Progress report on the International Research Cruise Information Database and web-site - a joint POGO-CoML-NOAA initiative

Status: July 2010

PROJECT OVERVIEW
To develop, update and maintain an international cruise information database to facilitate resource sharing and information exchange related to past and planned research cruises.

ACCOMPLISHMENTS/PROGRESS/STATUS
The POGO Cruise Information Database (www.pogo-oceancruises.org) was launched in May 2007 and is coordinated by the British Oceanographic Data Centre (BODC). The website focuses on vessels greater than 60m in length and incorporates three major databases, including a research vessel directory, a cruise programme database and a database of Cruise Summary Reports.

The current priorities are:
- Continue requesting and enter into database 2010 (and 2011) cruise programmes
- Continue to work with operators to improve timeliness and content of cruise programme information, making special effort to contact and obtain information from Brazil, Canada, India, Korea, Russia and South Africa.
- Adapt Cruise Programme CMS to allow input from CCHDO, IOCCP and GO-SHIP
- Allow input to be displayed where only preliminary information is available (useful for cruises at an early stage of planning).
- Routine maintenance of the system - including ensuring the research vessels database is kept up to date.
- Synergy from working with EU EUROFLEETS project, including:

  (1) Develop more automatic input of cruise programme information by using and extending software developed by SeaDataNet (Mikado). The SeaDataNet Mikado software allows one to map the fields of a database into the agreed standard fields. When this has been done once, it is a simple matter of running the software to generate the information in the required format, including using the standard codes/dictionaries. Checks can also be incorporated (e.g. checking that the end of the cruise is after the start). This will be developed and initially tested it out with EUROFLEETS and then adapted to POGO contributors. This should improve efficiency and remove the need for most of the manual checking and editing.

  (2) New initial browse facility (Browse-step) – see mock-up web page for EUROFLEETS below. This also shows how the Cruise Programme database is now taking a more prominent position, and the research vessel and cruise summary report being subsidiary, rather than the equal importance implied by the current arrangement for POGO. This arrangement will be transferred across to the POGO system.

  (3) Inclusion of NASA Blue Marble WMS Maps for the Cruise Programme database.

  (4) Primary importance of the Cruise Programme database emphasised by allowing access to research vessel and cruise summary report information directly from the cruise programme search results.
1. Cruise Programme Database
At the end of 2007 the cruise planning database included details of 573 cruise programmes by 18 ship operators, covering 24 research vessels from 10 countries. For 2008 cruises, information has been received for over 450 cruises from the following countries: Australia, Belgium, China, France, Germany, Japan, Netherlands, Norway, Sweden, UK and USA (UNOLS including Bermuda). For 2009, cruise programme information has been received for over 580 cruises from the following countries: Australia, Belgium, China, France, Germany, Japan, Netherlands, Norway, Sweden, UK and USA (UNOLS including Bermuda). So far for 2010 information has also been supplied for 413 cruises from Australia (4), Belgium (40), France (29), Germany (11), Ireland (42), Netherlands (6), Romania (5), Sweden (19), UK (34) and USA including Bermuda (223).

The current content of the database is summarised in Table 1 below.

<table>
<thead>
<tr>
<th>Country</th>
<th>Information Provider</th>
<th>Research Vessels</th>
<th>No. of 2010 cruises</th>
<th>Total No. of cruises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>CSIRO</td>
<td>RV Southern Surveyor</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>Belgium</td>
<td>MUMM</td>
<td>RV Belgica</td>
<td>40</td>
<td>115</td>
</tr>
<tr>
<td>China</td>
<td>IOCAS</td>
<td>RV Ke Xue San Hao</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RV Ke Xue Yi Hao</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>FIMR</td>
<td>Aranda</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>France</td>
<td>IFREMER</td>
<td>L'Atalante</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pourquoi pas?</td>
<td></td>
<td>87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Le Suroit</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thalassa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>BSH/DOD</td>
<td>FS Meteor</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FS Maria S. Merian</td>
<td></td>
<td>85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FS Polarstern</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FS Poseidon</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FS Sonne</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Walther Herwig III</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iceland</td>
<td>MRI</td>
<td>Arni Fridriksson</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bjarni Saemundsson</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>MI</td>
<td>Celtic Explorer</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Celtic Voyager</td>
<td></td>
<td>77</td>
</tr>
<tr>
<td>Japan</td>
<td>JAMSTEC</td>
<td>RV Natsushima</td>
<td></td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kaiyo</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RV Yokosuka</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kairei</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mirai</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RV Hakuho Maru</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kaiyo</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tansei Maru</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>NIOZ</td>
<td>RV Pelagia</td>
<td>6</td>
<td>52</td>
</tr>
<tr>
<td>Norway</td>
<td>IMR</td>
<td>RV Jan Mayen</td>
<td></td>
<td>158</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RV Johan Hjort</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RV G.O. Sars</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr. Fridtjof Nansen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>National Institute of Marine Geology and Geoecology - GEOECOMAR</td>
<td>Mare Nigrum</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Country</td>
<td>Information Provider</td>
<td>Research Vessels</td>
<td>No. of 2010 cruises</td>
<td>Total No. of cruises</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------</td>
<td>------------------------------------------------------</td>
<td>---------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Sweden</td>
<td>SMHI</td>
<td>RV Argos</td>
<td>19</td>
<td>74</td>
</tr>
<tr>
<td>UK</td>
<td>NERC NMF</td>
<td>RRS Discovery</td>
<td>34</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RRS Ernest Shackleton</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RRS James Cook</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RRS James Clark Ross</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>UNOLS (including Bermuda)</td>
<td>Melville</td>
<td>223</td>
<td>848</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Roger Revelle</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kilo Moana</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thomas G. Thompson</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Atlantis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Knorr</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marcus Langseth</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seward Johnson</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOAA Ronald H. Brown</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Atlantic Explorer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Summary of information in Cruise Programme Database (2007-2010)

Ship operators are provided with a blank spreadsheet and guidance notes to assist in completion of the spreadsheet. Wherever possible they are encouraged to extract from their own databases rather than re-type information. The ship operators who have replied are cooperative but, in general, do not have a lot of time to spend on this or have other more pressing priorities. On a number of occasions we have been directed to their web sites, which often contain sparse information – and as Adobe Acrobat (pdf) files – which means cut and paste or re-typing. We request that the SeaDataNet vocabularies are used in the spreadsheet, but even when the BODC vocabularies are listed, these are not often used. This means that work has to be done at BODC translating the information into the appropriate codes. Information continues to be requested for 2010 cruises (and 2011 if available).

The website was refreshed (including adding the new POGO logo) at the end of 2009 and the layout resulting from searches was improved. A new field has been added to show whether the cruise is planned, currently taking place, or has been completed. There is also an option to show if the cruise has been cancelled. This is indicated by coloured dots – green=planned; yellow=currently in progress; blue=completed; black=cancelled: this is updated automatically for the in progress and completed cruises. This shows the cruise status at a glance.

Also added is the opportunity to link in an image of the planned cruise track if this is available.

A further improvement has been to use the Ports Gazetteer developed by SeaDataNet. This is a list of ports together with their geographic coordinates, and other supporting information. Using this ensures that there is consistency in naming the departure and arrival ports.

One of the continuing problems encountered is the lack of geographic information – most operators will provide some general description of the area to be visited, but do not have latitude-longitude ranges available in their own systems. BODC add these in, but this is a time consuming exercise. Some cases are reasonably straightforward, e.g. the USA (UNOLS) contribution usually has US Navy Squares which can be converted fairly easily. Others may only have a text description (e.g. Porcupine Abyssal Plain, Off Omaezaki, Sagami Bay). The
latitude/longitude range is important to the cruise programme database as it is the basis for the geographic searching, and this information is viewed on a map.

The online Content Management System (CMS) for the cruise programme information established in 2008 has been tested and has been in regular use during 2009 and 2010 by NIOZ for RV Pelagia cruises, and occasionally by Germany for FS Polarstern and FS Meteor. The CMS can be reached at the POGO International Cruise Information Database web-site (www.pogo-oceancruises.org) and selecting “Planned Cruise Programmes” and “Updating Cruise plans via the online Content Management System” or directly at:

www.pogo-oceancruises.org/vu_cruises/welcome.asp

The system has been designed so that:

- Each operator can only manage its own records AND for a fixed set of vessels
- Where a vessel is shared and thus operated by two (or more) operators, each operator manages and sees only its own records (see e.g. Argos in Sweden)
- The CMS works on the basis that the account holder is also the operator - thus they can not change the operator.

Account holders can generate new entries and make modifications to existing entries and save these. This is indicated by an ORANGE dot in the “active” column, which means that the records are forwarded for final acceptance by the Administrator. The account holder can also change this orange to red, perhaps because the entry is not finalised yet.

Offers have been received from the International Ocean Carbon Coordination Project (IOCCP) and the Climate Variability and Predictability Program (CLIVAR) to enter cruise programme information when it becomes available to them. As the CMS is designed to allow updates and new entries by ship operators for their own vessels only, further security needs to be added to the CMS needs to be adjusted to allow IOCCP (Maria Hood) and CLIVAR (Steve Diggs) to add new records for vessels owned by a number of different operators. This is under discussion and development. The CMS has been upgraded to allow preliminary information only to be included and for the entry to be labelled as such (this allows for information which would otherwise be mandatory to be omitted).

2. Global Directory of Ocean-going Research Vessels
The Global Directory of Ocean-going Research Vessels has been operational since early July 2007. It has been developed by EurOcean with support of MARIS and it contains characteristics, owners and operators’ information for ocean-going research vessels. The content format conforms to the Oceanic database, operated by the University of Delaware. This global directory has been developed as a special version online research vessel directory for all European vessels previously developed by EurOcean, which can be found at the EurOcean portal (www.eurocean.org). It contains up-to-date information on ocean-going Research Vessels, operated worldwide, and is accessible from the www.pogo-oceancruises.org website.

The Directory software was upgraded to enable research vessel operators to maintain the vessel information themselves by an online Content Management System. During the second half of 2007 European operators were invited by EurOcean to validate and improve the entries for their vessels. Subsequently the identified operators of these non-European vessels have been invited to validate and update their entries, using the online Content Management System.
The Research Vessel Directory now contains facts and figures of 174 Research Vessels. The Research Vessels are provided with a ship code, identifying a unique hull, through cooperation with ICES, US NODC and BODC. These ICES ship codes are used in each of the 3 databases in the full POGO system as linking pin. There are nine vessels in the database which are less than 60m in length of which Belgica is the shortest at 50.90m. Cruise programmes for vessels less than 60m unless have not been specifically requested unless it was deemed useful to do so (e.g. Bermuda with Atlantic Explorer at 51m), or the operator requested it (e.g. Finland, with Aranda at 59.80m, Belgium with Belgica).

3. Cruise Summary Reports (CSR) database and Content Management System (CMS)

The Cruise Summary Report (CSR) database has been developed by BSH/DOD, Germany. It focuses on details of completed cruises and provides a first level inventory of oceanographic measurements made and samples taken. The ROSCOP (Report of Observations/ Samples Collected by Oceanographic Programmes) was conceived by IOC/IODE in the late 1960s in order to provide an inventory for tracking oceanographic data collected on Research Vessels. The ROSCOP form was extensively revised in 1990, and was re-named the Cruise Summary Report (CSR). Most marine disciplines are represented in the CSR, including physical, chemical, and biological oceanography, fisheries, marine geology/geophysics, marine contamination/pollution, and marine meteorology. Traditionally, it is the Chief Scientist's obligation to submit a CSR to his/her National Oceanographic Data Centre (NODC) not later than two weeks after the cruise. In the past these have been periodically transmitted to the World Data Centres for Oceanography and to ICES. The CSR activity gained new momentum in Europe during EU-funded marine data management projects EURONODIM and Sea-Search under the lead of BSH/DOD, Germany. The combined ICES and Sea-Search/SeaDataNet CSR database now comprises details of over 37000 oceanographic research cruises primarily from Europe and North America, some information extending back over the last 40 years. This ongoing CSR database can be found via the POGO research cruises website at www.sea-search.net/roscop.

As part of the POGO-CoML-NOAA initiative BSH/DOD has developed a special version of the CSR database, that gives access to Cruise Summary Reports of all ocean-going vessels worldwide larger than 60 metres. It is directly accessible from the www.pogo-ocean cruises.org website.

In 2008, BSH/DOD developed an online Content Management System (CMS) to allow Chief Scientists and NODCs of countries outside Europe to prepare and deliver their Cruise Summary Reports. This is now available and linked into the International Research Cruise Information system. Retrieval software has also been developed in line with that used for SeaDataNet, but with the POGO “look and feel” and limited to POGO ships. This allows searching of all cruise summary reports provided to BSH, including those supplied before the POGO system was developed, but restricted to the larger research vessels.

HIGHLIGHTS

The Cruise Programme Database continues to be operational and 580 new entries from 10 countries have been added during 2008. Requests for 2010 cruises are continuing and requests for 2011 cruises will be issued soon.
The Research Vessels Database continues to be operational and updates and amendments have been made during the year. Vessel operators have access to the database and are able to update details of their own vessels.

The Cruise Summary Report (CSR) database is operational for input of new CSRs and searching of existing ones. It is linked into the POGO Cruise Information site.

Within Europe, the new EU-funded EUROFLEETS project (started September 2009) is beginning to improve information provision from the project partners. EUROFLEETS aims to bring together the existing European Research Fleet owners to enhance their coordination and promote the cost-effective use of their facilities in order to support the efficient provision of essential research services for monitoring and sustainable management of the regional seas and the oceans and allow access to all European scientists. The system will utilise and build on the developments carried out for POGO, and POGO in turn will benefit from an enhanced system. In particular the EUROFLEETS project will develop more automatic harvesting from the operator databases and refresh the information at regular intervals.

SOCIETAL BENEFITS
The project was undertaken to enhance resource sharing and information exchange related to past and planned research cruises. Benefits include:

- Helping scientists from different countries coordinate future funded research through information about research vessels of opportunity;
- Aiding in retrospective ability to find data in regions of interest;
- Making it possible for projects to conduct joint work and to fill empty berths;
- Creating capacity-building and training opportunities;
- Aiding in tracking and distributing data;
- Allowing cost sharing among institutions, projects, and nations;
- Making possible intercomparisons, intercalibrations, and validation among different data types (e.g. CTD vs. Argo, in situ vs. remote sensing)

EDUCATION AND OUTREACH ACHIEVEMENTS
List any related activities including conference presentations.

POGO Research Cruise Information System - presentation given at POGO-11 Meeting, Shirshov Institute of Oceanology, Moscow, Russia, 26-28 January 2010 (see below under FIGURES/PHOTOGRAPHS/ILLUSTRATIONS)


PUBLICATIONS
List only current year publications (in review, in press, and published) and separate by category with full citation Note: Please include presentations under Outreach.

FIGURES/PHOTOGRAPHS/ILLUSTRATIONS – (preferably jpegs) – that help explain the results and or depict the highlights – please include captions.

Screen shots illustrating components of the POGO International Cruise Information System
POGO Research Cruise Information System

• Tool for ocean scientists to become more efficient in cruise planning, utilise spare berths, instrument deployment, and servicing of moorings
• For ocean-going research vessels (>60m)
• Implementation carried out by a SeaDataNet subgroup (BODC, Maris, BSH, EurOcean)
• Initially developed in 2007
• Funding from POGO, CoML and NOAA

Research Cruise Information System is in 3 parts:
• Cruise Programmes
• Research Vessel Directory
• Cruise Summary Reports

Cruise Programme Status

Number of cruises:
• 2007 – 573 cruises
• 2008 – 455 cruises
• 2009 – 586 cruises
• 2010 cruise programmes beginning to arrive

Technical Developments in 2009

• Cruise Programme Content Management System (CMS) operational
• Cruise Summary Reports CMS and search linked to International Research Cruise Information System

Technical Developments in 2009

• Cruise programme database upgraded
• Cruise status added (planned, current, completed), automatically updated
• Planned cruise track option
• Use of ports gazetteer (from SeaDataNet)
**Outreach**

- Contribution to EOS article
- Abstract for poster submitted to IMDIS Conference
- Dissemination of information to EU EUROFLEETS project

---

**Issues**

- Some organisations supply information rapidly, but some are slow
- Some organisations do not reply
- Incomplete information supplied
- Lack of geographic information provided
- Manual work necessary => time consuming

---

**Future activities**

- Continue requesting 2010 and 2011 cruise programmes
- Including input from CCHDO, IOCCP and GO-SHIP
- Allowing input where only preliminary information is available
- Develop more automatic input of cruise programme information
- Using/extending software developed by SeaDataNet (Mikado)
- New dynamic user interface (initial “browse” facility)
- Inclusion of NASA Blue Marble WMS Maps for the Cruise Programme database
- Primary importance of the Cruise Programme database emphasised by allowing access to research vessel and cruise summary report information directly from the cruise programme search results

---

**Towards an alliance of European research fleets**

The EUROFLEETS proposal covers 3 areas:

**Networking Activity:** working groups (specification, training and information) to strengthen coordination between research fleets.
- Shared strategic vision (future investments)
- Eco-responsibility (guidelines of good practices) & environment friendly research vessels
- Interoperability and operational progress
- European peer review of cruise projects and harmonization proposals
- Training and education
- Dissemination and exploitation

**Trans-National Access:** access offered to the vessels below will be implemented through a call for proposals
- 5 Ocean large vessels with underwater vehicles and embarked equipment of international class (seismics or long coring)
- 14 Regional vessels, carrying out cruises in 6 European eco-regions.

**Joint Research Activity** to modernise infrastructure or service regarding:
- Innovating software, and on board data processing
- Interoperable sensors to equip European underwater vehicles.

**POGO International Research Cruise Information System**
Lesley Rickards (BODC), Dick Schaap (Maris), Friedrich Nast and Anne Che-Bohnenstengel (BSH), Telmo Carvalho and Cristina Costa (EurOcean)

**What?**
- Dedicated International Research Cruise Information Database and web site giving access to three interrelated modules for research vessels >60m in length, certified for open ocean research
- Research Vessel Cruise Programme database - planned cruises per research vessel and owner/operator
- Research Vessel Directory database - characteristics of each research vessel, owner/operator contact details and, if available, a link to the ship's web page
- Cruise Summary Report (CSR) database - details of completed cruises - providing a first-level inventory of oceanographic measurements made and samples taken

**Why?**
- Assists scientists from different countries coordinate future research through information about research vessels
- Aids in retrospective ability to find data in regions of interest
- Makes it possible for projects to conduct joint work and to fill empty berths
- Creates capacity-building and training opportunities
- Aids in tracking and distributing data
- Provides information to evaluate the benefit of observations from ships as part of GOOS
- Makes it possible for scientists and operational users from other projects to get instruments deployed and/or samples taken in hard-to-reach areas of the ocean (e.g. drifters, profiling floats, moored buoy servicing)
- Allows cost sharing among institutions, projects, and nations
- Makes possible intercomparisons, intercalibrations, and validation between different data types

**How?**
Search via a map-based user interface with menu-driven search
Utilising and developing SeaDataNet standards, infrastructure and common vocabularies
Contribute by supplying cruise programme information as ASCII files or through online content management systems

**Who?**
- Partnership for Observation of the Global Oceans (POGO) members
- Census of Marine Life (CoML)
- Co-funded by the Alfred P. Sloan Foundation and NOAA
- Implemented by: British Oceanographic Data Centre, Maris, BSH and EuroOcean

**What next?**
- EUFLEETS – EU-funded project
- Cruise Information system will build on the POGO system
- Develop system further and feed back to POGO

**Where?**
Visit: [www.pogo-ocean cruises.org](http://www.pogo-ocean cruises.org)