



World  
Meteorological  
Organization

# METEOWORLD

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Weather • Climate • Water

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Earth observations

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A  
record-  
breaking year  
for tropical  
cyclones

## Message from the Secretary-General

WMO contributes every hour of every day to the welfare of humankind. In all countries its actions are manifested by the services and warnings provided by the National Meteorological and Hydrological Services for safety, support to socio-economic development, protection of the environment, and policy formulation. This is achieved operationally through a unique network of observing stations over land and water and in space, while national, regional and global centres produce and exchange weather forecasts and climate projections for the benefit of all nations.

Timely information on how WMO is contributing to human welfare and sustainable development will be contained in the bi-monthly publication, *MeteoWorld*, available in print and an expanded electronic version on the Web. I hope everyone will find it useful as all human activities, one way or another, are affected by weather, climate and water.

M. Jarraud

## Climate

Work is underway to develop guidelines on heat/health warning systems, which will be distributed to National Meteorological and Hydrological Services and other partners in health and other sectors to alleviate suffering and reduce the impacts of heatwaves in vulnerable regions. A booklet will explain different aspects of



Training tropical cyclone forecasters

heatwaves to the general public. Other guidelines will include best practices for health services and decision-makers. A WMO publication on the socio-economic benefits of climate services (Technical Note No. 145) will be updated.

Training has been provided to meteorologists in Indochina in the preparation of national seasonal climate bulletins and the promotion of networking between forecast producers and users, both within and across those nations.

The concept and structure of a Regional Climate Centre for North America, Central America and the Caribbean have been endorsed and details are now being worked out about implementation.

A climate data management system (CLIDATA) has been installed and training has been carried out at the regional Agrometeorological and Hydrological (AGRHYMET) Centre of the Inter-State Committee on Drought Control in the Sahel (CILSS), based in Niamey, Niger. CLIDATA will be installed in the nine CILSS countries by the end of 2004.

A preliminary analysis of the availability and accessibility of atmospheric and hydrological data

relevant to climate, from the perspective of monitoring and archiving centres was submitted to the 20th session of the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the Conference of Parties to the United Nations Framework Convention on Climate Change in June 2004.

## Disaster reduction

WMO is promoting a shift in disaster management approach from relief and rehabilitation to prevention and proactive strategies. Another objective is to integrate WMO's core technical and scientific capabilities in all relevant aspects of disaster risk management from assessment, planning and prevention, to response and recovery at international, regional and national levels. The role of National Meteorological and Hydrological Services is a critical component.

WMO co-chairs, with the United Nations Development Programme, the Working Group on Climate Adaptation and Disaster Reduction of the International Strategy for Disaster Reduction Inter-Agency Task Force and participates actively in the work of other groups. WMO is also actively participating in the intergovernmental process leading up to the World Conference on Disaster Reduction (WCDR), (Kobe, Japan, January 2005).

## Water resources

A project called Volta-HYCOS was launched in mid-November for the six countries of the Volta basin: Benin, Burkina Faso, Côte

d'Ivoire, Ghana, Mali and Togo. A water-resource information system will be established with up-to-date, high-quality data, easily accessible by users, in particular via the Internet. Institutional and technological capacity at the National Hydrological Services of the six countries will be built up. The main focus will be on strengthening hydrological observing networks, especially with the use of remote-sensing techniques, developing national data-banks and promoting regional cooperation, as well as staff training.

### Coding the weather

Meteorological data are coded to facilitate their exchange in real-time for all World Weather Watch operations. Any changes to the standard codes are significant, as they have implications for training and resources. A new standard called table-driven codes (the information is defined in sets of tables) is gradually being introduced. These codes are universal and flexible and can be easily expanded to satisfy all observational, including specific national, requirements: vital qualities in the face of fast evolving science and technology and the need for exchanging operationally new parameters and data types. A training programme has been developed to explain the philosophy, structure and use of the new codes.

### Transmitting weather data

Ensuring the exchange of data in near-real-time among nations is at the core of WMO's World Weather Watch operations and the task of the Global Telecommunication System. The cost-effectiveness and capacity of its Improved Main Telecommunication Network have recently been enhanced. Procedures and guidance have been refined for use of the Internet for

weather and climate data exchange, collecting these data on the Internet via e-mail or a Web interface, as well as on information technology security. File naming conventions and IP addresses for the GTS are also under review.

### Public weather services

The exchange, understanding and use of warnings and forecasts are of particular importance. Current issues are cross-border exchange and public forecast exchange over the Internet, and risk-management principles. Of special interest is the further development of two Web-based projects: the Severe Weather Information Centre (SWIC) and the World Weather Information Service (WWIS). SWIC provides information in real-time about heavy precipitation and tropical cyclones worldwide. On 1 November, climatological data from 1 038 cities in 153 countries were being presented and 94 Members were supplying weather forecasts for 957 cities.

### Drought and desertification

Improving knowledge about the use of weather, climate and water data in the combat against desertification and drought in the context of sustainable development remains a top priority in many countries. Aspects that are also taken into account are food safety and quality, nutritional balance, cultural heritage and agricultural research.

### Marine safety and environment

Operational oceanographic models, product preparation and service delivery systems, parallel to the existing systems for operational

meteorology, are major concerns. Such operational meteorological/oceanographic (metocean) products and services are vital for maritime safety and environmental management. National Meteorological Services work closely with national response authorities to provide a range of meteorological and oceanographic data and services in pollution incidents in waters under national jurisdiction. WMO's Marine Pollution Emergency Response Support System (MPERSS) ensures that similar high-quality services are also available in international waters in a coordinated manner. On trial since 1994, MPERSS has now been substantially implemented as far as the meteorological components are concerned and some NMSs are running oil-spill models. An MPERSS Website is being developed.

### Reports of the WMO Commission for Agricultural Meteorology (CAGM)

Papers presented at the International Workshop on Reducing Vulnerability of Agriculture and Forestry to Climate Variability and Climate Change

CAGM Report No. 94

User requirements for satellite and other remote-sensing information in the field of agricultural meteorology.

CAGM Report No. 95

Impact of Agrometeorological Information on Rangeland and Pasture Ecology and Management

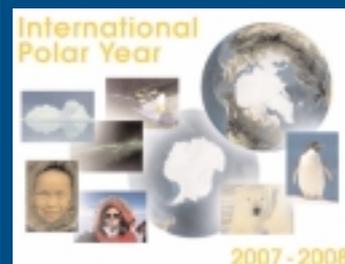
CAGM Report No. 96.

### Education and training

Computer-aided and distance learning are key educational tools in the fields of meteorology and hydrology. Other priority areas are the development of case-studies, the provision of educational materials in multiple languages and workshops for instructors.

A subject of particular concern is to ensure a high level of qualifications of forecasters for aviation safety and security.

## International Polar Year (IPY) 2007-2008



A wide range of research and operational activities for the IPY are planned. The outcomes will contribute to climate prediction and environmental protection. Existing observing networks in the polar regions will be expanded and improved. New observing systems will be set up for the Arctic and Southern Oceans and a hydrological station network will be developed which will provide data on river input to the Arctic basin.

Monitoring of the ozone layer will be extended and atmospheric chemical processes and the impacts of certain chemicals on polar ecosystems will be investigated.

Studies will be made of the polar circulation on high-impact weather events and of the processes through which the cryosphere interacts with other components of the climate system. The data thus collected should allow for a more detailed scientific assessment of climate change in polar regions, as well as an investigation of teleconnections between polar regions and lower latitudes, and an improvement in climate prediction models for more populated areas.

## Weather and locusts



When weather and ecological conditions favour breeding, huge swarms of desert locusts form which can be dozens of kilometres long. They fly downwind in search of food, travelling up to 200 km a day. A small part of an average swarm (or about one tonne of locusts) eats the same amount of food in one day as 10 elephants or 25 camels or 2 500 people.

In western and central Africa in 2004, the swarms were the worst in more than a decade, covering thousands of hectares, destroying subsistence crops and jeopardizing the lives of farmers and herders in an already fragile environment. Outbreaks also occurred in Australia, Cyprus and Egypt.

The National Meteorological and Hydrological Services in affected countries are actively involved in locust control operations. They monitor and forecast meteorological parameters such as precipitation, temperature, humidity and wind speed and direction, which are crucial for forecasting locust incubation and movement and for spraying operations.

A major gap is the identification of clear and useful guidelines on the exact nature of the meteorological products that should be provided to the agricultural community, decision-makers and the public. WMO and the UN Food and Agriculture Organization are collaborating in the preparation of guidance material for National Weather Services and locust control centres for more effective monitoring of this destructive pest.

Provision of access to expertise and real-time data via the Internet, opportunities for instructors to study at training centres in developed countries and the preparation and distribution of lectures in the form of electronic presentations are all items high on the agenda for training centres.

### Forthcoming training events

Expert Team on Accreditation and Certification in Meteorological Education and Training (ETAC-MET) (WMO Headquarters, Geneva, Switzerland, 24-26 January 2005)  
Training Seminar on Curriculum Development in Aeronautical Meteorology (Met Office College, Exeter, United Kingdom, 7-11 March 2005)

## Technical cooperation

Implementation of the Small Island Developing States (SIDS)-Caribbean project nears completion with local training courses on data management and observing networks being held. The NMSs in the Caribbean region are key institutions that contribute to the reduction and mitigation of natural disasters and climate change impacts in the various national socio-economic sectors.

WMO is playing a central role in the reconstruction and modernization of the Iraqi Meteorological Organization (IMO). Assessments of infrastructure, facilities and human resources have been carried out; a forecaster workstation has been installed; and 10 IMO weather observers participated in an intensive training course at the National Weather Forecasting Centre in Amman, Jordan.

## In the Regions

Discussions are ongoing in countries of the Black Sea region of Europe to facilitate the exchange of information regarding the present level of understanding of coastal air-sea phenomena, impacts and

applications and to summarize that knowledge for policy-makers and planners.

An interdisciplinary project has been proposed for countries adjoining the Black Sea to study the Sea's influence on weather forecasting, early warnings, climate change, impacts and adaptation strategies, water pollution and protection of biodiversity.

## Satellites

The satellite observing system under the aegis of WMO provides data of the atmosphere, ocean and land surface which are vital in many socio-economic sectors, such as water resources, aviation, agriculture, oceanography, marine meteorology, activities pertaining to natural disasters and climate monitoring and prediction. The basic architecture of the space-based system of the WMO GOS consists of three constellations: operational meteorological polar-orbiting and geostationary satellites and environmental research and development satellites. Every country can benefit from the system.

## THORPEX: a Global Atmospheric Research Programme

This new 10-year international research programme aims to respond to the challenges associated with accelerating improvements in the skill of 1-14 day forecasts of high-impact weather.

THORPEX will contribute to the development of an interactive global multi-model ensemble forecast system, which will generate numerical probabilistic products which will be made available to all countries. The purpose is to provide accurate, timely, specific and definite weather warnings in a form that can be readily used as decision-support tools in order to



Automatic weather station installed at Timehri, Guyana, under the SIDS-Caribbean project

reduce the impact of natural hazards and realize the socio-economic benefits of improved weather forecasts and environmental protection.

## 2004: the year of the tropical cyclone

The hurricane season in the Caribbean Sea, Gulf of Mexico and North Atlantic Ocean proved to be not only an above-normal season but a record-breaking one as well. August was unusually active with eight named storms, one more than the record of seven set in 1933 and 1995. By mid-September, there had already been 12 named storms, seven of which were hurricanes. Preliminary estimates of deadly *Charley's* swath across Florida range from 13-15 billion US dollars, making it the second costliest tropical cyclone in US history. In Cuba, *Charley* was blamed for property damage in excess of US\$ 1 billion. *Frances*, a slow moving hurricane, brought death and destruction to the Bahamas and Florida, with insurance claims of some four billion US dollars. *Ivan* was the most powerful storm to hit the Caribbean in 10 years and significantly affected at least eight islands in the Atlantic and Caribbean. It made a direct hit on Grenada, then Jamaica and then the state of Alabama, USA, leaving in its wake more than 100 dead and property damage estimated at 12 million US dollars. *Jeanne*, the weakest of the four, swept across the northern coast of Haiti on 16 September, leaving more than 2 000 dead and a devastated economy.

2004 was also a record year for typhoons in the western

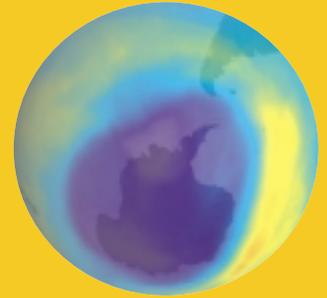
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The full version of this newsletter may be found on the WMO homepage:  
[www.wmo.int](http://www.wmo.int)

We would welcome your comments about *MeteoWorld* and look forward to hearing from you.

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## Ozone hole update



The ozone hole started its seasonal decrease in size during mid-September, losing more than 50% of its area in the following five weeks. During the next three weeks (until 12 November), the ozone hole increased in area by more than 30%. This slow increase was followed by a rapid decrease that ended on 17 November, when the ozone hole disappeared. Until late October, the ozone hole was generally much smaller than the average size over the past decade.

The year-to-year variations in the size, depth and persistence of the ozone hole are primarily due to changing meteorological conditions in the stratosphere.

## El Niño latest

Satellite-derived sea-level height data from the central equatorial Pacific during a 10-day period ending 15 November 2004 indicate warmer-than-normal sea-surface temperatures between 180°W and 130°W. Previous warmings over the past several months, have dissipated. Scientists are monitoring the Pacific closely for further signs of El Niño intensity and development.

## Tracking air pollution

The largest air-quality and climate study to date (the International Consortium for Atmospheric Research on Transport and Transformation), was carried out in July and August 2004. Data were gathered by hundreds of measurement platforms on land, at sea, in the air and in space, to provide information about air-mass transport across North America and the Atlantic Ocean to western Europe.

Airmasses that had been transported across the Pacific were observed. Pollution was found to be transported in the middle to upper reaches of the troposphere, trapped in stratified layers that carry distinct plumes for thousands of miles. In contrast, much of the eastbound air pollution over North America was found closer to the surface, in the boundary layer, staying closer to populated areas. Other tracked events were the transport of smoke and carbon monoxide from forest fires in Alaska, Canada and the south-western USA.

The results from these experiments will provide insights into the mechanisms affecting the long-range transport of pollutants. The detailed snapshot of the atmosphere provided by the study should advance the knowledge of our role in influencing the composition of the air we breathe.



*Tracking the air we breathe*



*Typhoon Tokage*

North Pacific Ocean. Ten typhoons made landfall in Japan—two within 10 days. After *Meari* and *Ma-on* came *Tokage*, which was the most powerful typhoon to hit Japan in 16 years. The year's number of typhoons surpassed the previous record of six set in 1990 and left the largest number of people dead (some 220) and injured since 1983.

## Tropical cyclone forecasting

By their severity, size, frequency and vulnerability of the areas they affect, tropical cyclones and associated phenomena of storm surges, floods and landslides, are among the worst of natural hazards. An integrated approach to tropical cyclone disaster prevention and mitigation is being promoted, which brings together tropical cyclone and associated storm surge and flood operational and research experts.

Capacity-building is a key element in this process and WMO regularly organizes training for tropical cyclone forecasters at its regional centres around the world. Participants are coached in the use of the latest techniques to lengthen lead time of warnings and track cyclone paths with greater accuracy. Regional partnerships are important, as

well as efficient telecommunications and new technology.

## Global Earth Observation System of Systems (GEOSS)

GEOSS will look at the measurements of air, water, and land made on the ground, in the air and from space together and will study their interactions. GEOSS is set to further enhance understanding of the Earth and how it works and make peoples and economies around the globe healthier, safer and better equipped to address basic needs. The aim is to make 21st century technology as interrelated as the planet it observes, providing the science on which sound policy and decision-making must be built.

Outcomes and benefits of GEOSS include: disaster reduction; integrated water-resource management; ocean and marine resource monitoring and management; weather and air-quality monitoring and forecasting; biodiversity conservation; sustainable land use and management; public understanding of environmental factors affecting human health and well being; better development of energy resources; and adaptation to climate variability and change.

## Calendar of coming events

- 6-10 December 2004: Thirteenth session of WMO Regional Association II (Asia), Hong Kong, China
- 6-10 December 2004: First THORPEX International Science Symposium, Montreal, Canada
- 6-17 December 2004: Tenth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, Buenos Aires, Argentina
- 9-13 January 2005: Building the Earth Information System (85th Annual Meeting of the American Meteorological Society), San Diego, California, USA
- 10-14 January 2005: International Meeting on Small Island Developing States, Mauritius
- 18-22 January 2005: World Conference on Disaster Reduction, Kobe, Japan
- 23 February-2 March 2005: Thirteenth session of the Commission for Basic Systems, Saint Petersburg, Russian Federation