

Situation of Oceanographic Research Activities and Data Management Activities in China

Zhang Dongsheng

National Marine Data and Information Service

Tianjin, China

Introduction

The ocean, which covers 71 percent of the earth's surface, is a basic component of the global bio-support system. It is also a treasure house of resources and an important regulator of the environment. As a major developing country with a long coastline, China attaches great importance to marine development and protection, and takes it as the state's development strategy. It is constantly strengthening comprehensive marine management, and actively developing science, technology and education pertaining to the oceans.

1. Situation of Oceanographic Research Activities

Many planning oceanographic research activities have been carried on within the past 10 years. China has made further efforts to promote the investigation and exploration of marine resources and marine environment; search actively for new exploitable resources; study new techniques and methods of marine resources exploitation and protection; develop marine monitoring technologies and manufacture of oceanographic technical equipment; train technical personnel in marine development and protection, and spread oceanographic knowledge among the general public.

Focus:

- research, development and dissemination of the technologies of marine reproduction and mariculture;
- fine processing of marine biological resources;
- exploration and extraction of marine pharmaceuticals;
- exploitation of chemical resources in seawater;
- research of basic oceanographic science,.
- surface observation aerospace remote sensing and underwater detection,
- make surveys of the Antarctic and the surrounding sea areas
- North Pole Research
- Establishment of a multidisciplinary oceanographic research system with regional characteristics.
- promotion of offshore fisher, and oil and gas exploitation,
- protection of the marine environment
- Reduction and prevention of marine disasters.

2. Data Management Activities in China

The National Marine Data and Information Service (NMDIS) is a national center directly under the State Oceanic Administration (SOA) of China, which is mainly responsible for the centralized management of national marine basic data, the establishment, maintenance and management of the marine basic databases; the collection, processing and management of domestic and foreign marine data; marine data products; the establishment and development of the marine environmental data and information system; and service of comprehensive information for ocean development, oceanographic research and marine environmental protection.

2.1 Marine Data Research Work

Collection, standardization and processing technologies of marine data.

All kinds of domestic and foreign marine data has been collected and standardized by NMDIS. Meanwhile the quality control was carried out. NMDIS has also established various archives of marine data, such as coastal station data, meteorological data, temperature and salinity data, sea wave data, sea ice data, buoy data, Nansen station data, tidal current data, marine chemical data, marine pollution data, marine biological data, marine geological data and geophysical data, etc., and has also provided services for the users both at home and abroad.

Establishment of various marine databases and information systems.

NMDIS holds many kinds of marine data. For utilizing and managing these data, NMDIS has established many marine databases and information systems in a lot of area, including:

- Oceanic Mineral Resources Database,
- Database on Tropical Western Pacific and Kuroshio Area,
- Hydrographic part of the Continental Shelf Database
- Comprehensive Nanshen station Database.

NMDIS has also developed many information systems, such as The Marine Environment and Disaster Information System, with which to provide technical support for the marine management.

Marine data product making.

We make a series of data products which provides service for science research, marine management and public users, including:

The Oceanographic atlases for the Bohai Sea, the Yellow Sea and the East China Sea,
The Oceanographic Atlas of Japan-China Kuroshio Research,
The Ocean-Air Interaction Research Atlas on the Tropical Western Pacific,
The Chart of Surface Current in the Tropical Western Pacific,
The Chart of Current System on the Continental Shelf of China, etc..

Development of the high and new technologies of data processing.

Researches on the processing technologies of CTD, ADCP and buoy data, etc have been carried out. Research on the seabeam data processing techniques is being carried on.

Collection and exchange of international marine data.

As the operational center of CNODC and WDC, Oceanography and the major operational sector of the IODE/IOC China Center. NMDIS has actively participated in international marine data and information exchange with ocean-related international organizations, and has established cooperation-relation with over 170 institutions in 32 countries and regions.

Provision of the services for the users at home and abroad with environmental

We serve for the users at home and abroad by the way of providing the data set, data product and research report of environmental analysis and assessment such as sea waves, temperature and salinity, sea current, meteorology, pollution and so on.

2.2 Marine information network construction and service

NMDIS is responsible for the establishment and management of the national marine information communication networks; organizes and implements the transmission and sharing of national marine information; maintains and manages the China Oceanic Information Network(COINet); and provides the public technological support and service which is the core of the National Marine Information System. It mainly takes charge of the local and wide area network communication of the system and the *exchange* of international data and information, and the on-line service of marine information and its products.

The established COINet has joined the international marine data exchange system via Internet. It not only provides rich marine data and information, but also makes it easy and convenient to get various kinds of information in the world and conduct the information exchange with other counterparts in the world. It extends our services to all over the world.

COINet changes the traditional communication methods and decreases the communication costs in great measure. The COINet provides the following services:

- World Wide Web-WWW service, <http://www.nmdis.gov.cn/>;
- Anonymous transmission service of FTP files, <ftp://ftp.nmdis.gov.cn/>;
- Service of Telnet remote login and Information resources sharing;
- News service: receiving, storing and reading marine news;
- PPP network inward dialing service;
- Homepage design and production service;
- Web station and node design and setup service

2.3 International Exchange and Cooperation

NMDIS has actively participated in marine data and information management activities of international organizations, such as IODE, JCOMM, GOOS, etc. for many years. It acts as China's national focal point for international oceanographic data exchanges. It also conducts direct bilateral data exchange of marine data and information with dozens of ocean-related international organizations, and over 170 institutions in 32 countries and regions.

WDC for Oceanography (Tianjin)

As the center for oceanography of the World Data Center, WDC (Tianjin) has established formal relationship of marine data exchange with over 130 marine institutions in more than 60 countries in the world and keeps a close relationship of data exchange with over 30 major national oceanographic data centers all over the world. Through the COINet, a large amount of data have been acquired through international exchange, which, plus the marine data collected at home for many years, has brought the WDC for Oceanography over 100 years' global marine data with a total data amounting to more than 10 billion bytes. In the meantime, a vast amount of work has been done in the standardized and normalized processing and management of these data, and a series of national and professional standards have been formulated and implemented successively. Moreover, appropriate standards and norms are being formulated as required.

China Delayed Mode Database for NEAR-GOOS

At its 28th session (Paris, November 1995), the General conference of UNESCO adopted Resolution 138 which calls on Intergovernmental Oceanographic Commission (IOC) to continue its effort to establish North-East Asian Regional-Global Ocean Observing System. In the light of the objectives of the NEAR-GOOS Implementation Plan, an efficient data exchange scheme has been established for the existing observing system in the region at its initial phase. The NMDIS has developed and maintained China Delayed Mode Data Base for NEAR-GOOS (CDMDB) to offer basic data.

JCOMM Ocean Data Acquisition (ODAS) Systems metadata service

At the JCOMM First Session of the JCOMM Data Management Programme Area Coordination Group (DMCG-I) meeting in 2002, the National Marine Data and Information Service (NMDIS) of China volunteered to undertake the construction of the ODAS Metadata Center. The major objectives of ODAS metadata management center are collecting, sort-out, processing, management and service of the ODAS metadata from the Members and Members States, international organizations and cooperative projects and programs in an operational way.

The ODAS metadata database and management system have been developed by ODAS Metadata Center .The DBCP and ARGO metadata information has been translated into the

ODAS metadata operationally. The management system will be improved continuously. Users can get useful information from the ODAS metadata database

3 . The Activities of GODAR Project in China

The National Marine Data and Information Service of China (NMDIS) carried out two cooperative projects to digitize a set of historical marine oceanographic and meteorological observations known as the Maury Collection (1792--1910) and the Marine Meteorological Journal (1878—1894) with the U.S. National Climatic Data Center (NCDC) in 1994-1998.

Under the cooperative projects, about 200 rolls of microfilms, which contained observations made by merchant ships, fishing boats and research vessels, were digitized. These digitized data have been merged into the COADS dataset.

The NMDIS also implemented projects to digitize the domestic voluntary observing ship collection data, BT data, coastal station collection and developed some quality control methods for WOD01.

3.1. Maury Collection

The Maury Collection is a historical dataset collected during the period 1792-1910. Most of observations were collected in the period 1832-1860. The geographical distribution of Maury Collection covers the global oceans. The main parameters of the Maury Collection include Current, Wind, Barometer, Air Temperature, Surface Water Temperature, Forms of Clouds, Weather, Sea State and so on. The amount of digitized and available Maury Collection is **1.5 million records**.

3.2. Marine Meteorological Journal

The Marine Meteorological Journal is a historical dataset collected during the period 1878-1894. Most of them were collected in the period 1883-1887. The geographical distribution of Marine Meteorological Journal covers the global oceans. The main parameters of Marine Meteorological Journal include Current, Wind, Barometer, Air Temperature, Water Temperature, Forms of Clouds, Sea State, Weather and so on. The interval of most observations is in every two hours. Some interval of observations is 3 times every day. The amount of Marine Meteorological Journal is **1.8 million records**.

3.3 Digitization of Domestic Voluntary Observing Ship Collection

The domestic voluntary observing ship collection has been digitized. It is a dataset that was observed during the period 1968-1993 by Chinese ships. Most of them were collected in the period 1968-1983. The geographical distribution covers the global ocean. Most of them are located in the Northwest Pacific. The main parameters include Wind, Barometer, Air Temperature, Surface Water Temperature and Salinity, Wave, Visibility, Forms of Clouds, Sea State, Weather and so on. The amount is **400 thousand** records and those data have been merged into a relative database.

3.4. Digitization of MBT Observing Collection

The domestic MBT observing collection has been digitized. It is a dataset that was observed during the period 1976-1990 by Chinese ships. Most of them are located in the Northwest Pacific. The main parameters include Depth and Water Temperature. The amount is **10,600** records and those data have been merged into a relative database.

Under the two national projects, about 13,300 sheets of photo records, which contain observations by research vessels of the North ,East and South China Sea Branches ,SOA, have been digitized.

3.5. Digitization of Coastal Station Collection

In last 4 years, coastal station collection was gathered by NMDIS which fulfilled the work on their digitization. It is a dataset that was observed during the period 1960-1990 by 13 Chinese coastal stations. The parameters include meteorological data, temperature and salinity data, sea wave data, sea ice data.

3.6. Quality Control of WOD01

In order to get higher quality, some quality control methods have been developed for WOD01. This quality control system includes duplicate check, data field verification, data relationship verification and climatological verification. By using this system many interrogative data or problems hidden in WOD01 could be found out.

For some reasons, some historical marine observed data are recorded on paper and most of these data are managed by different agencies in China. In order to rescue these data, it will take some time to do some work in coordination with the relative agencies now and in the future. The GODAR project is not finished in China.