



World  
Meteorological  
Organization

# METEOWORLD

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Weather • Climate • Water

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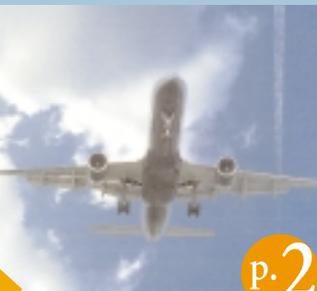
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Image: DigitalGlobe



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## News in brief

### Tropical cyclones

In the field of prevention and mitigation of tropical-cyclone-related disasters, WMO promotes cooperation among National Meteorological and Hydrological Services, and partnerships with global and regional organizations.

In South-East Asia, hands-on training is organized for tropical cyclone and storm surge forecasters and a research fellowship scheme is being implemented. A model is being developed to improve forecasts of flooding associated with tropical cyclones, observation and telecommunication facilities are being upgraded, and capacity is being enhanced through fellowships and attachments of staff to advanced centres in the region.

### Climate and tourism

Climate is a key resource for tourism. Climate variability can affect travellers' and holiday-makers' safety and comfort and needs to be factored into planning and management. WMO supports National Meteorological and Hydrological Services (NMHSs) in the provision of data, information and products to the sector. Many NMHSs have information and prediction services for specialized requirements, such as ecotourism, mountaineering and sailing. In collaboration with the World Tourism Organization, WMO has produced the *Handbook on Natural Disaster Reduction in Tourist Areas*.

#### Typhoon award

The 2004 Typhoon Committee Natural Disaster Prevention Award was presented to the China Meteorological Administration.

### Climate and health

WMO is currently collaborating with the World Health Organization to develop guidelines on heat-health warning systems. These systems will help meteorological and health experts establish programmes to warn of potentially deadly heatwaves and ensure appropriate intervention and support to minimize human suffering during such events.

### Agriculture and climate

Agriculture influences weather and climate through land-use measures. WMO is supporting the establishment of a network which would provide an integrated approach and contribute significantly to the process, policy-making, education and outreach of the WMO/UNEP Intergovernmental Panel on Climate Change. An integrated assessment of impacts would be useful to policy-makers, environmental assessors and the United Nations Framework Convention on Climate Change.

### Weather, climate and farmers

The growth in human population and negative weather and climate impacts are imposing enormous pressures on farmers. More targeted weather and climate forecasting can improve preparedness and lead to better and

sustainable outcomes for farmers. WMO contributes to this process by providing knowledge and training in the impacts and their mitigation of climate variability on agriculture, forestry and fisheries; the production and application of weather forecasts and climate predictions; the development and improvement of advisories, early warnings and other services; and applications of remote-sensing and geographical information systems.

● The January 2005 issue (No. 26) of *World Climate News* is available in printed form from the WMO Secretariat and online (pdf) via the WMO homepage.

### Present weather observations

Present weather is measured more and more by unattended automatic equipment. Measurements are particularly needed in harsh environments (ice, deserts, tropics, the oceans), near roads and in urban areas. Appropriate siting and exposure are critical as is the



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presentation of metadata in a uniform format. Work is therefore underway to develop standards for these observations, based on technologies which will provide alternative information on siting criteria and metadata standards. Quality-management systems and training material are other areas receiving attention in order to ensure reliable data and acceptable measurements.

## Flying weather

The World Area Forecast System (WAFS) was developed by WMO and the International Civil Aviation Organization in order to supply meteorological authorities and other users—particularly airlines—with forecasts of global upper wind, temperature, humidity and significant weather phenomena.

WAFS forecasts and operational meteorological information are broadcast by satellite from the two World Area Forecast Centres in London, UK, and Washington DC, USA, to over 164 countries, 24 hours a day.

The last phase in establishing WAFS that included the requirements for the transmission of information about volcanic ash, tropical cyclones and prevailing visibility, became applicable in November 2004. The cessation of the transmission of flight documentation in facsimile charts is planned for 31 December 2006. Meteorological service providers will need to install visualization software on their workstations and train staff to access, process and decode the information, and prepare flight documentation.

Significant progress has been made in implementing the WMO Aircraft Meteorological Data Relay (AMDAR) Programme. More than 200 000 observations per day are now being exchanged via WMO's Global Telecommunication System. AMDAR data support a wide range of meteorological applications and are an essential source of upper-air information for numerical weather prediction models.

## Water resources

WMO helps National Hydrological Services build up capacity so that they can deliver essential services such as water-resources monitoring, extreme hydrological events forecasting, studying the effect of increased anthropogenic changes on river flow and assessing the effects of climate change and variability on water availability.

Criteria have been defined for identifying pristine river basins in order to detect trends and data exchange formats and protocols, including metadata, are being developed.

Extreme climatic conditions can affect water availability—too much or too little—with consequences for food security in vulnerable regions. Adaptation strategies are being drawn up which focus on changing cropping patterns and

improving the resistance of varieties of crops, as well as on the forecasting and early warning of flood and drought events.

## Dealing with floods

Integrated flood management (IFM) aims at maximizing the productivity of floodplains whilst minimizing loss of life. IFM touches on many areas of law on various institutional and geographical scales, as it covers interventions related to flood prevention, preparedness and mitigation, and emergency response, recovery and rehabilitation. A legal framework is being elaborated which will provide guidance on how to translate IFM principles into practice. Initially for legal experts, it is ultimately aimed at policy-makers, flood practitioners and stakeholder groups, NGOs and the media.

## Technical cooperation

An automatic weather station network of six stations has been established for the Bahrain Directorate of Meteorology. A TV weather presentation system and a climate database management system have been installed and staff trained.

In Maldives, capacity of the Department of Meteorology has been strengthened for weather forecasts, maintenance of technical equipment and collection of climate data. Marine meteorology and seismology are now part of core activities.

A network of six automatic weather stations has been established in Libyan Arab Jamahiriya. At Tripoli airport, an integrated terminal weather system has been installed. A workshop has been established at the Headquarters of the National Meteorological Centre and a mobile workshop provided. Staff have been trained.

An automated weather service production system for the

## Floating robots observe the oceans



Photo: Argo

The international Argo Programme began in 2000 with the aim of establishing a global array of 3 000 robotic instruments, known as Argo floats, to observe the temperature and salinity of the oceans. The half-way point was reached recently with 1 500 floats operating in the Atlantic, Indian, Pacific and Southern Oceans (the number was 1 572 on 4 January 2005).

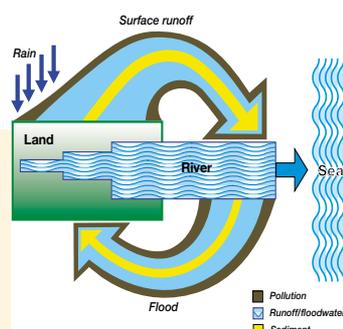
Argo provides a new source of data from the top 2 km of the ocean. Its fleet of robotic floats spend most of their life at depth and surface regularly to make temperature and salinity profile measurements (55 000 profiles per year). The data are valuable contributions to climate and ocean research and for operational weather and climate centres around the world. The floats are contributed by many countries but all data are freely available.

The Argo Programme is a key international project endorsed by WMO and the Intergovernmental Oceanographic Commission of UNESCO.

### Updated aeronautical meteorology publications

*Guide to Practices for Meteorological Offices Serving Aviation* (WMO-No. 732)

*WMO Technical Regulations (C.3.1), Meteorological Service for International Air Navigation, Volume II* (WMO-No. 49)



## Tsunami early warning systems

In the wake of the Indian Ocean tsunami tragedy of December 2004, WMO is joining forces with the Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC), the UN International Strategy for Disaster Reduction and other key agencies to develop a tsunami early warning system in the Indian Ocean and other regions at risk.

UNESCO-IOC has coordinated the development of the Tsunami Warning System in the Pacific (TWSP) since 1968, which has proved to be highly effective. It provides end-to-end capabilities for data collection and the development and dissemination of early warnings at national level.

WMO's Global Telecommunication System (GTS) interconnects the world's National Meteorological and Hydrological Services and facilitates the timely and reliable exchange of warning messages and related information. It is already used by the TWSP and WMO is taking action to ensure that it will be fully operational for tsunami and seismic applications in vulnerable areas.

Global early warning systems, including national alert-and-response mechanisms based on a multi-hazard approach, could avert another tragedy on the scale of the Indian Ocean tsunami. More frequent use of such mechanisms would be critical. A multi-hazard approach would not only save lives but would also be more cost effective.



The 100-m high sampling tower of the new Danum Valley GAW station

Caribbean is being developed. It will contribute to the enhancement, visibility and maintenance of the National Meteorological Services and socio-economic development of the region.

## Environment of tropical rainforests

The Malaysian Meteorological Service has established a Global Atmosphere Watch station in the Danum Valley, a forest reserve in north-eastern Borneo.

Measurements are made of the atmosphere in order to improve the understanding of processes in an equatorial rainforest environment. The data provided are expected to contribute to the study of environmental issues such as climate change, stratospheric ozone depletion, transboundary haze and acid deposition.

## Small islands and development

The International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Development

States (SIDS) was held in Mauritius from 10 to 14 January 2005. The major outcomes were the Mauritius Strategy and the Mauritius Declaration.

WMO supports SIDS in developmental and environmental areas, especially with regard to natural disaster mitigation, climate variability, climate change and its potential impacts, coastal zone management, pollution monitoring over land, rivers and oceans, assessment and management of water resources and capacity building.

Some SIDS are only 1-4 metres above mean sea-level, making them especially vulnerable to sea-level rise, as well as flooding and storm surge associated with tropical cyclones, and tsunamis. Of particular interest to SIDS therefore, in the wake of the disaster of 26 December 2004, is the creation of a global tsunami early warning system (see article on the left of this page).

A brochure covering the specific problems of SIDS is available from the WMO Secretariat, as well as poster, fact sheets, the WMO position paper and a video (see announcement on page 4).

## Natural disasters: prevention and preparedness

The year 2004 saw a series of major disasters, ranging from one of the most devastating tropical cyclone seasons ever in the North Atlantic and western North Pacific Oceans, to severe flooding in East and South-East Asia, and culminating in the Indian Ocean tsunami of 26 December.

WMO is promoting a culture of pro-active disaster prevention and preparedness, based on risk assess-

ment and management. Hence the need to establish and strengthen early warning systems. Resources required for the provision of meteorological and hydrological warning systems should be regarded as an investment in view of the benefits to be derived—all the more so if weather and climate extremes are to increase, resulting in socio-economic setbacks, notably for developing nations.

## Public weather services

METEOSAT Second Generation (MSG) satellite products are being used routinely for forecasting and other services at a number of National Meteorological Services (NMSs) in Europe. Staff of NMSs in eastern European and Balkan countries recently had the opportunity to learn more about MSG products and their applications. Other issues of increasing importance for these NMSs and for which WMO is providing guidance and assistance are: handling the media (interviews, press releases); quality management; improving warning systems, including coordination with other national authorities; corporate identity; marketing; Internet homepages; and responding to users and their needs through regular consultations and surveys.

## Disaster-risk reduction

Some 90 per cent of all natural disasters are related to weather, climate and water hazards. At the World Conference on Disaster Reduction (Kobe, Japan, January 2005), WMO demonstrated the benefits of its activities in all aspects of the

### Forthcoming training events

Regional Training Seminar for National Trainers of RA II and RA V, Kuala Lumpur, Malaysia, 16-27 May 2005

Training Seminar on Curriculum Development of Aeronautical Meteorology, UK Meteorological Office College, FitzRoy Road, Exeter, 7-11 March 2005

### Training publications on CD-ROM

A CD-ROM containing electronic versions of 49 out-of-print WMO "Blue Series" training publications (pdf files) in meteorology and operational hydrology is now available. The publications are in Arabic, English, French, Russian and Spanish.



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The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Meteorological Organization concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitations of its frontiers or boundaries.

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

We would welcome feedback about *MeteoWorld* and look forward to receiving your comments:

E-mail: [jtorres@wmo.int](mailto:jtorres@wmo.int)

## A warm 2004



The year 2004 was the fourth warmest ever recorded and the past decade was the warmest since measurements began in 1861. It came just below 2003, 2002 and 1998, with the average world temperature exceeding by 0.44° C the 14° for the 30 years 1961-1990. October 2004 was the warmest October on record. In the northern hemisphere, the mean temperature was 14.60° and in the southern hemisphere 14.27°.

The year was characterized by a number of extreme or abnormal weather events, including a record number of devastating tropical cyclones in close succession in the North Atlantic and western North Pacific Oceans and severe flooding in Asia (see "Natural disasters" on page 3).

disaster-risk-reduction decision process, with particular emphasis on risk assessment and early warning systems to prevent hazards from becoming disasters. It was stressed that disaster-risk prevention must be viewed as part of a multiple-hazards approach for warning purposes and that early warnings must be a cooperative effort with other agencies and the National Meteorological and Hydrological Services. An information package on WMO's activities in disaster reduction is available from the WMO Secretariat.

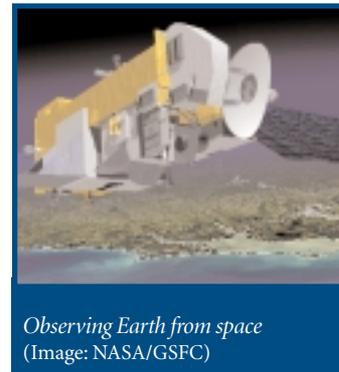
## Earth observations

The Third Earth Observation Summit has established the inter-governmental Group on Earth Observations (GEO) and adopted the 10-year Implementation Plan for the Global Earth Observation System of Systems (GEOSS). WMO's land- and space-based observing and monitoring systems will contribute substantially to GEOSS. The GEO Secretariat will be hosted by WMO at its Headquarters as will the first session of GEO (May 2005).

## Measuring precipitation from space

The International Precipitation Working Group (IPWG) provides an opportunity for operational and research users of satellite precipitation measurements to exchange information on methods and impacts in numerical weather and hydrometeorological prediction and climate studies.

The IPWG aims to develop better measurements and applications, improve scientific understanding, and foster international partnerships.



Observing Earth from space  
(Image: NASA/GSFC)

## Aura

For six years, NASA's Aura will observe the climate system's complex interactions and how the planet is changing in response to natural and human influences. Aura studies the composition, chemistry, and dynamics of the Earth's upper and lower atmosphere, enabling daily global observations of the atmospheric ozone layer, air quality, and key climate parameters.

## World Meteorological Day 2005 (WMD2005)

WMD2005 (23 March) focuses on the theme "Weather, climate, water and sustainable development". A brochure has been prepared, as well as a poster and a video, which may be requested from the WMO Secretariat.

## Arctic ozone

Temperatures in the Arctic ozone layer are the lowest for 50 years and have been consistently low since late November 2004, with unprecedented large areas of polar stratospheric cloud at altitudes around 20 km. Emissions of chlorofluorocarbons and halons have led to an increase in the atmospheric concentration of chlorine and bromine, which can cause ozone depletion. If the Arctic stratosphere remains cold during February and March, large ozone loss is expected to take place as sunlight returns to northern latitudes. This could lead to increased levels of ultraviolet radiation in northern Europe.

Overall, a decrease in total ozone in the Arctic region has been observed since 1980, although there is considerable year-to-year variation in the observed values.

The Arctic ozonesonde network is part of WMO's Global Atmosphere Watch.

## Locusts

The locust plague in 2004 highlighted the threat to the food security of affected countries. In several African countries, locusts devastated entire crops. Conditions now appear favourable for locust breeding in North Africa in the spring, which could bring more locust swarms into West Africa in the rainy season.

WMO and FAO are planning guidance material and workshops on locust monitoring for National Meteorological Services and National Locust Control Centres.

### New from WMO

*Saving paradise, ensuring sustainable development* (WMO-No. 973)  
[E] [F in preparation]

*Weather, climate, water and sustainable development* (WMO-No. 974)  
[E]-[F]-[S]

*We care for our climate*  
(WMO-No. 975) (cartoon) [E]-[F]-[S]

*Working together for a safer world*  
(WMO-No. 976) [E]-[F]-[R]-[S]

Price of each: CHF 15

### Upcoming events

- 14-18 March: Expert Meeting/Workshop on GTS Support to Early Warning Systems in the Indian Ocean, including for Tsunamis, Jakarta, Indonesia
- 14-18 March: RA III Working Group on Hydrology, Montevideo, Uruguay
- 14-16 March: Global Atmosphere Watch Expert Workshop, Geneva
- 17-18 March: CAS Working Group on Environmental Pollution and Atmospheric Chemistry, Geneva
- 21-25 March: International Workshop on Tropical Cyclone Landfall Processes, Macao, China
- 31 March-5 April: RA IV Hurricane Committee, San José, Costa Rica
- 11-23 April: Workshop on Hurricane Forecasting and Warning, and Public Weather Services, Miami, USA
- 18-22 April: Fourth WMO International Symposium on Assimilation of Observations in Meteorology and Oceanography, Prague, Czech Republic