IIOE-2 Data and Information Management

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International Indian Ocean Expedition 2 (IIOE-2)

The second International Indian Ocean Expedition (IIOE-2) is a multinational research program endorsed by the Intergovernmental Oceanographic Commission (IOC) of UNESCO in 2015. The research focus is the Indian Ocean basin with broad, trans-disciplinary science themes designed to encourage wide participation. The current science implementation plan (1) calls for the full range of ocean research platforms including research vessels, vessels of opportunity, mooring arrays, floats, gliders, satellite imagery, lab-based experiments and modelling efforts. Securing funding for such a complex, coordinated, multinational research program is difficult. The plan is to coordinate the research via joint program offices hosted at IOC Perth and the Indian National Centre for Ocean Information Services (INCOIS) in Hyderabad, India, complemented by several national efforts. The research will be carried out by investigator teams that must arrange for their own research grants, funded within their respective nations. While the IIOE-2 researchers recognize that management of data and information is critical to the success of the research objectives, funding a program-specific data and information management effort for IIOE-2 is extremely difficult.

IIOE-2 Data and Information Management Needs

Multinational, transdisciplinary research requires that program participants share and provide access to data and results. To facilitate access to and interpretation of the data, those data must be accompanied by rich metadata. The success of the IIOE-2 science plan will require data to be supported by complete metadata records that describe who, what, where, when, why and how the data were collected, processed and analyzed. Descriptions of sampling and analytical protocols as well as quality assurance and control procedures are essential to accurate interpretation of the data especially when the research themes are transdisciplinary. The majority of IIOE-2 data will be generated by in situ field studies and it is especially important that such environmental data be preserved in archive data centers. Generating standards-compliant metadata and use of open, non-proprietary data formats where possible, will help facilitate data and information exchange between centers. Good data management and sharing of best practices have always been integral to successful scientific research, but advances in technology and increased expectations for data sharing have resulted in even greater requirements for management of research data.

Leveraging IODE Capabilities and Services

The International Oceanographic Data and Information Exchange (IODE) of the IOC of UNESCO, established in 1961, has grown into a networked community of National Oceanographic Data Centres (NODCs) and Associate Data Units (ADUs) and runs, sponsors or coordinates several programs that can provide effective solutions for IIOE-2 data and information management challenges. In February 2017, the IIOE-2 Scientific Steering Committee decided to leverage existing components of the IODE network to provide comprehensive data and information management for their program (Figure 1).

IIOE-2 Data and Information Management System

An IIOE-2 metadata portal has been established at INCOIS in Hyderabad, India (http://www.iioe-2.incois.gov.in/IIOE-2/data.jsp).   At the moment, all nations proposing IIOE-2 research are IOC Member States and have a NODC, ADU or OBIS node that is part of the IODE network of data repositories. The IIOE-2 Data Policy recommends that data from IIOE-2 endorsed research projects be submitted to the appropriate NODC or ADU, with project and deployment metadata also submitted to the IIOE-2 Data Office at INCOIS. When ready, data packages including metadata should also be submitted to the appropriate NODC or ADU and eventually to INCOIS. Related information is already being managed in existing IODE systems including: names of marine professionals and their affiliations in OceanExpert (https://www.oceanexpert.net/); an open access repository of digital format marine science publications including preprints, published articles, technical reports, and working papers in OceanDocs (https://www.oceandocs.org/); a secure, permanent repository of published, recommended, community practices including the IOC Manuals & Guides and Ocean Data Standards (https://www.oceanbestpractices.net/); and the extensive training materials available from Ocean Teacher Global Academy (https://classroom.oceanteacher.org/) as well as the facilities of the OTGA Regional Training Centers, four of which are in the Indian Ocean region. The IIOE-2 data and information will then be included in the nascent IOC Ocean Data and Information Sources platform that is being developed to capture results from all IOC endorsed research programs.
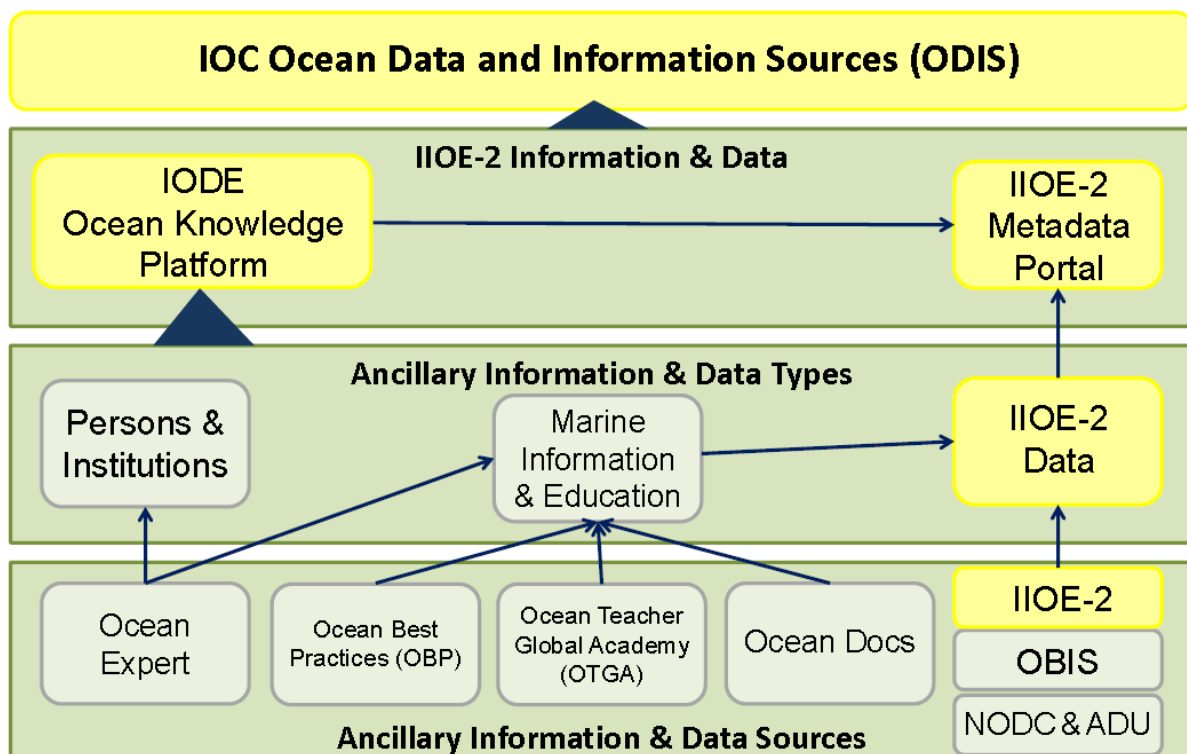

Figure 1: Proposed architecture for IIOE-2 data and information management
that leverages many existing IODE projects, capabilities and services (green) with new components shown in yellow.

REFERENCES

(1) Hood, R.R., et al., (2015) "Science Plan of the Second International Indian Ocean Expedition (IIOE-2): a Basin-Wide Research Program". Scientific Committee on Oceanic Research, Newark, Delaware, USA. http://hdl.handle.net/1834/9675