

INTERNATIONAL METEOROLOGICAL ACTIVITIES

OBJECTIVE

To meet Australia's international obligations, advance Australia's interests and support the operations and services of the Bureau through participation in international meteorology.

OUTPUT

Effective Australian participation in the various constituent bodies, programs and activities of the World Meteorological Organization including the provision of data, products and services to overseas National Meteorological Services and overseas user communities; along with participation in the international meteorological and related programs of other international organisations; and bilateral cooperation with other advanced countries and bilateral cooperation with, and assistance to, developing country National Meteorological Services in the South-West Pacific.

OUTCOME

International cooperation and goodwill including the benefits of global meteorological cooperation under the Convention of the World Meteorological Organization and related international meteorological treaties and agreements.

Meteorology is one of the most inherently international of all fields of science and human endeavour. Accordingly, international cooperation plays a vital role in the operation of the Bureau, enabling it to draw on, and benefit from, scientific, technological and operational developments and expertise in other countries while contributing, within its own capability, to the effectiveness of the total international effort from which all countries benefit. This helps to ensure that the Australian community receives the best services possible within the limitations of available resources and the international state of the art in meteorological science and technology.

International Meteorological Activities focus on Australia's involvement in the pro-

grams and activities of the World Meteorological Organization (WMO), a special feature of which is the Bureau's operation of one of the three World Meteorological Centres (WMCs) of the WMO World Weather Watch (WWW). The WMO involvement is complemented by a range of other multilateral and bilateral activities with neighbouring countries in the South-West Pacific and South-East Asia, including formal bilateral arrangements with China, India, Indonesia, the Islamic Republic of Iran, Japan, Papua New Guinea, the Republic of Korea, the Russian Federation, Saudi Arabia and the Socialist Republic of Vietnam.

A fundamental principle embodied in the Convention and traditions of the WMO

is that of voluntary contribution to the total international system and the free exchange of essential data and products between National Meteorological and Hydrological Services (NMHSs) of all countries. Australia benefits greatly under this system, particularly through free access to the meteorological satellite data of Japan, the USA, China, the Russian Federation and Europe.

The Bureau's International Meteorological Activities are coordinated by the International and Public Affairs Section of the Executive and International Affairs Branch in the Bureau Head Office. Most Branches of the Bureau are involved in activities that have an international impact. The International and Public Affairs Section provides the focal point for the planning and coordination of these activities and provides support to the Permanent Representative of Australia with WMO and the Australian members of WMO Technical Commissions.

Highlights

The major achievements in 2002–03 included:

- successful hosting in Cairns in December 2002 of the Extraordinary Session of the Commission for Basic Systems (CBS), the first session of that WMO Technical Commission held in Australia; the WMO CBS Technical Conference on data Processing and Forecasting Systems; and the Fifth International Workshop on Tropical Cyclones;
- a high level of representation and effective contribution to the proceedings of the Fourteenth World Meteorological Congress (Geneva, May 2003), which was chaired by Dr J W Zillman, Director of Meteorology in his capacity as outgoing President of WMO;
- funding agreement with the Australian

Agency for International Development (AusAID) on the implementation of the project 'Enhanced Application of Climate Predictions in Pacific Island Countries', and contribution to activities relating to the Global Climate Observing System (GCOS) implementation plans of the Pacific Island Countries; and

- improved support and service to other NMHSs in WMO Region V (South–West Pacific) through the implementation of improvements and enhancements to the Global Telecommunications System links and improved and more numerous numerical products.

Resource Use

The resources committed to International Meteorological Activities in 2002–03 are summarised in Table 3 and are given in more detail in Table 14.

Performance

Performance during 2002–03 was assessed at two levels in terms of:

- the quality, quantity and price of the outputs directed to the achievement of the planned outcome relative to the agreed target levels; and
- the contribution of the outputs to the achievement of the planned outcome.

The measures used as a basis for performance assessment were as published in the Portfolio Budget Statements 2002–03 for the Environment and Heritage Portfolio (Budget Related Paper No. 1.7). The performance for 2002–03 against each of the performance measures and targets for quality, quantity and price of outputs is summarised in Appendix 12.

In 2002–03, there were 192 missions (excluding those undertaken as part of the commercial activities of the Special Services

Table 14. International Meteorological Activities expenses and revenue (\$'000) and staff level for 2002–03 compared with the actuals for 2001–02 and with the 2002–03 Budget and Budget plus Additional Estimates appropriations.

	ACTUAL	BUDGET	BUDGET &	ACTUAL
	2001–02	2002–03	BUDGET &	2002–03
	(\$'000)	(\$'000)	ADD. EST.	(\$'000)
			2002–03	
			(\$'000)	
<i>FINANCIAL</i>				
EXPENSES				
Employee Expenses (Appropriation)	617	642	642	560
Employee Expenses (Section 31)	0	3	3	3
Supply of Goods and Services (Appropriation)	757	597	601	825
Supply of Goods and Services (Section 31)	1	3	4	13
Operating Lease Rentals	99	105	106	73
Depreciation	41	65	65	31
Other Goods and Services Expenses (WMO Contribution)	1,194	1,149	1,149	1,275
TOTAL EXPENSE*	2,709	2,564	2,570	2,780
REVENUE				
Appropriations	2,547	2,582	2,585	2,609
Sale of Goods and Services	19	6	7	0
Miscellaneous - other	1	0	0	1
TOTAL REVENUE	2,567	2,588	2,592	2,610
<i>STAFFING</i>				
Staff Years (actual)				
- Funded from Employee Expenses (Appropriation)	8.1	7.5	7.5	7.6
- Funded from Supplier Expenses (Appropriation)	0.1	0.0	0.0	0.1
- Funded from Section 31 Receipts	0.1	0.1	0.1	0.1
- Funded from Capitalised Salaries (Asset Replacement)	0.1	0.2	0.2	0.1
TOTAL	8.4	7.8	7.8	7.9

*The operating result (Total Revenue less Total Expense) provides funds required to pay the Capital Use Charge as a dividend from Equity on the Balance Sheet. The Bureau's dividend is some \$20m per annum.



Delegates at the WMO Commission for Basic Systems (CBS) Extraordinary Session, Cairns, 4-12 December, 2002.

Unit), involving a total Bureau expenditure of \$0.465m.

The contribution to the achievement of the planned outcome during 2002-03, assessed in terms of the indicators listed in Appendix 13, is reviewed below for each of the individual outputs (WMO Contribution, Multilateral Activities and Bilateral Activities), drawing on the performance information summarised in Appendix 12.

WMO Contribution

The WMO is a specialised agency of the United Nations and facilitates the coordination, standardisation and improvement of world meteorological and related activities.

In recognition of the value of international cooperation in meteorology, and in support of the overall operation of the WMO, Australia met its financial commitment in terms of the annual assessed contribution to the Regular Budget of the WMO, which for 2002-03 was \$1.239m.

The Australian contribution is based on an intergovernmentally-agreed allocation of funding responsibilities and is closely linked to Gross National Product. It represents 1.60 per cent of the total Regular Budget of the WMO. While most of the operational activities of the WMO continue to be carried out at the national level by its Members, the Regular Budget is used to fund the work of the various constituent bodies of WMO, including coordination through the Technical Commissions of the WMO scientific and technical programs and the coordination activities of the Regional Associations.

The achievements of the various WMO scientific and technical programs during 2002-03 were comprehensively recorded in the WMO Annual Report for the calendar year 2002 and in update reports of the President and Secretary-General to the 14th World Meteorological Congress held in May 2003. Overall, the WMO continued in its fifty-third year (2002) to ensure very effective international cooperation and coordination across a wide range of activities, especially the WWW and the Global Climate Observing System (GCOS).

Australia continued to gain greatly through participation in WMO programs. When compared with the relatively small national contribution to WMO, the benefits received through membership represent considerable value to Australia. In terms of observations, for example, while Australia provides data acquired within its own territory to other countries for their use, it receives, from around the world, much greater quantities of data and information, without which it could not provide many of its national services to acceptable standards.

In particular, the Bureau maintained access to satellite data from meteorological satellites operated by the USA, Japan, China, the Russian Federation and Europe as part of the WMO WWW. As a contribution to the stability of the international arrangements for the distribution of meteorological satellite data, the Bureau continued to operate two Turn Around Ranging Stations at Crib Point in Victoria to assist in



Dr JW Zillman chaired the 14th World Meteorological Congress held in May 2003.

the navigation of the Japanese GMS-5 and the Chinese FengYun-2 satellites.

Multilateral Activities

Contribution to international policy-level decision-making

The Bureau continued its close involvement with a number of multilateral international programs, especially through the WMO and the Intergovernmental Oceanographic Commission (IOC) of UNESCO during 2002-03.

Australia maintained its active involvement and influence in WMO programs, including participation in a number of important international meetings. During the year, the Bureau contributed significantly to policy-level decision-making and scientific and technical planning within WMO through:

- the Director's Presidency of WMO and chairmanship of the Executive Council Panel of Experts on Education and Training and the Executive Council Advisory Group on the Role and Operation of NMHSs until May, and subsequently membership of the Executive Council;
- the Assistant Director (Weather and Ocean Services)'s Vice-presidency of the Commission for Instruments and Methods of Observation (CIMO) until May, and subsequently as Acting President of CIMO;
- the Assistant Director (Climate, Consultative and Hydrological Services)'s Vice-presidency of the Commission for Hydrology;
- the Regional Director Tasmania and Antarctica's chairmanship of the

Executive Council Working Group on Antarctic Meteorology until May; and

- Australian representation on a number of other constituent bodies of WMO.

The Bureau continued to make a substantial contribution to international climate change issues, including through senior level participation in bodies such as:

- the WMO-UNEP (United Nations Environment Programme), Intergovernmental Panel on Climate Change (IPCC) and its Working Groups I, II and III; and
- the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) and its Subsidiary Body for Scientific and Technological Advice (SBSTA).

Meeting Australia's international obligations

The WMO World Weather Watch (WWW) is a globally coordinated system for the collection, processing and distribution of meteorological information in real time on a worldwide basis. It provides the common infrastructure to support a wide range of WMO activities at the national and international levels. The facilities of the WWW are used by other international organisations, in particular the International Civil Aviation Organization, the IOC and the International Atomic Energy Agency, and provide the essential foundation for the development of the GCOS.

The National Meteorological and Oceanographic Operations Centre (NMOC) in Melbourne continued to be an important and integral part of the WWW through its incorporation of the role of a WMC, a Regional/Specialised Meteorological Centre (RSMC) with geographic specialisation, an RSMC with activity specialisation in environmental emergency response, and an IOC and WMO IGOSS (Integrated Global Ocean Services System) Specialised Oceanographic Centre (SOC). The Darwin

Regional Forecasting Centre of the Bureau continued effectively in its capacity as an RSMC with geographic specialisation for the tropical area in the surrounding region. Melbourne also continued to host the WMO Regional Association V (South-West Pacific) Regional Instrument Centre while the Bureau of Meteorology Training Centre maintained its role as a WMO Centre of Excellence in Satellite Meteorology Training.

The Melbourne and Darwin centres fulfilled their formal international obligations in 2002-03, in terms of their specific international obligations for the provision of global and regional meteorological products, such as tropical cyclone or pollution dispersion predictions. Additionally, during the year, the Bureau made several enhancements to international communication links with the Melbourne WMC:

- a new British Telecom (BT) frame relay link was established to Tokyo, replacing a leased line;
- a direct new BT frame relay link was established to Washington;
- the Bureau's Melbourne BT access was increased to accommodate the above new links as well as the existing BT frame relay links to Bracknell, Singapore and Jakarta;
- a new link, via the Internet, was established with Moscow; and
- an order was placed with BT for the establishment of back-up data links from the Brisbane Disaster Recovery Site to Tokyo, Washington, Bracknell and Singapore, which are set up to activate automatically in the event that the main link fails.

Several upgrades were carried out to NMOC and Darwin RSMC products and services provided to other National Meteorological Services (NMS):

- phase 2 of the WMO World Weather Information Service (WWIS) web site, operated by the Hong Kong Observatory under the auspices of the WMO, was launched in December,

complementing the first phase of the project (which provided climatological information) with current weather forecasts for 405 cities around the world, of which 177 are Australian towns and cities;

- the forecast ranges of some numerical models was extended from 48 to 72 hours;
- web products produced by the Darwin RSMC were added to the package of charts supplied to NMHSs in our region via registered user pages on the Bureau website; and
- Samoa, Tuvalu and the Cook Islands were added to the list of countries with registered user access to relevant products on the Bureau's website.

Route forecasts in support of aviation were provided to Pacific Island nations in our region routinely and on request. Australian climate data were provided to the Global Precipitation Climatology Centre (GPCC) and to the WMO/ International Atomic Energy Agency network on isotopes.

Routine atmospheric transport predictions for sites in South-East Asia, including those required to participate in monthly trials of the Environmental Emergency Response system, were continued.

During the year, the Bureau continued to strengthen cooperation with the South Pacific Regional Environment Programme (SPREP) and the WMO Sub-regional Office for the South-West Pacific in Apia, with a major focus on climate and monitoring issues. In particular, the Bureau:

- funded, in part, the attendance of seven Pacific Island delegates to the Fourteenth World Meteorological Congress;
- contributed to the implementation plans associated with the Pacific Islands GCOS and the development of GCOS plans for South-East Asia;
- collaborated with AusAID on the preparation of a project design document titled *Enhanced Application of Climate Predictions in the Pacific*; and

- provided funding support, through WMO, towards the follow-up of the Pacific Meteorological Services Needs Analysis Project.

The Bureau continued its role in the overall coordination of GCOS and the Global Ocean Observing System (GOOS), with Special Adviser Oceanography, Dr Angus McEwan, serving on the IOC Committee for GOOS. The Bureau hosted the annual GCOS Steering Committee meeting in April. Bureau staff also contributed to the development of the *Second Report on the Adequacy of the Global Observing Systems for Climate in support of the UNFCCC*, which was prepared under the guidance of the GCOS Steering Committee and finalised at its April meeting in Melbourne.

The Bureau contributed funds to the South Pacific Applied Geoscience Commission towards the organisation of a workshop on Potential Applications for Ocean Observations in the Pacific Region.

Bilateral Activities

The Bureau continued to maintain and develop existing bilateral programs with other countries. These programs enabled cost-effective application of pooled regional resources and expertise as well as transfer of technology for the collective benefit of the countries concerned. They also provided exposure to Australian meteorological technology in the Asia-Pacific region and helped further Australia's foreign policy objectives in the region. The benefits of these activities flow both ways, with improved capability and capacity leading to improved data flows, and generally higher quality, more reliable data available to all users.

The Bureau continued to play an important role in US-Australia bilateral climate science and monitoring activities, under the

Climate Action Partnership (CAP) established in March 2002. The CAP is based on the concept of developing practical approaches to deal with climate change and involves the US Environmental Protection Agency and the US Departments of Commerce, Energy and State, and the Australian counterpart agencies. The Bureau's role in the CAP is focused on climate change science and monitoring. Under this theme, progress has been made on two projects: Evaluation of Climate System Models; and Roles of the Southern Ocean and Antarctic in Climate. Under the theme of collaboration with Developing Countries to build capacity to deal with climate change, progress has been made in

two further projects: Meeting the Needs for Improved Climate Monitoring Systems in the Pacific; and Applications of Ocean Observations for the Pacific Islands.

Bilateral agreements

Vice Admiral Conrad C. Lautenbacher, the Administrator of the US National Oceanic and Atmospheric Administration (NOAA) and the Director of Meteorology, Dr John Zillman, formalised their commitment to continued collaboration between NOAA and the Commonwealth Bureau of Meteorology through the signing of a letter of understanding on 19 November 2002 during Vice Admiral Lautenbacher's four



Vice-Admiral Conrad Lautenbacher, Administrator of NOAA, (second from right) and Dr John Zillman, Director of Meteorology, signed a letter of understanding to formalise the ongoing collaboration between NOAA and the Bureau on global monitoring and prediction activities, in the presence of the Hon. Dr Sharman Stone MP, Parliamentary Secretary with responsibility for the Bureau, and Dr Bill Brennan of NOAA.

day visit to Australia.

The cooperative program with Japan is particularly important to Australia because of the benefits accruing from access to data from the Japanese GMS and, in the future, from its successor, the Multi-functional Transport Satellite (MTSAT), which has an expected launch date later in 2003. During the year:

- the Bureau participated in, and contributed significantly to, the 21st session of the Japan-Australia Joint Committee on the Geostationary Meteorological Satellite (GMS), hosted by the Japan Meteorological Agency (JMA);
- a Bureau officer conducted a series of lectures and workshops for scientists at JMA's Meteorological Satellite Centre, and held discussions on training and the development and use of material on and for the WMO Virtual Laboratory for Satellite Education and Training;
- arrangements were made for access to satellite imagery from the USA's GOES-9 as a back-up to GMS-5, as an interim measure and in accordance with plans to phase out the ageing GMS-5, pending the launch and activation of Japan's Multi-functional Transport Satellite – Infrared (MTSAT-IR); and
- officers of the JMA held discussions with Bureau officers in Melbourne on the Bureau's meteorological and oceanographic services in general, and sea surface temperature analyses, and also with Bureau officers at the Darwin Regional Forecasting Centre on the Tokyo and Darwin Volcanic Ash Advisory Centres.

The Memorandum Of Understanding (MOU) between the Bureau and the China Meteorological Administration (CMA) provided a framework for several collaborative activities, with a focus on service delivery and research. During the year:

- Bureau officers contributed to the International Symposium on Atmospheric Remote Sensing and Modelling the Symposium on Seasonal Climate Prediction; and the Second

International Symposium on Physico-Mathematical Problems Related to Climate Modelling; and Prediction hosted by CMA, and had discussions with CMA staff on related issues;

- CMA officers had discussions in Melbourne, Canberra and the NSW Regional Office on matters related to meteorological service provision;
- officials from the Changjiang Water Resources Commission and the Ministry of Water Resources of China had discussions with Bureau officers in Melbourne and Queensland on matters related to flood forecasting and warning systems, in the context of the Yangtze River Flood Control and Management Project;
- a joint review report was completed on bilateral cooperation between the Bureau and the CMA since 1985;
- a CMA scientist attended the 14th Annual Bureau of Meteorology Research Centre (BMRC) Modelling Workshop; and
- two officers of the Bureau attended the International Symposium on Climate Change organised by the CMA.

Activities conducted under the MOU between the Bureau and the Korea Meteorological Administration (KMA) included:

- discussions between the Korea Meteorological Administration's Aviation Meteorology Office and Bureau officers in Melbourne and Sydney on various aviation meteorological matters;
- discussions by a Bureau scientist with KMA counterparts on collaboration and future plans for KMA's numerical weather prediction system; and
- an officer of KMA attended the 14th Annual BMRC Modelling Workshop.

Activities conducted under the MOU between the Bureau and its Indonesian counterpart, the Badan Meteorologi dan Geofisika (BMG), included:

- the fourth session of the Bureau-BMG Joint Working Group, convened in

Melbourne, to review progress with past activities and plan future activities;

- joint formal offer of assistance by the Bureau and BMG to East Timor to develop its meteorology;
- discussions and advice by senior Bureau officers and experts to BMG officers, on the state and future needs of BMG's meteorological systems;
- discussions with BMG officers on matters related to volcanic ash and liaison between relevant Indonesian agencies with the Darwin Volcanic Ash Advisory Centre; and
- attendance by a BMG officer at the 5th Southern Hemisphere Tropical Cyclone Workshop and the Public Weather Services Workshop.

Under the MOU between the Bureau and the Islamic Republic of Iran, a Bureau officer conducted lectures in Iran on some aspects of regional climate modelling.

The eighth formal meeting between the Bureau and the Russian Federal Service for Hydrometeorology and Environmental Monitoring, within the framework of the MOU between the two organisations, was held in May in Geneva. The meeting drew up future plans for cooperative activities.

Support for the NMHSs of developing countries

The Bureau worked closely with the National Meteorological and Hydrological Services (NMHSs) of several developing countries in the South Pacific, Asia, the Indian Ocean and Africa in the provision of meteorological training and in bilateral and multilateral support programs. This was undertaken in collaboration with other organisations, and through contribution to the Voluntary Cooperation Programme of the WMO.

These activities were aimed primarily at augmenting the quality of meteorological (including climatological) and related envi-

ronmental data in these countries, improving the capabilities of the NMHSs to undertake research, provide services and monitor climate, improving regional telecommunication links and enhancing data input into regional and global numerical weather prediction models run by the NMOC in Melbourne, in support of weather and climate services for Australia and of its role as a WMC under the WMO WWC. During the year:

- an officer from the Fiji Meteorological Service completed a 3-month Bureau radar training course, through funding support from the Bureau;
- a Bureau expert on communications visited the Fiji Meteorological Service to upgrade communications at the Nadi RSMC;
- officers from Fiji, Indonesia, Madagascar, Micronesia, Mozambique, Niue, Samoa, Solomon Islands, Tonga, Vanuatu and Zimbabwe participated in the 5th Southern Hemisphere Tropical Cyclone Workshop and the Public Weather Services Workshop, which was partly sponsored by the Bureau and conducted by the Bureau;
- a Bureau officer had discussions with the Director of the Papua New Guinea (PNG) National Weather Service on aspects of service provision within PNG;
- the Queensland Regional Office of the Bureau issued Tropical Cyclone Advisories for the eastern region of the Solomon Islands for severe tropical cyclone Zoe;
- trainees from Malaysia (two), Mauritius, Singapore (two), Swaziland, Vanuatu, and Zimbabwe completed the 2002 Graduate Diploma in Meteorology Course and a trainee from Namibia joined the 2003 course;
- in addition to the face-to-face courses, the Bureau provided information and training material to other NMHSs via the Bureau's Virtual Laboratory in Satellite Meteorology website, as well as hard copy training material;

- in cooperation with SPREP the Bureau made arrangements for the assessment of the Port Moresby GCOS Upper Air Network station with the view to upgrading the important baseline station to operational status, in preparation for Bureau donation of six months supply of upper air consumables, as a part of the Bureau's contribution to enhancing the Pacific GCOS network;
- provided partial funding support to the Workshop on Meteorological Research Applications and Services organised by the Kenya Meteorological Service;
- provided funding to the African Centre of Meteorological Applications for Development to support some of the Centre's activities;
- provided meteorological journals and some telecommunications equipment to the Fiji Meteorological Service; and
- provided funding to SPREP in support of the Ninth Pacific Regional Meteorological Services Directors Meeting.