INTERNATIONAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

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IODE NATIONAL REPORT FOR AUSTRALIA
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1. Name of Data Centre:
   Australian Oceanographic Data Centre (AODC)

2. National IODE Coordinator:
   Name: Commander Craig Roy, Director, Oceanography and Meteorology
   Address: Maritime Headquarters, Wylde Street, POTTS POINT NSW 2011, AUSTRALIA
   Tel: +61 2 9359 3140
   Fax: +61 2 9359 3120
   E-mail: dom@metoc.navy.gov.au

3. Data Center Address:
   Australian Oceanographic Data Centre
   Directorate of Oceanography and Meteorology
   Maritime Headquarters
   Wylde Street
   POTTS POINT NSW 2011
   AUSTRALIA
   Tel: +61 2 9359 3139
   Fax: +61 2 9359 3120
   E-mail: d_dir@aodc.gov.au

4. Data Center URL:
   www.aodc.gov.au

5. IODE Data Center Designation Date:
   AODC was designated a NODC in 1964

6. Brief History:
   The Australian Oceanographic Data Centre (AODC) was established in 1964 through a joint agreement
   between the Royal Australian Navy (RAN) and Commonwealth Scientific and Industrial Research
   Organisation (CSIRO). Originally formed within the Australian Hydrographic Office, AODC returned
   to the RAN Hydrographic Force Element Group as an element of the Directorate of Oceanography and
   Meteorology in 2000. This followed a seven-year period during which it operated as part of the RAN
   Maritime Operations Division.

7. Roles and Responsibilities of the Data Centre:
   The AODC operates as the National Oceanographic Data Centre for Australia within the guidelines
   established by UNESCO's Intergovernmental Oceanographic Commission (IOC). In performing this
   role AODC participates in various national and international oceanographic data collection, exchange
   and management programs and supports the Australian marine community through the management
   and provision of oceanographic data and data products.

   The AODC also operates as the Defence Oceanographic Data Centre (DODC) for the Australian
   Defence Force (ADF), providing data management and archiving support for Defence collected data.
   The DODC further supports the ADF through the acquisition, processing, management and
   dissemination of non real-time oceanographic and marine meteorology data and products.

   AODC International Roles and Responsibilities
• Act as the National Coordinator for the IOC’s International Oceanographic Data and Information Exchange (IODE) program
• Cooperate with, and support, the international marine science community on data management aspects of international scientific projects and data exchange programs
• Support international oceanographic data collection programs

**AODC National Roles and Responsibilities**

• Operate as Australia’s National Oceanographic Data Centre within the guidelines established by UNESCO’s Intergovernmental Oceanographic Commission (IOC) program
• Coordinate, as appropriate, national oceanographic data management activities including contact between agency data centers and IODE
• Provide data, information, products and services to the marine community
• Develop and implement marine data management systems
• Introduce new technology to improve the quality and timeliness of product support
• Provide marine environmental data and information management advisory services

**AODC Defence Roles and Responsibilities**

• Quality control, manage and archive oceanographic and marine meteorology data collected by ADF units
• Manage the ADF Marine Environmental Database covering physical oceanography, marine meteorology, sea-floor characteristics and marine mammal distribution
• Acquire, process, manage and disseminate marine environmental data in the ADF Oceanographic Area of Interest (bounded by: 40° N to 80° S from 20° E to 150° W)
• Provide the capability to acquire, process, manage and disseminate marine environmental data outside the ADF Oceanographic Area of Interest as required
• Provide non real-time products and services to support ADF Maritime activities
• Develop and disseminate products to improve the tactical exploitation of the marine environment
• Develop and disseminate products to assist with the management of protected marine environments and species.

8. **Description of national data and information management coordination:**

Australia’s national data and information management coordination is primarily achieved through three bodies. The combination of these bodies ensures that Australia’s broad spatial data interests are coordinated at the Commonwealth level, and that oceanographic data management is consistent with both IOC and IODE guidelines. The three bodies are:

- Commonwealth Spatial Data Policy Executive and Management Group
- Heads of (Commonwealth) Marine Agencies
- Australian National Marine Data Group

The Commonwealth Spatial Data Policy Executive (CSD PE), its technical management committee (CSD MG) and an Office of Spatial Data Management (OSDM) were established to enable the Commonwealth to meet its national spatial data leadership responsibilities – marine information is a sub set of spatial data. Collectively, the roles of these groups are to guide and oversee the implementation of Australia’s spatial data access and pricing policy. Accordingly, the CSD PE is to report annually on the spatial data policy with regard to:

- the data schedule;
- the access and pricing arrangements;
- the arrangements for custodianship and sponsorship;
- the annual workplan; and
- the coordination arrangements
The Committee of Heads of Commonwealth Marine Agencies is a consortium of approximately sixteen Australian Government agencies and departments with an active interest in marine issues. Their Executive Heads, or senior nominees carrying the delegation of their Executive Heads represent member agencies. It serves, inter alia, as the national coordination mechanism for Australian involvement in the activities of the IOC.

The Australian National Marine Data Group (ANMDG) was established following the release of Australia’s Oceans Policy and the Marine Science and Technology Plan for Australia. The group members represent a Peak Body, with the Commonwealth member representing the Committee of Heads of Commonwealth Marine Agencies. The primary role of this group is to develop strategies and policies to achieve better national coordination of marine data management. Improved outcomes should include increased effectiveness of Australian science, policy development, public interest needs and commercial activities.

The Director Oceanography and Meteorology, as Director of AODC is a full member of the CSD MG and HOMA and the Commonwealth member of the ANMDG.

9. Data Centre Projects and Activities during the Intersessional Period:

Metadata
AODC currently manages two forms of metadata: Services Metadata for data discovery and online access which is compliant with the Australia New Zealand Metadata (ANZMETA) Standard and accessed through the Australian Spatial Data Directory (ASDD), and Data Metadata for management and archiving of raw observation data for exchange between national data centers under IODE and for inclusion into NASA’s Global Change Master Directory.

- **Services Metadata.** AODC manually creates Services Metadata for all data and products made available through direct (internet) access or on request. AODC operates its own node on the ASDD serving Services Metadata through a Z39.50 architecture server. The AODC data inventory can be accessed through http://www.auslig.gov.au/asdd/.

- **Data Metadata.** AODC currently uses IODE’s version 3.0 release of MEDI, as developed by AODC. Data Metadata allows all ancillary data elements to be stored with the data along with the full history of quality control. Data Metadata is accessed through the AODC website http://www.aodc.gov.au/.

Data Acquisition
The RAN deploys an average of 2,000 XBT probes per annum from Fleet units. All XBT data is relayed via the Global Telecommunication System (GTS).

Data Management System
The AODC has moved from its previous Informix (EDMS) database to an Oracle/ESRI geospatial data repository for the management and archiving of data. This system was developed to comply with requirements for a Common Operating Environment to facilitate interoperability of data management, dissemination and visualisation throughout Defence. The management of raw, non-operational, data was migrated to an XML dependent system where all RAN data is encoded in the AODC developed MarineXML format, which is then parsed through numerous data management systems for quality checks, archiving and metadata creation.

Data Processing
A Marine XML Schema and DTD was developed for uniform data processing and a paper on “Development and Use of Marine XML Within AODC” was presented at the first IOC/ICES XML Study Group meeting in April 2002. Marine XML documentation can be downloaded from http://www.aodc.gov.au/. The ESRI suite of GIS tools is used to process data into products that can be visualised and further analysed.

Quality Control Software
The AODC has developed an application to support the quality control of RAN collected marine data. Utilising the flexibility of Marine XML structured data files all edits, applied tests, and QC operator information is stored within the data, thereby providing a complete history of the data processing. The software was designed in a modular way providing tests for spatio-temporal attributes and plug-in modules for the parameter based attributes. Currently modules exist for bathythermograph data, marine meteorology, and seafloor sediments. More information about the software can be found in a user manual at [http://www.aodc.gov.au](http://www.aodc.gov.au/).

**Data and Information Dissemination**

The AODC web page was modified to become the website of the RAN Directorate of Oceanography and Meteorology. Access functionality was developed to serve internal and external users. In addition to the existing products online, access to oceanographic layers within AODC’s Geospatial Data Repository was developed via an ArcIMS interface which can be access through [http://www.aodc.gov.au](http://www.aodc.gov.au/).

**Real-Time Data:**

- Since 1998 AODC has received real-time GTSPP data via ftp every few days from the Canada Marine Environmental Data Service (MEDS) and archived them in the AODC database.
- The AODC is currently generating near real-time sea surface temperature data received from polar orbiting satellites and processed by the USN Naval Oceanographic Office.

**SOOP**

The RAN provides 2500 Deep Blue XBT probes annually to CSIRO and Bureau of Meteorology in support of the Ship of Opportunity Program.

**Data Submission - WDC-A/NODC/WOCE**

The ocean temperature profile data collected over the past ten years by RAN Fleet units using XBT probes has been reprocessed to a higher standard and re-submitted to the World Ocean Data Centre to be incorporated into global data sets and to support the WOCE project.

10. **Data Centre Products and Services Developed and/or made available during the Intersessional Period:**

**Software Development:**

- MEDI 3.0 operational version of the software developed by AODC and adopted by IOC/IODE.
- MarineQC semi-automatic software internally developed in Java and using XML format for the encoding of processing and quality control details for ADF collected marine environmental data. The software has a common interface for the QC of spatial and temporal information of all data types and a number of QC modules tailored to handle the quality control of additional oceanographic parameters. More information about this application can be found in the Marine QC [User Manual](http://www.aodc.gov.au/).
- The AODC Marine XML data format was developed for marine environmental data using an extensible markup language (XML). Marine XML Schema documentation provides a detailed description and examples of XML encoding of oceanographic data at the AODC. The Marine XML Schema and DTD can be downloaded at [http://www.aodc.gov.au](http://www.aodc.gov.au/).

**Data and Information Products on-line:**

- Weekly oceanographic analysis of the East Australian Current and the Leeuwin Current. These analysis charts are updated each Wednesday. A complete chart archive back to 1984 is available including annual animations. This service was recently updated to provide on-line SST analyses over user-defined areas anywhere on the globe. [http://www.aodc.gov.au](http://www.aodc.gov.au/).
- An on-line geospatial data repository and server has been established to provide access to historical oceanographic and marine meteorological observations and climatologies. The range of parameters and data available is regularly reviewed and updated. [http://grey2.aodc.gov.au/website/gdr/viewer.htm](http://grey2.aodc.gov.au/website/gdr/viewer.htm).
11. List of Activities that were undertaken during Intersessional Period to promote IODE:

- AODC continued its practice of allocating significant staff resources to IODE activities as part of its long-standing commitment and contribution to the IOC. During the period:
  - Mr. Ben Searle continued as Chairman of the Committee IODE until resigning from AODC to take up a new position.
  - Mr. Greg Reed continued as Chair IODE Group of Experts on Technical Aspects of Data Exchange (GETADE). Mr. Reed was also released by AODC to join the IODE Secretariat as the Consultant, Information Technology in May 2001 and later extended for a second year.
  - Mr. Matthew De Plater from AODC authored MEDI version 3.0.
  - AODC have contributed to IODE Ocean Teacher, notably the Oceanographic Data Collection Kit.
  - A brochure on the GODAR-WESTPAC project was distributed to Australian marine research institutions in response to a request from the Director JODC.

12. Future Plans:

   **Review of AODC**

   A Task Team representing lead marine agencies in Australia has been established to conduct a review of AODC, with the following objectives:

   - Review the national roles and functions necessary for management of marine data and products within Australia and internationally
   - Assess the current national capacity to meet these identified roles and functions, either individually or collectively
   - Examine options to provide greater efficiency and effectiveness including the establishment of an Australian Distributed Oceanographic Data Centre

   **Online data**

   AODC intends to significantly improve client access to data and products through the continued development of internet map services for its spatial information. Data and products to be made available during the next inter-sessional period include observations and climatologies of temperature, salinity, sound speed, currents, wind speed, wave height, water clarity, bathymetry, sea floor characteristics and marine mammal distribution.

   **Product revision**

   The improved availability of regional and global climatologies, particularly those that include satellite derived data (Sea Surface Temperature, Wind Speed, Wave Height) in data sparse areas of the Southern Ocean provides an opportunity to revise many of the products developed by AODC for Defence and marine community users.

   **XBT Data Acquisition System Software**

   Following the successful trial of the AODC XBT System, a joint working group from AODC, CSIRO and the BoM has been established to develop a single data acquisition system to be used by the agencies. The system, once developed, will be provided to other Australian marine agencies and to the IODE for dissemination to National data centres.

   **XBT Data Quality Control Software**

   As a separate project to the XBT Data Acquisition System Software, the ANMDG Oceanography and Meteorology Working Group, comprising members from AODC, BOM and CSIRO, will develop common quality control software for upper ocean temperature data processing. The software will allow member agencies to quality control their own data to an agreed standard and demonstrate the viability of a distributed model for the Australian Oceanographic Data Centre through the development of regional upper ocean temperature datasets from consistent data, exchanged over the internet.