

Sub-task Number: CB-09-03d

Sub-task Title: Building Capacity for Operational Oceanography

Overarching Task: Building Institutional Capacity to Use Earth Observations

Area: CAPACITY BUILDING

Relevant Committee: CBC

Related Targets: (to be included in 2009)

Sub-task Definition

Facilitate ocean data sharing and use by stimulating a global cooperation on operational oceanography, especially in developing countries. In the first stage, establish a global operational oceanography network connecting advanced operational forecasting centres in developed countries and quasi-operational centres in e.g. Asia, Africa and Latin America. In the second stage, establish regional cooperation projects (between advanced and less-developed operational centres). The first cooperation example will be based on EU project YEOS, a cooperation among China, EU and Korea.

Leads (GEO Member or PO, Entity carrying out the work, Contact: e-mail):

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Motivation/Background

The task aims to stimulate capacity building on operational oceanography in countries where they are non or not mature, through close cooperation and knowledge/experience sharing between advanced centres and centres who are build up their operational oceanography systems. Via this cooperation, GEO marine data exchange will also be enhanced in combing with the cooperation activities. Significant social-economic benefits could be expected from building up operational oceanography in developing countries.

Outputs

Planned:

- A global network of operational oceanography
- Strategy for developing national operational oceanography programs in an international environment
- Demonstration of regional sea operational ocean-wave forecasting systems through GEO cooperation

Produced:

1. A Yellow Sea weather-ocean-wave forecasting system as a result of EU FP6 project YEOS.
2. A pre-operational NW. Pacific Shelf Sea forecasting system by IAP
3. A global network of operational oceanography

Activities

Planned:

1. A global network of operational oceanography

The network is formed by a variety of international operational oceanography centres, from both developed and developing countries. Among them the advanced centres already well established the operational oceanography systems while the other centres are in the planning or starting phase in establishing operational oceanography. The aim of this network is to stimulate operational oceanography capacity building in the

second category of centres. The way to build up the global network is to 'rolling the snow ball'. In the beginning a few advanced centres, together with their partners in developing countries will be invited to form the network. Later this network will be extended by involving more and more partners. DMI will lead the network activity, 2009-2010.

2. Catalyzing funding for capacity building of operational oceanography

A survey will be made to give an overview of on-going national operational oceanography programs, as well as potential Social Benefit Areas of operational oceanography, and what will the next step be in developing national capacity on operational ocean forecasting. The possible cooperation mechanism and areas between the advanced centres and less-advanced centres should be investigated. Strategies should be developed building up national operational oceanography capacity with added value from international cooperation. Joint applications on building up operational oceanography in less-advanced countries are encouraged.

This task will be carried out throughout 2009-2011

3. Demonstration of operational ocean forecasting systems

Based on the funding availability, demonstration of new regional sea operational ocean forecasting systems in Asia, Africa and Latin America will be made. This will be done through cooperation projects between developed and developing countries. The results and products will be well explored and disseminated to users and stakeholders. It is important that the advanced knowledge and experiences from the established operational centres should be well transferred to less-advanced centres.

This task may start from 2010-2011.

Progress (current status):

1. Asia:
 - a. Operational system: a Yellow Sea weather-ocean-wave forecasting system as a result of EU FP6 project YEOS, running operationally at DMI, FIO (China).
 - b. New high resolution weather forecast: the area of YEOS weather forecast has been extended to cover the entire China Sea (15-46N, 105-143E), in a resolution of 7.5km, ready since July 1, 2009.
 - c. Forecast data sharing: the DMI weather forecast data are now used by Chinese and S. Korean partners in forcing their pre-operational wave and ocean forecasting systems
 - d. Pre-operational system: IAP (China) has implemented HYCOM as a pre/operational system, with a horizontal resolution of around 1/8 degree and 22 vertical layers. The model domain covers the South China Sea (SCS), East China Sea, Yellow Sea and Japan Sea. A data assimilation scheme uses ensemble optimal interpolation is developed for the system. The GHRSSST Sea surface temperature products and the Jason-1 along track SLA observations can be assimilated into the model.
2. Latin America:
 - a. Chile: UDEG is working on building up an operational forecasting and observation system for the Bay of Coquimbo (30S, Chile coast), with funding from INNOVA-Corfo fund. ROMS model and MERCATOR Ocean forecast can be used in this application. UDEG has a Meso-scale weather forecast model MM5 in operation. UDEG is planning to work on some capacity activities to transfer the MM5 knowledge to Chile Navy.
3. Africa:
 - a. South Africa: CSIR is about to host an African Operational Oceanography workshop in Cape Town July 20-22, with participants also from US and Europe. The outcomes of this meeting will make a constructive contribution to task CB-09-03d.
4. Network: a global network of operational oceanography, which is focused on capacity building, has been established, with involvement from major operational and research centres from Chile, China, Denmark, France, Germany, Republic of Korea, Norway, South Africa and USA, and IOC/GOOS.

Resources (indication of resources – e.g. financial, human – contributed by GEO Members or Participating Organizations to produce outputs)

Currently the task activities will be carried out on a self-financed basis. A few operational oceanography projects are running in national and regional level (e.g., China, Chile, Denmark, S. Korea and USA), which may be used for minor activities. This has formed a good basis for further cooperation and capacity building, which means significant progress will be made if some funding can be provided for a Research Network or a large scale coordination and supported action.

Architecture and Data Component

1) Please briefly describe any task-related Earth observation resources (data set, system, website/portal) and any related Web Service interfaces that are contributed to GEOSS. State whether these items are or will be registered with the GEOSS Component and Service Registry for access via the GEO Web Portals, and whether any associated standards or other interoperability arrangements will be registered in the Standards and Interoperability Registry.

2) Please also describe what data and information your activity/system needs that you would request to be accessible through the GEOSS Common Infrastructure.

Capacity Building Component

(capacity building is defined to include the development of capacity related to: (i) Infrastructure and technology transfer (Hardware, Software and other technology required to develop, access and use EO); (ii) Individuals (education and training of individuals to be aware of, access, use and develop EO) and (iii) Institutions – building policies, programs & organizational structures to enhance the value of EO data and products).

1) In accordance with the above definition does this Task have a capacity-building component? If so, please provide a short description of this component including a description of end users.

(i) Yes. According to the above definition, the capacity building activity in this task covers:

1. Infrastructure and technology transfer
2. sharing of EO and in-situ observations;
3. transfer and sharing of knowledge, models, data assimilation methods and operational forecasting technology;

(ii) Individuals: host visiting scientists from developing countries by advanced centers

(iii) Institutions: working together to stimulate and build up national operational oceanography programs

End users of the capacity building are ocean administrations and forecasting centers in developing countries; end users of the established forecasting systems will cover wide dimensions in marine economy.

2) Have any additional CB needs for this Task been identified? Please provide a short description.

Yes, this might be in the national level to build up operational marine forecasting and monitoring facilities. This, however, depends on the national policy and funding level on operational oceanography.

User Engagement Component

(please briefly describe to what extent end users are engaged in this Task and influence the nature of the outputs produced)

Science and Technology (S&T) Component

1) Please briefly describe the elements of scientific research or technological development contained in this Task.

2) In relation to the S&T component(s) of this task, please describe gaps, priorities, continuity needs, barriers, scientific expertise and additional resource needs (this information will be used for developing a gaps and needs assessment in Task ST-09-01)

Members and POs' Contributions to Outputs and Activities above:

(Input is optional. This section gives the chance to Members and POs to provide more details (3-5 lines) on their individual activities, making a clear connection with the Outputs and Activities outlined above).

Denmark

One of the bottlenecks for building up operational oceanography is the high quality weather forecasts. DMI's high resolution weather forecast outside Europe may speed up the capacity building of pre-operational ocean forecasting in developing countries. DMI has experiences in establishing pre-operational ocean forecasting system for China Sea and adjacent waters through international cooperation (FP6 project YEOS, FP7 project DevCoCast). DMI also has wide cooperation with African and Latin American countries on ocean climate modelling and satellite oceanography.

China

IAPCAS is currently working on pre-operational forecasting system for China marginal Seas. IAP and DMI have close cooperation in EU projects YEOS and ECOOP on operational oceanography. The two institutions will work together on improving pre-operational marine forecasting system for the NW Pacific marginal seas.

Norway

Nansen Environmental and Remote Sensing Center: Norwegian contribution to MyOcean. NERSC has close cooperation with African partners, e.g., CSIR, Univ. of Captown, on data assimilation, ocean modelling and satellite oceanography.

USA

NOAA: Experience with IOOS partnerships in US.

JPL: JPL has a close cooperation with South Africa partners on operational oceanography.

IOC/GOOS

Through GOOS-Africa, empower African countries in the fields of: (i) ocean in-situ and satellite observations; (ii) ocean modelling; (iii) ocean hindcasts/forecasts and data assimilation; and (iv) communication, outreach and public and policy awareness.

Capacity Building in Operational Oceanography: This is a key component of GOOS within IOC/UNESCO. The wide scope covered reflects the crosscutting and multidisciplinary nature of the GOOS contribution to capacity building of IOC/UNESCO Member States. The ultimate goal is to empower Member States in the fields of: (i) Ocean In situ Observations and Measurements; (ii) Ocean Satellite Remote Sensing; (iii) Ocean Modelling; (iv) Ocean Hindcasts/Forecasts and Data Assimilation; (v) Communication, outreach and public and policy awareness; (vi) Project coordination, team building and leadership. Within the framework of capacity building activities, IOC promotes National, Regional, South-South and North-South Cooperation and Networks through joint ventures, targeted workshops with innovative approaches in networking capitalizing on the added value of IOC/UNESCO as an intersectoral and multidisciplinary Organisation.

France:

Mercator-Océan and IRD : IRD (Institut de Recherche pour le Développement, see <http://www.ird.fr/us/index.htm>) in France is responsible for scientific cooperation and capacity building with developing countries but also French territories outside European continent. IRD is one of the six public institutions forming part of the public consortium Mercator-Océan (www.mercator-ocean.fr). Mercator Océan aims to bring the global ocean forecasting capabilities at an operational level both for national objectives, but also as the leading partner of the MyOcean European GMES Marine Core Service project. Mercator Océan has been committed for years in participating and supporting IRD projects abroad. The development plan of the Mercator Forecasting Systems since 1995 has been driven by IRD requirements: offer aglobal and daily description of the ocean circulation at mesoscale, in particular in Tropical and southern hemisphere areas; and participate to the enhancement of the seasonal forecast and climate prediction. These objectives are still motivating the improvements of the Mercator Forecasting Systems and the collaborations that have been conducted since outside the European Marginal Seas. First, the regular and real-time delivery of daily estimates or long numerical simulations of ocean circulation, both to academic or intermediate users in many developing countries. Second, with expert teams, the delivery of ocean boundary

or initial conditions for model downscaling to regional ocean configurations. Among them, Mercator Océan has been collaborating to projects in Chili, Peru, Brazil, French Guyana, Marocco, Cape Verde, Gulf of Guinea, Indian Ocean, Indonesian Seas, and New Caledonia. Some downscaling projects are rather academic, like analysis of the Gulf of Guinea role in the onset of the African Monsoon (AMMA project <http://amma.mediasfrance.org/index>), but some others, like in Peru aim to develop a regional operational forecasting capability dedicated to monitor the fishing industry impact on the fish stocks, and is fully integrated in the Peru national and economical fishing strategy. In practice, most of these collaborations are performed through networking with IRD or Météo-France collaborations (IRD researchers usually working in these developing countries maintain the scientific partnership between local scientist and the Mercator Océan experts in France).

These past years, Mercator Océan, in strong link with IRD, has been involved in building capacity activities dedicated to operational oceanography. Foreign researchers from Cape Verde have been hosted by Mercator Océan (Cape Verde); Mercator Océan experts have been asked to participate to high level educational programs in operational oceanography (GODAE Summer Schools, summer schools in Marocco, Master of Oceanography in Bénin). These activities are increasing each year.

Participation (More members to be filled in 2009):

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