Appendix 6 – World Meteorological Organization (WMO) scientific programs

WMO facilitates international cooperation in the establishment of networks for making meteorological, hydrological and other observations, and promotes the rapid exchange of meteorological information for public, private and commercial use. The scientific activities coordinated by WMO include weather predictions, climate change, air pollution, ozone depletion studies and tropical storm forecasting.

As of August 2003, there were 187 member nations (including Australia), comprising 181 member states and six member territories, all of which maintain their own national meteorological and hydrological services. Members are grouped into six regional associations (Africa, Asia, South America, North and Central America, South-West Pacific and Europe). Australia has been a member of WMO since its establishment and participates strongly in its programs (eg, in the formal framework of the constituent bodies, especially the WMO Congress, the executive council, South-West Pacific regional association and all eight Technical Commissions). The nominated permanent representative for Australia with WMO is the Director of Meteorology.

WMO supports a number of weather research programs that are directly relevant to climate change research at an international level. These include:

World Weather Watch (WWW)

(www.wmo.ch/web/www/www.html)

WWW is the backbone of WMO's activities, and provides up-to-the-minute worldwide weather information and support for developing international programs related to global climate and other environmental issues, and to sustainable development. WWW comprises three core components: the Global Observing System (GOS), the Global Data-Processing System (GDPS) and the Global Telecommunication System (GTS).

The Australian Bureau of Meteorology (BOM) is involved through one of three World Meteorological Centres in Melbourne, regional specialised meteorological centres in Melbourne and Darwin, and a regional instruments centre of the South-West Pacific regional association. Two Australians are on the management group of the Commission for Basic Systems (CBS) of WWW.

Applications of Meteorology Programme (AMP)

(www.wmo.ch/web/aom/aom.html)

The AMP consists of four component activities:

- Public Weather Services Programme – several Australians from BOM are involved in expert teams and co-ordination committees;
- Agricultural Meteorology Programme – projects overseen by the Commission for Agricultural Meteorology (CAgM);
- Aeronautical Meteorology Programme – Australia's BOM is involved, but no Australians are involved in the management group;
- Marine Meteorology and Related Oceanographic Activities Programme – part of JCOMM (see below).

Atmospheric Research and Environment Programme (AREP)

(www.wmo.ch/web/arep/arep-home.html)

The main programs of AREP are:

- Global Atmosphere Watch (GAW) – There are several Scientific Advisory Groups under GAW and Australian scientists are involved in these. Australia has observing stations involved with the GAW network;
- World Weather Research Programme;
- Tropical Meteorology Research Programme;
- Physics and Chemistry of Clouds and Weather Modification.

AREP is overseen by the Commission for Atmospheric Sciences (CAS). Dr John Gras, CSIRO Division of Atmospheric Research, is a member of the CAS working group.

Global Climate Observing System (GCOS)

(www.wmo.ch/web/gcos/gcoshome.html)

(See also Appendix 3)

GCOS was established in 1992 to ensure that the observations and information needed to address climate-related issues are obtained and made available to all potential users. It is co-sponsored by the World Meteorological Organisation (WMO), the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the United Nations Environment Programme (UNEP) and the International Council for Science (ICSU). GCOS is intended to be a long-term, user-driven operational system capable of providing the comprehensive observations required for monitoring the climate system, for detecting and attributing climate change, for assessing the impacts of climate variability and change, and for supporting research toward improved understanding, modelling and prediction of the climate system. It addresses the total climate system including physical, chemical and biological properties, and atmospheric, oceanic, hydrologic, cryospheric and terrestrial processes.

Mike Manton of Australia's BOM is chair of one of the three science panels of GCOS. Australia contributes observational data to GCOS.

Hydrology and Water Resources Programme (HWRP)

(www.wmo.ch/web/homs/hwrpframes.html)

The overall objective of HWRP is to apply hydrology to meet the needs for sustainable development and use of water and related resources; to the mitigation of water-related disasters; and to effective environmental management at national and international levels. HWRP is implemented through five mutually supporting components:

- Programme on Basic Systems in Hydrology (including HOMS and WHYCOS);
- Programme on Forecasting and Applications in Hydrology;
- Programme on Sustainable Development of Water Resources;
- Programme on Capacity Building in Hydrology and Water Resources;
- Programme on Water-related Issues.

Projects are primarily implemented by regional working groups. Australia is involved with the South West Pacific groups through the BOM's Hydrometeorological Advisory Service (HAS).

Intergovernmental Panel on Climate Change (IPCC)

(www.ipcc.ch)

Recognising the problem of potential global climate change, the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. It is open to all members of the UN and WMO. The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. The IPCC does not carry out research nor does it monitor climate related data or other relevant parameters. It bases its assessment mainly on peer reviewed and published scientific/technical literature. The IPCC has three Working Groups and a Task Force:

- Working Group I assesses the scientific aspects of the climate system and climate change.
- Working Group II assesses the vulnerability of socio-economic and natural systems to climate change, negative and positive consequences of climate change, and options for adapting to it.
- Working Group III assesses options for limiting greenhouse gas emissions and otherwise mitigating climate change.
- The Task Force on National Greenhouse Gas Inventories is responsible for the IPCC National Greenhouse Gas Inventories Programme.

A main activity of the IPCC is to provide in regular intervals an assessment of the state of knowledge on climate change. The IPCC also prepares Special Reports and Technical Papers on topics where independent scientific information and advice is deemed necessary and it supports the UN Framework Convention on Climate Change (UNFCCC) through its work on methodologies for National Greenhouse Gas Inventories. The First IPCC Assessment Report was completed in 1990. The Report played an important role in establishing the Intergovernmental Negotiating Committee for a UN Framework Convention on Climate Change by the UN General Assembly. The UN Framework Convention on Climate Change (UNFCCC) was adopted in 1992 and entered into force in 1994. It provides the overall policy framework for addressing the climate change issue. The IPCC Second Assessment Report, Climate Change 1995, provided key input to the negotiations, which led to the adoption of the Kyoto Protocol to the UNFCCC in 1997. The Third Assessment Report (TAR), Climate Change 2001, was completed in 2001. The IPCC has decided to continue to prepare comprehensive assessment reports and agreed to complete its Fourth Assessment Report in 2007. Considerations about scope and outline are about to start.

Australian scientists have been actively involved in the IPCC and the preparation of its assessment reports.

Technical Cooperation Programme (TCO)

(www.wmo.ch/web/tco/TCOHome.html)

The objective of TCO is to ensure, through collaborative efforts of Members, for their mutual benefit, the enhancement and development of the capabilities of the national Meteorological and Hydrological Services (NMHSs) so that they can contribute to and participate efficiently in the implementation of WMO Programs, for the benefit of the global community and in support of national socio-economic development activities.

(More of a funding/infrastructure program than a scientific program.)

World Climate Programme (WCP)

(www.wmo.ch/web/wcp/wcp-home.html)

WCP comprises the following components, all administered by the Commission of Climatology (CCL), which has involvement from Australia's BOM:

- World Climate Data and Monitoring Programme (WCDMP);
- World Climate Applications and Services Programme (WCASP);
- World Climate Impact Assessment and Response Strategies Programme (WCIRP);
- World Climate Research Programme (WCRP);
- Climate Information and Prediction Services (CLIPS).

World Climate Research Programme (WCRP)

(www.wmo.ch/web/wcrp/wcrp-home.html)

(See Appendix 3)

WMO/IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM)

(www.wmo.ch/web/aom/marprog)

JCOMM is an intergovernmental body of experts, which provides the international, intergovernmental coordination, regulation and management mechanism for an operational oceanographic and marine meteorological observing, data management and services system. Until the formation of JCOMM in 1999, the coordination of these activities was provided by two separate bodies: the WMO Commission for Marine Meteorology (CMM) and the Joint IOC/WMO Committee for the Integrated Global Ocean Services System (IGOSS). JCOMM is the result of the recognition of the increasing demand for integrated marine meteorological and oceanographic data and services, and the efficiencies that may be achieved by combining the expertise and technological capabilities of the WMO and IOC systems.

Phillip Parker of Australia's BOM is on the nine-member management group of JCOMM.