the reports of the Intergovernmental Panel on Climate Change (IPCC). The final *Statement on the State of the Global Climate* with complete 2019 data will be released in March 2020.

More information: [bit.ly/WMO-StateofGlobalClimate-prov2019](http://bit.ly/WMO-StateofGlobalClimate-prov2019)

## State of Climate Services report shows significant cost benefit of investments in climate services for agriculture and food security

Weather and climate services are vital for sustainable development and climate change adaptation. The benefits of investment greatly outweigh the costs, and yet the capacity to deliver and access these services is uneven and inadequate, according to the inaugural WMO 2019 *State of Climate Services* report.

Climate services investments have an overall cost benefit ratio of 1 to 10. The evidence suggests that the benefits of investing systematically in strengthening the operational global, regional, national and hydrometeorological system needed for climate services outweigh the costs by about 80 to 1.

The report also highlights that “the capacities to deliver and access these services are highly uneven across regions and countries. The challenge is to strengthen the global-regional-national hydro-meteorological system needed to operationalize and deliver these products and services at country level, particularly in developing countries, so that everybody benefits”.

Food-insecure people are among those hit hardest by climate change. Over 80% of the world’s food insecure live in degraded environments exposed to recurrent extreme events such as storms, floods and drought. In a warming world, extreme climate conditions will become more frequent and severe.

The report puts forward strategic recommendations addressing five major areas in need of improvement:

- Fit-for-purpose financial support to operationalize and scale up climate services to support country-level agrometeorological service delivery, especially in Africa and small island developing states
- Systematic observations as fundamental for the provision of climate services
- An enhanced climate science basis for priority climate actions;
- Addressing the “last mile” barrier through multi-stakeholder partnerships
- Systematic monitoring and evaluation of socioeconomic benefits of climate services

WMO spearheads the Global Framework for Climate Services and prepared the report in partnership with the Adaptation Fund, the CGIAR Research Program on Climate Change Agriculture and Food Security, the Food and Agriculture Organization of the United Nations, the Green Climate Fund, the Global Environment Facility, the Global Facility for Disaster Reduction and Recovery, the World Bank and the World Food Programme.

More information and report: [bit.ly/WMO-ClimateServices-report](http://bit.ly/WMO-ClimateServices-report)

## WMO joins new partnership on renewable energy

A new partnership has been cemented to boost provision of targeted weather and climate information and services for renewable energy to help cut emissions of greenhouse gases and tackle climate change.

On 9 December, WMO and the United Nations Framework Convention for Climate Change both signed agreements with the Global Energy Interconnection Development and Cooperation Organization (GEIDCO) to promote efficient, resilient and renewable energy generation and use.

The agreement with GEIDCO provides for cooperation in the following areas:

- Selection of potential sites globally for large-scale renewable energy systems, based on available research and analyses on wind and solar resource identification, regional and local conditions such as land cover, power-grid integration potential, and existing capacity.
- Analysis of the impact of weather, climate variability, and climate change on the renewable energy resources such as hydro and wind power, to inform the national policy dialogue on the energy planning under climate change scenarios.
- Pre-feasibility studies for clean energy systems with high potential for implementation investment, including (i) resource analysis of hydropower and wind power systems in regions such as East Africa, Southeast Asia and Northeast Asia, (ii) analysis of the long-term climate change impact on clean energy resources, and (iii) analysis of socio-economic outcomes to guide the energy industry investments and decision-making in major projects.
- Assessment of risks to power-generation infrastructure under climate extremes and climate change in selected regions, to provide support for energy operation, planning and management as well as to related decision-making.

The agreement will enable WMO to expand the provision of climate services for energy as a contribution to the implementation of the Global Framework for Climate Services. The occasion for the signing was the release of several reports at the United Nations Climate Change



WMO Secretary-General Petteri Taalas and GEIDCO Chairman Liu Zhenya sign agreement to promote efficient, resilient renewable energy generation and use.

Conference (COP25) focused on implementation of renewable energy systems on a scale and scope sufficient to achieve the temperature target of the Paris Agreement, of keeping the global temperature increase to less than 1.5°C or 2 °C above pre-industrial levels.

Since fossil energy combustion is the main source of global greenhouse gas emissions, accelerating de-carbonization of energy systems plays a fundamental and decisive role in addressing climate change.

WMO Secretary-General Petteri Taalas said that renewable energy currently only accounts for 15% of total consumption.

"Despite the commitments under the Paris Agreement, there is still no sign of a decline in greenhouse gas emissions or atmospheric concentrations from fossil fuel consumption", he told a thematic event at COP25 on 9 December.

"There is really a need for energy consumption to become carbon neutral," he said, adding that a switch to clean energy would also tackle air pollution and improve public health.

"If you want an energy system based on solar or wind energy, you need good weather and climate forecasts and information. You have to know current and future climate conditions to get the best out of renewable energy systems," said Mr Taalas.

More information: [bit.ly/WMO-RenewableEnergy-partner](https://bit.ly/WMO-RenewableEnergy-partner)

## Alliance for Hydromet Development launched to unite efforts to close the capacity gap on early warnings and climate information by 2030

Twelve international development organizations, spearheaded by WMO and the World Bank, launched the Alliance for Hydromet Development on 10 December at the United Nations Climate Change Conference. Members will work together to collectively ramp up action that strengthens the capacity of developing countries to deliver high-quality weather forecasts, early warning systems, and climate services. Known for short as "hydromet" services, these underpin resilient development by protecting lives, property and livelihoods.

Their work will specifically serve to:

- Improve systematic observations for better data by strengthening country capacity for sustained operation of observational systems and seeking innovative ways to finance developing country observations.
- Enhance support for better adaptation, mitigation and resilience by strengthening country capacity for science-based mitigation and adaptation planning.
- Strengthen early warning systems for improved disaster risk management by developing multi-hazard national warning systems, comprised of better risk information, forecasting capabilities, warning dissemination and anticipatory response.
- Boost investments for better effectiveness and sustainability by fostering programmatic approaches that go beyond individual projects, including systematically strengthening the WMO integrated global, regional and national operational hydromet system.



The founding members of the Alliance for Hydromet Development are the Adaptation Fund, African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, Global Environment Facility, Green Climate Fund, Islamic Development Bank, United Nations Development Programme, United Nations Environment Programme, World Bank, World Food Programme and WMO.

The Alliance is open for membership to all public international development, humanitarian and financial institutions providing assistance to strengthen developing countries' hydromet capacity.

More information: [www.wmo.int/alliance](http://www.wmo.int/alliance)

## WMO voices concern about radio frequency decision

The race to release 5G technology threatens to squeeze out other radio-frequency dependent technologies, including the world's critical national severe weather early warning systems, raising WMO concern. This was evident with the outcome of the World Radiocommunication Conference (WRC-19), which concluded on 22 November. It was attended by more than 160 nations, which agreed on the allocation of bandwidths of the world's radio spectrum – casting a shadow over the future of Earth observation satellite systems.

With radio spectrum bandwidths a limited resource, the emergence of technologies like 5G means demand is now outstripping the limited supply. The conference agreed to protect the microwave bands that support their life-saving severe weather early warning systems, but with time-limited provisions, which leaves the future of these systems uncertain.

"This WRC-19 decision has the potential to significantly degrade the accuracy of data collected in this frequency band which would jeopardize the operation of existing Earth observation satellite systems essential for all weather forecasting and warning activities of the national weather services," said WMO Secretary-General Petteri Taalas in a written intervention to the conference organized by the International Telecommunication Union.

"Potential effects of this could be felt across multiple impact areas including aviation, shipping, agricultural meteorology and warning of extreme events as well as our common ability to monitor climate change in the future," he said.

More information: [bit.ly/WMO-WRC19](https://bit.ly/WMO-WRC19)

## Nomination of WMO Experts by Permanent Representatives now facilitated online

The launch of the new WMO Community Platform has already begun to streamline several of the organization's important processes, and to give WMO Members and Partners control of the information they share with the WMO Secretariat.

The WMO Experts Database is the first component of the platform to be released and facilitates the easy online nomination of experts. WMO Permanent Representatives are therefore requested to begin nominating their organization's experts via the platform.

Permanent Representatives are also asked to nominate their organization's Agency Approvers who will be authorized to update the platform with organizational information, contacts and expert nominations.

More information and the comprehensive Experts Database Users Guide are available here: [public.wmo.int/en/community-platform](http://public.wmo.int/en/community-platform)

## First WMO-International Maritime Organization joint symposium on extreme maritime weather

Although weather forecasting has greatly improved, ships continue to be caught in extreme weather at sea resulting in damage and loss of life and property. WMO and the International Maritime Organization (IMO) jointly held the first Symposium on Extreme Maritime Weather: Towards Safety of Life at Sea and a Sustainable Blue Economy.

The event, which took place from 23 to 25 October at IMO headquarters in London, brought together approximately 200 public and private sector stakeholders from the shipping industry. These included freight operators, passenger ferries and cruise liners, as well as offshore industries, ports and harbours, coast guards, insurance providers and the met-ocean community.

The symposium was a key platform for WMO and IMO to identify best practices and improve services for safety and risk reduction, emergency response, sustainable shipping practices and greater collection and sharing of ship observations.

Participants identified the urgent need to close the gap between met-ocean providers and users in the maritime industry, with recommendations made in four priority areas:

- Education, awareness and training at the policy level
- Data exchange between parties with validation
- Portrayal and communication of weather impacts
- Better applications to use weather data

Participants also agreed that formalized collaboration between WMO and IMO on extreme maritime weather issues would help achieve these goals, while ad hoc entities might be needed to solve specific issues.

More information is available here: <https://public.wmo.int/en/events/meetings/londonsymposium> or through the WMO Marine Meteorology and Ocean Affairs Division at [mmo@wmo.int](mailto:mmo@wmo.int)

## New animated video launched to prevent loss of life and property during coastal flooding in Pacific Island communities

Coastal flooding annually costs billions of dollars worldwide and causes untold loss of property and life. This is often due to many people not knowing what safety measures they should take in the case of a flood warning. In response, WMO is working to raise awareness and has released a new engaging and informative animated video to specifically support communities in the Pacific Islands. These communities are particularly vulnerable to deadly coastal flooding, including from storm surges during cyclonic or storm events, wind waves and swell, and flooding from coastal rivers.



The animated video includes life-saving tips on understanding early warning signs, how to access emergency alerts, what to expect during coastal flooding, seeking safe shelter, responding to dangers and staying informed.

It is being made freely available across the Pacific Islands, and is expected to be aired on television, in schools, in cinema previews and at community events. It will also be translated, where possible, into local languages to enable wider use.

The production of the video was endorsed by Regional Association V (South-West Pacific) in Resolution 5 of its Seventeenth Session in October 2018. It was made possible with funding from the Korea Meteorological Administration and the Canada CREWS project. Similar animated videos are planned that will be tailored to communities in South-East Asia and Africa.

The video may be viewed at: [bit.ly/WMOvideo-floodsafety](https://bit.ly/WMOvideo-floodsafety)

Also released in November by WMO, is an informative animated video about the Flash Flood Guidance System: [bit.ly/WMOvideo-flashflood](https://bit.ly/WMOvideo-flashflood)

## Marine and hydrological sites may soon be included in WMO list of recognized centennial observing stations

Centennial observing stations provide a hundred or more years of largely uninterrupted meteorological observations from the same station — a unique opportunity for climate variability and change analysis. In 2017, with these important stations under threat from tightening government agency budgets, WMO created a mechanism

to recognize and preserve their operation. To date, 140 long-serving stations in 47 countries have been honoured with this recognition.

Experts of the Advisory Board for WMO Recognition of Long-term Observing Stations – which is composed of climate, instrument and observation experts – are now exploring the prospect of adding marine and hydrological observing sites to this valuable recognition initiative. This was discussed at the first meeting of the group, held from 12 to 14 November at the Hong Kong Observatory, one of the first recognized centennial observing stations. This and other recommendations of the advisory board will be submitted at the WMO Executive Committee and Congress sessions for endorsement. The new call for candidate centennial observing stations was launched in December 2019.

More information: [bit.ly/WMO-CentennialStations](https://bit.ly/WMO-CentennialStations)

## Artificial intelligence for operational hydrology – call for challenges and mentors now open

The WMO HydroHub is collaborating with the University of Geneva and other partners to organize the next Open Seventeen Challenge (O17) leveraging the power of artificial intelligence (AI), under the theme “AI for the SDGs”.

Challenges on this theme will be published by O17 in early 2020, with students and young scientists worldwide invited to submit project proposals. The best proposals will be selected for implementation, with their developers receiving six weeks of mentoring by experts in their respective field.

HydroHub is currently using a crowdsourcing approach – including through social media – to identify potential O17 challenges and mentors in the field of hydrometeorology. This will enable a transparent and inclusive process, reaching as broad an audience as possible, as well as providing a sense of how AI is being considered worldwide by the hydromet community. As AI is now more widely understood and beginning to drive significant technological innovations, it has great potential to be applied to addressing hydrometeorology’s greatest challenges.

Projects selected for mentorships that realize the best results will then be presented to an international audience at the annual AI for Good Global Summit in Geneva, 4 to 8 May 2020. The most promising projects may then have the chance to receive further support for their development.

You can help make this a success by spreading the word – or volunteering as a mentor and proposing a challenge you think can be tackled with AI. We are looking forward to receiving your hydrometeorology challenge proposal and offer to mentor young scientists.

Submit your challenge at: [bit.ly/WMO-hydrohub-AIchallenge](https://bit.ly/WMO-hydrohub-AIchallenge)

## Digitization of 150 years of hydrometeorological data in Uzbekistan advances

The recovery of climate records from paper and obsolete electronic media is an important and ongoing task for WMO, national meteorological and hydrological services and other institutions. Those observations bolster the climate record and allow a better understanding of climate variability and change.



The Uzbek National Meteorological and Hydrological Service, Uzhydromet, has a valuable paper archive of hydrometeorological data with significant historical value going back more than 150 years to 1867. WMO has now photographed more than 7 million pages from 19 categories of valuable historical data, as part of phase one of the Climate Data Rescue in Uzbekistan project. This has been made possible through funding from the Korea Meteorological Administration and technical support from the International Environmental Data Rescue Organization (IEDRO) as well as data rescue expertise from Bulgaria.

The project is now working to digitize the imaged climatological and hydrological data sets as part of its phase two. This will be done through a combination of both data recognition software and manual keying. The rescued data and existing electronic data will then be migrated to a modern climate data management system (CDMS).

Experts from WMO, IEDRO, Bulgaria and Uzhydromet met in Tashkent, Uzbekistan in November 2019 to map out the priorities and timeline for phase two. They concluded that the digitization would begin with the monthly summary data with daily records for all available meteorological variables for 87 synoptic stations, for the entire observational period. In conjunction with this, will be the digitization of the monthly summary hydrological data with water level and water discharge starting from 1960. The Uzhydromet team will also begin reviewing different CDMS solution options.

This project will importantly serve to facilitate CDMS implementation to underpin climate services with high-quality long-term data sets.

More information: [bit.ly/WMO-UZdata](https://bit.ly/WMO-UZdata)

## Regional cooperation between Asia and the South-West Pacific strengthens capacities and creates valuable opportunities

Shared cross-cutting issues, challenges and opportunities emerged from the Joint Management Group Meeting for Asia and the South-West Pacific, held 29 to 31 October in Singapore.

Participants included the Permanent Representatives with WMO and high-level representatives from 16 WMO Members across the Asia-Pacific region. They identified key cross-cutting issues and challenges in the regions, including the need for enhanced forecasting and early warning systems – and capacity building and financial support for these.

Both Management Groups expressed openness to collaborate on emerging opportunities and issues of common interest including utilization of satellite data, impact-based forecasting, sub-regional cooperation on SIGMET for aviation safety, climate services and training opportunities, and facilitating the contribution of National Meteorological and Hydrological Services to the climate change agenda.

Both Management Groups also expressed strong support for continuing the functions of regional associations and the strengthening of the working mechanisms between regional associations and technical commissions with enhanced links to regional partners.

These meeting outcomes have now been endorsed as a set of joint recommendations from the regions, which will be brought to the next session of the WMO Executive Council.

More information: [bit.ly/WMO-AsiaPacific-meet](https://bit.ly/WMO-AsiaPacific-meet)

## Advances towards increased air quality prediction and forecasting capacity across Africa

Seamless air quality prediction and forecasting are crucial, and in response, international efforts are underway to expand these capacities across Africa. Leading this effort is the Air Quality Prediction and Forecasting Improvement for Africa (PREFIA) project – a collaborative initiative of the WMO Global Atmosphere Watch programme.

Experts and stakeholders came together on 7 to 12 October at the WMO Regional Training Centre in Nairobi for two events designed to advance efforts that will help African countries and decision makers to improve air quality and public health, mitigate the occurrence of acute air pollution episodes, particularly in urban areas – and reduce the associated impacts on agriculture, ecosystems and climate.

This first two-day session included nearly 30 experts and stakeholders from Cameroon, Egypt, Finland, Kenya, the Netherlands, South Africa, Sweden, United Kingdom of Great Britain and Northern Ireland, and United States of America. They explored several new developments, including initiatives on air quality for Africa, air pollutant emissions over Africa, needs of the African air quality community, updates on the model inter-comparison exercise, and plans for the next phase of the project.

This meeting was immediately followed by a four-day training for forecasters in Africa on “Seamless Prediction of Air Pollution for Africa”, led by instructors from University of Hertfordshire, North Carolina State University and the Finnish Meteorological Institute. Participants learned fundamentals and advanced topics in air quality modelling, atmospheric chemistry and aerosol modelling, atmospheric composition observations, emission processing for air quality modelling, data management and model evaluation, downscaling methods, data assimilation and model inputs, integrated urban weather and environment prediction systems and services, and air quality forecasting experiences in South Africa and Egypt.

Much of the training was drawn from the upcoming publication *Best Practices and Training Materials for Chemical Weather/Air Quality Forecasting*, which is currently being finalized by the Global Atmosphere Watch (GAW) Programme and the Education and Training Programme (ETRP) of WMO. The draft publication was made available to the participants to test the effectiveness of the materials.

Having an air quality forecast and assessment system in place, along with the required technical capacities, will support governments to improve air quality and public health, mitigate the occurrence of acute air pollution episodes, particularly in urban areas, and reduce the associated impacts on agriculture, ecosystems and climate.

The event also increased the capacity of WMO Regional Training Centres (RTCs) of Africa in teaching air pollution prediction and to engage with universities and institutions worldwide. Participants attended from Algeria (RTC), Cameroon, Cote d'Ivoire, Egypt (RTC), Ethiopia, Finland, France, Ghana, Kenya (RTC), Madagascar (RTC), Rwanda, South Africa (RTC), Spain, United Republic of Tanzania, United Kingdom of Great Britain and Northern Ireland and United States of America.

More information, including the list of participants and presentations for both events, is available on the WMO ETRP platform: <http://bit.ly/WMO-PREFIA>

### **Scale-up of Tajikistan agrometeorological pilot programme advances**

Strengthened agrometeorological services and early warning systems are needed to provide farmers and rural dwellers in Tajikistan with the capacity to prepare for and adapt to climate changes that will impact agricultural production.

With this in mind, a two-day workshop was held to advance the scaling up of the country's pilot agrometeorological system, which is led by the Food and Agriculture Organization of the United Nations and funded by the European Union. The event took place from 23 to 24 November in Khoja Obi Garm, Tajikistan with the participation of the key stakeholders involved in the collection and production of agrometeorological services. These included representatives of Tajikistan's State Agency of Hydrometeorology, State Agency of Plant Protection and Chemicalization, Committee for Environmental Protection, national NGOs and farmer organizations.

They validated the outcomes of the pilot programme, which was launched earlier this year, and paved the way for scaling up the system to cover more agricultural regions in the country. They also identified practical and feasible approaches to boost the efficiency and effectiveness of the agrometeorological sector with timely and accurate agro-climate information.

The event marked a milestone in forging the public-public and public-private dialogue required to move from the pilot stage to building a full agrometeorological system in the country. It also achieved the first steps in forming agreements between national institutions and non-governmental organizations for the future development of the system in Tajikistan.

WMO welcomed the opportunity to take part in the FAO-hosted event and looks forward to continuing to expand the successful collaboration with FAO in areas like drought management, crop models and training, among others.

### **WMO Global Campus Initiative rolls out regionally in Africa**

One of the key strategies of the WMO Global Campus Initiative is to "think globally, act locally". As part of this strategy, in addition to

launching a global learning events calendar and the Global Campus E-Library, the WMO Education and Training Office has now led two on-the-ground regional coordination meetings with WMO Regional Training Centres. The most recent took place in Cairo, Egypt from 28 October to 1 November and included the participation of directors from the Africa region, as well as representatives of WMO Africa-based regional training centres and collaborating partners.

The meeting resulted in eleven concrete action plans for increased collaboration and support to WMO Members. These included documenting and sharing expertise; exchanging information on capacity development initiatives; sharing resources and collaborating on training offerings; collaborating on marine forecasting training; sharing strategies on implementing distance learning; tracking competency-based learning completion; conducting an Africa region learning needs assessment; French-language Basic Instruction Package for Meteorologists (BIP-M) training; numerical weather prediction applications training; and improving collaboration with the private sector and academia. Many of these actions also have positive global implications.

More information is available on the meeting website, where participants will continue sharing progress on each action. The website has already been updated to include resources in each action area, and may be accessed at: [bit.ly/WMO-GlobalCampus-meeting](http://bit.ly/WMO-GlobalCampus-meeting)

### **Empowering strong leadership and management of National Meteorological and Hydrological Services across Africa**

Good institutional governance and management is one of the key elements of an efficient and sustainable National Meteorological and Hydrological Service (NMHS). In support of this, WMO and the South African Weather Service jointly organized a conference on "Leadership and Management of National Meteorological and Hydrological Services in Africa", which took place from 18 to 22 November in Boksburg, South Africa.

The conference addressed the increased demand across Africa, as elsewhere around the globe, for NMHSs to provide more accurate and timely weather, water and climate services to safeguard lives and livelihoods. This is especially important given the more frequent occurrence of extreme weather and climate events across Africa, which significantly impacts the lives and livelihoods of vulnerable communities.

Fifty-five participants from 41 countries, including 32 Permanent Representatives with WMO took part.

The conference achieved several valuable outcomes, including:

- Increased knowledge of the leadership role of NMHSs in their capacity to perform their mandate, through the acquisition of new strategies and development of scenarios in information processing as a contribution to sustainable national development.
- Enhanced understanding of decision makers and related institutions to support science-based decisions that inform policy to mainstream weather, water, climate services into socioeconomic development and promote increased national funding to NMHSs.

- Identified concrete actions to support NMHSs in Africa to develop and retain sustainable skills, expertise and competencies to produce customer-tailored services as well as provide good leadership required to interact effectively with decision makers in government.
- Enhanced understanding of the weather-water-climate user community on the added value of engaging in partnerships in support of NMHSs to collect and process data and deliver services as may be required.
- Sensitized participants towards a new line of thinking as they deal with a variety of societal and economic issues in a dynamic world.
- Provided a set of reference materials for leadership and management with emphasis on meteorological, hydrological, environmental and related services.

More information, including list of participants and presentations, is available on the WMO Education and Training Programme platform at: [bit.ly/WMO-NMHS-AfricaTraining](http://bit.ly/WMO-NMHS-AfricaTraining)

### New e-course on integrating climate risk information into national adaptation plans

In October, a new online training course, Integrating Climate Risks Information into National Adaptation Plans (NAPs), was launched by the Climate Coordination Activity under the Climate Prediction and Adaptation Branch and the Global Framework for Climate Services in collaboration with UNITAR/UN CC Learn.

The e-course shows how to strengthen NAPs through appropriate climate information and coordinated policy action, enabling different types of institutions and actors to work together in a collaborative framework, drawing on the resources of the global hydro-meteorological community at large.

The course is designed to respond to the learning needs of both climate services providers such as National Meteorological and Hydrological Services, research/academic and international organizations, and users (e.g. decision makers, private investors, non-governmental organizations), as well as for those working at the science-policy interface for outreach or communication purposes. The training is modular and provides the freedom to choose and combine different thematic modules.

There are two main learning tracks available:

- Producing climate information for NAPs
- Using climate information for NAPs

The course aims to achieve the following learning objectives:

- Describe the importance of climate information in adaptation planning and decision-making
- Identify technical resources for assessing climate risks
- Explore the role of National Hydro-meteorological Services in the NAP process
- Discuss how priority climate actions can be enhanced by climate scientific information
- Identify climate products and services that support NAPs
- Discuss how to promote effective partnerships between climate information producers and users

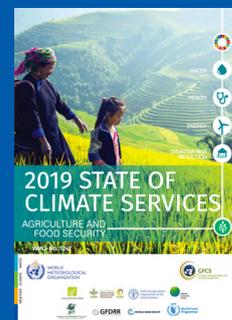
The course is currently being translated into French and Spanish and will be available soon. To enrol in the e-course, register through the UN CC Learn platform: [www.uncclearn.org](http://www.uncclearn.org)

### Newly Issued

**2019 State of Climate Services: Agriculture and Food Security**, WMO No. 1242, ISBN 978-92-63-11242-2. Available in English.

**Technical Regulations, Volume I - General Meteorological Standards and Recommended Practices**, WMO No. 49, ISBN 978-92-63-10049-8. Available in Arabic, Chinese, English, French, Russian and Spanish.

**WIGOS Metadata Standard**, WMO No. 1192, ISBN 978-92-63-11192-0. Available in Arabic, Chinese, English, French, Russian and Spanish.



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