The World Meteorological Organization at a glance

Working together
for monitoring, understanding and predicting
weather, climate and water

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METEOROLOGISTS, CLIMATOLOGISTS AND HYDROLOGISTS WORKING FOR YOU

"Every day, National Meteorological and Hydrological Services are working around the clock, all year round, to protect and provide vital information to you and your communities. Their early and reliable warnings of the occurrence of severe weather, air quality and climate events allow decision-makers, communities and individuals to be better prepared. They help save life and property, protect resources and the environment and support socio-economic growth.

Weather, climate and water greatly affect every aspect of our daily lives and socio-economic development. They affect food and water resources and shape a society and its ability to grow in a sustainable way. Accurate observations and predictions and the free and timely exchange of reliable information about weather, climate and water, therefore, are of vital importance.

WMO is committed to ensuring that all nations are able to take full advantage of weather, climate and water information and products for their sustainable development and the safety and well-being of their people."

Michel Jarraud
Secretary-General of the World Meteorological Organization

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WORKING TOGETHER IN WEATHER, CLIMATE AND WATER

Weather, climate and water know no political boundaries. To promote international cooperation in these areas, the World Meteorological Organization (WMO) coordinates the activities of the National Meteorological and Hydrological Services (NMHSs) of its 188 Members. Originating from the International Meteorological Organization established in 1873, WMO was created in 1950 as an intergovernmental organization and became a specialized agency of the United Nations in 1951.

WMO is the United Nations system's authoritative voice on weather, climate and water.

IMPROVING SAFETY AND WELL-BEING

Since its inception, WMO has galvanized the global community to improve our understanding of weather, climate and water. WMO provides a unique mechanism for the timely exchange of data, information and products. It makes major contributions to sustainable development, the reduction of loss of life and property caused by natural hazards related to weather, climate and water, as well as safeguards the environment and the global climate for present and future generations.

Through its Members, WMO provides forecasts and early warnings to nations, economic sectors and individuals, which help prevent and mitigate disasters, save lives and reduce damage to property and to the environment through better risk management.

WMO draws world attention to the depletion of the ozone layer, climate variability and change and their impacts, dwindling water resources, and air and water quality.

WMO monitors and forecasts the transport of chemical and oil spills, forest fires, volcanic ash, haze and nuclear isotopes. It assists in the formulation of global and regional strategies, conventions and the implementation of related action plans.

TAKING THE PULSE OF THE EARTH SYSTEM

WMO provides up-to-date, accurate and quantitative information on the state of the Earth's atmospheric system, the oceans, surface water bodies and underground water. It also monitors the interactions of the atmosphere with the Earth's surface, ecosystems and human activities.

WMO facilitates the provision and exchange of near-real-time information from across the globe around the clock. The data are collected by 10 000 land stations, 3 000 aircraft, 1 000 upper-air stations and more than 1 000 ships working in tandem with 188 National Meteorological Centres and 50 Regional Specialized Meteorological Centres. These are bolstered by 16 operational meteorological and 50 environmental research satellites. The WMO Integrated Global Observing System acts as an umbrella for these observational networks, using the WMO Information System to connect together all regions for data exchange, management and processing.

The WMO Research Programmes coordinate and integrate the research activities of Members to take full advantage of global observations in analysis of the weather and climate and to develop computer models that represent the key underlying processes for improving the accuracy and range of weather forecasts. In so doing, uncertainties in climate predictions and water resource assessments

can be reduced. Cooperative research and development among WMO Members has made a five-day weather forecast today as reliable as a two-day weather forecast 20 years ago. In addition to this great advance, WMO-supported observations and monitoring contribute to improved scientific understanding on a number of other topics, including air and water quality and climate.

Air quality services are a core component of WMO-supported programmes. Changes in the composition of the air affect human health and the Earth's climate. An essential activity of NMHSs is to monitor long-term changes in atmospheric composition, including levels of greenhouse gases, ultraviolet radiation, aerosols and ozone, and to assess the effects of these changes on people, climate, regional and urban air quality, and marine and terrestrial ecosystems.

Likewise, measurement of hydrological variables, including the quantity and quality of both surface- and groundwater, is essential for protecting life, property and the environment. Hydrological observations enable the effective management of water resources around the world.

In these activities, WMO ensures that observational and monitoring instruments worldwide are accurate and provide standardized

data. This is vital if data generated in one place are to be usable elsewhere in the world.

WMO also assists countries in enhancing their data-management capacity. Data-rescue activities help NMHSs, especially those of developing countries, safeguard and access historical data for various purposes.

TRANSFORMING DATA INTO USEFUL PRODUCTS

Powerful computers in WMO centres process the data collected from the tens of thousands of land-based observing platforms and Earth-observing satellites. Scientists develop and use numerical models based on physical laws to produce weather and air-quality forecasts, climate predictions, risk assessments, early warning for extreme events and a growing range of services for the public and decision-makers all over the globe.

UNIVERSAL AVAILABILITY OF DATA AND PRODUCTS

Thanks to WMO, the data, information and derived products are widely available and exchanged freely every day between WMO centres and weather Services in each country, and between and among countries around the world. They are provided quickly and efficiently, using the latest information and communication technologies.

A SEASON TO A YEAR AHEAD

The scientific research sponsored by WMO and its partners during the past 30 years considerably improved our understanding of the climate system and enabled the provision of forecasts for a season to a year ahead with a projection of impacts in various parts of the world. Among those, El Niño forecasts are the most successful. Seasonal climate forecasts are increasingly used in disaster management, health, agriculture, forestry, fishery, tourism, transport and energy.

KNOWING OUR FUTURE CLIMATE

Climate shapes a society's development and greatly affects its people's health, livelihoods and prosperity. It is now widely recognized that the global climate is changing, and while efforts to mitigate the causes of these changes are vital, equally important are efforts to adapt to and plan for the changes. The information gathered, managed and analysed under the aegis of WMO by the NMHSs, in collaboration with other regional and international organizations and programmes, assists all communities in coping with current and future climate conditions. For example, the WMO Regional Climate Outlook Forums, active in several parts of the world, provide short-term climate prediction information to help reduce climate-induced risks, for example, in human health and agriculture.

WMO, jointly with other organizations, coordinates efforts to meet the needs for climate information, such as for climate monitoring, climate-change detection, seasonal-to-interannual predictions and assessments of the impacts of climate change. WMO also promotes research that improves our understanding of the Earth's weather and climate systems.

NMHSs maintain climate observations and contribute to monitoring and detecting climate change. They work to understand and attribute causes of climate change and to project the magnitude

and rate of human-induced climate change, regional variations and related sea-level rise.

Another key player is the Intergovernmental Panel on Climate Change (IPCC), established in 1988 and co-sponsored by WMO and the United Nations Environment Programme (UNEP). It assesses the available scientific, technical and socio-economic information to understand the risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. In recognition of its "efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change," the IPCC was awarded the Nobel Peace Prize in 2007, also the year in which it published its Fourth Assessment Report, which stated that global climate is unequivocally warming, very likely as a result of human activities. Consequently, IPCC predicts more climate-induced risks worldwide, affecting inter alia food and water resources, weather extremes and socio-economic development.

To address these challenges, WMO is stepping up its efforts to improve seasonal-to-interannual predictions and to enhance the use of climate information and predictions in decision-making at all levels and in all socio-economic sectors.

RESEARCH

WMO coordinates and organizes research programmes that contribute to our scientific understanding of the dynamical physical and chemical processes in the atmosphere and oceans, as well as the interactions of various components of the Earth system on all time- and space-scales.

That understanding has helped achieve unprecedented improvement in the quality and accuracy of numerical weather prediction. This, in turn, has greatly enhanced the accuracy and usefulness of weather forecasts, warnings of extreme events, seasonal predictions, climate-change projections and environmental predictions.

WMO promotes research into fundamental scientific understanding of the physical climate system and climate processes needed to determine to what extent climate can be predicted and the extent to which humankind influences climate.

It promotes the advancement of atmospheric sciences in understanding atmospheric composition changes and consequent effects on weather, climate, urban environment and marine and terrestrial ecosystems. The WMO Atmospheric Research and Environment Programme accelerates improvements in "nowcasting" – forecasting the next six hours – and one-day to two-week high-impact weather forecasts for the benefit of society, the economy and the environment. It also

focuses on tropical cyclones and monsoons. Other programmes aim to measure and understand the influence of greenhouse gases and other climate-changing particles and chemicals in the atmosphere.

Climate research on global to regional scales and time horizons ranging from weeks to centuries is coordinated by the World Climate Research Programme (WCRP) co-sponsored by WMO, the International Council for Science and the Intergovernmental Oceanographic Commission of UNESCO. By facilitating analysis and prediction of variability and change in the Earth's systems to address an increasing range of applications for the benefit of society, WCRP directly underpins the needs of the United Nations Framework Convention on Climate Change and the IPCC Assessment Reports.

WMO has been one of the leaders of the International Polar Year (2007–2008). This intensive campaign of internationally coordinated interdisciplinary scientific research and observations focuses on the Earth's polar regions to enable a better understanding of our future climate, among other things. The polar regions provide both a window into the planet's past climate through ice cores and a view of our current climate, as glaciers, ice sheets and other ice and snow cover at the poles are extremely sensitive to climatic changes.

APPLICATIONS

Weather, climate and water have an impact on many socio-economic sectors: agriculture and fisheries, energy, transport, health, insurance, sports and tourism. WMO endeavours to promote the application of meteorological, climatological, hydrological and oceanographic information to human activities are therefore of great importance worldwide.

Disaster prevention and mitigation

About 90 per cent of all natural disasters are related to weather, climate or water. The human and material losses caused by natural disasters are a major obstacle to sustainable development and world safety and security. With other international, regional and national organizations, WMO coordinates the efforts of NMHSs to improve forecast services and early warnings to protect life and property from natural hazards, such as tropical cyclones, storms, floods, droughts, heatwaves, cold waves and wildfires. In addition to public safety, such extremes affect water and food supplies, the environment, transport, health and many other socio-economic sectors.

Emphasis is on improved warnings and better integration of such information in disaster risk management: one dollar invested in better prediction and disaster preparedness can prevent seven dollars' worth of disaster-related economic losses – a considerable return on investment. The WMO objective is to reduce by

50 per cent, by 2019, the associated 10-year average fatality of the period 1994–2003 for weather-, climate- and water-related natural disasters.

Water resources assessment and management

Global freshwater resources are both diminishing and deteriorating under demographic and climate pressures. Water is essential for life, for generating hydroelectric power and meeting irrigation and domestic requirements. WMO promotes water resources assessment and provides the forecasts needed to plan water storage, agricultural activities and urban development. It supports an integrated, multidisciplinary approach to managing water resources.

Agriculture and food security

The agricultural sector critically depends on timely and accurate weather, climate and water information, particularly as it faces increasing climate risks. The observations, analyses and forecasts produced by WMO Members enable the agricultural community to increase crop and livestock yields, plan planting and harvest time, and reduce pests and diseases. Regular Regional Climate Outlook Forums, as well as training, coordination services and resources, provide a range of services to improve agricultural output and sustainability, thus contributing to world food security.

Public health

Through its Members, WMO provides weather and climate services to the public health community. Early warnings for disease epidemics, disaster prevention and mitigation, and air quality services all aim to protect people's health and welfare. Several Regional Climate Outlook Forums, for example, now support malaria surveillance and warning systems in Africa. Heat health advisory services give early warning of heatwaves. Joint partnerships with international, regional and national health sector partners are increasing the effective use of weather and climate information in support of such efforts.

Transport

The aviation sector requires a range of information on weather conditions. Precipitation, wind, turbulence, fog and a host of other factors affect day-to-day aviation activities. WMO ensures the worldwide provision of cost-effective and responsive meteorological services in support of safe, regular and efficient aviation operations. Likewise, WMO provides services in support of marine and land transport safety. These services provide early warning to the offshore oil and natural gas infrastructure, thereby aiding energy security and transport.

Oceans

WMO promotes the protection of the marine environment and the efficient management of marine resources, based on the timely collection and distribution of marine meteorological and oceanographic data. WMO provides assistance to Members in establishing national and regionally coordinated systems to ensure that the loss of life and damage caused by tropical cyclones are reduced to a

minimum. It also supports the sustainable operation of fisheries through weather and climate observations and analyses.

Energy

Climate, weather and water information supports optimal development and use of renewable energy resources, such as hydropower, wind, solar and biological energy. Such information also underpins the routine operation of nuclear power plants, coal power plants and other forms of energy production. WMO facilitates the exchange of data that can help energy developers and managers better plan for changes in energy demand, the development of local energy systems and compliance with environmental requirements.

Socio-economic development

Through its various activities, WMO helps developing countries manage resources, prevent disasters and adjust to climate variability and change. The Fourteenth World Meteorological Congress established the WMO Programme for the Least Developed Countries in May 2003 to address the special problems and needs of these countries, as well as to enhance the capacity of NMHSs to contribute effectively to their socio-economic development. In line with the overall Programme of Action for the Least Developed Countries for the Decade 2001–2010, adopted by the Third United Nations Conference on the Least Developed Countries, the WMO Programme for the Least Developed Countries encompasses the five following strategic areas: fostering a people-centred policy framework; strengthening productive capacities; building human and institutional capacities; reducing vulnerability and conserving the environment; and resource mobilization.

Unsustainable development, coupled with rising sea level and increasingly severe weather, leave small island developing States wide open to devastation. To help protect against such hazards and build up sustainable economies, WMO has been helping the 31 small island developing States among its Members meet priority areas outlined under the 2005 Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States. Special assistance is allocated to the development and modernization of the NMHSs in small island developing States, especially for strengthening their early warning systems.

WMO supports developing countries, particularly the least developed countries and small island developing States, in their social and economic development and combat against poverty by enhancing the capacities and capabilities of their NMHSs. Capacity-building in the most vulnerable communities ensures a greater ability to monitor weather, climate and water conditions and plan for future conditions. One dollar of investment in weather information returns 10 dollars' worth of socio-economic development. Such actions contribute to the achievement of the United Nations Millennium Development Goals by 2015, especially the eradication of extreme poverty and hunger.

SHARING EXPERTISE AND BUILDING CAPACITY

WMO assists NMHSs, especially those of developing countries, in their efforts to contribute, in the most effective manner, to the development plans of their countries and to become full partners in global collaborative efforts.

WMO helps its Members develop human resources through training, the provision of educational material and the awarding of fellowships. Its more than 30 Regional Training Centres, along with a network of cooperating universities and advanced training institutions, contribute to the global effort.

WMO promotes and facilitates technology transfer, as well as the establishment and development of specialized centres of excellence in various regions.

It has established Regional and Subregional Offices in various parts of the world. They enable WMO to effectively assist its Members in their quest for sustainable development.

MILESTONES

1853:	First International Meteorological Conference (Brussels)
1873:	WMO's predecessor, the International Meteorological Organization (IMO) established
1947:	WMO Convention agreed unanimously by Conference of Directors
1950:	WMO Convention entered into force on 23 March
1951:	WMO became a specialized agency of the United Nations
1957:	Global Ozone Observing System set up
1957/1958:	Participation in the International Geophysical Year
1963:	World Weather Watch launched
1971:	Tropical Cyclone project established (upgraded to Tropical Cyclone Programme in 1980)
1972:	Operational Hydrology Programme established
1976:	WMO issues first international assessment of the state of global ozone
1977:	Integrated Global Ocean Services System established jointly by WMO and the Intergovernmental Oceanographic Commission of UNESCO
1978/1979:	Global Weather Experiment and Monsoon Experiments under the Global Atmospheric Research Programme
1979:	First World Climate Conference (led to the establishment of the Intergovernmental Panel on Climate Change, the World Climate Programme and the World Climate Research Programme)
1980:	World Climate Research Programme established
1985:	Vienna Convention on the Protection of the Ozone Layer
1987:	Montreal Protocol on Substances that Deplete the Ozone Layer

1988:	WMO/UNEP Intergovernmental Panel on Climate Change established
1989:	Global Atmosphere Watch established
1990:	Second World Climate Conference (initiated the Global Climate Observing System); International Decade for Natural Disaster Reduction; First IPCC Assessment Report released
1991:	WMO/UNEP convened first meeting of the Intergovernmental Negotiating Committee of the United Nations Framework Convention on Climate Change
1992:	The Global Climate Observing System established
1993:	World Hydrological Cycle Observing System launched
1995:	Climate Information and Prediction Services established; Second IPCC Assessment Report released
1998:	Scientific Assessment of Ozone Depletion
1999:	Inauguration of new WMO headquarters in Geneva
2000:	World Meteorological Organization celebrates 50 years of service
2001:	Third IPCC Assessment Report released
2003:	Natural Disaster Prevention and Mitigation Programme, Space Programme and Programme for the Least Developed Countries launched
2005:	Group on Earth Observations Secretariat established at WMO headquarters
2007:	Fourth IPCC Assessment Report released; IPCC is awarded the Nobel Peace Prize
2009:	World Climate Conference-3

MEMBERS OF THE WORLD METEOROLOGICAL ORGANIZATION (AT 1 AUGUST 2009)

I. Members (States) under the terms of Article 3, paragraphs (a), (b) and (c) of the WMO Convention (182)

Afghanistan
Albania
Algeria*
Angola
Antigua and Barbuda*
Argentina*
Armenia
Australia*
Austria*
Azerbaijan
Bahamas*
Bahrain
Bangladesh
Barbados*
Belarus*
Belgium*
Belize
Benin
Bhutan
Bolivia
Bosnia and Herzegovina*
Botswana
Brazil*
Brunei Darussalam
Bulgaria*
Burkina Faso*
Burundi
Cambodia*
Cameroon*
Canada
Cape Verde
Central African Republic*
Chad
Chile
China*
Colombia
Comoros
Congo
Cook Islands
Costa Rica
Côte d'Ivoire*
Croatia*
Cuba*
Cyprus*
Czech Republic*
Democratic People's Republic of Korea

Democratic Republic of the Congo*
Denmark*
Djibouti
Dominica*
Dominican Republic
Ecuador*
Egypt*
El Salvador
Eritrea
Estonia*
Ethiopia
Fiji
Finland*
France
Gabon*
Gambia*
Georgia
Germany*
Ghana*
Greece*
Guatemala*
Guinea*
Guinea-Bissau
Guyana*
Haiti*
Honduras
Hungary*
Iceland
India*
Indonesia*
Iran, Islamic Republic of*
Iraq*
Ireland*
Israel
Italy*
Jamaica*
Japan*
Jordan*
Kazakhstan
Kenya*
Kiribati
Kuwait*
Kyrgyzstan
Lao People's Democratic Republic*
Latvia
Lebanon
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Liberia
Libyan Arab Jamahiriya*
Lithuania*
Luxembourg*
Madagascar*

Malawi*
Malaysia*
Maldives
Mali*
Malta*
Mauritania
Mauritius*
Mexico
Micronesia, Federated States of
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Mongolia*
Montenegro
Morocco*
Mozambique
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Nepal
Netherlands*
New Zealand*
Nicaragua*
Niger*
Nigeria*
Niue
Norway*
Oman
Pakistan*
Panama
Papua New Guinea
Paraguay
Peru
Philippines*
Poland*
Portugal
Qatar
Republic of Korea*
Republic of Moldova
Romania*
Russian Federation*
Rwanda*
Saint Lucia*
Samoa
Sao Tome and Principe
Saudi Arabia
Senegal*
Serbia
Seychelles*
Sierra Leone*
Singapore*
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Spain*
Sri Lanka
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Switzerland
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Thailand*
The former Yugoslav Republic of Macedonia*
Togo
Tonga*
Trinidad and Tobago*
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United Arab Emirates
United Kingdom of Great Britain and Northern Ireland*
United Republic of Tanzania*
United States of America
Uruguay*
Uzbekistan*
Vanuatu
Venezuela
Viet Nam
Yemen
Zambia*
Zimbabwe*

* Member States that have acceded to the Convention on the Privileges and Immunities of the Specialized Agencies.

II. Members (Territories) under the terms of Article 3, paragraphs (d) and (e)

British Caribbean Territories
French Polynesia
Hong Kong, China
Macao, China
Netherlands Antilles and Aruba
New Caledonia

World Meteorological Organization

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