4th meeting of the Global Ocean Ship-based Hydrographic Investigations Program

GO-SHIP 4 – Final Report (reviewed)

Date: 23 February 2014

Time: 08:30 -18:00

Venue: East-West Center, Hawaii Imin International Conference Center, 1777 East-West Road, Kamehameha Room (2nd level – 210), Honolulu, Hawaii 96848

Meeting Website: www.jcomm.info/go-ship4 (participant details, documents, etc.)

Attendees:

Carolina BERYS-GONZALEZ, Kenneth CASEY, Stephen DIGGS, Richard FEELY, Eric FIRING, Masao FUKASAWA, Nicolas GRUBER, Julia HUMMON, Masao ISHII, Gregory JOHNSON, Brian KING, Alex KOZYR, Martin KRAMP, Yuichiro KUMAMOTO, David LEGLER, Mauricio MATA, Elaine MCDONAGH, Herlé MERCIER, Akihiko MURATA, Bernadette SLOYAN, James SWIFT, Lynne TALLEY, Toste TANHUA, Maciej TELSZEWSKI

By Webex: Leif ANDERSON, Kumiko AZETSU-SCOTT, Aida F. RIOS, Christopher SABINE, Mike WILLIAMS

1. Welcome and logistics

Bernadette Sloyan, Chris Sabine (GO-SHIP co-chairs) and Martin Kramp (coordinator) welcomed the attendees to the meeting and explained organizational matters. Martin Kramp reminded in particular that profiles on jcomm.info should be updated by all participants as appropriate and that all presenters should provide draft text for the meeting report by 17 March. A template had been provided prior to the meeting.

2. Coordinator report (Martin Kramp)

Martin Kramp reported on GO-SHIP coordination activities in the last year. The GO-SHIP coordinator position makes currently a third of the Ship coordinator position of the JCOMM Observation Programmes Support Centre (JCOMMOPS). Martin recalled the terms of reference of the JCOMMOPS centre, which coordinates under the auspices of IOC and WMO also the Argo, DBCP, SOT and OceanSITES programmes and aims in particular to:

- monitor and evaluate the performance of the networks
- assist in the planning, implementation and operations of the observing systems
- act as a clearing house and focal point on all programme aspects
- assist in data distribution on the Internet and GTS
- encourage cooperation between communities and member states
- relay user feedback on data quality to platform operators
- provide technical assistance and user support worldwide
- develop synergies between observing systems (GOOS)

The center will move from Toulouse (hosted by CLS) to Brest (Ifremer) by the end of the year and will thus be embedded in an internationally important oceanography pole.

Regarding the role of GO-SHIP as a JCOMM associated programme, Martin stressed the importance of a more integrated ship coordination in order to better exploit cross-programme synergies, for example in regard of deployment opportunities for floats and drifters from GO-SHIP and other research cruises. He recalled that JCOMM 4 (2012) decided:

(1) To re-establish a JCOMM Observations Programme Area, with the following components:

(a) An Observations Coordination Group;

(b) A Data Buoy Observations Team, known as the Data Buoy Cooperation Panel;

(c) A Sea Level Observations Team, known as the GLOSS Group of Experts;

(d) A Ship Observations Team, aimed at continuing to develop coordination and synergies among the existing ship-based panels, that is, the Ship-of-Opportunity Programme Implementation Panel and the Voluntary Observing Ship Panel;

(2) To maintain a close liaison and coordination with the Argo Steering Team, the OceanSITES project, the International Ocean Carbon Coordination Project, and the Global Ocean Ship-based Hydrographic Investigations Program

The OCG Membership is selected to ensure an appropriate range of expertise and to maintain an appropriate geographical representation.

(a) Programme Area/Observations coordinator (Observations Coordination Group chairperson)

(b) Observations Coordination Group vice-chairperson

(c) Chairperson Ship Observations Team

(d) Chairperson Data Buoy Cooperation Panel

(e) Chairperson Global Sea Level Observing System (GLOSS) Group of Experts

(f) Representative of Argo Steering Team

(g) Representative of International Ocean Carbon Coordination Project

(h) Representative of OceanSITES

(i) Representative of the Global Ocean Ship-based Hydrographic Investigations Program

Martin introduced the data management and monitoring systems currently under development at JCOMMOPS, including a cross-programme website for operational purposes. He recalled that JCOMMOPS is not a data distribution centre, but rather a metadata centre. JCOMMOPS status maps are widely recognized as authoritative and giving an up-to-date, verified status of the arrays, encouraging the community to share the data and showing how the programs assess and meet their requirements. GO-SHIP maps are currently under development and Martin showed first examples of the proposed GO-SHIP network design in different projections and versions, as a starting point for the meeting discussion.

Information on upcoming cruises are currently gathered per pdf form, but appropriate tools and close collaboration with in particular CCHDO will on the long run allow for a consistent tracking of information from past to future cruises in different steps (Planning, Funding, Scheduling, Upgrading, Establishing, Data Processing, Closure) as it is already the case for the Argo programme.

Regarding the performance of GO-SHIP, and in particular in regard of Mike Johnson's performance metrics for GOOS (with 62% for GO-SHIP), Martin suggested to create a GO-SHIP task team, in order to define metrics and targets for GO-SHIP, and also more appropriate names for sections which have not been part of WOCE. It was later decided that a subgroup of the GO-SHIP committee will in the future act as GO-SHIP Executive Group (EXG) which will take this task.

Martin demonstrated the new GO-SHIP bibliography, which is based on a ZOTERO group and merged with the US repeat hydrography bibliography. Items can be tagged (nation etc.) and a public online access allows for basic query functions, whilst it is also possible to synchronize with a local copy of the

bibliography for more advanced functions (export, Office reference etc). Administration of the data base is shared between JCOMMOPS and CCHDO. Through the GO-SHIP mailing lists maintained by JCOMMOPS (currently ~ 200 subscribers), members of the GO-SHIP community have been encouraged to send relevant publication metadata to JCOMMOPS.

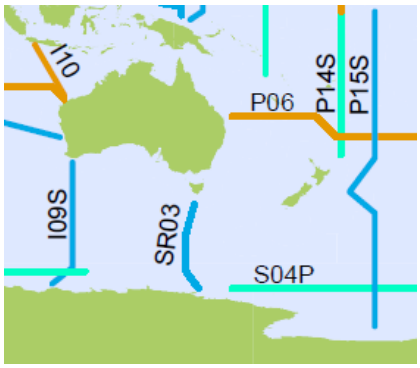
Martin thanked the group for their continuous cooperation, and encouraged all committee members to provide him regularly with as many information as possible on GO-SHIP activities.

3. Program Update

a) National Reports

Australia - Bernadette Sloyan

Australia has plans to occupy three sections – P15S in 2016, SR03 in 2016/2017 and I09S 2017/2018. A proposal for ship time on the RV Investigator has been submitted for the occupation of P15S. We are still waiting on funding decision. The SR03 and I09S sections will either be undertaken on the RV Aurora Australis or RV Investigator.



The RV Investigator is currently being built and delivery is expected in 2014. This vessel will provide increased capacity for Australian research activities due to the increased vessel length (94 meters), increased scientific berth (40) and duration at sea (60 days). The vessel is ice strengthened. The increased vessel capability will enable us to extend the southern limit of the P15S section which in 2016 will be occupied from the ice-edge to the equator. The RV Investigator will also provide an alternate to the RV Aurora Australis for the future occupation of SR03 and I09S.

The Australian voyage will meet most level 1 measurement requirements and data timelines (see section 6 for information on level 1, 2 and 3 measurements and for data time lines). However, Australia does not have capability to measure CFC/SF6 . Thus we will work with US colleagues - Mark Warner (University of Washington) and John Bullister (NOAA PMEL), and potentially other international collaborators – to ensure tracer measurements on the sections.

New Zealand - Mike Williams

NIWA is looking at the possibility of occupying the Southernern most part of the P15 line in February 2016 as part of a mooring deployment cruise in to the Ross Sea. They are looking for international partners to assist with Carbon and non-hydrographic parameters. New Zealand funding has not yet been secured (expected July 2014).

Action Item : Bernadette Sloyan (Australia) and Mike Williams (New Zealand) to discuss coordination of southern occupation of P15S into the Ross Sea and Southern Ocean to ensure best use of resources.

Canada - Kumiko Azetsu-Scott

In the Labrador Sea line, a Canadian university program, VITALS, will participate for the next 4 years adding more biological and gas measurements. Moorings including a SeaCycler and gliders will be deployed during this period. There is no extra berth during this period.

In Davis Strait, a program started in 2004, with an annual sampling till 2011, and a sampling every two years till 2015. They are planning to extend this time series. This program includes extensive mooring arrays and glider operation. Marine mammal studies are included. Low trophic level biology is not in the program presently.

The Canada Basin program (JOIS) is not included in GO-SHIP network previously. JOIS is a time series program from the shore to the ice edge, annually sampled and funded from 2003 to 2017. Kumiko would like to request the GO-SHIP committee to consider JOIS as a part of GO-SHIP network.

Brazil - Mauricio Mata

A few universities, the Brazilian Navy and federal institutes form the national hydrography programme. Most hydrographic capable ships are run by the Brazilian Navy (Noc Antares, Noc Cruzeiro do Sul, AvPq Aspirante Moura, NApOc Ary Rongel(polar) and NPo Alt Maximiano(polar); two full hydrography capable vessels are run by universities – Apha Crucis (University of São Paulo) and Atlantico Sul (FURG).

Planned and recently established Cruises: Cruzeiro do Sul has occupied twice the WOCE A10 line between Brazil and Africa (2009 and 2011). Another cruise is being planned but not confirmed so far. Ary Rongel and Alt Maximiano frequently occupy SR04-west (in the Weddell Sea).

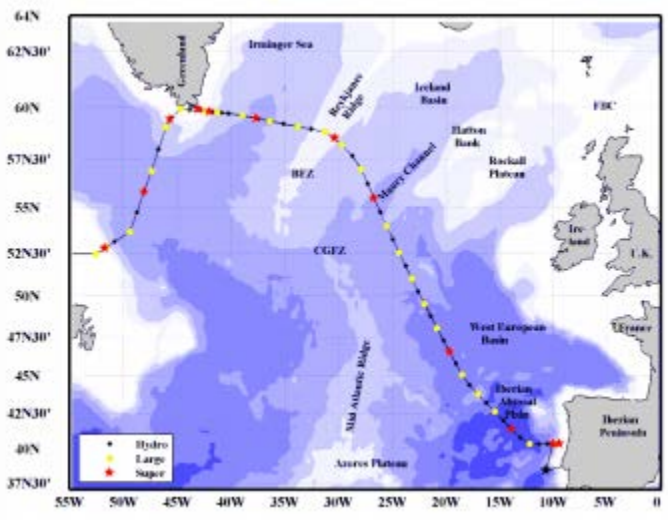
Parameters: CTD, O2, Nutrients, Bio-Optics, pCO2 (not all cruises), L-ADCP and S-ADCP (some ships only). Most data come from individual research projects, but some come from regular Navy hydrographic surveys. All data is submitted to the Brazilian National Oceanographic Database. Trace metals, CFCs, micronutrients and Isotopes are still not measured (although recent proposals have been approved to boost those measurements).

Action Item: Need to send official letter to Brazil to recommend that data from GO-SHIP section be sent to CCHDO. Bernadette, Rik and Martin to send letter, Maurico to advise to whom letter should be sent.

France - Herlé Mercier

The national hydrography programme is run by Ifremer and CNRS, and coordinated by Pascale Lherminier and Herlé Mercier.

Planned and recently established cruises: OVIDE/A25 and Labrador Line on Pourquoi Pas? in May-June 2014 (nutrients, ph, alk, pCO2, and geotraces). The next OVIDE/A25 is planned in 2016 on Sarmiento de Gamboa (Chief Scientist Fiz Perez, LPO in charge of CTDO2 and ADCP).



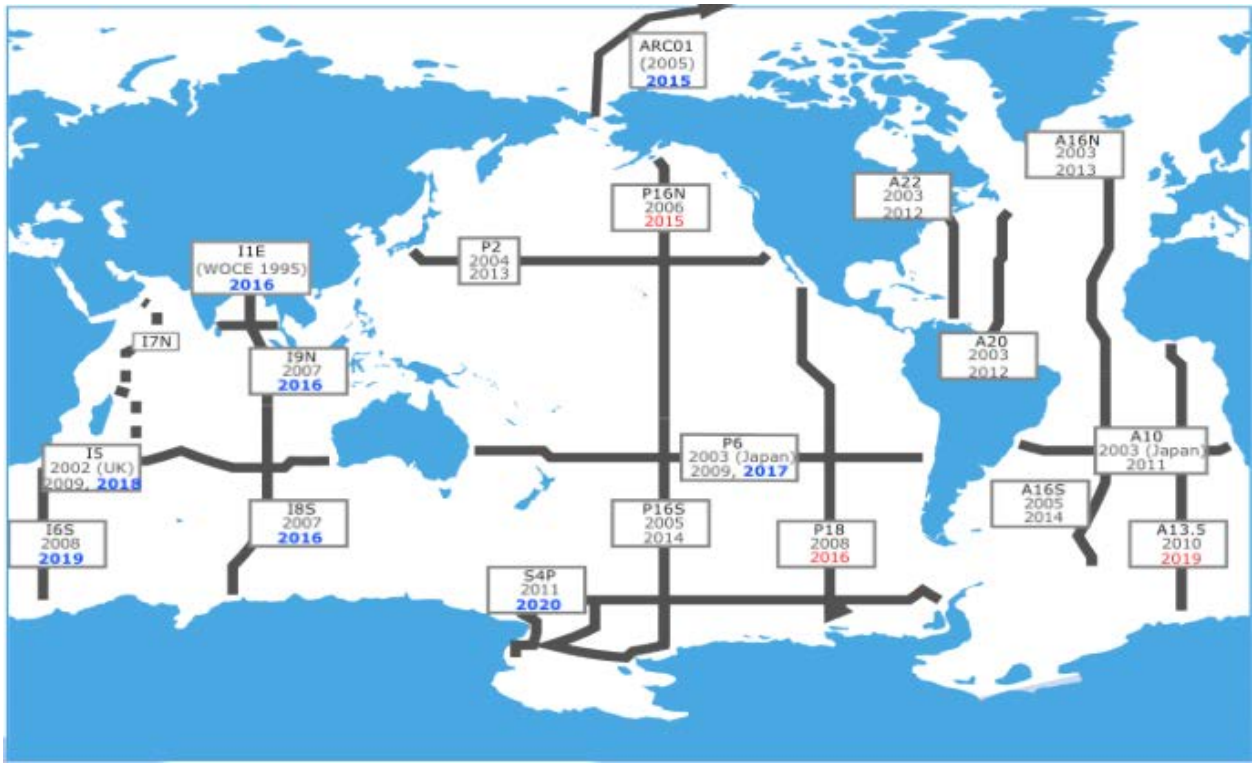
Japan - Masao Ishii

The national repeat hydrography programme is run by JAMSTEC (R/V Mirai) and JMA (R/V Ryofu Maru III). 11 cruises took place in the last 10 years on lines P01, P03, P03W, P09, P10 (twice), P13, P14, P21, P14S/SO4I and 40N (the latter is not a GO-SHIP line). 6 cruises are planned in the next 4 years on lines P01, P04W, P09, P10, P13 and P17E/P19C.

USA - Lynne Talley

The U.S. Repeat Hydrography Oversight Committee is co-chaired by Richard Feely (NOAA/PMEL) and Lynne Talley (UCSD/SIO). Principal investigators for current funding are from NOAA/PMEL, NOAA/AOML, UCSD/Scripps Institution of Oceanography, U. Miami, U. Washington, U. Hawaii, UC Santa Barbara,

Columbia University, U Texas Austin and Woods Hole Oceanographic Institution. Recently established and planned US cruises, based on the GO-SHIP network, are shown on the following map:



Action Item: US are adding trans-Arctic section. We need to name this section and ensure consistent with other named sections in the program. US investigators to work with Sweden, Norway, Russia and other interested nation to agree on naming convention on Arctic section. Level 1 parameter data centers are CCHDO, CDIAC, U Hawaii, NGCD and U Florida.

No external groups are required on US cruises. For U.S. groups to participate on non-U.S. cruises, a separate proposal must be written to NSF or possibly NOAA to support their participation. This has run into difficulties with mismatches between the non-U.S. cruise dates and the U.S. NSF funding cycle timing. (e.g. CFCs on Australian cruises). Hence, for U.S. groups to have time to propose the measurements on non-U.S. cruises, there must be sufficient time allowed for proposal writing, review and funding decision.

UK - Elaine McDonagh

Elaine McDonagh, Brian King and Penny Holliday coordinate the national hydrography programme. RVs are Discovery (28), James Cook (31) and James Clark Ross (25-28)

Planned and recently established Cruises: OSNAP (AR07W, AR07E), A05, SR1b (annual, often physics-only), UK-Iceland (annual, limited chemistry).

Parameters: CTDO, LADCP, O2, nutrients (sometimes i/c organic), DIC, TA, CFCs, SF6, underway (TSG, pCO2, ADCP)

CTD & bottle i/c carbon data go to CCHDO at cruise end, remaining cruise data to BODC; CODAS directory is available on request. C14 or He/Tr are usually absent on UK cruises.

Germany - Toste Tanhua

Mario Hoppema at AWI is the main actor, in particular for line A12/SR04, last conducted in 2010-11 (without carbon, unclear on nutrients, tracers, oxygen) by RV Polarstern, with a new cruise planned for 2014-15, including S,T, O2, nutrients, carbonate system. Transient tracers are needed.

Another established cruise: 14.5°N section, repeat from a 1989 section in 2012 on the Meteor (M96, only physics and oxygen).

Data are available at Pangaea, not yet at CCHDO, which should be initialized through Mario Hoppema.

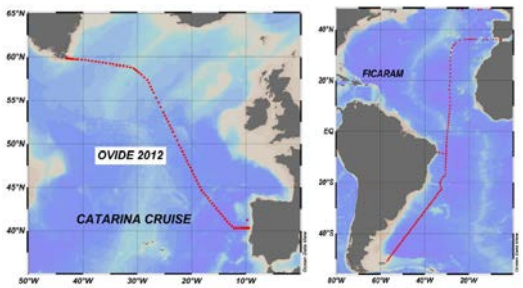
Action Item: Need to increase sampling for bottle data salinity and oxygen for production of high quality CTD/O2 data. GO-SHIP (Bernadette, Rik and Martin) to send letter to all national representative regarding minimum bottle requirements for calibration of CTD/O2 data.

Spain - Aida F. Rios

Main actors in Spain are Fiz F. Pérez and Aida F. Rio from CSIC-IIM, and Emma Huertas from CSIC-ICMAN. RVs are Sarmiento de Gamboa (total berths 26, at least 6 berths for the technician of the UTM of CSIC, normally no free berths), RV Hespérides (total berths 37, 10 berths for the technicians of the UTM of CSIC. Normally some free berths for collaboration groups that want to join), RV Hespérides, RV Garcia del Cid and RV Al Amir Moulay Abdellah.

Last occupied lines were OVIDE (with France in 2012, next in 2016) and FICARAM (2013, next in 2018). Other activities take place between Marocco and Spain, but not on GO-SHIP lines.

For CFC, external groups (Bremen, Exeter) participated. Data are submitted to CDIAC.



3 b. Horizonz 2020 – AtlantOS and Med-SHIP - Toste Tanhua

Horizon 2020 - AtlantOS

In response to the call BG8 "Developing in-situ Atlantic Ocean Observations for a better management and exploitation of the maritime Resources" in the first call of the EU initiative Horizon-2020, a consortium called "AtlantOS" has been formed. In WP2 a task related to GO-SHIP has been formed. The proposal see the development of a system of European reference laboratories for increasing the coverage and usefulness of carbonate system, transient tracer and ADCP data on GO-SHIP lines. It also sees the development of a structure for support of data QC and submission. The GO-SHIP has also support for the international GO-SHIP office. The call is a two-stage call and the first stage will be submitted in mid-February, the second stage in mid-June.

Med-SHIP

After an initial workshop in 2011 with report and town hall meeting during CIESM congress fall 2013, a GO-SHIP SSG was formed in February 2014, with support from particularly CIESM. The objective is a program for repeated oceanographic surveys in the Mediterranean. On the map below, high frequency lines are in black (~every 3 years), low frequency lines in red (~every 6 years).

The Mediterranean community is very keen on being a recognized part of, or partner of, the global GO-SHIP program. The zonal section (last cruises 2001, 2011) has delivered high quality data with full GO-SHIP parameters to CCHDO/CDIAC and could be the interface between GO-SHIP and MED-SHIP.

4. Funding of Coordinator Position - Bernadette Sloyan

The GO-SHIP coordinator Martin Kramp joined JCOMMOPS in February 2013. Martin has been extremely active since taking on the role of GO-SHIP coordinator. He has provided a clear focal point for international coordination and been proactive in seeking information on national plans, data submission

and development on interactive program maps. This has resulted in improved visibility for GO-SHIP at both national and international level. We are now recognised as a vital component of the global ocean observing system.

Major progress:

- Coordination of committee meetings
- Representation of GO-SHIP at international meetings, JCOMM and other component of the global ocean observing system
- Coordination with CCHDO and CDIAC
- Coordination and update of national plans
- Developing interactive maps
- Added bibliography to website
- Regular updates to web site

The coordinator position was supported in 2013 by Australia (CSIRO) $25K (USD), with significant base funding from JCOMMOPS. These funds have allowed GO-SHIP to access 1/3 full time of Martin effort. In order to keep this level of support for coordination effort the nations involved in GO-SHIP must increase the level of financial support. If we do not show a financial commitment we are highly likely to lose the coordinator positions.

The level of support for required for 1/3- 1/2 full time Coordinator is of the order $30 - 60K per year, plus additional support for travel and consumables.

2014 Funding Commitments:

Australia – $20K (AUD) which depending on exchange rate (1AUD = 0.8 USD) is approximately ~$16K USD

Japan - $10K (USD)

USA (NSF/NOAA proposal) – no allocation for international coordination support was included in the proposal that was submitted in February 2014.

Canada – they are assessing their contribution level

Future Funding beyond 2014

A European consortium is preparing a proposal to the EU Horizon 2020 – AtlantOS. The proposal contains 1/3 funding of a co-ordination position. If the proposal is approved funding is likely to begin in early 2015. However, we note that this funding is not solely for GO-SHIP activities as there are many

non-GO-SHIP ship based coordination efforts required in the AtlantOS proposal. Given this GO-SHIP support will still be required to ensure that continued GO-SHIP coordination.

Finally, the GO-SHIP co-chairs will submit a proposal to IOC for $8000 (USD) travel and consumable support for the coordinator.

How to make contributions

The co-chairs with JCOMMOPS and IOC will provide details of how the funding can be transferred, either through a trust fund at IOC (with overhead costs) or a fund at CLS (without overhead costs).

5. Organisation of the Ocean Sciences Town Hall meeting.

GO-SHIP town hall: GO-SHIP and IOCCP update of the current decadal (2012-2023) Hydrographic survey: A community forum (Wednesday 26 February 2014 at 12:45 in room 313B).

Abstract: This town hall meeting will firstly provide a community update on the status of the current decadal survey, including a list of funded and planned sections. And secondly, seek feedback from the community regarding (1) the status of and updates to the current plans, (2) data availability and ease-of-access to data and suggestions for improvements to data access, (3) connections and contributions to related large-scale ocean projects and other ocean observing systems, and (4) emerging issues that the global survey should consider.

This is a question and answer session for interested Ocean Science community members. It was agreed that we would open the meeting with a short presentation (5 Slides) that outline the program, role of the coordinator, measurements and map of sections that contribute to GO-SHIP. We will then have a number of committee members from a panel to answer question from the floor.

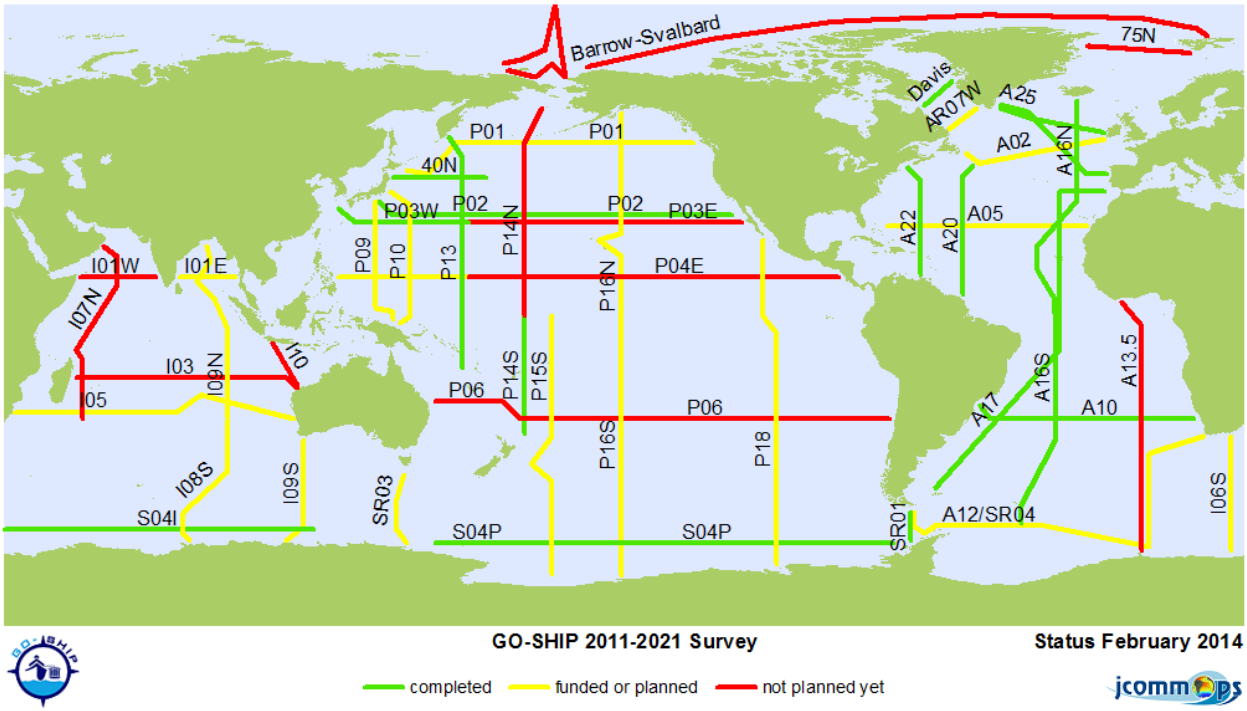
Action Item: Bernadette and Martin put together the slide presentation and circulate to committee prior to Wednesday.

6. Review of Global Survey design and refinement of Level 1, 2 and 3 level measurements and timelines for submission of data.

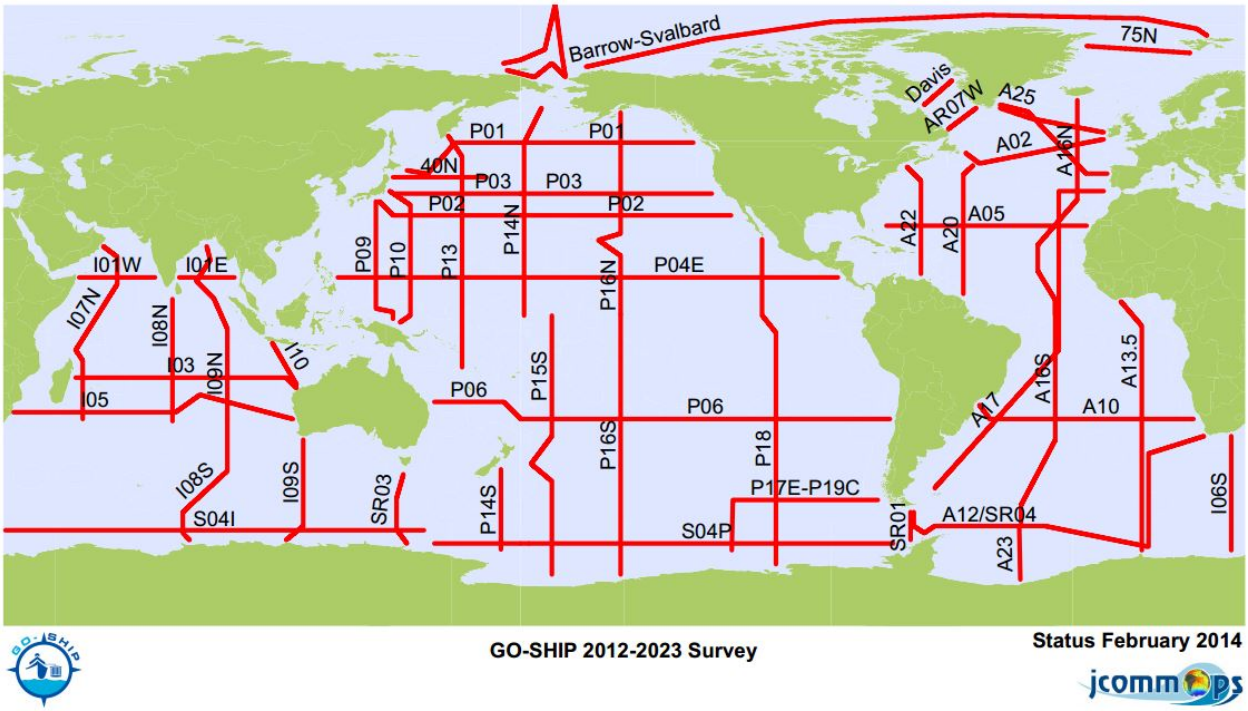
a) Global Survey Design

To begin discussion a map of the program (February 2014) was presented to the meeting. From this starting point a wide ranging discussion was held that resulted in correction to the map to including missing sections (A23, P17E/P19S and I8N).

The US is proposing a trans-Arctic line that will be added to the map. As stated before, a small sub-group will consider what name is given to this section.



The meeting then considered whether the program design is appropriate. There was some discussion on the I07N section and extension to the Southern Ocean (IO7S). While this section has not been reoccupied due to security issues, the science rational for the inclusion of the section in GO-SHIP is still applicable. The section will remain in the program. Color codes indicating the progress of the current survey were taken off the general network design map.



b) Level 1, 2 and 3 measurement requirements

Using the level 1, 2 and 3 measurements from the US Repeat Hydrography program as guidance the international community considered and endorsed the GO-SHIP data requirements.

Level 1 data are of highest priority. GO-SHIP recommends that level 1 data should be collect at least once per decade on all sections. This recognizes that sections occupied at higher frequencies (yearly, biennial) do not need to undertake all level 1 measurement on all re-occupation.

Level 1 data:

- Dissolved inorganic carbon (DIC)
- Total Alkalinity (TAlk)
- pH
- (note any two of the above)
- CTD pressure, temperature, salinity (calculated)
- CTD oxygen (sensor)
- Bottle salinity
- Nutrients by standard auto analyzer (NO_3/NO_2, PO_4, SiO_3)
- Dissolved oxygen
- Chlorofluorocarbons (CFC-11, -12, -113) and SF_6
- Surface underway system (T, S, pCO_2)
- ADCP shipboard
- ADCP lowered
- Underway navigation and bathymetry
- Meteorological data.

Level 2 data are highly desirable. GO-SHIP recommends that level 2 should be collected when possible.

Level 2 data:

- Discrete pCO_2
- ^{14}C by AMS
- CCl_4
- $\partial^{13}C$ of DIC
- Dissolved organic carbon
- Dissolved organic nitrogen
- Fe/trace metals
- CTD Transmissometer
- Surface underway system (nutrients, O_2, Chl, skin temperature).

Level 3 data are ancillary measurements are done according to opportunity and space available. They should not significantly interfere with Level 1 or 2 data collection, and may be regional or specific to an individual cruise.

Level 3 data (examples):

- Chlorophyll
- Primary production
- HPLC pigments
- Experimental continuous analyzers
- $\partial^{15}N$
- NO_3
- ^{32}Si
- $\partial^{18}O$ of H_2O
- NH_4
- Low level nutrients
- Total organic phosphorus
- Upper ocean optical
- Isotopes of O_2
- N_2, Ar, O_2
- Methyl halides
- DMS

c) Data Policy Timelines

The group discussed the data policy timelines and the meeting agreed to the following recommendations:

Within 5 weeks of the cruise, released to the relevant data management structure:

- Preliminary CTD (pressure, temperature, salinity, oxygen if measured)
- A merged bottle data file including preliminary discrete salinity, oxygen, nutrients (and carbon system components)
- Preliminary CFC-11, CFC-12, CFC-113, SF_6
- Underway data, including continuous (1-minute) navigation, bathymetry, shipboard meteorological measurements, temperature, salinity, pCO_2 (if measured).
- Shipboard ADCP data

Within 6 months of the cruise, presuming the 5-week releases of CTD and discrete salinity data:

- Final salinity, oxygen, nutrients, CFC, CTD data
- Final underway data
- Final shipboard ADCP data
- Final carbon system parameters (Total CO_2 and Total Alkalinity required; pH, pCO_2 if measured)
- CDOM if measured
- Lowered ADCP (if measured)
- Any other Level 2 measurements

Within 6 months of shore-based analysis:

- Tritium/helium
- ^{14}C and ^{13}C
- DON if measured

Within 2 years of analysis:

- Any other (Level 3) observations. Those based on discrete bottle samples should be submitted to the hydrographic data management structure and merged with the other bottle data.
- Underway data should be submitted to the underway data management structure to be merged with the Level 1 and 2 underway data.
- Other discrete sampling programs that are likely to be carried out on many of the cruises, such as transmissometry and optics, should be submitted to the relevant data management groups (examples are a JGOFS SMP project for global transmissometry, and the NASA DAC for optics).

Action Item: The level 1, 2, and 3 requirements and data timeline policy need to be put onto the GO-SHIP web site. Need to add some wording to introduce and clarify the reasoning of the policy need to be included. (GO-SHIP co-chairs and Martin)

7. Data Archive Status

a) CTD and Bottle Data (CCHDO - Jim Swift)

The assembly and distribution center for high-quality global ocean water property data is supported by NSF (80% of total) through 2018, and NOAA (20%, determined annually), going well. It is an intermediary between investigators carrying out CTD/hydrographic field work and the research community, bringing disparate files, information, and formats to a common standard. (Otherwise each data user would need to do this.) "If one can read one CCHDO data file one can read them all" - is a key goal. Good ties exist with CDIAC and NOAA/NODC.

As of mid-2013, the CCHDO supported 1310 cruises, an increase of 449 over 5 years. During this same period the CCHDO added 2674 new data and documentation files and updated 434 earlier files. The CCHDO adds about 2000 pages of documentation each year.

The CCHDO web site is viewed by 5000-14000 visitors per year, from 80-95 countries per year. The CCHDO site areas for each WOCE section are visited by about 250-500 distinct users each year – the section data are well in use by the research community. The main page for each cruise has not only the data, docs, and map, but also the complete data history and immediate access to any files submitted but not yet merged or checked (before going on-line in the principal holdings). Priority is given to USHYDRO and GO-SHIP data & their updates.

The principal CCHDO problem is establishing sustained contacts for data submission from some programs, mostly from a few nations with which the CCHDO is not yet functioning smoothly.

a) CCHDO needs to know of a cruise, or often more important, exactly who to contact for cruise information.

b) Obtaining data from a known cruise - contacting data originators can be difficult. Even once contacted some data originators may not be enthusiastic about providing data or helping the CCHDO obtain them.

Once data are received at the CCHDO, some cruises take time to match data to community exchange standards – but this is a less severe problem now than in the past.

Coming enhancements: Improved interoperability, in particular by:

• Exploit relationship with JCOMMOPS

• DOI (Information session at OS14)

• Discovery Metadata: ISO 19115

• IODE/ADU (Assoc. Data Unit)

Application in Process:

• Linked Data

• Harmonized API (Argo, OceanSITES, CDIAC)

b) Carbon parameters (CDIAC - Alex Kozyr)

Alex Kozyr reported that 16 new data sets from GO-SHIP cruises have been archived recently at CDIAC for cruises established between 2007 and 2013 by Japan, Spain, Norway, US, France, UK, and Canada.

c) Other data (Ship-board and lowered ADCP, underway data - Brian King)

Whilst data from US cruises find a good home at US data centers, this must be initialized for international data. Closer cooperation with JCOMM-SOT will be helpful for some parameters.

8. US Repeat Hydrographic Report (Dick Feely, Lynne Talley, Greg Johnson)

Dick Feely provided an update on the status of the report paper. It is quite long and in its final revision stage. It was suggested that a short form of the document be published as a US CLIVAR report and the complete (including international perspective) article be submitted to an international journal.

Action Item: Dick to send to final US report to Bernadette and Martin Bernadette, Elaine, and Toste to add/edit international component to the article. We should have the article submitted to an international journal by July 2014.

9. Other Business

a) International Indian Ocean Expedition (IIOE-2) – How should we engage? (Brian King and Bernadette Sloyan)

Brian provided a summary of the first meeting held in Hyderabad in May 2013. A draft meeting report has now been produced. Brian was present at that meeting, with the intention of representing Argo, GO-SHIP, and to the extent that I was able, other sustained observing programs. Mike McPhaden was also there, Gary Meyers provided some input to my presentation, and Lisa Beal also sent some material to the convenors.

A 2nd meeting was held in Qingdao, China on November 20-21 2013, and they have planned the 3rd IIOE-2 Reference Group meeting in Mauritius, March 6-7, 2014

The committee had a lively discussion on how GO-SHIP should engage with the IIOE-2 program. The conclusion was that the GO-SHIP committee will recommend that the GO-SHIP Indian Ocean reference sections be included in the IIOE-2 plans and that GO-SHIP engages with the major players of the IIOE-2 to achieve a complete survey of the Indian Ocean sections as part of the IIOE-2 science program. The GO-SHIP section will provide the ability to add additional marine observations, not considered in level 1 or 2, and capacity building for Indian Ocean countries to become involved in the GO-SHIP

Action Item: Lynne and Brian to put together GO-SHIP position and send to Raleigh Hood and Nick D'Adamo. Ideally this should be to them by 6 March for next meeting or as soon as possible.

b) Joint IOOCP, GO-SHIP and Argo Science workshop (Bernadette Sloyan and Dick Feely)

Bernadette and Dick presented the idea of holding a joint IOCCP, GO-SHIP and Argo science workshop meeting in the second-half of 2015. This idea was discussed at the IOCCP SSG meeting (22 February 2014) and was support at that meeting.

We discussed the potential science goals and outcomes of such a combined meeting. In general, the meeting felt this was an idea worth perusing, but noted that we need to better define goals of such a workshop.

The next Agro steering meeting will be held in Halifax, Canada 17-21 March 2014. It would be good to have a document to present to this meeting

Action Item: Greg, Dick, Nicky and Elaine to work on document to produce goals, cross cutting themes for the proposed workshop for presentation at the March Argo meeting.

c) JCOMMS salinity activity (Brian King)

Brian led a discussion on the JCOMM salinity inter-laboratory comparison pilot project. This pilot project was suggested and supported at its meeting in September 2013, JCOMM OCG endorsed a plan for a salinity measurement intercomparison exercise.

Relevant links:
http://www.jcomm.info/index.php?option=com_content&view=article&id=21&Itemid=38
http://ioc-unesco.org/index.php?option=com_oe&task=viewEventRecord&eventID=1194

It is unclear what the intention and outcomes of this project and how it will be relevant to GO-SHIP. However, GO-SHIP needs to maintain some level of involvement. Brian agreed to continue his participation as a GO-SHIP (and Argo) representative.

Action Item: Brian to continue to be involved and report to GO-SHIP on status of the project.

10. Nominations and election of Executive Group and General Committee (comprise of national representatives)

The following committee members were nominated, and elected.

GO-SHIP Committee: Executive Group

Bernadette Sloyan (CSIRO, Australia; co-chair)
Rik Wanninkhof (NOAA, USA; co-chair)
Masao Ishii (MRI-JMA, Japan)
Elaine McDonagh (NOCS, UK)
Takeshi Kawano (JAMSTEC, Japan)
Lynne Talley (SIO, USA)
Toste Tanhua (GEOMAR, Germany)

Martin Kramp (JCOMMOPS, IOC-UNESCO) serves as coordinator

GO-SHIP Committee: Further Members

Leif Anderson (U. Gothenburg, Sweden)
Isabelle Ansorge (UCT, South Africa)
Kumiko Azetsu-Scott (BIO, Canada)
Richard Feely (NOAA, USA)
Masao Fukasawa (JAMSTEC, Japan)

Gregory Johnson (NOAA, USA)
Mauricio Mata (FURG, Brazil)
Herle Mercier (IFREMER ,France)
Aida F. Rios (CSIC, Spain)
Mike Williams (NIWA, New Zealand)

The group thanked departing co-chair Chris Sabine and committee members Nicky Gruber and Brian King for their work.

Action Item: Update web site with new committee and write appreciation letter to out-going members for their outstanding efforts on the Go-SHIP committee (Bernadette, Rik and Martin).