



World
Meteorological
Organization

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NEWS IN BRIEF

Socio-economic benefits of weather, climate and water services

WMO organized an international conference in Madrid, Spain, 19-22 March 2007, entitled Secure and Sustainable Living: Social and Economic Benefits of Weather, Climate and Water Services. The purpose was to increase the awareness of users of the opportunities afforded by these services and to assist providers to understand users' requirements more fully.

The Conference adopted an Action Plan, whose overall objective is to "achieve, within five years, a major enhancement of the value to society of weather, climate and water information and services in response to the critical challenges represented by rapid urbanization, economic globalization, environmental degradation, natural hazards and the threats from climate change".

The Action Plan calls for a quantum change in the way that weather, climate and water information and services are produced, used and communicated. This will require a strengthening of the capacities of National Meteorological and Hydrological Services (NMHSs) and a closer dialogue among providers and users of weather, climate and water information and services.

Projections of climate change and climate variability have generated a growing sense of urgency for closer collaboration between NMHSs and the users of their products and services in key sectors, such as agriculture, water resources, health, energy, transport and tourism.

One way for NMHSs to meet growing demand is through strengthened observational programmes and associated research and development. Delivery and distribution systems, including early warning systems, need to be improved so that NMHSs may meet

the needs of institutions, agencies and the general public.

The urban environment needs to be further analysed as a critical ecosystem requiring targeted analysis, research and meteorological and hydrological services.

The Madrid Action Plan also aims to foster recognition, by governments and other stakeholders, of the contributions of NMHSs and encourages the involvement of the social science research community for quantifying the benefits of their services in various socio-economic sectors. New economic assessment techniques should be developed, especially for developing and least developed countries.

The Madrid Conference Statement underpins the Action Plan. It states the resolve of participants to draw the attention of decision-makers everywhere to the large and growing impacts of weather, climate and water on community safety and well-being

and the enormous potential benefits to be gained from enhanced use of meteorological and hydrological services in decision-making in virtually every social and economic sector and every country.

Making weather information more effective

Weather information contributes to the safety and welfare of the public and affords many socio-economic advantages. The remarkable advances in the accuracy of weather forecasting made in recent years have provided National Meteorological Services (NMSs) with the basis for delivering more effective public weather services.

WMO encourages NMSs to implement public education and outreach programmes which aim to strengthen links between the providers and users of weather products and services (e.g. those in the farming, fishing, energy, transport and construction

sectors) so that optimal use can be made of them.

Extreme weather events, including tropical cyclones, floods, droughts, cold spells and heat waves, can cause enormous destruction and loss of life. On longer time-scales, climate change, ozone depletion, dwindling freshwater resources and increased pollution affect the global environment. Educating the public, specialized users and policy-makers to understand these issues and develop strategies to deal with them is a task of primary importance.

When NMSs undertake these activities with partners such as educational authorities, emergency management agencies and the media, the weather forecasts and warnings can be used to maximum

effect. In this way, the public comes to appreciate the level of service that may be expected of an NMS. The NMS understands what products the users need, which ones it needs to develop further and what new ones need to be produced.

Public awareness and outreach programmes are aimed at users, the general public and those involved in economic activities. They may also be aimed at schools and academic institutions with the aim of developing an awareness of the environment amongst students and educators, with particular emphasis on understanding the physical processes associated with weather, climate and water.

Journalists and editorial staff working with the mass media also



There is a close correlation between media coverage and humanitarian response. It has been shown that the media can help in averting catastrophe. The more they understand about the underlying science, therefore, the more effective their contribution will be.

benefit from such programmes, as do those involved in managing, mitigating and handling hazards, as well as high-level policy- and decision-makers.

Climate research

Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)

The first major global assessment of climate change science in six years was released on 2 February 2007. Based on a thorough review of the most-up-to-date, peer-reviewed scientific literature available, it concludes that changes in the atmosphere, the oceans, glaciers and ice caps show unequivocally that the world is warming.

The report *The Physical Science Basis* is the first of four volumes to be released this year by the IPCC. It concludes that major advances in climate modelling and the collection and analysis of data have improved understanding of anthropogenic warming and cooling influences on climate since the Third Assessment Report in 2001, leading to *very high confidence* (at least a 9 out of 10 chance of being correct) that the globally averaged net effect of human activities since 1750 has been one of warming.

The report confirms that global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human

activities since 1750. It goes on to say that continued greenhouse-gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would *very likely* be larger than those observed during the 20th century.

It describes an accelerating transition to a warmer world marked by more extreme temperatures, including heat waves, new wind patterns, worsening drought in some regions, heavier precipitation in others, melting glaciers and Arctic ice and rising global average sea-levels.

For the first time, the report provides evidence that the ice sheets of the Antarctic and Greenland are slowly losing mass and contributing to sea-level rise.

Progress in observations and measurements of the weather and climate are key to improved climate research, with National Meteorological and Hydrological Services playing a crucial role.

The World Climate Research Programme (WCRP) provides the scientific material which is assessed by the IPCC. For the Fourth Assessment Report, WCRP established the first comprehensive collection and analysis of climate-model projections.

WMO co-sponsors the IPCC with the United Nations Environment Programme and is the major co-sponsor of the World Climate Research Programme.

COMING EVENTS

7-25 May 2007: Fifteenth World Meteorological Congress (Geneva)

28-30 May 2007: Executive Council – 59th session (Geneva)

4-8 June 2007: World Climate Research Programme Workshop on Seasonal Prediction (Barcelona, Spain)

4-8 June 2007: Chemistry-Climate Model Validation Workshop (Leeds, United Kingdom)

4-8 June 2007: Training Course on Buoy Programme Implementation and Data Management (Ostend, Belgium)

18-27 August 2007: Typhoon Operational Forecasting Training (Tokyo, Japan)

11-14 September 2007: Climate Variability and Predictability (CLIVAR) project – 15th session of the Scientific Steering Group (Geneva)

18-21 September 2007: Stratospheric Processes and their Role in Climate (SPARC) project – 15th session of the Scientific Steering Group (Bremen, Germany)

Record use of global warming simulations

On 28 February 2007, the thousandth climate expert registered to use the world's most complete collection of global warming data from climate models. The data include both simulations of the past climate and projections of the future climate. The archive was initiated by World Climate Research Programme (WCRP) scientists working on coupled climate modelling in response to a request from the Intergovernmental Panel on Climate Change (IPCC) to consolidate predictions made for the IPCC's Fourth Assessment Report.

WCRP's Coupled Model Intercomparison Project is the largest undertaking of its kind to date. The data comprise nearly

900 separate sub-projects on such diverse topics as African monsoon variability, drought in Australia, hydrology in the Mekong River, Pacific island climate-change detection, Arctic contribution to sea-level rise, and anthropogenic impact on Antarctic oceanography.

The database contains 23 state-of-the-art climate simulation models developed at 19 research institutions worldwide.

Polar ice

Scientists overseeing International Polar Year 2007-2008 (IPY) (see box below) have welcomed the first part of the Fourth Assessment Report by the Intergovernmental Panel for Climate Change (IPCC).

Recent measurements show that Arctic sea-ice masses last

year nearly matched lows recorded in 2005 and that, for the first time, re-freezing was delayed until late autumn.

Unexpected breakage and movement of large pieces of Arctic coastal ice have also been reported, as well as significant warming of ocean surface waters entering the Arctic from the North Atlantic.

Climate change adaptation in developing countries

The assessment of climate change is crucial in helping identify its impacts and in developing adaptation policies, strategies and plans. Climate extreme indices constitute a practical tool for summarizing climate variability and changes at global, regional

and national level. They offer the possibility of application in various sectors particularly in agriculture, water resources, health and energy. Developing countries face many challenges as they are in great need of assistance in contributing and exploiting climate data.

WMO addresses these challenges through a project on the implementation of modern climate data management systems which provides National Meteorological and Hydrological Services (NMHSs) a complete technological information package. This includes training in data management and related information technology and the provision of technical support, including a high-performance computer/laptop and the necessary software set to implement a robust climate data management infrastructure.

INTERNATIONAL POLAR YEAR 2007-2008

International Polar Year (IPY) 2007-2008 was launched officially in Paris on 1 March 2007. A programme established by WMO and the International Council for Science, it is the largest internationally coordinated scientific research effort in 50 years. Thousands of scientists from over 60 countries and a wide range of research disciplines will carry out 220 projects. The campaign also aims to educate and involve the public, while helping to train the next generation of engineers, scientists and leaders.

Climate issues will be at the forefront of the majority of IPY studies. WMO contributes to climate research in the polar regions through, in particular, the Climate and Cryosphere project of the World Climate Research Programme.

WMO will focus on creating a strong legacy of better understanding of the role of the poles in the Earth system and on more comprehensive and better sustained polar observing systems. The previous International Polar Years 1882-1883 and 1932-1933 and the International Geophysical Year 1957-1958 each led to major improvements in our understanding of the Earth system.

To mark the launch of International Polar Year, WMO produced a video news release in English and French.

WMO has also produced a film entitled "Two poles—one planet" to celebrate World Meteorological Day on 23 March 2007, whose theme "Polar meteorology: understanding



The Arctic is home to four million indigenous peoples, who have reported warmer and increasingly variable weather, as well as changes in terrestrial and marine ecosystems, which have had an impact on their traditional way of life. Climate and climate-change research are priorities for this region.

global impacts", marked IPY. The film, prepared in WMO's six official languages, is available in Beta SP, VHS and DVD.

As reported in the February 2007 issue of *MeteoWorld*, WMO has published a kit for World Meteorological Day which contains a brochure, a poster and a message from the Secretary-General.



Recently issued

WMO Bulletin January 2007 issue (Vol. 56(1)) – theme “Socio-economic benefits of meteorological and hydrological services”



Social aspects and stakeholder involvement in integrated flood management (WMO-No. 1008)

Environmental aspects of integrated flood management (WMO-No. 1009)

Impact of the use of meteorological and climatological data on fisheries and aquaculture (WMO/TD No. 1342)

Fire in forests, rangelands and agricultural systems (WMO/TD No. 1313)

A guide on strategy for developing public education and outreach (WMO/TD No. 1354, PWS-4)



Drought can lead not only to human, plant and animal stress but also to wildfires, which destroy crops, forests and communities. WMO, together with the Secretariat of the United Nations Convention to Combat Desertification, is taking the lead to establish a drought-management centre for south-eastern Europe.

WMO has provided a new version of its capacity-building workshops. The aim is to help NMHSs of developing countries be full partners in the United Nations Framework Convention on Climate Change (UNFCCC) Work Programme on climate change (called the Nairobi work programme). An adjustment of the package has been introduced to include hands-on training on climate extremes and climate change indices.

Climate concerns in Europe

Impacts of climate change and variability on European agriculture

WMO contributes to studies of the evaluation of possible impacts of climate change and variability on agriculture and the assessment of critical thresholds and hazards for agricultural activity and environmental resources.

Work includes the evaluation of current trends in agroclimatic indices and simulation model outputs describing agricultural impacts and hazard levels; the development and assessment of future regional and local scenarios of agroclimatic conditions; risk assessment and foreseen impacts on agriculture.

Based on the findings, specific recommendations and suggestions, such as for warning systems, will be elaborated and proposed.

Greenhouse gases

As reported in the December 2006 issue of *MeteoWorld*, the latest analysis of data from the Global Greenhouse Gas Monitoring Network of WMO's Global Atmosphere Watch shows that the globally averaged mixing ratios of carbon dioxide and nitrous oxide reached new highs in 2005 of 379.1 parts per million and 319.2 parts per billion (ppb), respectively. The mixing ratio of methane remains unchanged at 1783 ppb. These values are higher than those in pre-industrial times by 35.4%, 18.2% and 154.7%, respectively.

From 1990 to 2005, the atmospheric radiative forcing by all long-lived greenhouse gases increased by 21.5%.

Some species, such as hydrochlorofluorocarbons, which are strong infrared absorbers, are low in abundance but are increasing at rapid rates. Ozone in the troposphere does not have a long lifetime, but has an atmospheric greenhouse effect that is comparable to those of chlorofluorocarbons. Although tropospheric ozone is important

for the atmospheric greenhouse effect, it is difficult to estimate the global distribution and trend because of its uneven geographic distribution.

Early warning system for sand- and duststorms

Large amounts of dust and sand are uplifted and transported from deserts as sand- and duststorms. For areas adjacent to deserts, this process is a serious natural hazard, causing significant negative impacts on air quality and health, transport and agriculture.

Airborne sand and dust aerosol affect climate and weather through direct or indirect interaction with atmospheric processes. The atmospheric life cycle of sand and dust aerosol is characterized by strong daily, seasonal and inter-annual variations.

WMO has decided to establish an early warning system to monitor sand- and duststorms. The proposed system will promote research on operational forecasts for these phenomena. Canada, China and Spain have been designated as centres to coordinate regional forecasting activities.

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