



*Dragoness Annual Meeting*  
**Final Report of Work Package 3**



# **Review of Level of Data Integration and Information Management**

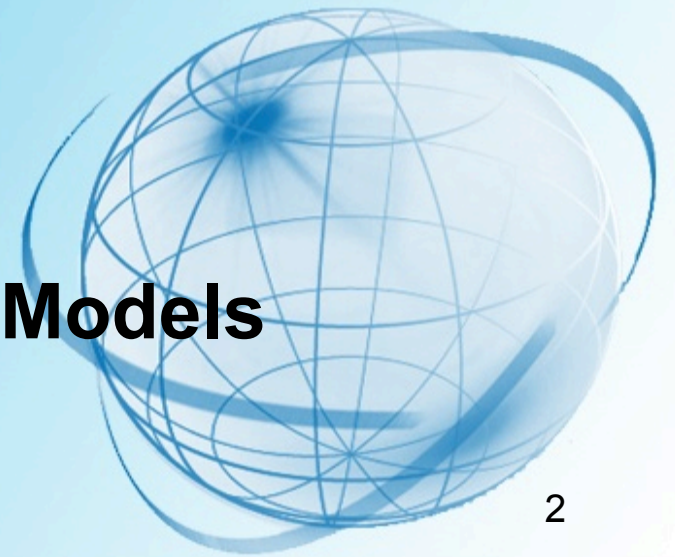
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**Ocean Remote Sensing Institute  
Ocean University of China**

**May 17-18, 2010, Guilin, China**

# CONTENTS

- **Description of Work**
- **Marine Data Policy**
- **Data Integration and Sharing**
- **Methods for Utilizing Data in Models**

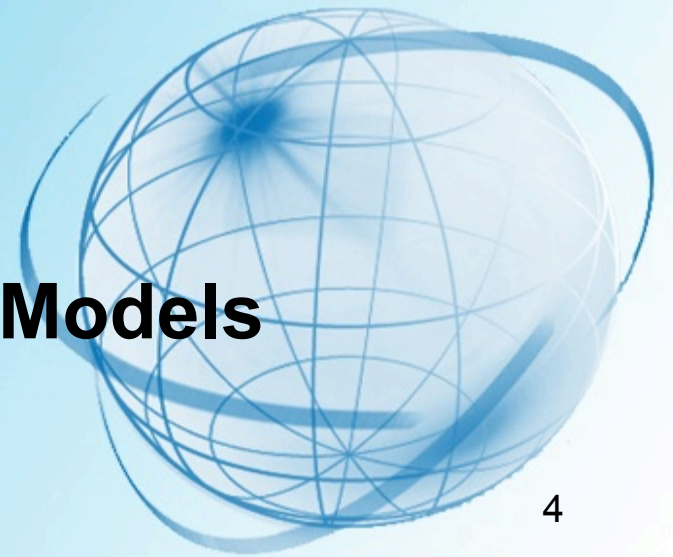


## **Main Tasks**

- **Assess the status of existing Chinese facilities and investigate the possibility of converging with MERSEA in order to meet GEOSS requirements. ♪**
- **Assess whether the existing data policies are suitable for generating an integrated data system. Identify the differences between Chinese and European data policies. ♪**
- **Evaluate the methods for utilizing in situ and satellite data in oceanic and atmospheric prediction models.**

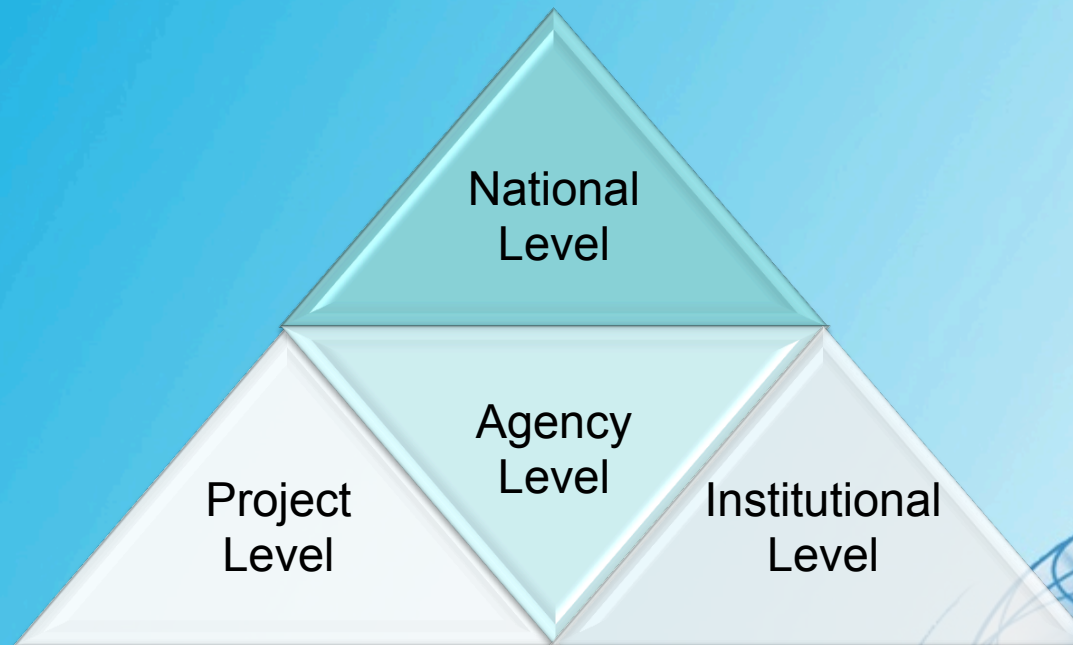
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# Marine Data Policy in China

In China, marine data policy can be understood at four levels:



- **National Level**

At national level, due to security and copyright reasons, scientific data are divided into five confidential categories as for other sensitive or valuable data in China: Absolutely confidential, highly confidential, confidential, internal, and public.♪

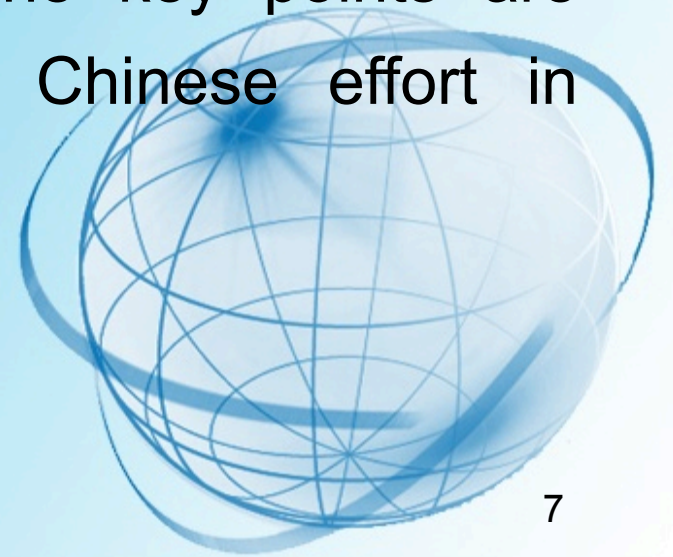
## **Marine Data Policy in China**

Ministry of Science and Technology (MOST) is the national administration in charge of making policies on scientific data integration and sharing, and monitoring the implementation of those policies. Although MOST does not handle scientific data by itself, it is the top authority which coordinates and regulates the activities of data standardization, collection, management, archiving and distribution in China.



## **Marine Data Policy in China**

MOST issued a regulation of data integration and archiving for the national basic research program (the so-called '973' program which is one of the major categories of scientific programs in China) in the scientific field of resource and environment in 1998. The key points are summarized here as an example of Chinese effort in scientific data integration and sharing.



# Marine Data Policy in China

## ➤ Procedures for Project Data Integration, Management and Distribution

- Data should be submitted to a designated data I/A center **2 months** before the end of the project, along with a data description (metadata) and quality report.

- The data I/A center should complete the evaluation of data within **1 month** after their submission.

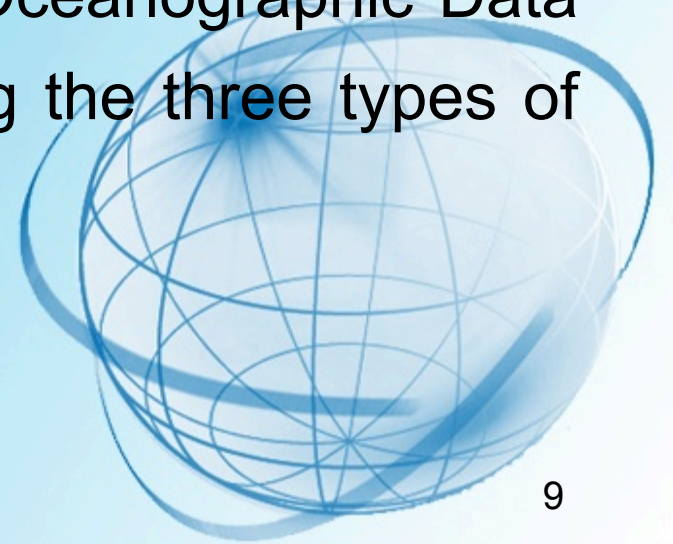
- The metadata of project data will be released to the public **1 month** after submission.

- Under normal circumstances, the project data should be provided to the public upon request after a protection period of no more than **2 years**.



## **Marine Data Policy in France**

In France, marine data can be divided into three categories, i.e., the database data, oceanographic cruise data, and SISMER (Systèmes d'Informations Scientifiques pour la Mer) data. Different types of data have different policies. The French National Oceanographic Data Center (NODC) is in charge of providing the three types of data.



# Marine Data Policy in France

## ● **Policy for Database Data**♪

Database data are collected by the laboratories of the French scientific community. So the data policy should obey the laboratories' requirements. Firstly, engineers, scientists, students and other users can get and exchange the data easily. Secondly, the data center should have a system to monitor the data.♪

## ● **Policy for Oceanographic Cruise Data**♪

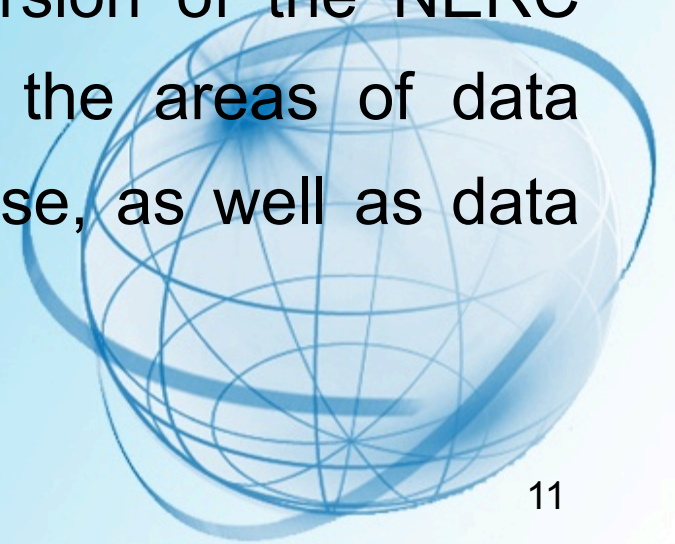
The policy for oceanographic cruise data is that the national and international fleets must submit a summary report every year. One can get the summary report from the French NODC website, but if you want to obtain the data, you may have to pay.♪

## ● **Policy for SISMER Data**♪

The policy for SISMER data is generally good. For identified users, unclassified data can be obtained freely unless they are specified as being charged.♪

## **Marine Data Policy in UK**

In UK, marine data policy is defined by the Natural Environment Research Council (NERC). NERC is UK's main agency for funding and managing research, training and knowledge exchange in the environmental sciences. In February 2010, a new version of the NERC data policy was issued, which covers the areas of data acquisition, management, access and use, as well as data charges.



# Marine Data Policy in UK

## • **Data Acquisition**♪

The data are often acquired from scientific projects including UK projects (e.g., Land-Ocean Interaction Study), European projects (e.g., SeaDataNet), and international projects (e.g., Argo).♪

## • **Data Management**♪

There are many data centers in UK. The British Oceanographic Data Center (BODC) is the most important one to assemble data from other project data centers such as British Antarctic Survey, Sea Mammal Research Unit and National Oceanography Centre and so on.♪

## • **Data Access and Use**♪

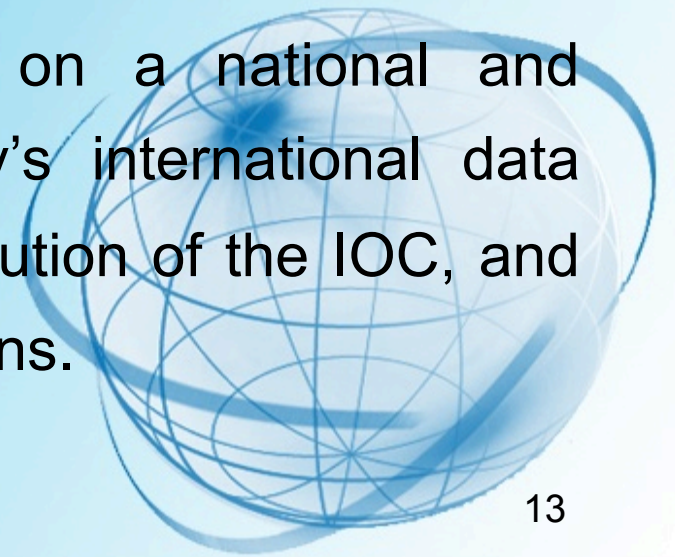
Original data suppliers can have a reasonable period to work exclusively on their data. After that period, data should be publicized effectively. ♪

## • **Data Charges**♪

The charges for accessing the data obey the government's regulations. For 'raw' data, NERC will only charge the marginal cost of supply with no restrictions to further use. For 'product' data, NERC will also charge on a cost recovery basis.

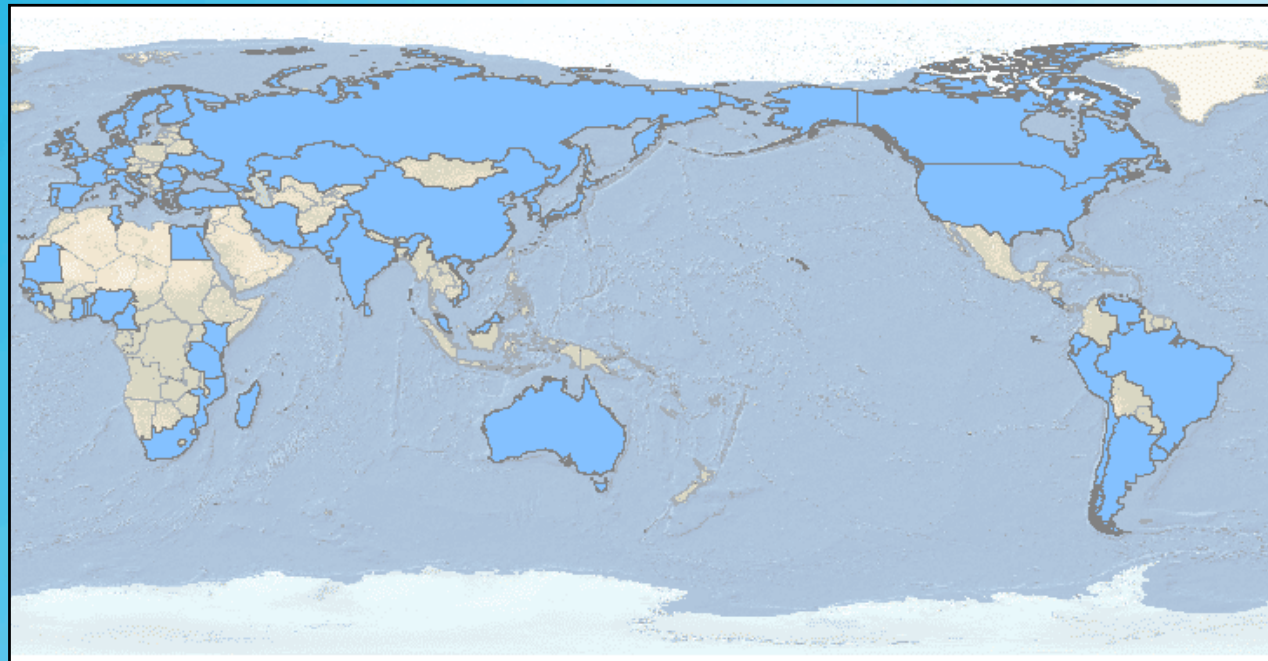
## **Marine Data Policy in Germany**

In Germany, marine data policy is in agreement with that of the IOC's (Intergovernmental Oceanographic Commission). It requires that the data and products should be easily available through the German Oceanographic Data Center (GODC). The GODC aims to acquire the marine data sampled by German institutes and agencies, archive them and maximize their utilisation by promoting data exchange on a national and international level, and to meet Germany's international data exchange obligations according to the resolution of the IOC, and under the Oslo/Paris and Helsinki Conventions.



# International Marine Data Policy for IOC

The Intergovernmental Oceanographic Commission (IOC) was established to enhance marine research, exploitation and development by facilitating the exchange of oceanographic data and information between participating Member States and by meeting the needs of users for data and information products. During the past years, 65 oceanographic data centers have been established in IOC Member States. They all obey the marine data policy of IOC.



IOC Member States (In blue)

# International Marine Data Policy for IOC

- **Data Delivery**♪

IOC has a system which can receive data and information from all its programs and projects and deliver them in a uniform and transparent way to all users.

- **Data Management**♪

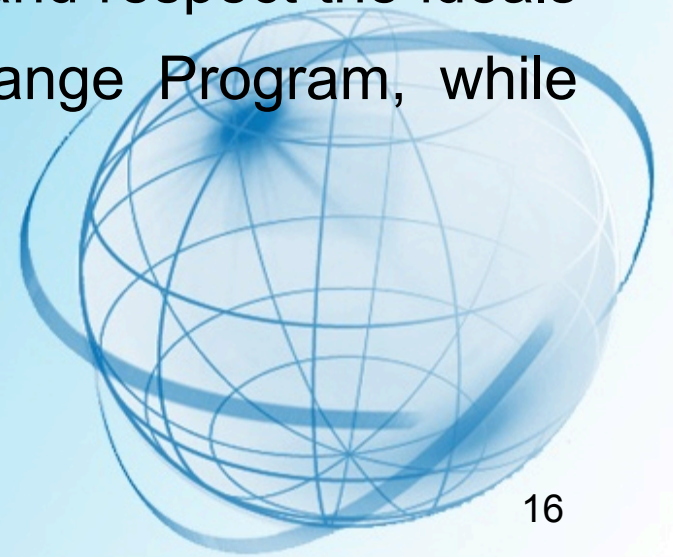
There is an Internet-based distributed network of data centers which manage the data, products and information. This distributed model enables a wider range of user communities to access the data, products and information. SeaDataNet is a good example of this distributed network.

- **Data Access**♪

IOC data policy promotes free and open access to data, metadata and products.

# **International Marine Data Policy for ICES**

The data policy of ICES (International Council for the Exploration of the Sea) was adopted in 1994, in response to the wishes of data suppliers and the needs of ICES working groups. The main principles for access to oceanographic data outlined here aim to promote good science and respect the ideals of International Oceanographic Data Exchange Program, while providing as much flexibility as possible.



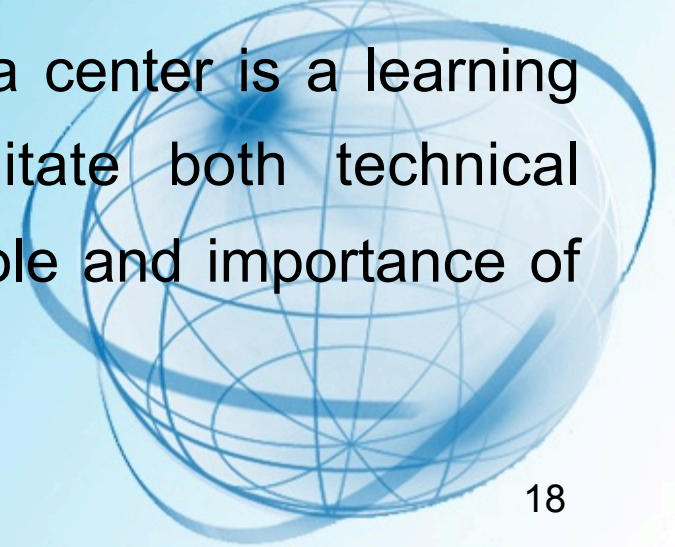


# **International Marine Data Policy for ICES**

- **All data more than 10 years old are publicly available.♪**
- **For data less than 10 years old, ICES respects the wishes of the data supplier. While most data suppliers grant unrestricted access, some grant access only on a case-by-case basis.♪**
- **Data are made available free of charge for bona fide scientific users, especially if the scientific use is of ICES interest. However ICES retains the right to make a nominal charge in certain circumstances.♪**
- **ICES reserves the right to withhold data from requesters who own but do not contribute data.♪**
- **All users of ICES data are requested to report any data errors and/or corrections to ICES.♪**
- **Requests for the preparation of products such as maps and gridded means may need to pay for. ♪**
- **Project datasets abide by the rules of the project foremost. This normally can access after 2 years.♪**
- **Cruise information has no restrictions of use.♪**

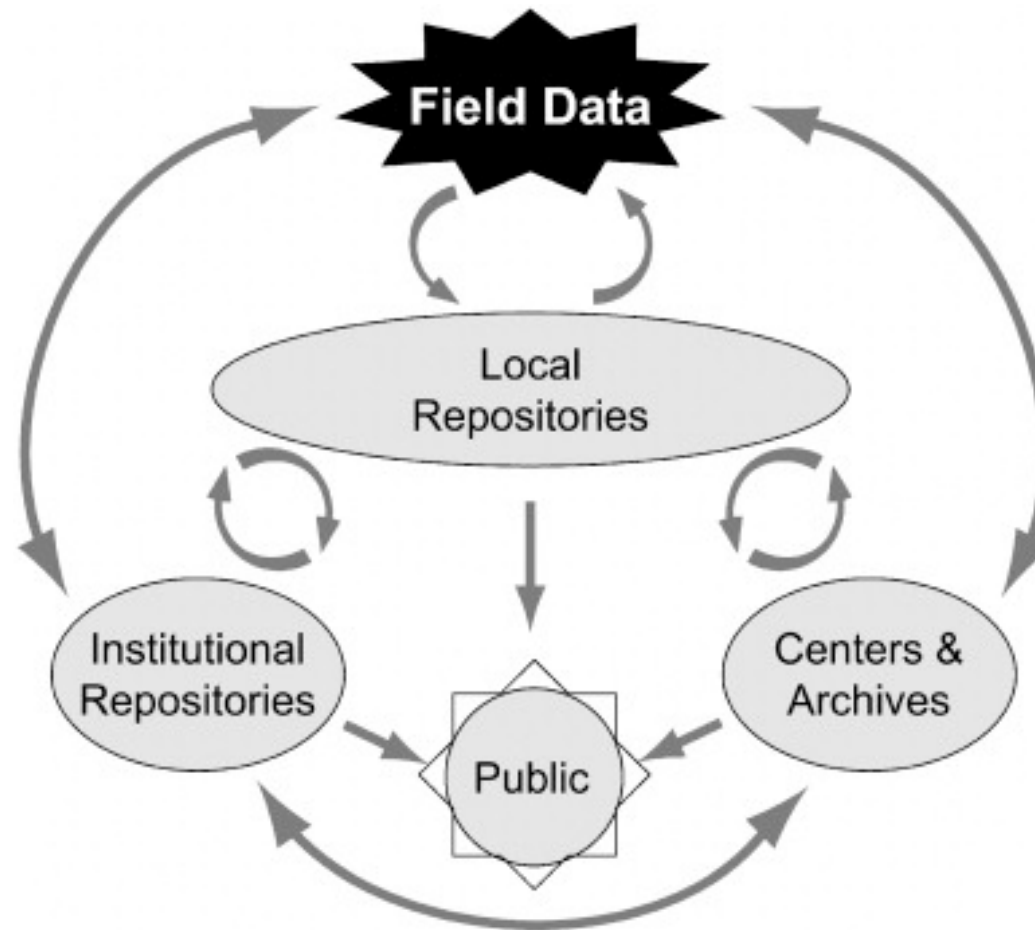
## **International Marine Data Policy for MMI**

The goals of the data policy on Marine Metadata Interoperability (MMI) are to help researchers and data managers follow best practices in metadata development, interoperation, and distribution, and to foster community involvement in this process. To reach these goals, they have turned the complex aspects of marine metadata into easily accessible documents. According to the MMI data policy, their data center is a learning environment, which they hope will facilitate both technical understanding and an appreciation of the role and importance of marine metadata.



# International Marine Data Policy for MMI

➤ **Marine Data Management Strategy of MMI**



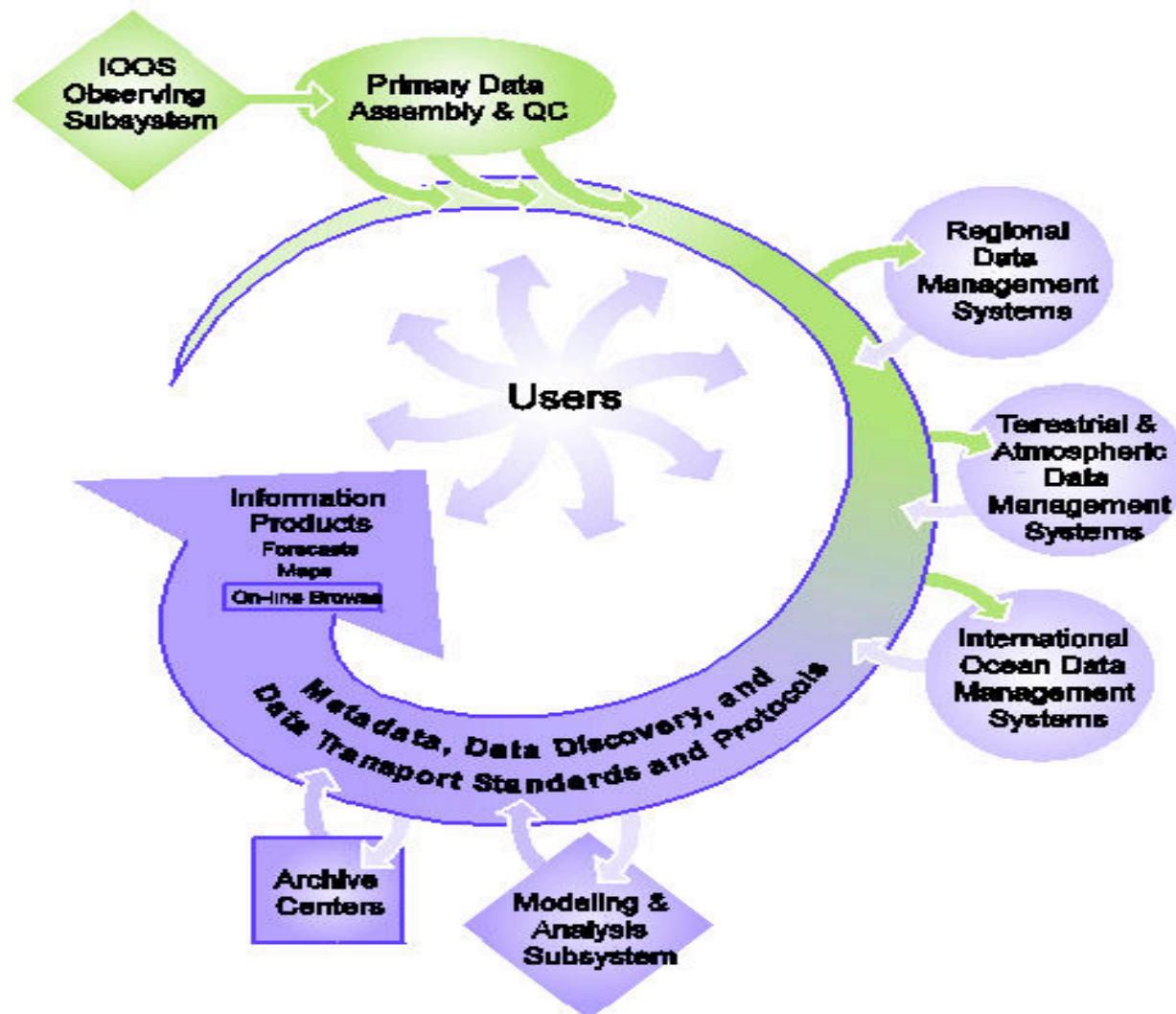
# **International Marine Data Policy for DMAC**

Integrated Ocean Observing System (IOOS) and other regional, national, and international ocean and coastal observing systems, are subsystems of the Data Management and Communications (DMAC). The marine data policy of DMAC is defined with the following guiding principles:

- **Interoperability**♪
- **Open, easy access and discovery**♪
- **Reliable, sustained, efficient operations**♪
- **Effective user feedback**♪
- **Open design and standards process**♪
- **Preservation of data and products**♪

# International Marine Data Policy for DMAC

## ➤ The Steps of IOOS Data Integration and Sharing



## Summary of Marine Data Policy and Practice in China

	Level	A	B	C	D
<b>Policy</b>	Project				×
	Institution			×	
	Agency		×		
	National	×			
<b>Practice</b>	Project	×			
	Institution		×		
	Agency			×	
	National				×

A: Excellent; B: Good; C: Average; D: Poor.

## Summary of Marine Data Policy and Practice in Europe

	Level	A	B	C	D
<b>Policy</b>	Project			×	
	Institution		×		
	Agency		×		
	National	×			
<b>Practice</b>	Project	×			
	Institution		×		
	Agency		×		
	National		×		

A: Excellent; B: Good; C: Average; D: Poor.

## Summary of Marine Data Policy and Practice for International Programs

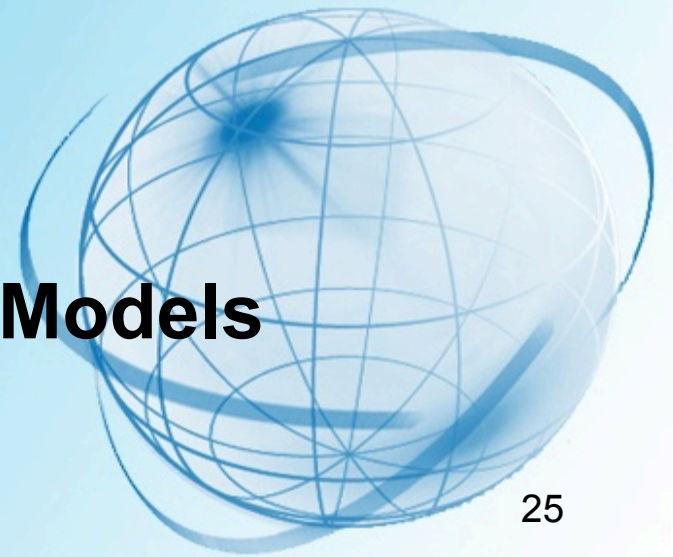
	Level	A	B	C	D
<b>Policy</b>	Project		×		
	Institution		×		
	Agency	×			
	International	×			
<b>Practice</b>	Project	×			
	Institution		×		
	Agency		×		
	International		×		

A: Excellent; B: Good; C: Average; D: Poor.



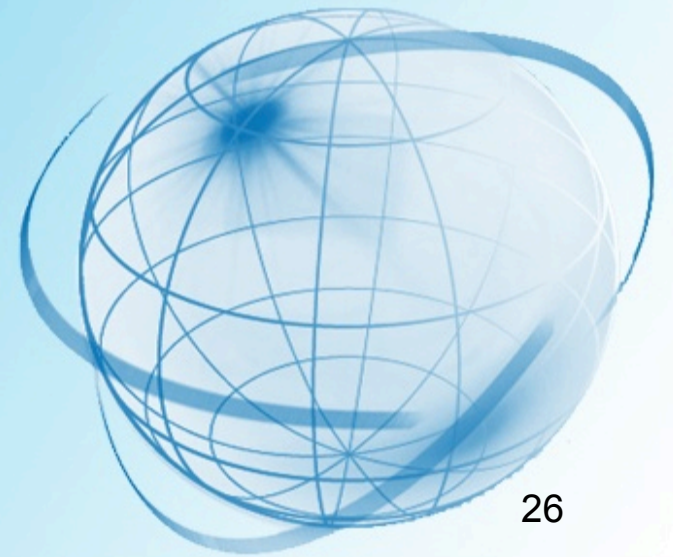
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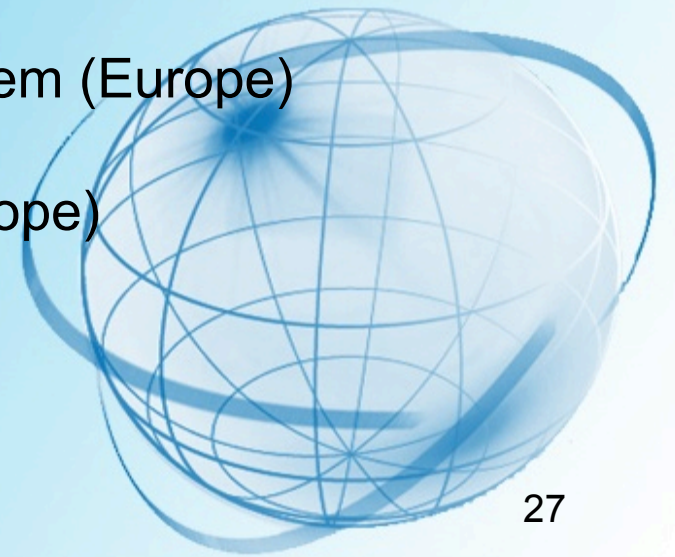
## **Level of Marine Data Integration and Sharing**

In the past decade, significant progresses have been made in the field of marine data integration and sharing. In order to find the gap between China and Europe in this area, two kinds of comparisons will be made:



## Comparison Items

- Overall Comparison
  
- Case-based Comparison
  - ✓ The NMDIS System (China)
  - ✓ The NSOAS System (China)
  - ✓ The MERSEA Integrated System (Europe)
  - ✓ The SeaDataNet System (Europe)



# Marine Data Distribution Websites in China

IOCAS Ocean Data Sharing Platform  
Southern China Seas marine data sharing platform  
Northern China Seas marine data sharing platform



# Survey of Marine Data Sharing in China

Agency	Institution	Data Service Website	A	B	C
CAS	Institute of remote sensing applications	N/A	—	—	—
	Institute of oceanography	<a href="http://www.qdio.ac.cn:8000/Query.htm">http://www.qdio.ac.cn:8000/Query.htm</a>	—	—	—
SOA	First institute of oceanography	<a href="http://www.nsfcodc.cn/">http://www.nsfcodc.cn/</a>	By contact	Image only	—
	Second institute of oceanography	<a href="http://www.soed.org.cn/station.asp">http://www.soed.org.cn/station.asp</a>	—	—	Yes
	East China sea branch	<a href="http://share.eastsea.gov.cn/">http://share.eastsea.gov.cn/</a>	Online application	—	—
	South China sea branch	<a href="http://www.southseadata.cn/default.asp">http://www.southseadata.cn/default.asp</a>	—	Image only	—
	North China sea branch	<a href="http://222.173.119.130/Index.aspx">http://222.173.119.130/Index.aspx</a>	Online application	Yes	—
	National satellite ocean application service	<a href="http://www.nsoas.gov.cn/default.asp">http://www.nsoas.gov.cn/default.asp</a>	By contact	Image only	Yes
MOE	Ocean university of China	<a href="http://211.64.133.112:8080/rice/index">http://211.64.133.112:8080/rice/index</a>	Online application	Image only	Yes
	Share information platform of ocean data	<a href="http://222.195.158.243:8080/marine/">http://222.195.158.243:8080/marine/</a>	Online application	Image only	Yes
CMA	NSMC (National MODIS data center)	<a href="http://satellite.cma.gov.cn/eos/project.html">http://satellite.cma.gov.cn/eos/project.html</a>	Online application	Yes	Yes

Notes: A. Means to get data; B. Whether the data can be downloaded online; C. Whether the data updated timely.

# Marine Data Distribution Websites in Europe

European Commission My-Ocean Platform

**MyOcean**

European Commission My-Ocean Platform

myOcean

- Project
- Products & Services
- User's Feedback

Image of the month:  
**EL NIÑO IS BACK - AGAIN**

Cyclones are sweeping the Pacific more than usual, whereas the last Atlantic hurricane season was a bit on the low side. El Niño, this

# Survey of Marine Data Sharing in Europe

Acronym	Type of Site	Data Service Website	Product Types	A	B	C	Remarks
European space agency	Institution	<a href="http://earth.esa.int/dataproducts/">http://earth.esa.int/dataproducts/</a>	Metadata/data/products	By contact	No	Yes	Need to submit orders
EUMETSAT	Institution	<a href="http://www.eumetsat.int/Home/Main/Access_to_Data/index.htm?l=en">http://www.eumetsat.int/Home/Main/Access_to_Data/index.htm?l=en</a>	Data/images	Online application	Yes	Yes	Free of charge (some of data )
French national oceanographic data center	Institution	<a href="http://www.ifremer.fr/sismer/index_UK.htm">http://www.ifremer.fr/sismer/index_UK.htm</a>	Metadata/data/images	Online application	Yes	Yes	Not free of charge
GMES-marinecore service	Project	<a href="http://gmesdata.esa.int/web/gsc/home">http://gmesdata.esa.int/web/gsc/home</a>	Data	Online application	No	Yes	Provide a link to the website of dataset
SeaDataNet	Project	<a href="http://www.seadatanet.org/">http://www.seadatanet.org/</a>	Metadata/data/images/analysis tools	Online application	Yes	Yes	Free of charge, unless otherwise stipulated
IFREMER CORIOLIS Argo site	Project	<a href="http://www.coriolis.eu.org/">http://www.coriolis.eu.org/</a>	Metadata/data/images/visualization	Online application	Yes	Yes	Real time/operational projects
My-ocean project	Project	<a href="http://www.myocean.eu.org">http://www.myocean.eu.org</a>	Metadata/data/images	Online application	Yes	Yes	Free of charge (some of datas )
MFS-VOS	Project	<a href="http://moon.santateresa.enea.it/access.html">http://moon.santateresa.enea.it/access.html</a>	Metadata/data/images	Online application	Yes	Yes	Public/limited/restricted(data levels) 31

Notes : A. Means to get data, B. Whether the data can be downloaded online, C. Whether the data updated timely.

## Summary of Overall Comparison between China and Europe

Comparison Items Areas	Level of Data Transfer Format	Level of Query and Download Service	Level of Analysis and Visualization Tools	Level of Timely Data Update	Level of Data Charge
China	C	B	C	B	D
Europe	B	A	A	A	B

A: Excellent; B: Good; C: Average; D: Poor.

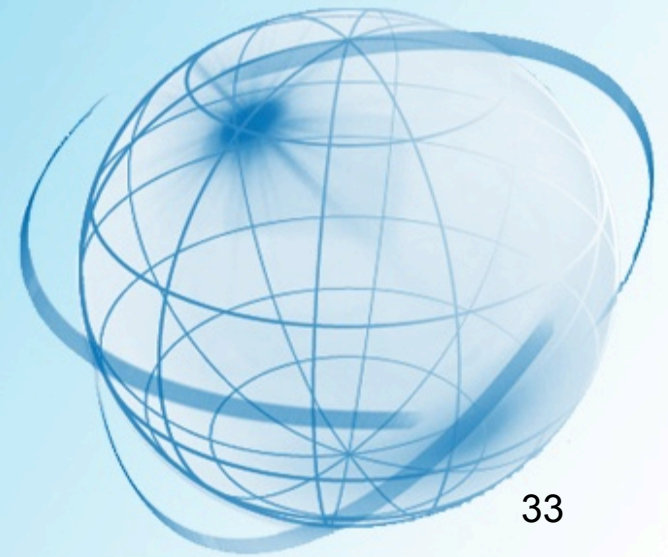
Gaps in marine data integration and sharing between China and Europe are summarized in the above table. As a result, it is necessary to promote the collaboration between various Chinese institutions to standardize marine data integration and distribution, meanwhile, to enhance the development of data analysis and visualization tools, and to improve the operation of data query and download services toward a more convenient and user-friendly manner, and above all, to reduce the cost of marine data sharing.



## **Case-based Comparison between China and Europe**

The case-based comparison of marine data integration and sharing between China and Europe will be carried out in three aspects:

- The major functions of data sharing platform
- The level of data services
  - ✓ The data resources
  - ✓ The data query services
  - ✓ The data download services
  - ✓ The data visualization services
- A brief summary



# Case I in China: NMDIS

## ➤ The NMDIS System

The National Marine Data and Information Service (NMDIS) is an advanced facility under the State Oceanic Administration (SOA) of China for archiving, integrating and distributing data and information concerning the marine environment.



## Case I in China: NMDIS

### ➤ The Major Functions of Data Sharing Platform

- ✓ As a National Oceanographic Data Center

- **NMDIS maintains and develops the national marine database: a collection and integration of marine data sets originating mainly from China marine observation establishments.**♪

- ✓ As a Marine Data Service Provider

- **Provide marine data and information services, as well as technical support for national marine economic development, sea area management, marine environmental protection, and marine research community.**♪

- ✓ As a National Coordinator for International Marine Data Exchange

- **NMDIS also serves as the World Data Center for Oceanography, China Argo Data Center, China Delayed Mode Database for NEAR-GOOS.**

## Case I in China: NMDIS

### ➤ The level of data services

- ✓ The data resources

Main sub-databases included in NMDIS database are given out in following table:

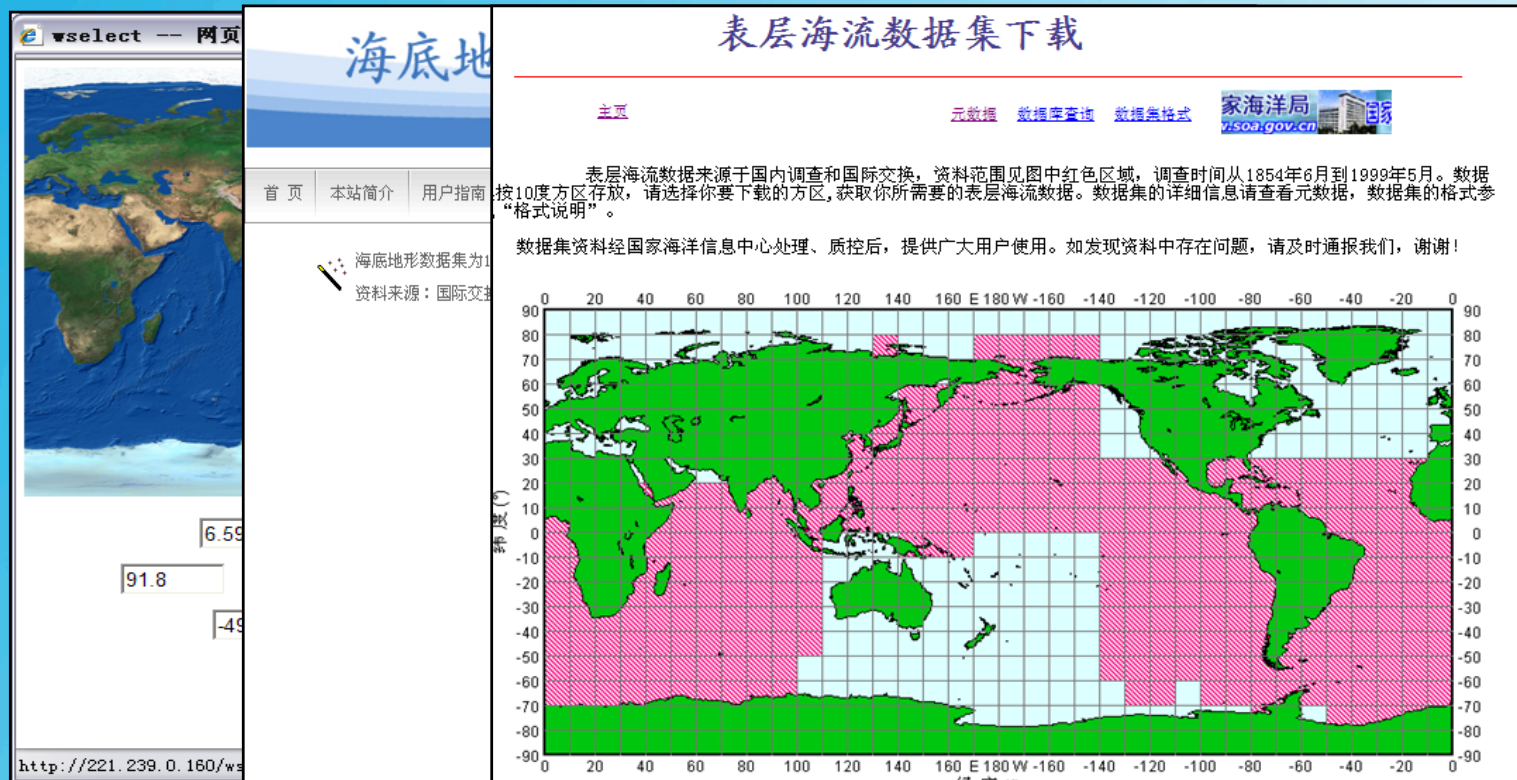
No.	Database
1	ARGO float database
2	Sea surface meteorological database
3	Marine environment observation station database
4	GTSP (global temperature salinity profile project) database
5	Marine chemical database
6	MODIS database
7	NEAR-GOOS meteorological database
8	Hydrological database

# Case I in China: NMDIS

## ➤ The level of data services

- ✓ The data query services

The data query services in NMDIS system including Metadata Query Service and Data-based Query service. In the data-based query service, selection of the spatial scope has used the GIS technology, one can directly select regions of interest in map, which has greatly improved the convenience of the query.

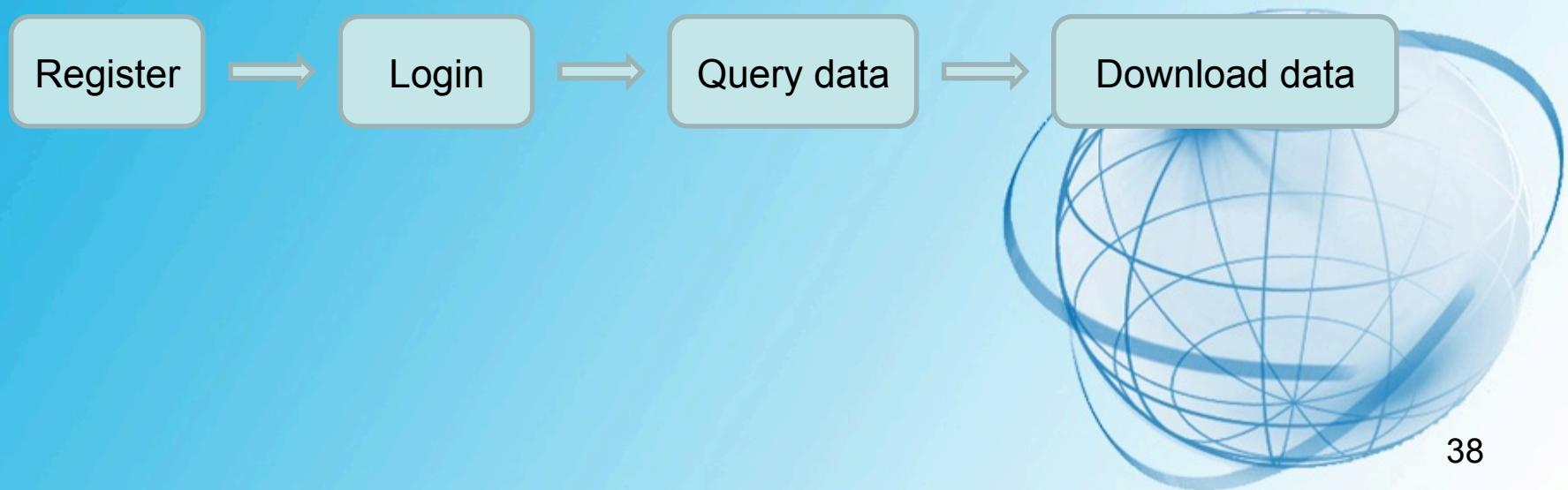


## Case I in China: NMDIS

### ➤ The level of data services

- ✓ The data download services

Some shared data provided by NMDIS, such as marine information products, marine metadata information, forecasting service and so on, can be acquired with the following procedures:



# Case II in China: NSOAS

## ➤ The NSOAS System

### National Satellite

Ocean Application Service (NSOAS) is in charge of real-time reception, processing, generation, archiving and distribution of HY series satellite data, the construction and management of the ocean satellite database and information system. It is also responsible for defining the format, standard and specification of the ocean satellite data and product.



# Case II in China: NSOAS

## ➤ The Key Missions of Data Sharing Platform

### ✓ Main Businesses

Main Business		Remark
Satellite project		To takes charge of the issuance of HY-1 satellite information product.
Ocean monitoring	Oil spill monitoring	HY-1A satellite data-based monitoring.
	Sea ice monitoring	
	Red tide monitoring	
Data distribution		This part will be given a Detailed description in the following.
MODIS data sharing		...

### ✓ Special Services

Directional Services	Remark
Forecast center	Need to be logged
Monitoring center	
East China sea fisheries research institute	
Satellite remote sensing sea state of fisheries	
Guangdong and Hainan satellite remote sensing services	
Sea ice monitoring	



## Case II in China: NSOAS

### ➤ The level of data services

#### ✓ The data resources

After the preprocessing and processing, the HY-1A data were made into 0, 1, 2 and 3 level products. All of the products were distributed to clients through archiving and distributing sub-system. The products are as follows:

Level	Remote Sensor	Type of Products
L0	COCTS	Unpacked original data COCTS.L0
	CCD	Unpacked original data CCD.L0
L1	COCTS	L1A, L1B corrected through geographic locating and radiation correction
	CCD	L1A、L1B corrected through geographic locating and radiation correction
L2	COCTS	6 bands of water leaving radiance (412, 443, 490, 510, 555 and 670 nm)
		3 bands of aerosol radiance (670, 750 and 865 nm) Concentration of chlorophyll-a suspended substance
		Sea surface temperature
		Concentration of pigment
		The radiance ratio of the aerosol in the 7th and 8th band Aerosol optical thickness (865 nm)
	Attenuation factor, 16 in total	
CCD	Normalized Difference vegetation Index(NDVI) and suspended material	
L3	COCTS	Weekly and monthly statistical results of 16 2-level product factors
	CCD	Determined according to the demand of the clients

## Case II in China: NSOAS

### ➤ The level of data services

✓ The data query services

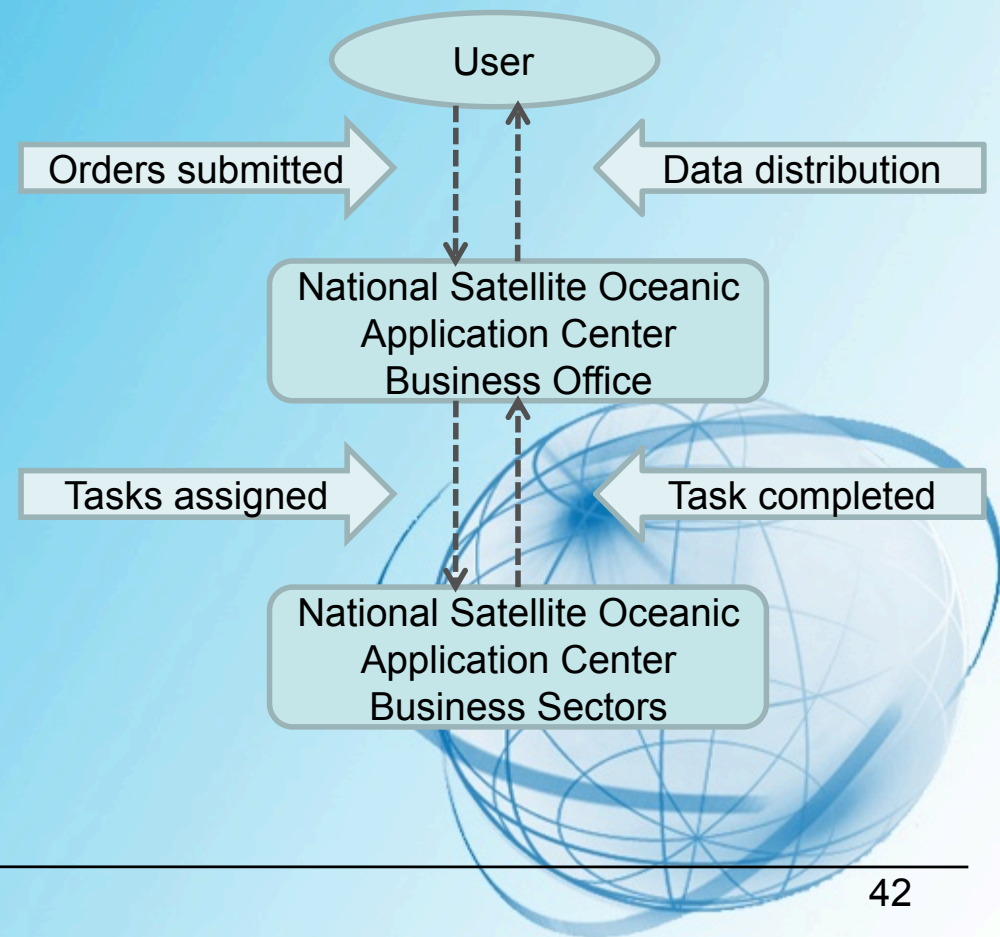
Data can be queried in two ways:

- Query at the reception
- Query online

Two data query services are provided online:

- Map-based query service
- Condition-based query service

✓ The data download services



# Case I in Europe: MERSEA

## ➤ The MERSEA Integrated System

The strategic objective of MERSEA is to provide an integrated service of global and regional ocean monitoring and forecasting to intermediate users and policy makers in support of safe and efficient offshore activities, environmental management, security, and sustainable use of marine resources.

MERSEA MARINE ENVIRONMENT AND SECURITY FOR THE EUROPEAN AREA Ocean and Marine Applications for GMES

Access to Products Observing systems Core Services Downstream Services Research & development Home

WELCOME TO THE MERSEA INTEGRATED PROJECT

Development of a European system for operational monitoring and forecasting of the ocean physics, biogeochemistry, and ecosystems, on global and regional scales.

The strategic objective of MERSEA is to provide an integrated service of global and regional ocean monitoring and forecasting to intermediate users and policy makers in support of safe and efficient offshore activities, environmental management, security, and sustainable use of marine resources.

The system to be developed will be a key component of the Ocean and Marine services element of GMES (Global Monitoring for Environment and Security).

[Access To The Latest Mersea Forecasts](#)

LATEST NEWS

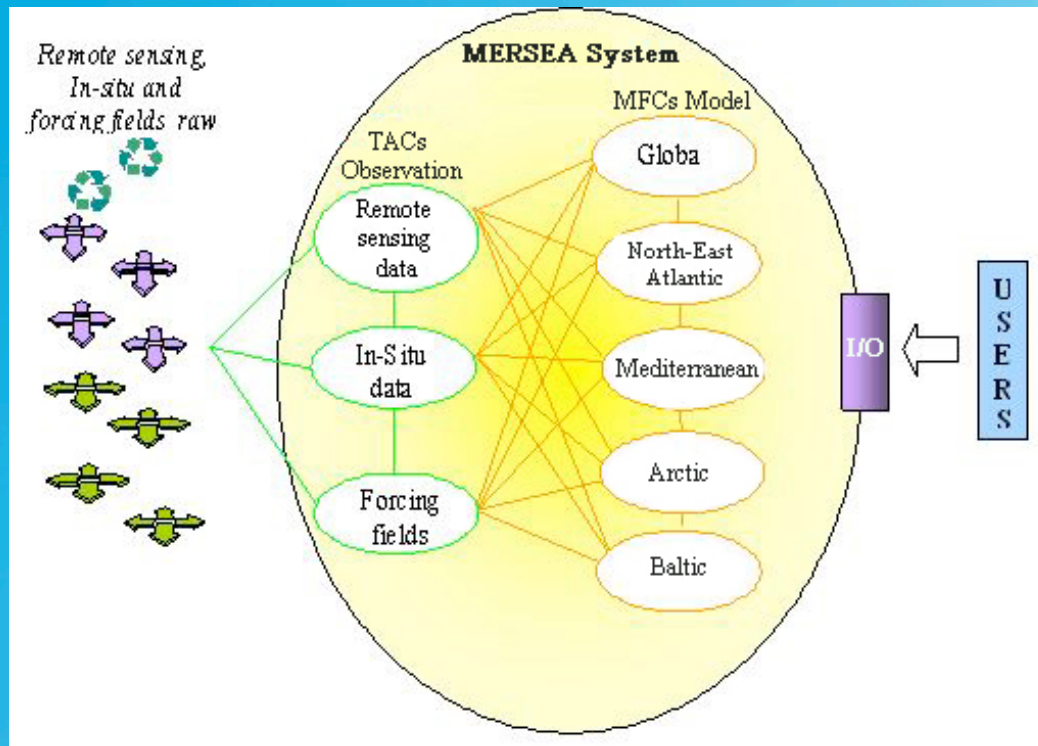
[2010/03/15] *Applications*  
**Final Payment**  
Scanned documents concerning final payment.  
[\[more\]](#)

[2009/03/30] *Project documents*

# Case I in Europe: MERSEA

## ➤ The Major Functions of Data Sharing Platform

### ✓ The major components



**TAC:** Thematic Assembly Center  
**MFC:** Monitoring & Forecasting Center

TACs and MFCs are in charge of:

- Federating services embedded in this center, checking those services are consistent and not redundant
- Describing services and products
- Operating services in a common way (automatic delivery, subsetting facilities, standard dissemination services)
- Product assessment in a common way
- Monitoring services and reporting at MERSEA level

# Case I in Europe: MERSEA

## ➤ The level of data services

### ✓ The data resources

The MERSEA system provides some critical external interfaces, through which the data are collected. The data resources are shown in the following table:

Data-served System	Data Source	Data Details	Operator
In situ ocean observation systems	In situ	Global ocean	CORIOLIS
Satellite ocean observation systems	Altimetry	Global ocean	Ssalto/Duacs/Aviso
	Temperature	Full capabilities demonstrated on Mediterranean Sea Merged products Monosatellite products	Medspiration / CNR-ISAC-GOS / Ocean and sea ice SAF
	Ocean color	Global ocean	Joint research centre
	Sea ice	Global ocean	Ocean and sea ice SAF
Global forecasting systems	Global ocean	1/4° resolution, eddy resolving 1/12° resolution, currently running a 1/15° demonstrator on North-Atlantic area	Mercator ocean
Regional forecasting systems	North-East Atlantic	FOAM 1° FOAM 1/9° (12 km) POLCOMs 12 km (Shelf Seas)	NCOF
	Mediterranean	MFS 1/16° , daily	INGV
	Baltic	CMOD	DMI
	Arctic	Topaz 2	NERSC

# Case I in Europe: MERSEA

## ➤ The level of data services

### ✓ The data query services

- Discovery Services
- Inventory Services

### ✓ The data download services

- Users can browse, select and download data easily by a tool (MDC) and a user interface (GUI).

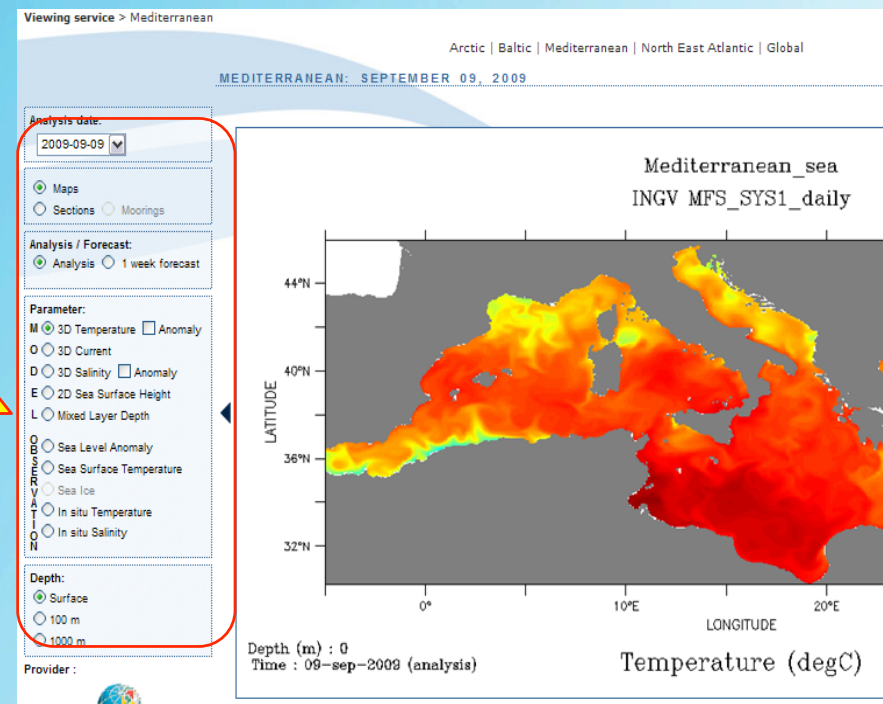
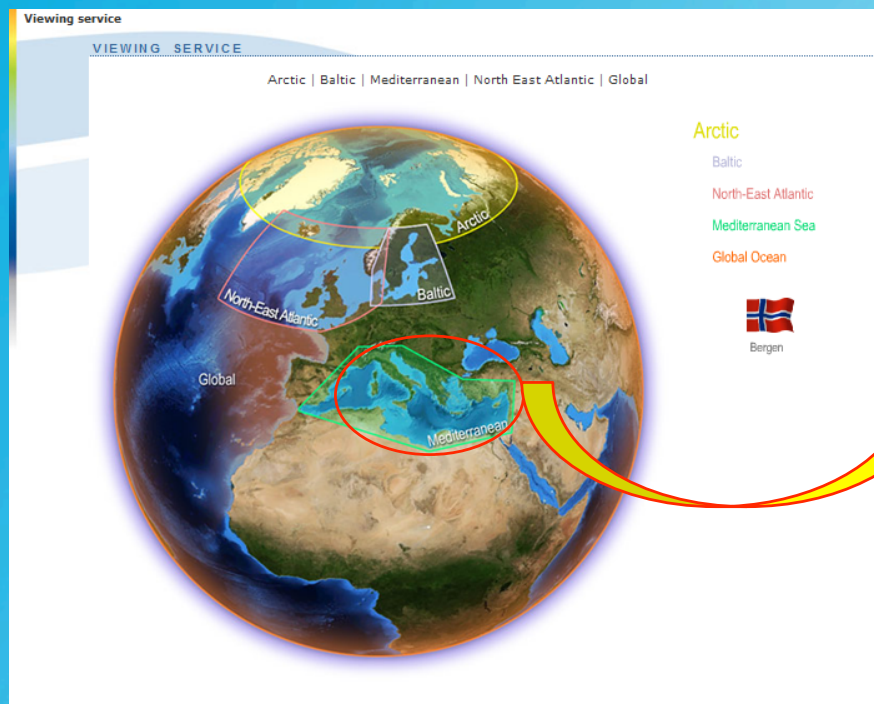
Discovery Services | Inventory Services | Download Client (MDC)

The image displays two side-by-side screenshots. The left screenshot shows the MERSEA web interface with a navigation menu on the left and a main content area displaying a tree view of 'Mersea Inventory' with sub-items like 'MERSEA Global TEP', 'MERSEA North-east Atlantic TEP', etc. The right screenshot shows the 'Mersea - Download Client' application window. It features a 'Servers list' with various URLs, a 'Data sets' list including 'MERSEA project datasets inventory' and 'MERSEA global TEP', a world map with a red bounding box over the Atlantic Ocean, and a 'Geographical criteria' section with input fields for longitude, latitude, depth, and time, along with a 'Variables' field containing 'temperature'.

# Case I in Europe: MERSEA

- **The level of data services**
  - ✓ The data visualization service

The data visualization service has another name called Viewing in MERSEA, which including two kinds of functions: Dynamic Viewing Service (V1) and Viewing Service (V2). Below is an example of the viewing service.



# Case II in Europe: SeaDataNet

## ➤ The SeaDataNet System

SeaDataNet is an integrated infrastructure initiative of the EU sixth framework programme coordinated by IFREMER and bringing together 49 partners of major scientific marine research institutes, and including the national oceanographic data centers and satellite data centers of 35 countries.

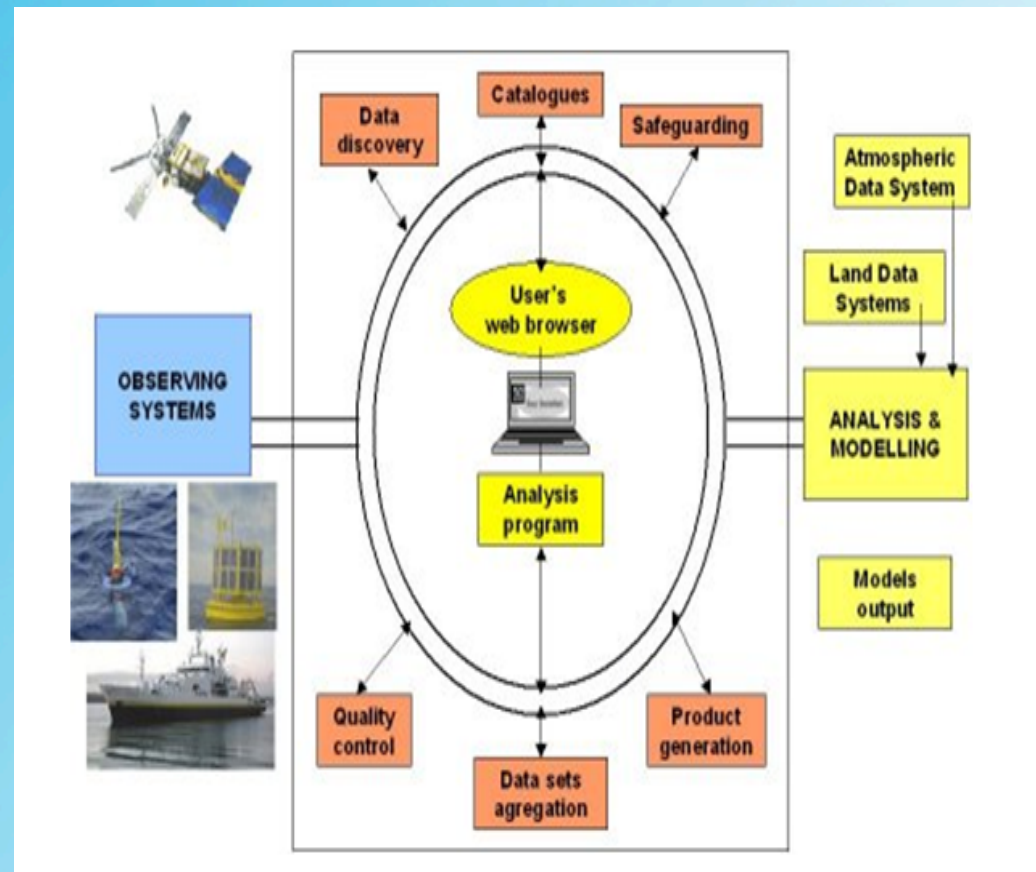
The screenshot displays the SeaDataNet website interface. At the top, it features the title "Pan-European Infrastructure for Ocean & Marine Data Management" and the SeaDataNet logo. A navigation menu includes links for Home, Overview, Metadata, Data Access, Products, Standards & Software, Education, Meetings, Publications, Partners, Links, and Extranet. Below the navigation, there is a "Tools" section with links for Sitemap, Links, PDF, Contact, Print, and All the news. The main content area includes a "News" section with several items: "4th SDN plenary meeting", "MoU MyOcean / SeaDataNet" (Version 1.0 signed on 13 January 2010), "MIKADO" (New release V1.7 available), "IMDIS 2010 Conference" (March 29-31, 2010, Paris, France), "NEMO" (version 1.2.17), "Seadatanet Newsletter n°5 - June 2009", and "SeaDataNet, adopted as basis for EMODNET pilots". A collage of images shows a satellite, a research vessel named "EKAEBE", a buoy, and a map of Europe. At the bottom, a text block states: "The SeaDataNet partnership is assuring the archival and preservation of data for their re-use for new research, retention of unique observational data which is impossible to re-create, enhance".



## Case II in Europe: SeaDataNet

### ➤ The Major Functions of Data Sharing Platform

The SeaDataNet aims to network and enhance the currently existing infrastructures, which are the national oceanographic data centers and satellite data centers of 35 countries active in data collection. The networking of these professional data centers in a unique virtual data management system will provide integrated marine datasets of standardized quality online.



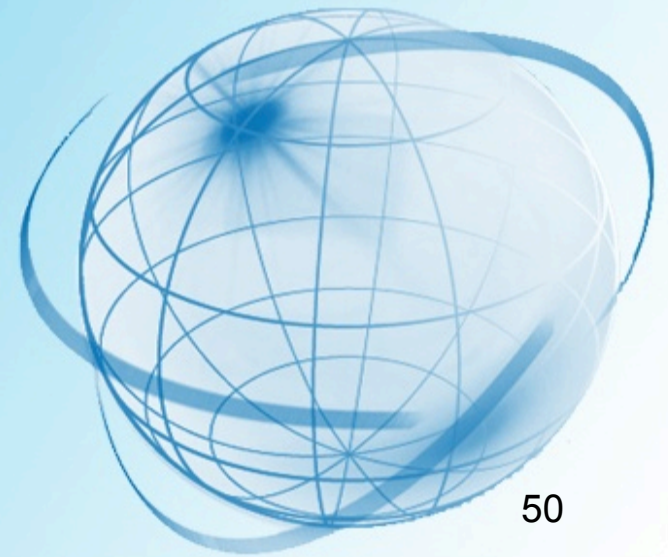
## **Case II in Europe: SeaDataNet**

### ➤ **The level of data services**

#### ✓ The data resources

The SeaDataNet regional products are under development. Already a number of regional products can be downloaded as NetCDF data files and explored by a viewer through a dedicated web interface. This interface offers products for the following regions:

- Arctic regional products
- North Atlantic regional products
- Baltic regional products
- Mediterranean regional products
- Black Sea regional products



## Case II in Europe: SeaDataNet

### ➤ The level of data services

#### ✓ The data query services

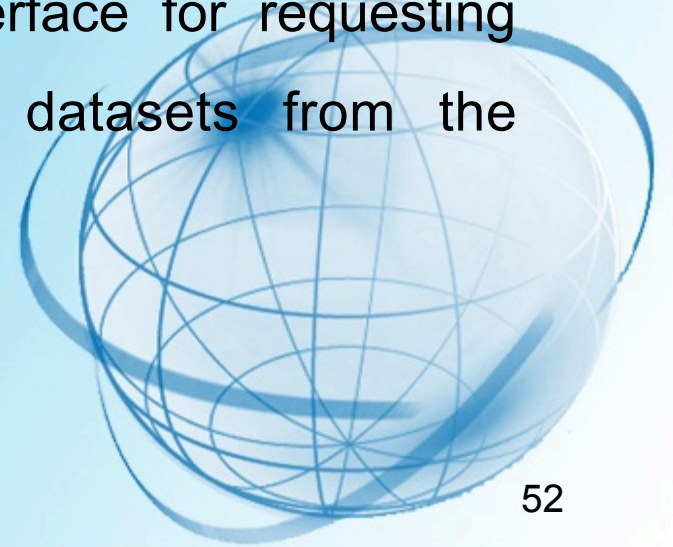
The following Pan-European metadata services give overviews of marine organisations in Europe and their engagement in marine research projects, managing large datasets, and data acquisition by research vessels and monitoring programmes for the European seas and global oceans.

NO.	Tools	Function
1	SeaDataNet common data index (CDI)	Query the data
2	European directory of marine organizations (EDMO)	Query the organizations
3	European directory of marine environmental data sets (EDMED)	Query the datasets
4	European directory of marine environmental research projects (EDMERP)	Query the research projects
5	Cruise summary reports (CSR)	Query the research cruises
6	European directory of the initial ocean-observing systems (EDIOS)	Query the observing stations/systems

## **Case II in Europe: SeaDataNet**

- **The level of data services**
  - ✓ The data download services

The SeaDataNet platform provides a service called Common Data Index (CDI) service, which gives users a highly detailed insight in the availability and geographical spreading of marine datasets, that are managed by the SeaDataNet data centers. Moreover it provides a unique interface for requesting access, and if granted, for downloading datasets from the distributed data centers across Europe.



## Case II in Europe: SeaDataNet

### ➤ The level of data services

- ✓ The data analysis and visualization service

SeaDataNet has provided a tool named Data Interpolating Variational Analysis (DIVA) software, which gives a web interface allowing quick production of horizontal analysis, providing NetCDF files and visualization. One can download it or use its online functions.

The screenshot displays the SeaDataNet web interface. On the left, the 'Upload observation' form is visible, featuring tabs for 'Text file' and 'ODV4'. The form includes a 'File:' input field with a '浏览...' button, a 'Column separator:' dropdown menu set to 'space or tab', and a 'Decimal separator:' dropdown menu set to 'dot (.)'. Below the form, a 'Format' section explains that the file must be an ASCII text file with three columns representing longitude, latitude, and value, with a sample data snippet: 

```
29.7667 45.15 16.146
29.7667 45.15 16.346
...
```

 A link for 'Sample global temperature data from ARGO' is provided at the bottom of the form. On the right, a global map visualization is shown, with a coordinate box displaying '-147.30469, 93.51563'. The interface also includes navigation tabs at the top ('Upload', 'Grid', 'Analysis') and a secondary set of buttons ('Statistics', 'Download analysis', 'Link or embed', 'Report a problem', 'Help').



## Summary Comparison of Data Services between the 4 Platforms

Comparison items	NMDIS	NSOAS	MERSEA	SeaDataNet	Remarks
Product types	Metadata/data/ images	Data/ images	Metadata/data/ images	Metadata/data/ images	—
Data transfer formats	Photos, CD, tapes, disks and also FTP	Photos, CD, tapes, disks and also FTP	NetCDF	NetCDF	There is no unified format in China
Query services	Metadata query/ Data-based query	Map-based query/ condition-based query	Discovery/inventory services	CDI/EDMO/ EDMED/ EDMERP/CSR/ EDIOS	SeaDataNet provides six kinds of query tools
Analysis and visualization tools	No	No	Dynamic viewing service (V1 & V2)	DIVA	The lack of these tools in China is a gap between China and Europe
Download tools	No	No	MDC	CDI	A software has been provided to download the required data in MERSEA and SeaDataNet
Free sharing of data	Some of data	Yes	Some of data	Some of data	Europe offers more data for free
Timely update of data	Yes	Yes	Yes	Yes	—

## **Gaps and Recommendations (I)**

(1) In China, there is no current marine data and information system which can include data from all observing approaches in the form of system of systems. Though the marine scientific sharing platform under NMDIS can provide much data and information, it is still under construction and most of the remote sensing data are still not included. Compared to European countries, the collaborations between the NMDIS and NSOAS are insufficient and more works need to be done in this context.

