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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

JOINT WMO / IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)

SHIP OBSERVATIONS TEAM

FIFTH SESSION

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SOT-V/Doc. IV-3
(09.04.2009)

ITEM IV-3

Original: ENGLISH

SOOP MONITORING AND DATA MANAGEMENT

(Submitted by the Secretariat)

Summary and purpose of the document

This document provides for (i) a report by the JCOMM in situ Observing Platform Support Centre (JCOMMOPS) regarding the operations and development of the JCOMMOPS in general, (ii) the development and operations of the SOOP metadata (ship and equipment) database, and (iii) the activities of the Global Temperature and Salinity Profile Programme (GTSPP), the Coriolis data centre regarding global temperature data distribution, as well as of the Global Ocean Surface Underway Data Pilot Project (GOSUD).

ACTION PROPOSED

The Team will review the information contained in this report, and comment and make decisions or recommendations as appropriate. See part A for the details of recommended actions.

Appendices:
- A. JCOMMOPS Monitoring and activities
- B SOOP Line Sampling Report for 2007
- C SOOP Line Sampling Report for 2008 – Preliminary results
- D SOOP Line Sampling Report - comparisons over 6 years. 2002-2007
- E. Testing BUFR Encoding of XBT Observations at AOML
- F. Testing BUFR Encoding of TSG Observations at AOML
- G. Monitoring reports by GTSPP and GOSUD

References:
- A. SOT-V Documents I-2.5 (report by the SOT Technical Coordinator)
- B SOT-V Document I-5.1 (JCOMMOPS and the future OPSC)
- C. SOT-V Document I-3.1.4 (Report on Platform Metadata/META-T)
- D. SOT-V Document I-4.6 (Report from SOT-Task Team on Coding)

- A - DRAFT TEXT FOR INCLUSION IN THE FINAL REPORT

IV-3.1 JCOMM *in situ* Observing Platform Support Centre (JCOMMOPS)

IV-3.1.1 Review of the 2007 survey

IV-3.1.1.1 The Argo/SOT Technical Coordinator, Mathieu Belbeoch presented the JCOMMOPS Monitoring and Issues report on behalf of the JCOMMOPS team. He explained the changes which had had been undertaken by the Centre during the last intersessional period. Support is now being provided to the following Observing Programs:

- The Argo Profiling Float Program (70 % Mathieu Belbeoch)
- The Data Buoy Cooperation Panel (70 % Hester Viola)
- The OceanSITES reference station network (30 % Hester Viola)
- The Ship Observations Team (30% Mathieu Belbeoch)

IV-3.1.1.2 Mr Belbeoch further explained that JCOMMOPS had been able to employ the services of an IT expert (1/2 time) for Web Development for all programs.

IV-3.1.1.3 The information system was upgraded during the last intersessional period and usage statistics have been collected since the beginning of 2008 for all JCOMMOPS websites. This gave a good indication of the level of use and the audience of the site. This will help in specifying how new JCOMMOPS web services should be designed in the future.

IV-3.1.1.4 The SOT Technical Coordinator went through some of the key reports generated, especially the SOOP Annual Sampling report, which was completed for 2006 and 2007 and had begun for 2008. He presented some of the results for 2007 and 2008.

IV-3.1.1.5 H Viola has also completed an ad-hoc comparison of the Line Sampling Success over the last 6 years (2002-2007). The Panel noted with appreciation that eleven (11) out of the forty-five (45) lines had been consistently well sampled or improved over the six-year period. However, it noted with concern that (i) eight (8) lines had been consistently under sampled or not sampled, and (ii) in the six-year period, fifteen (15) lines had worsened.

IV-3.1.1.6 The Panel agreed that the Ad-hoc comparison of SOOP Line Sampling Success (2002-2007) was a useful exercise in assisting them with regard to resource planning, line responsibility review, and global SOOP network optimization.

IV-3.1.2 **Timely submission of data for SOOP annual reports**.

IV-3.1.2.1 The Panel urged its members to provide input to the SOT Technical Coordinator on a timely fashion in order for the results of the annual survey for the previous year to be provided early in the year (***action; SOOPIP members: ongoing***).

IV-3.1.2.2 Regarding communication with the SOT Technical Coordinator, Mr Mathieu Belbeoch, the Panel proposed to contact him through the support@jcommops.org email address as emails sent to the latter are forwarded to both Technical Coordinators. This will permit Hester Viola to assist the SOT if necessary.

IV-3.1.3 **Improving ease of upload to JCOMMOPS database**.

IV-3.1.3.1 Mr Belbeoch presented some cross-program issues and discussed future plans for JCOMMOPS development. For example JCOMMOPS is planning:

(i) to completely redesign its web site to make it easier to use and more integrated across all

programs (as part of this exercise, the quality control feedback mechanisms for VOS, Argo and DBCP will be improved)

(ii) to coordinate updates to Best Practice documents that shall be organized for all SOT programs.

(iii) to be actively involved in BUFR template requirements definition

(iv) to address the requirement for a new resource to work on Cruise Planning, and (v) to address the need for improved products to track deployment opportunities with SOT vessels.

IV-3.1.3.2 The Panel requested its members to provide feedback, as required, on the SOOPIP and JCOMMOPS websites and reports generated by JCOMMOPS, especially if it would be useful for new reports or content to be developed. The Panel specifically asked its members to comment on the usefulness of the Monthly SOOP BATHY report, and indicate whether this report shall be discontinued or changed. (***action; SOOPIP members, ongoing***).

IV-3.1.3.3 With the view to manage SOOP metadata better, the Panel concurred with the recommendation made under agenda item I-4.5 that JCOMMOPS receives copies of Publication 47 for national submissions from WMO.

IV-3.1.3.4 The Panel noted the gaps in the DBCP drifting buoy and Argo networks outlined in JCOMMOPS report, and requested its members to routinely provide information to the Technical Coordinator on potential deployment opportunities from ships operating the relevant SOOP lines (***action; SOOPIP members; ongoing***).

IV-3.1.3.5 The Panel requested the Task Team on Instrument Standards to assist the Technical Coordinator in updating documents on Best Practice (***action; TT IS; SOT-VI***).

IV-3.1.3.6 The Panel requested JCOMMOPS to discuss further the issue of improving ease of upload of Ship Metadata to JCOMMOPS database directly with key SOOPIP members in order to develop a proposal, if necessary, at the next SOT Session (***action; JCOMMOPS; SOT-VI***).

IV-3.2 Metadata and coding

IV-3.2.1 Mr Derrick Snowden, Chairperson of the Water Temperature Metadata Pilot Project (META-T) presented a report providing an overview of metadata and coding issues of interest to the SOOP. He had prepared the report together with Francis Bringas (NOAA/AOML), Joaquin Trinanes (NOAA/AOML), and Hester Viola (JCOMMOPS). Mr Snowden recalled that SOOP metadata and coding issues did largely overlap with metadata and coding issues pertinent to the rest of SOT. Issues surrounding the collection and distribution of metadata related to SOOP programs have already been discussed under agenda item I-3.1.4. The overall framework for making improvements to the metadata management for all JCOMM observing system is being considered by the META-T Pilot Project.

IV-3.2.2 Mr Snowden explained that the process for advancing JCOMM data management began with an assessment of the information needs of multiple communities. This survey is a crucial step in advancing the management of observing system information for the long term, and in the current framework, it is the most neglected. Subsequent to an assessment of the needs or requirements for information, is the design of a data distribution system. The data distribution system which will be in place for the near to intermediate term future involves distributing data in BUFR format over the GTS. Therefore, of primary importance to the overall management and distribution of data and metadata, is the design of BUFR templates.

IV-3.2.3 The strategy recommended by META-T is to include as much metadata as is practically available at the time of GTS encoding in the BUFR templates. For these templates to be complete, input from multiple user communities is necessary. SOT and SOOP can facilitate this development by

commenting constructively on the current XBT template and by taking proactive steps to lead the design of a new TSG template. The time-line for implementing BUFR ends with a complete transition to BUFR based encoding for GTS distribution in 2012 and the process of getting a template approved for operational use can take years. In order for a useful TSG template to be implemented, SOT and SOOP must start to collect input for TSG (and ASAP) templates now. Without a proactive role by a responsible group, the BUFR transition will default to implement a direct translation of the current TRACKOB ASCII code form. This is an undesirable result, as the TRACKOB code form does not contain enough metadata to ensure the long-term preservation of underway data. Detailed regarding testing BUFR Encoding of TSG Observations at AOML are provided in Appendix F.

IV-3.2.4 The group is encouraged to be expansive, and consider the data management needs of multiple application areas from short-term numerical weather prediction to long-term retrospective climate analyses. The metadata requirements will inform the development of a BUFR template for underway data, which has not been started and is behind schedule relative to the 2012 deadline for switching GTS transmissions to BUFR. The Panel requested its members with expertise in thermosalinograph data or thermosalinograph operational systems to provide input to the META-T Pilot Project, the SOT-TC or the DMPA TT-TDC on the metadata requirements for thermosalinograph data (***action; SOOPIP members; ASAP***).

IV-3.2.5 The Panel noted that AOML and NCEP had taken successful steps to test the software machinery necessary to encode and decode XBT and TSG data in BUFR format using generic ad hoc templates. Details regarding testing BUFR Encoding of XBT Observations at AOML are provided in Appendix E. These are necessary steps for the full operational transition from ASCII Codes to BUFR. However, the crucial step of defining the full suite of metadata necessary for long-term preservation of the data is incomplete for XBT data and not yet begun for TSG data. In order for a template to be approved for operational use, at least two centres, with separate software implementations must validate the template encoding. NOAA/NCEP is one centre that has participated in tests using ad hoc templates. Once the templates are complete, NOAA/NCEP and another centre must validate the AOML encodings. The panel solicited other agencies, in addition to NOAA/NCEP, to participate in the test to decode BUFR XBT and TSG messages (***action; SOOPIP members; ASAP***).

IV-3.2.6 Considering the Recommendations and Actions that have already been addressed under agenda item I-3.1.4, the Panel requested its members to review the XBT BUFR template and provide comments to the META-T Pilot Project, the SOT-TC or the DMPA Task Team on Table Driven Codes (***action; SOOPIP members; ASAP***). See also agenda item I-4.6.

IV-3.2.7 The Panel noted that there was currently no user community dedicated to defining an appropriate template for the exchange of XCTD data. The panel discussed whether SOOP was the appropriate group to lead this effort. [*SOOPIP decision in this regard to be recorded here*]

IV-3.3 Monitoring reports by GTSPP and GOSUD

IV-3.3.1 Global Temperature Salinity Profile Programme (GTSPP)

IV-3.3.1.1 Dr Charles Sun (NOAA/NODC, USA), Chairperson of the Global Temperature Salinity Profile Programme (GTSPP) presented an overview and future directions of the GTSPP. He recalled that the GTSPP was a joint program of the International Oceanographic Data and Information Exchange committee (IODE) and JCOMM.

IV-3.3.1.2 The last meeting was held at the East-West Center, Honolulu, Hawaii, USA on 27 October 2008. The meeting discussed, in particular the XBT fall rate issue, GTSPP data formats, evaluation of a Cyclical Redundancy Check (CRC) in identification of real-time and delayed mode duplicates, identifying GTSPP data product centres and delayed-mode data assembly centres, cooperation with other programs, and the future of GTSPP.

IV-3.3.1.3 Over past two year period 2007–2008, GTSPP continued to deal in greater volumes of data. The Integrated Science Data Management (ISDM) of Canada managed Real-time data. The U.S. National Oceanographic Data Center (NODC) provided data processing services for delayed mode data and maintenance of the Continuously Managed Database (also known as the GTSPP archive). Delayed mode data include the full resolution data from XBTs or CTDs from the ships, or fully processed and quality controlled data from the organizations that provided the real time low-resolution data to the GTS (Global Telecommunication System). GTSPP continued to improve its capabilities of serving the GTSPP data for operations and climate research. The GTSPP data sets were available at the GTSPP Web site1.

IV-3.3.1.4 GTSPP collaborated with a number of international programs. In particular, it managed the XBT data collected by the SOOP operators. GTSPP developed a strategy for linking XBT profiles to the SOOP XBT survey lines that were sampled, and has been working closely with SOOP to assist in proper documentation of the XBT fall rate in the CMD. GTSPP produced monthly real-time maps including data density maps. GTSPP published a catalogue of the data collected, statistics of data on the GTS from various sources and monitoring reports for each ocean basin. In addition, GTSPP also publishes a monthly ship report that contains errors found. This is then sent to the operators for corrections

IV-3.3.2 Global Ocean Surface Underway Data Pilot Project (GOSUD)

IV-3.3.2.1 Dr Sun presented an overview and future directions of the Global Ocean Surface Underway Data (GOSUD) Project, on behalf of the GOSUD Chairperson, Mr Loic Petit de la Villeon (IFREMER, France).

IV-3.3.2.2 GOSUD is acquiring, controlling the quality, storing in standard format, and disseminating the collected, mostly by cargo vessels, the underway sea surface salinity data. It is establishing a close co-operation with relevant data centres to build a database and develop data management procedures and standards. Recently, GOSUD decided to expand the project to other parameters with salinity as the priority. In 2006, considering that there is a strong complementary interest between the US Shipboard Automated Meteorological and Oceanographic System (SAMOS project) and GOSUD, it was decided to make a joint effort to improve access to high quality underway meteorological and near-surface data collected by research vessels and merchant ships and to identify common potential data providers.

IV-3.3.2.3 The GOSUD data structure is based on a GDAC –Global Data Assembling Center-that centralizes and distributes the data. The data are provided to the GDAC either directly through national contributions or through the GTS (trackob format). The Coriolis data centre hosted by Ifremer-France operates the GOSUD GDAC. The US-NODC (Silver Spring, Maryland) holds the data in their long-term ocean archive. In addition, the US-NODC continuously mirrors the GDAC FTP data server. ISDM (Canada) provides a monitoring function, comparing what is circulating on the GTS and what is available at the GDAC. The objective is to identify new potential sources of data.

IV-3.3.2.4 The amount of data that have been collected has significantly increased from 2007 to 2008. This means that the GOSUD effort to enlarge the network to new data providers produced positive results. For the moment, most of the data that are archived in the GDAC are near real-time data. One of the challenges of years 2009-2010 will be the ability of the project to produce a delayed mode dataset.

IV-3.3.2.5 The Second joint SAMOS-GOSUD meeting was held in Seattle, June 2008. The GOSUG meeting recommended expanding access to underway meteorological and TSG observations in remote ocean regions and marginal seas. The scientific user community must determine critical regions for increased monitoring. GOSUD is encouraging efforts to develop new, and make available

1 http://www.nodc.noaa.gov/GTSPP/

historical upper-ocean and meteorological observations for use by developing nations. One strong conclusion from the GOSUD meeting was that GOSUD, should form a closer relationship with the scientific community, and CLIVAR in particular, to identify which observational parameters GOSUD should acquire and from which oceanic regions to acquire them.

IV-3.3.2.6 The Team noted that GOSUD work Plan for 2009-2010 will focus on (i) continuing to enlarge the network of data collectors and providers; (ii) starting the process of elaborating a delayed-mode dataset; and (iii) taking in account the scientific needs and the satellite community requirements (SMOS and AQUARIUS validation).

IV-3.3.2.7 Considering the importance of a high-quality surface data set that could serve both needs, of operational community, scientific community and satellite community, the Team concurred with the GOSUD Committee recommendation inviting all potential contributors to serve the GDAC. This could include near real-time data and/or historical data (***action, SOT members, ongoing***).

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Appendices: 7

APPENDIX A

JCOMMOPS MONITORING AND ACTIVITIES

(submitted by Hester Viola, JCOMMOPS, and former SOT Technical Coordinator)

JCOMMOPS developments and operations

1. JCOMMOPS structure and resources

1.1 During the intersessional period, the Technical Coordinator worked on the previous two years. The Technical Coordinators' time (relating to SOT) was spent as follows:

- User assistance
- JCOMMOPS - information system operations & maintenance (database, new web server, metadata uploads and reporting)
- Producing monthly maps
- Producing Annual Line Sampling reports
- Worked on SOOP and VOS Metadata within JCOMMOPS database
- Looking at GTS (new data, delays) and Quality Control Relay traffic
- Maintained mailing lists, contact details and user groups on SOT, JCOMMOPS and JCOMM websites
- Maintained and updated websites (DBCP, JCOMMOPS & SOT/SOOP sites)
- Producing reports and maps as required
- Attended monthly meetings with CLS and IOC
- Preparing for and attending meetings

1.2 This year, changes have occurred within JCOMMOPS, which will mean that, nominally one third of Hester Viola's time will be allocated to the OceanSITES Project Office support instead of SOT. Mathieu Belbeoch, who has worked since 2000 as the Argo TC will take over the SOT Technical Coordinator role. There was a period of several months when a significant amount of time will be spent working with the Argo TC on transitioning SOT activities and knowledge. A half time technical person – Laurent Cros from CLS this year, will join JCOMMOPS.

2. Reporting

2.1 Monthly Maps

- The monthly SOOP maps now include information about XCTD and TS observations.
- PDF versions of all maps are now available which allow layers to be toggled on or off to show different observations separately.
- Across JCOMMOPS there has been a redevelopment of the Map layer (GIS) file production for easier maintenance

2.2 SOOP Line Sampling Reports – assessment of success of sampling along UOT lines.

2.2.1 More details of recent results in the XBT sampling along SOOP lines are given in Appendices B and C.

2.2.3 A comparison of SOOP sampling success is also given in Appendix D for the last 6 years showing general trends. The SOOP panel members and operators should be encouraged by the fact that 11 out of the 45 have been consistently well sampled or improved over the 6 years. They should

also take note of the fact that 8 have been consistently under sampled or not sampled, and in the 6 years, 15 lines have worsened i.e. gone from being relatively well sampled to ~50% sampled or from ~50% sampled to being under sampled. The panel is encouraged to review the results and discuss their implications.

2.2.4 2006 SOOP Line Sampling Report was finalised and metadata made available in the SOOP report on http://www.jcommops.org/FTPRoot/SOT/SOOP/Survey/2006-Jan-Dec.zip and on the website at http://wo.jcommops.org/cgi-bin/WebObjects/SOOPIndicators. Members of the panels provided Metadata from Australia-BOM & CSIRO, USA -SEAS/AOML & SIO, Germany, Japan, Italy/Mediterranean, France – IRD Brest & Noumea and India.

2.2.5 2007 SOOP Line Sampling Report was finalised and XBT metadata made available in the SOOP report http://www.jcommops.org/FTPRoot/SOT/SOOP/Survey/2007-Jan-Dec.zip and on the website at http://wo.jcommops.org/cgi-bin/WebObjects/SOOPIndicators. Members of the panels provided Metadata from Australia-BOM & CSIRO, USA -SEAS/AOML & SIO, Germany, Japan, Italy/Mediterranean, France – IRD Brest & Noumea and India.

2.2.6 2008 SOOP Line Sampling Report - Almost all XBT metadata has now been submitted for 2008 (16925 drops), so it can be said that the timely submission of metadata is no longer a real problem, and the SOOP Report for 2008 is in progress. Some initial results will be presented at the SOT-V meeting.

2.2.7 After the XBT Fall Rate Equation Meeting in March 2008, it was decided that all SOOP annual Metadata for the last 7seven years should be exported to text files. These will be used by data managers, operators and especially by NODC for cross-referencing and assessment of which fall rate equation coefficients for data from those SOOP operators who did not record that with the data. The XBT metadata stored in the JCOMMOPS database is now being exported to text files on:

http://www.jcommops.org/FTPRoot/SOT/SOOP/Survey/2006_metadata_soop.txt
http://www.jcommops.org/FTPRoot/SOT/SOOP/Survey/2007_metadata_soop.txt

2.2.8 At the last meeting, the Technical Coordinator offered to try to make the SOOP Annual Line Sampling Report more efficient to generate, so that more time could be spent on User Support and broader coordination issues for JCOMMOPS. This has been relatively successful, as

- now the report includes links to the relevant information on the SOOP website, instead of including it in the document. This saves a lot of time in the final stage of generating the report and makes the report much less bulky. e.g. http://wo.jcommops.org/cgi-bin/WebObjects/SOOPIndicators.woa/wa/summary?line=PX40&year=2007&month=12
- Additionally the Technical Coordinator has worked with the SOOPIP data managers to ensure that metadata files submitted adhere as closely as possible to the submission format, which saves a lot of time in preparing the metadata files to be loaded into the JCOMMOPS database.

2.2.9 SOT III (action IV 1.3.1.5) discussed the monitoring of XBT data on the GTS in real-time, which did not contribute to the UOT implementation plan. In 2005, there were again discrepancies between what is reported as part of the Metadata provision for the SOOP Survey (and analysed for SOOP Sampling Report with respect to the UOT Implementation Plan) and the data actually reported on the GTS for the 12 months. At the last meeting, the Technical Coordinator also raised the issue of differences between the data for XBTs on the GTS and that reported in the XBT Metadata. It is clear that there are some Navy XBT data going onto the GTS which are not part of the SOOPIP (the Canadian Navy sends a callsign of SHIP), plus data from hydrographic surveys the globe, but for the most part the number of drops match fairly well for other operators. There is a potential source of missing data if the XBT message (BATHY) does not reach the GTS in good time, in which case it does

not actually get recorded in time to form part of the JCOMMOPS (via Meteo France) monthly statistics, but this is a minor source of discrepancies.

2.2.10 For reporting and monitoring from JCOMMOPS, several types of regular reports are issued by the Coordinator:

- A monthly map of XBT profiles reported on the GTS,
- A monthly map of sub-surface temperature profiles,
- The annual SOOP Line Sampling Report (Survey), all available on the JCOMMOPS web site.
- Monthly SOOP BATHY report: (which used to be emailed out but is now only available at ftp://ftp.jcommops.org/SOOP/Reports/ up until 2007) is not well utilised.

2.2.11 Feedback is sought again from Panel Members on the reports, in particular, on whether the reports are useful and appropriate.

2.2.12 Some reports have been discontinued as they are either under utilised or no longer deemed necessary

- JJXX or JJYY : The report on those XBT reports going onto the GTS with the old JJXX or JJYY formats instead of JJVV has been discontinued as the was only one occurrence of this (in May 2007, EMPIRE STATE, Call sign : KKFW), so the report does not seem necessary anymore.
- Creation of Upper Ocean Thermal data maps by country. These used to be produced biannually, but are currently not up to date.

The monthly map at http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=GTSM_SZ reports the same information.

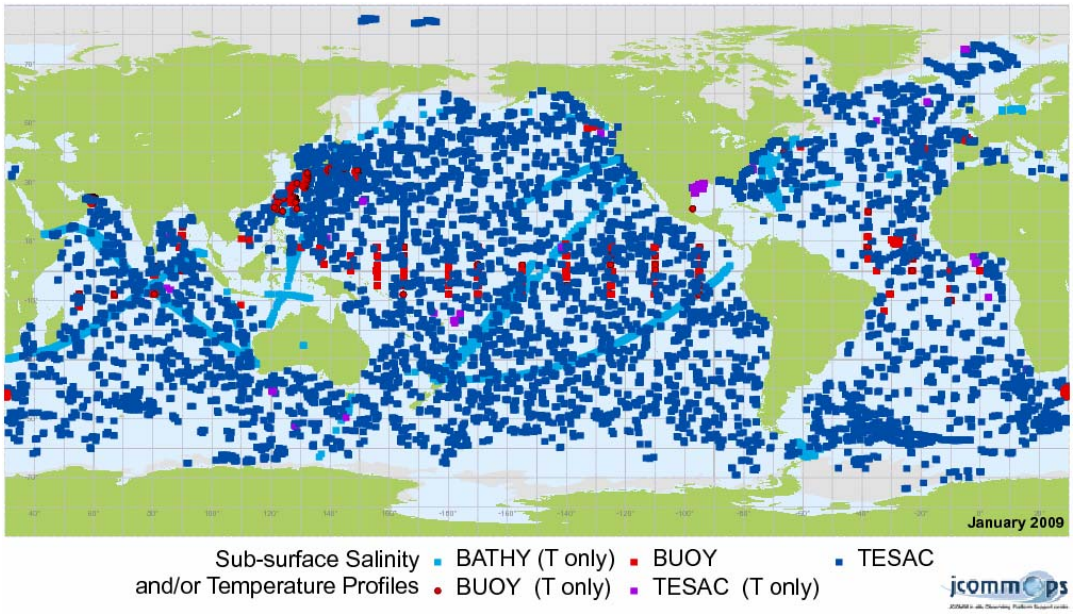

Figure 1 – Monthly map produced by JCOMMOPS showing all sub-surface profiles from all platforms

2.2.13 Considering that these reports were discontinued, feedback is sought again from Panel Members on the reports, in particular, on whether the reports should be reinstated or modified to suit members' needs more, or alternative reports which could be generated.

3. Cross Program Issues

3.1 JCOMMOPS was developed in this context with two Technical Coordinators and has gradually become a near-operational support centre. It is also supported by a ½ time IT person working on web development.

3.2 It provides support to:

- the Argo Profiling Float Program (70 % Mathieu Belbeoch)
- the Data Buoy Cooperation Panel (70 % Hester Viola)
- the OceanSITES reference station network (30 % Hester Viola) as of 2008
- the Ship Observations Team (30% Mathieu Belbeoch) as of 2009

3.3 JCOMMOPS also assists other observing systems on an ad-hoc basis: e.g. GLOSS, ITPs, and Marine Mammals, Bio-Argo. JCOMMOPS monitors their status (with basic reporting) and assists in their data distribution.

3.4 A new I.T. expert, Laurent Cros, started to work (half-time) for JCOMMOPS in September 2008, after many months of preparations and planning. He will assist with developing new products for Argo, DBCP, OceanSITES and SOT and will help us to achieve further integration of services and websites.

3.5 Laurent has been trained on the JCOMMOPS technologies and will start to develop the new JCOMMOPS website, following specifications made by the TCs, in order to move to a fully integrated, simple and easy to use web page for JCOMMOPS as a whole and each component program (though the VOS website will continue to be maintained by the Bureau of Meteorology). Laurent's first task will be to improve the JCOMMOPS Google Earth layers, to be served under the Google Ocean content offering. We have an opportunity to make the JCOMM networks highly visible within Google Ocean so we need to be proactive, starting with the Argo network. The challenge is to make a product that will be used by general public and the JCOMM community, with common templates for all observing systems.

3.6 Whilst the addition of a new half time IT resource is good progress, JCOMMOPS has identified that there could be a need for a dedicated resource (at least a half-time Coordinator) working to better manage information about cruises and ships/ research vessels, in order to capitalise on shared deployment resources (mostly ship-time for deploying floating platforms) and further develop cooperation between programs.

3.7 Proposed BUFR template additions and changes for SOOP were presented to the Expert Team on Data Representation and Codes (ET/DRC) by the Technical Coordinator (H Viola), and should be finalised (along with the JCOMM Task Team on Table Driven Codes) in time to be presented to the SOT-V meeting. The same process will be taken for other networks starting with VOS.

3.8 Platform Metadata about SOOP Ships (and instruments onboard) has been manually entered into the JCOMMOPS database via reports from operators (and some automatically from the Argos System.) This data is however not fully up-to-date. JCOMMOPS would benefit from having direct access to submissions for WMO Publication 47.

3.9 The JCOMMOPS IT infrastructure was upgraded in the intersessional period for better performance.

3.10 One server replaced and set up, all metadata loading and processing scripts were transitioned to this new server. Web Server, FTP Server and GIS Software upgraded. Changes made in response to system upgrades within the Argos System (for Argos 3).

3.11 The JCOMMOPS websites are fairly stable, but delays can occur twice a day (6, 18 UTC) when the whole system is refreshed and fed with heterogeneous data sources. The monitoring system set up within CLS operational team has been gradually tuned and the CLS system administrators are now used to restarting the JCOMMOPS web services when required. This can happen a few times a week (generally at the time above) and seem to have become less frequent.

3.12 The JCOMMOPS and SOT/SOOPIP websites are in need of updating. To better understand the audience of the websites a usage tracking system (Google Analytics) was set up to monitor the traffic. The numbers can be interpreted in many ways, as the definition of one website user or one page view is not simple, especially on dynamic websites. However, the different trends are extremely useful for planning the next version of the JCOMMOPS web services.

- The statistics show that the JCOMMOPS website has the following visit rates: ~80/day, ~400/week, ~1500/month
- 18862 visits in 2008, from 138 countries
- 74748 pages viewed in total.

3.13 The statistics also show that the search engine to find platform metadata is well utilized, as well as meeting documents and maps, but that the SOOPIP website is not as well utilized as other sections of the site. The SOOPIP website needs to be updated and simplified, which will occur as part of the JCOMMOPS web redevelopment. A document is currently being prepared to specify the developments needed on the website (as part of this, the quality control feedback mechanisms for VOS, Argo and DBCP will be improved). Feedback is welcome from panel members.

3.14 Some documentation on the SOOP website has been updated, but there is a need to further update documents on best practices.

3.15 JCOMMOPS looks forward to serving these different ocean observing programmes better than ever, thanks to this new IT support, and hopes to strengthen and stabilize the position to full-time in the future.

3.16 Deployment Opportunities: An important benefit that can come from working across programs is in capitalising on deployment opportunities. For this, JCOMMOPS would like to investigate the opportunities for deployment of floating platforms from SOOP Ships. Some maps are presented below to show the areas where Drifting Buoys and Floats need to be deployed. The networks for DBCP and Argo have achieved the optimal number of platforms and are sustaining that number over time; however, the networks have some persistent gaps, mostly due to a lack of regularly available ships for deployments.

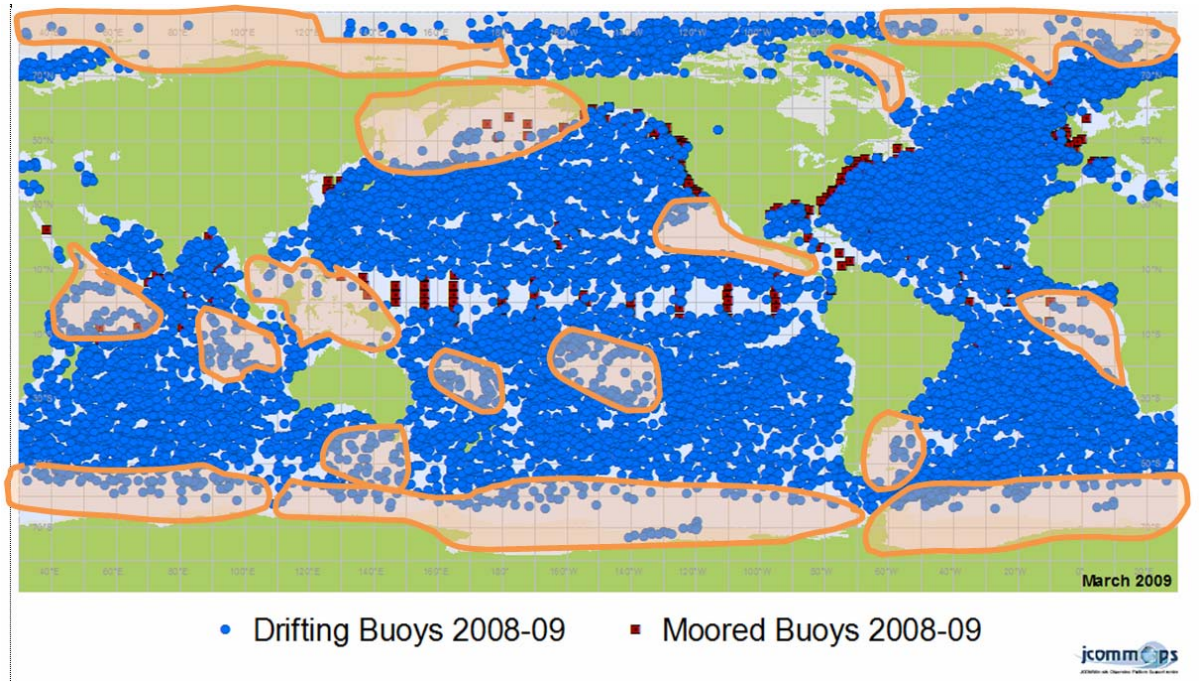

Figure 2 – map showing positions of buoys at the end of the month for the last 15 months (2008-2009) indicating areas where there is little or no coverage for drifting buoys i.e. persistent gaps in the network in orange.

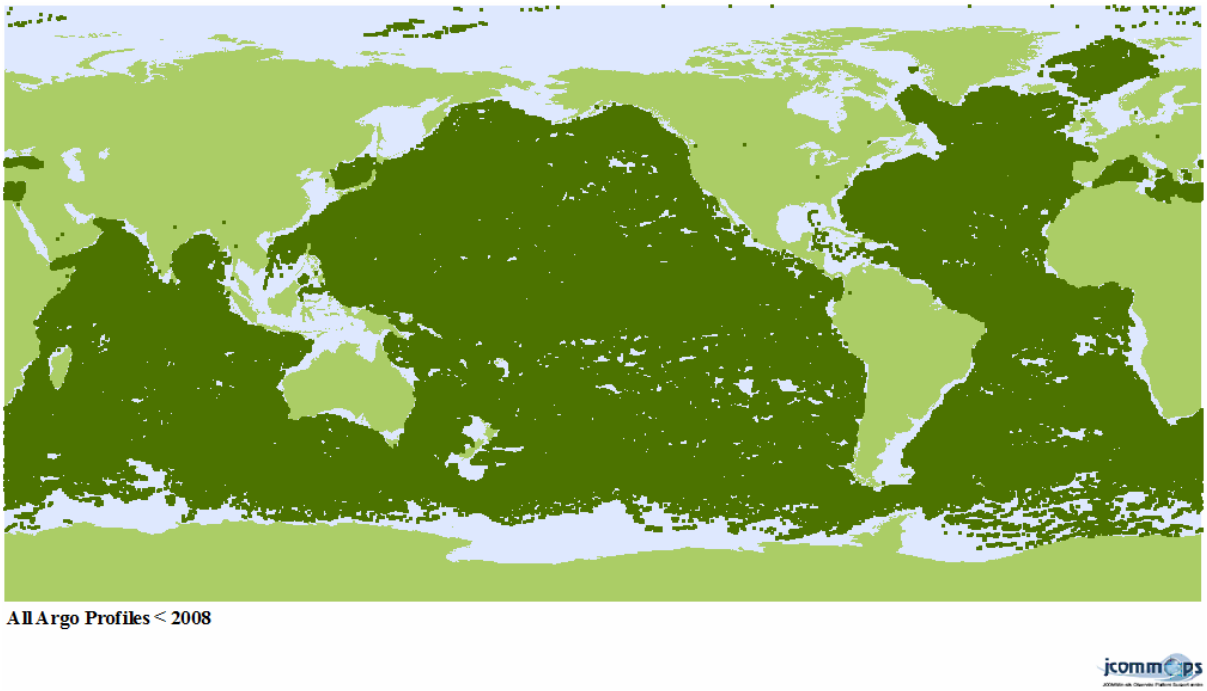

Figure 3 – Map showing all Argo profiles before 2009 which clearly shows the persistent gaps in the network.

3.17 For the Drifting Buoy and Argo networks, the Southern Ocean and Arctic Ocean are areas where deployment opportunities are needed, as well as the central and far north Pacific, surrounding New Zealand and to the west of the African continent.

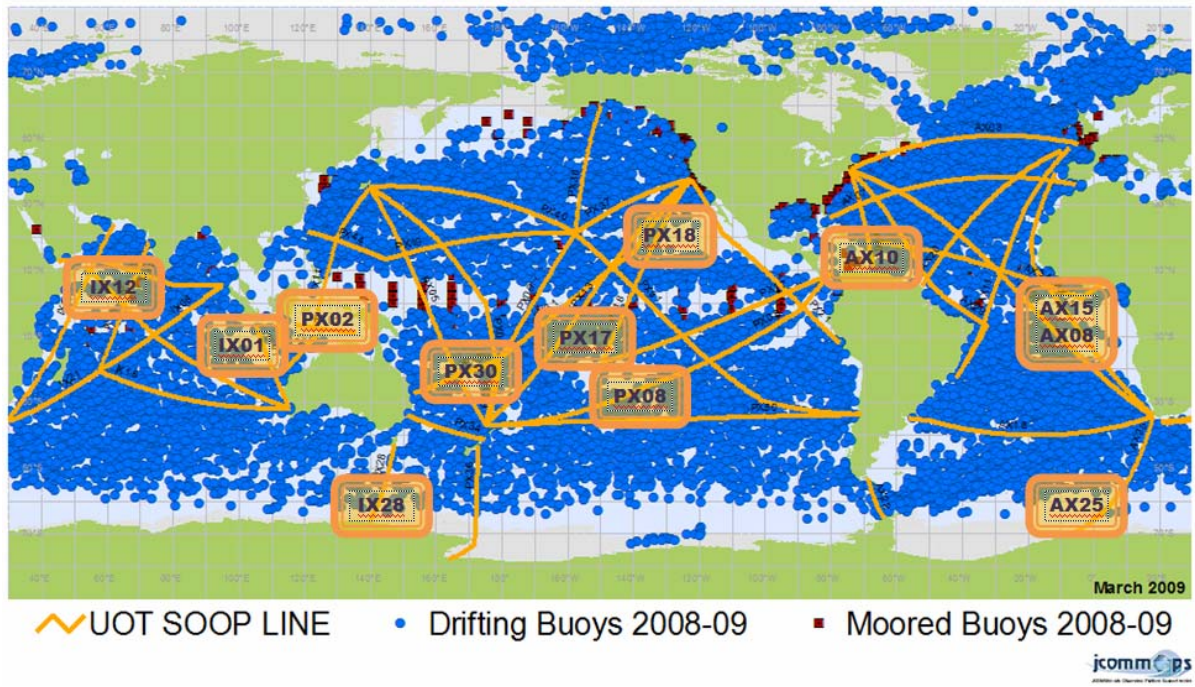

Figure 4 – showing the SOOP lines overlaid on the drifting buoy locations in 2008-09, showing (orange boxes) which lines could be used to deploy drifters to fill gaps in the DBCP network.

3.18 SOOP Lines, which could be used to deploy Argo floats or drifting buoys in areas required, are:

INDIAN	PACIFIC	ATLANTIC
IX01 (BOM)	PX02 (BOM)	AX08 (AOML)
IX12 (BOM)	PX08 (AOML/SIO)	AX10 (AOML)
IX28 (CSIRO)	PX17 (IRD)	AX15 (IRD)
	PX18 (AOML/SIO)	AX25 (AOML)
	PX30 (CSIRO)	

Table 1 – Lines, which have been active in the SOOPIP, which go through areas that have been consistently without drifting buoys

3.19 VOS operators may also be able to provide details of ships that regularly go through areas, which have been consistently without drifting buoys and Argo floats. Any information should be passed to the Technical Coordinator.

3.20 Two useful tools for assessing where drifting buoys or Argo floats may need to be deployed are as follows:

- The Global Drifter Program at AOML provides a map to show the projected locations of drifters 90 days ahead, which can help to decide where it is most important to re-seed the network.

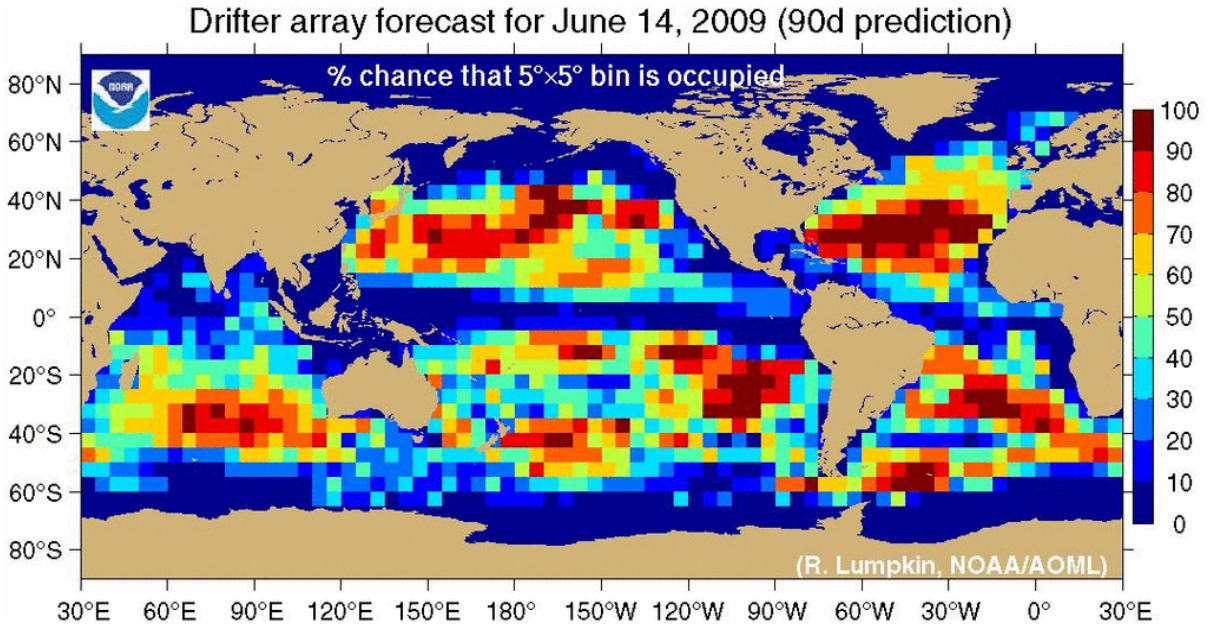

Figure 5 - Drifter Array 90 day Forecast from NOAA AOML see:
http://www.aoml.noaa.gov/phod/graphics/dacdata/forecast90d.gif

3.21 The Argo Information Centre also provides a similar product to show the network density (the number of floats in a 6 degree x 6 degree box)

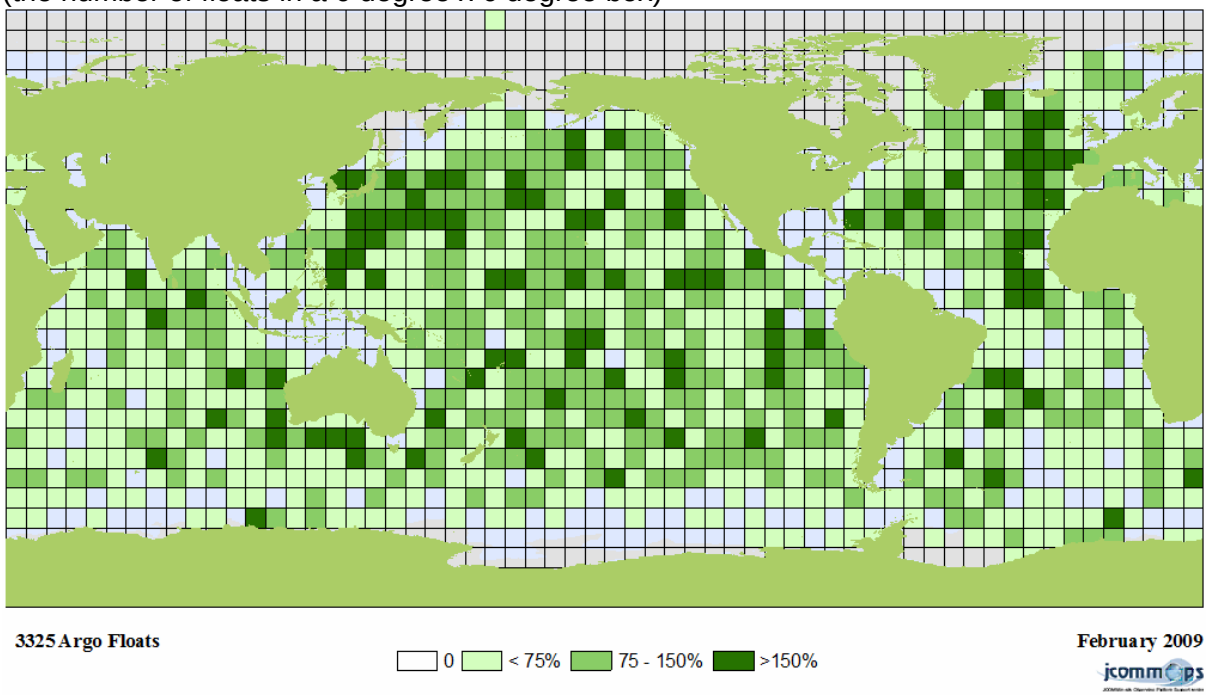

Figure 6 – Network density map for Argo from the Argo Information Centre
http://w3.jcommops.org/FTPRoot/Argo/Maps/2009-02-density66.pdf

3.22 For specific tasks undertaken and actions completed by the SOT Technical Coordinator, relating to SOOPIP, refer to the SOTV documents I-2.4 and I-2.5.

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APPENDIX B

SOOP SURVEY 2007 SUMMARY

(submitted by Hester Viola, JCOMMOPS, and former SOT Technical Coordinator)

1. This report is based upon metadata provided by SOOP operators for January 2007-December 2007.

2. During the period January 2007- December 2007, 18108 drops were committed to SOOP by the participants (other drops for which information was not provided to the SOOP Coordinator are not counted here). The number of probes committed to the programme is lower than the same period last year (i.e. about 18285 probes for January-December 2006).

3. Of those, 14251 were assigned to Upper Ocean Thermal (UOT) review lines. Based on UOT recommended lines and proposed sampling, it is estimated that about 25500 probes are required per year in order to sample all UOT lines properly. 2771 Argo floats were operational on 31 December 2007, for a target of 3000 floats.

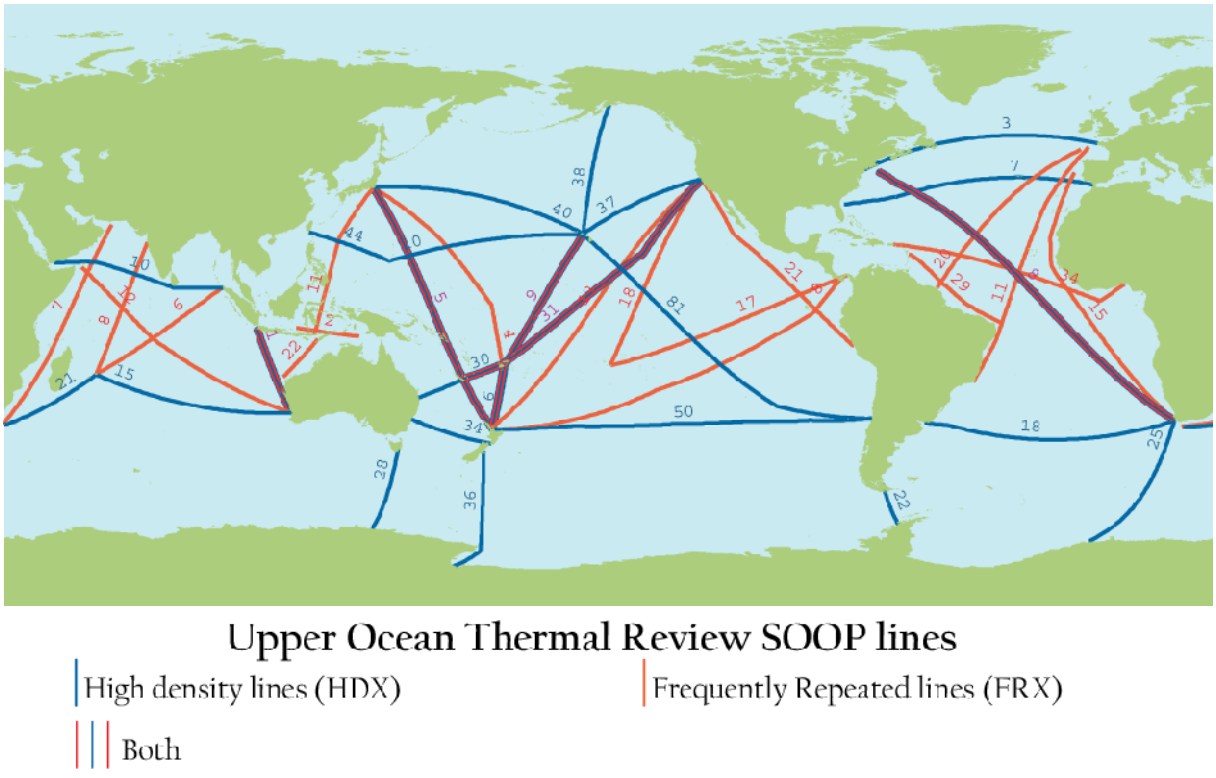

Figure 1 - Upper Ocean Thermal Review lines

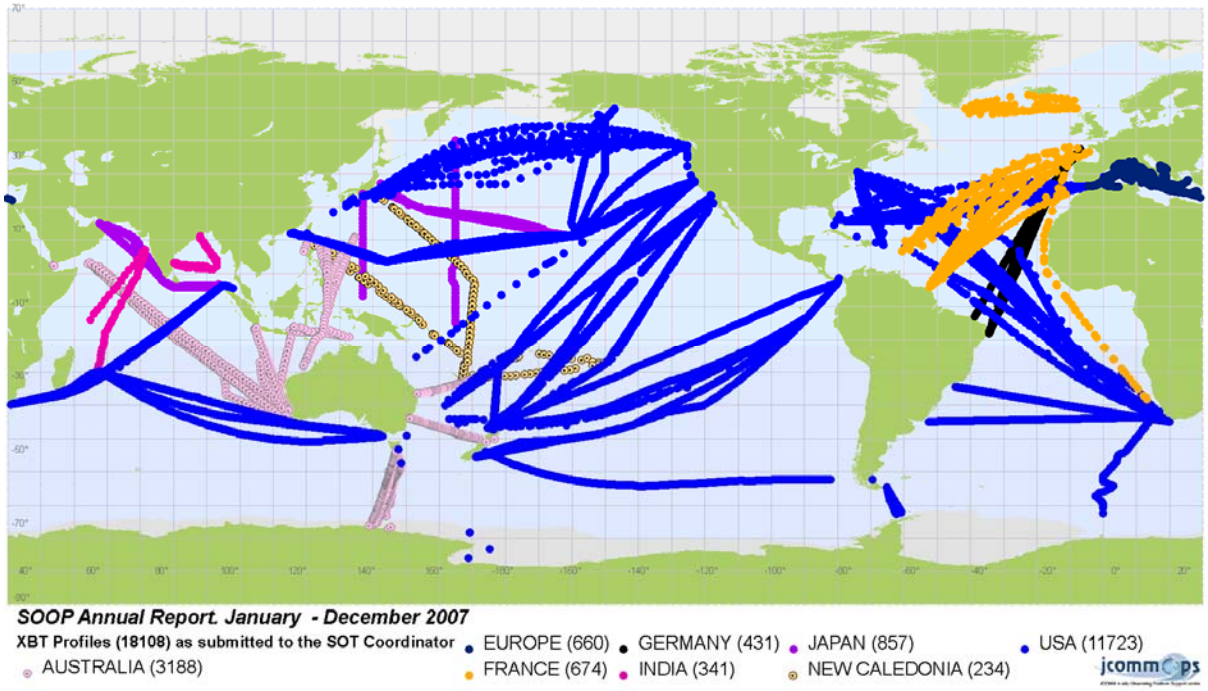

Figure 2 – XBT Drops by country for the period January to December 2007

4. **GTS data (BATHY messages) -** There were however 22588 drops distributed onto the GTS. This includes additional data from navy ships and hydrographic surveys.

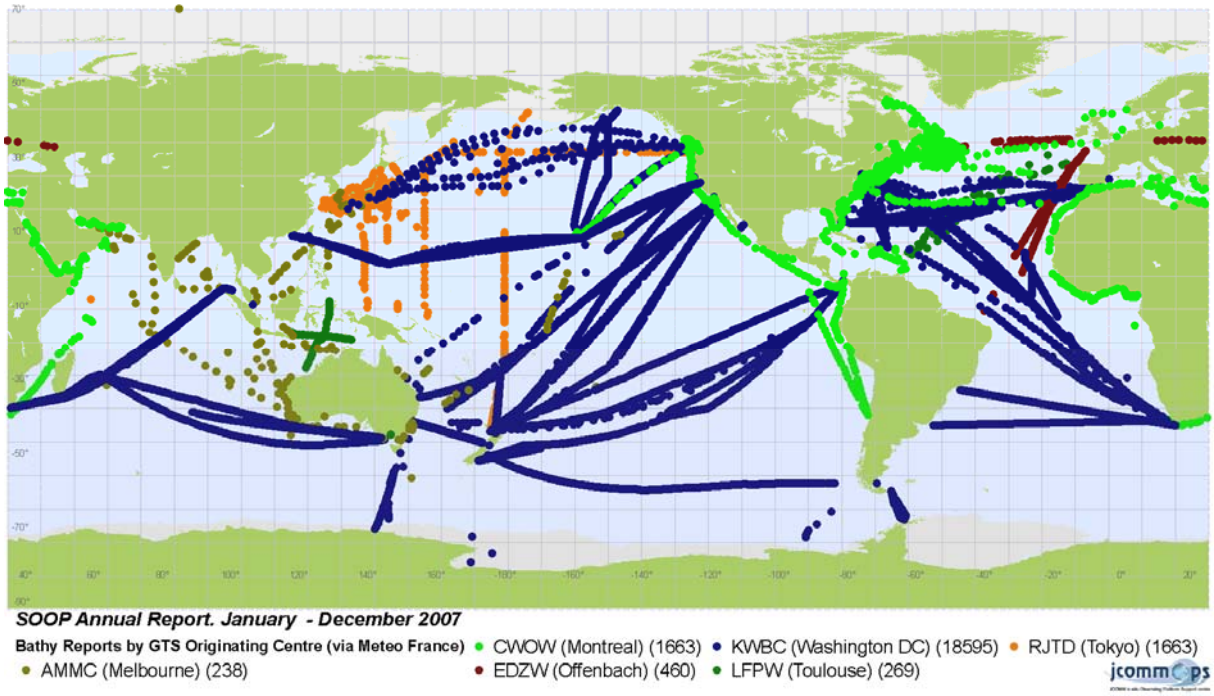

Figure 3 - XBT reports distributed on GTS during 2007(by originating centre)

5. The analysis carried out for the SOOP Annual Line Sampling report produced the following results for those lines recommended by the Upper Ocean Thermal Review:

6. During 2007, for a total of 45 FRX and HDX UOT lines (some of them operated in both modes) we had the following summarised results for the period:

- Well Sampled: 11

- o Oversampled:1
- o 50% Sampled: 8
- o Undersampled: 15
- o Not Sampled: 10

7. Figure 4 below, shows the analysis performed based on this SOOP Annual Report for 2007 along each SOOP UOT Review line – indicating if the line was **Well Sampled, Oversampled, 50% sampled or Undersampled** (those lines not sampled appear as dashed grey lines) based on Upper Ocean Thermal Review requirements.

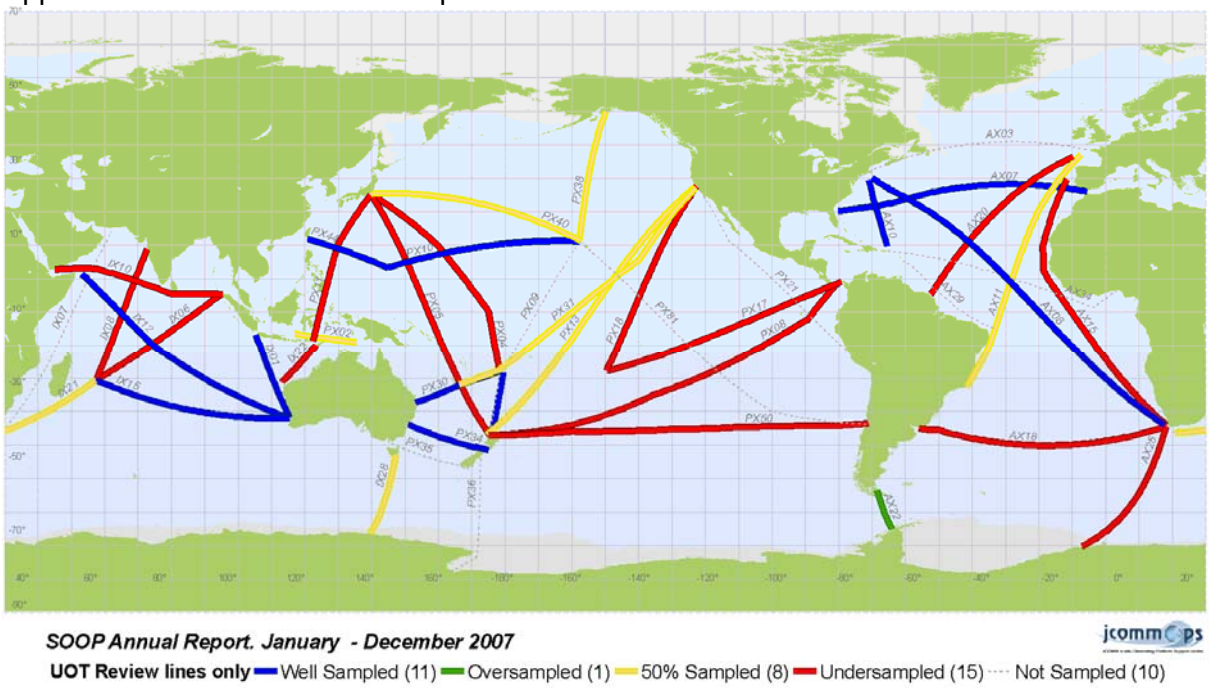

Figure 4 - Results of analysis (comments) for 2007 along only UOT Review SOOP Lines

See: http://www.jcommops.org/FTPRoot/SOT/SOOP/Maps/2007-SOOP-COMMENT-UOT.png

8. The same analysis was completed for all SOOP lines in 2007, the results of which are shown in Figure 5 below , which shows the results of the analysis performed based on this SOOP Annual Report for 2007 along each SOOP line – indicating if the line was **Well Sampled, Oversampled, 50% sampled or Undersampled** (those lines not sampled appear as dashed grey lines).

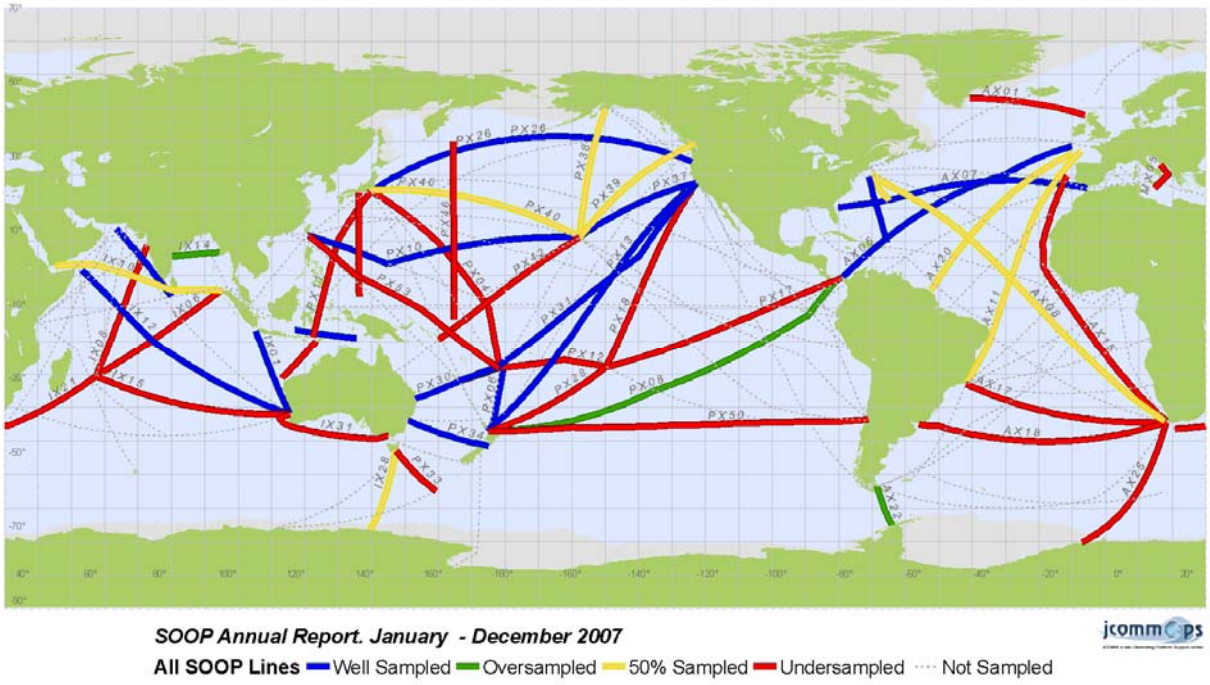

Figure 5- Results of analysis (comments) for 2007 along all SOOP Lines
See: http://www.jcommops.org/FTPRoot/SOT/SOOP/Maps/2007-SOOP-COMMENT.png

Total number of drops during the period by SOOP operator and ocean basin.

	Atlantic	Indian	Pacific	Mediterranean	Global	Total
BOM		1665	117			1782
BSH	431					431
CSIRO		640	766			1406
IRD (Brest)	674					674
IRD (Nouméa)			234			234
JMA			245			245
JMA/JAMSTEC			406			406
MFSPP/MOON				116	544	660
NIO		341				341
SEAS	3877					3877
SEAS/SIO	378	1251	6024			7653
SIO			193			193
TOHOKU-U/JAMSTEC			206			206
Total	**5360**	**3897**	**8191**	**116**	**544**	**18108**

Table 6 – Total number of drops during the period January – December 2007 by SOOP operator and ocean basin.

9. More details can be found in the final report at: http://www.jcommops.org/FTPRoot/SOT/SOOP/Survey/2007-Jan-Dec.zip and on the website at http://wo.jcommops.org/cgi-bin/WebObjects/SOOPIndicators.

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APPENDIX C

SOOP SURVEY 2008 SUMMARY

(submitted by Hester Viola, JCOMMOPS, and former SOT Technical Coordinator)

1. This report is based upon metadata provided by SOOP operators for January 2008-December 2008, though the results are preliminary and the metadata has not all been received or verified.

2. Some Preliminary Results for 2008 are as follows although Metadata submissions have only been received from Germany, Australia (CSIRO), France IRD Brest, Japan, MOON (Mediterranean). India, USA – Scripps and AOML and these figures have not been verified yet.

3. These initial results indicate that the total number of drops for 2008 should reach about the same number as in 2007.

SOOP Operator	2007	2008	2008 GTS data only
Australia BOM	1782		
Germany BSH	431	512	
Australia CSIRO	1406	1314	
France IRD (Brest)	674	675	
France IRD (Nouméa)	234		
Japan JMA	245	268	
Japan JMA/JAMSTEC	406	376	
Mediterranean MOON	660	532	
India NIO	341	286	
USA SEAS	3877	6771	
USA SEAS/SIO	7653	-	
USA SIO	193	6077	
Japan TOHOKU-U	206	114	
Total	**18108**	**16925**	**~27900**

Table 1 – results for number metadata records for drops submitted by SOOP Operators to JCOMMOPS for 2007 and preliminary totals for 2008.

4. As in previous years, the number of messages on the GTS is much higher than the number of drops reported in the SOOPIP metadata. Note that the GTS data figures for 2008 include the drops known to be by the Canadian Navy and many additional BATHY messages by coming via the Japanese GTS centre which are not officially counted under the SOOPIP.

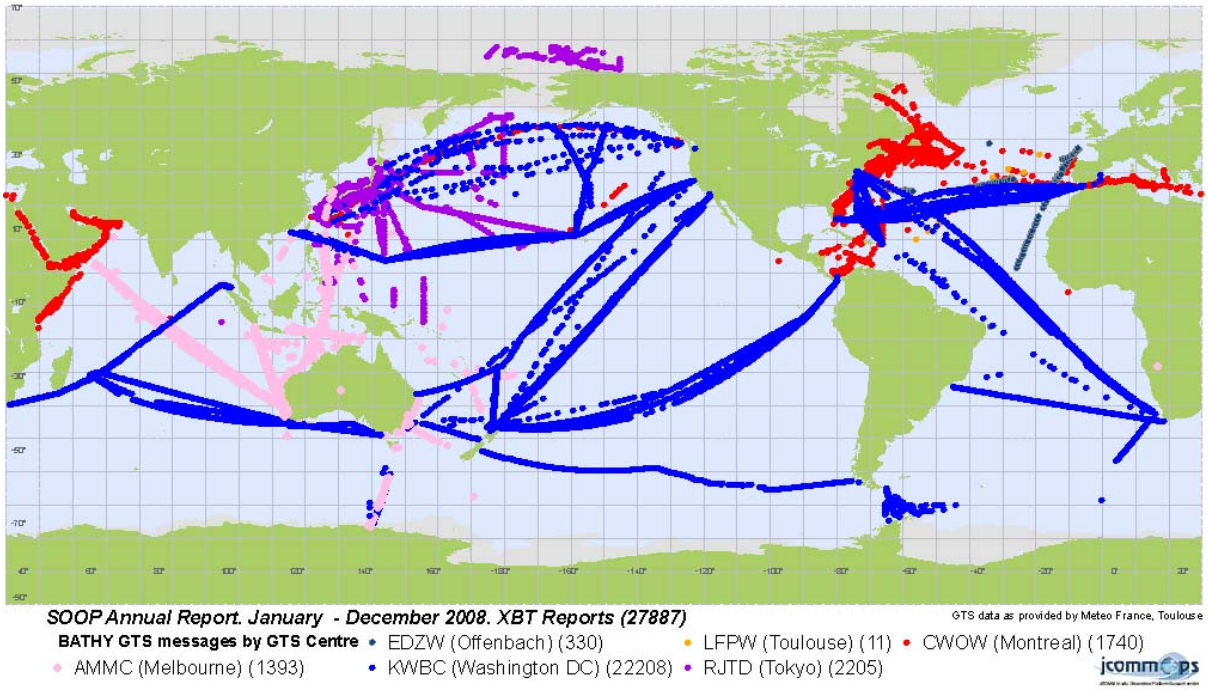

Figure 2 – GTS statistics for BATHY messages on the GTS during 2008.

5. More results should be available for the SOTV meeting and from the online tool http://wo.jcommops.org/cgi-bin/WebObjects/SOOPIndicators, during May 2009.

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APPENDIX D

AD-HOC COMPARISON OF SAMPLING SUCCESS FOR ALL SOOP UOT LINES FOR THE LAST 6 YEARS: 2002-2007

(submitted by Hester Viola, JCOMMOPS, and former SOT Technical Coordinator)

The assessments completed each year for the SOOP Line Sampling Report (previously known as the SOOP Semestrial Survey) give an indication of the global success of sampling along SOOP lines recommended by the UOT, as important complements to Argo.

An ad-hoc comparison of the results of each annual survey, for the past 6 years, has been compiled here, to assist in managing the SOOP resources available and to assist SOOP panel in understanding the performance of the global XBT network over the last three intersessional periods. Hopefully, it will provide some useful information for discussions during the meeting.

A summary of Sampling Success for 45 UOT lines in the last 6 years is given in the Table and Map below.

	2002	2003	2004	2005	2006	2007
Well sampled lines:	18	11	20	15	18	11
50% sampled lines:	8	8	8	2	3	8
Oversampled lines:	3	5	3	2	1	1
Undersampled lines :	6	9	3	15	14	15
Not sampled:	10	12	11	11	9	10

Table 1 - Summary of Sampling Success for UOT lines between 2002 and 2007

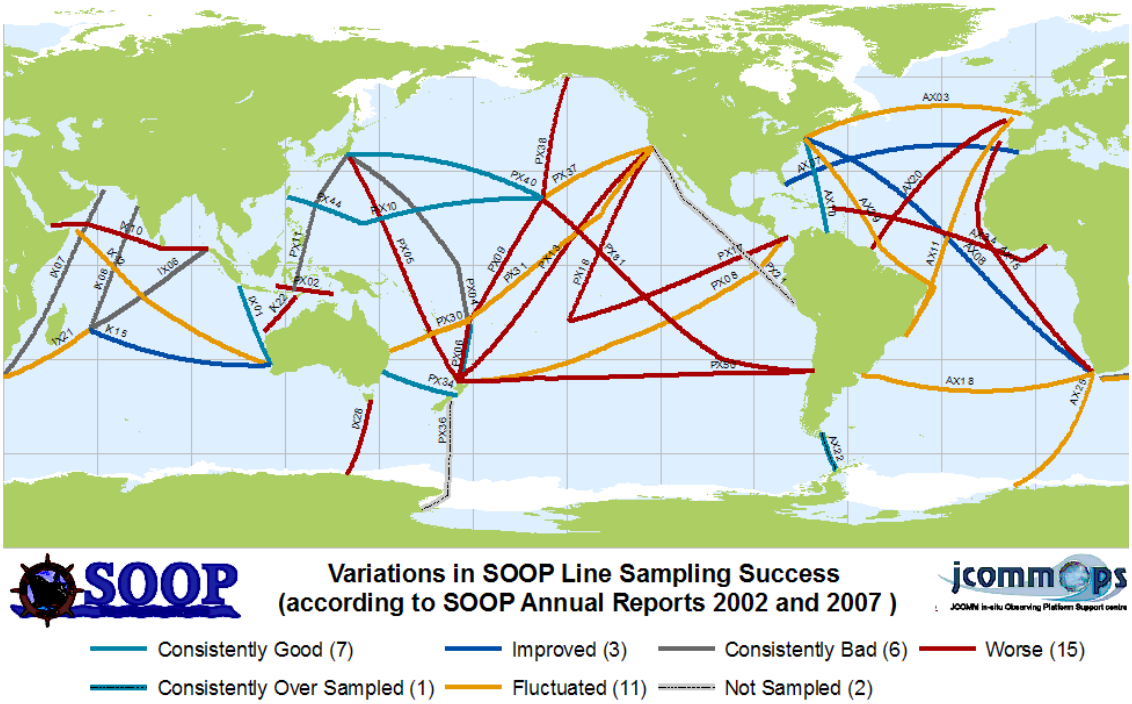


Figure 1 - Map demonstrating the summary of changes in SOOP Line Sampling Success for 45 UOT lines over the last 6 years.

The SOOP implementation panel and operators should be encouraged by the fact

that 11 out of the 45 have been consistently well sampled or improved over the 6 years, but should also take note of the fact that 8 have been consistently Undersampled or Not Sampled, and in the 6 years, 15 lines have worsened i.e. gone from being relatively Well sampled to ~50% sampled or from ~50% sampled to being Undersampled.

The panel is encouraged to review the results, discuss the implications on resource planning, and line responsibilities.

More details about the general trend in Line Sampling Success, for each UOT Line, over time are given in tables below.

Table and Figure 2 - UOT SOOP Lines which have Improved over the 6 years (3)

	2002	2003	2004	2005	2006	2007		Trend
AX07	Undersampled	50% Sampled	50% Sampled	Well Sampled	Well Sampled	Well Sampled	AX07	Improved
AX08	50% Sampled	Undersampled	Oversampled	50% Sampled	Well Sampled	Well Sampled	AX08	Improved
IX15	Not Sampled	Not Sampled	Well Sampled	50% Sampled	Well Sampled	Well Sampled	IX15	Improved

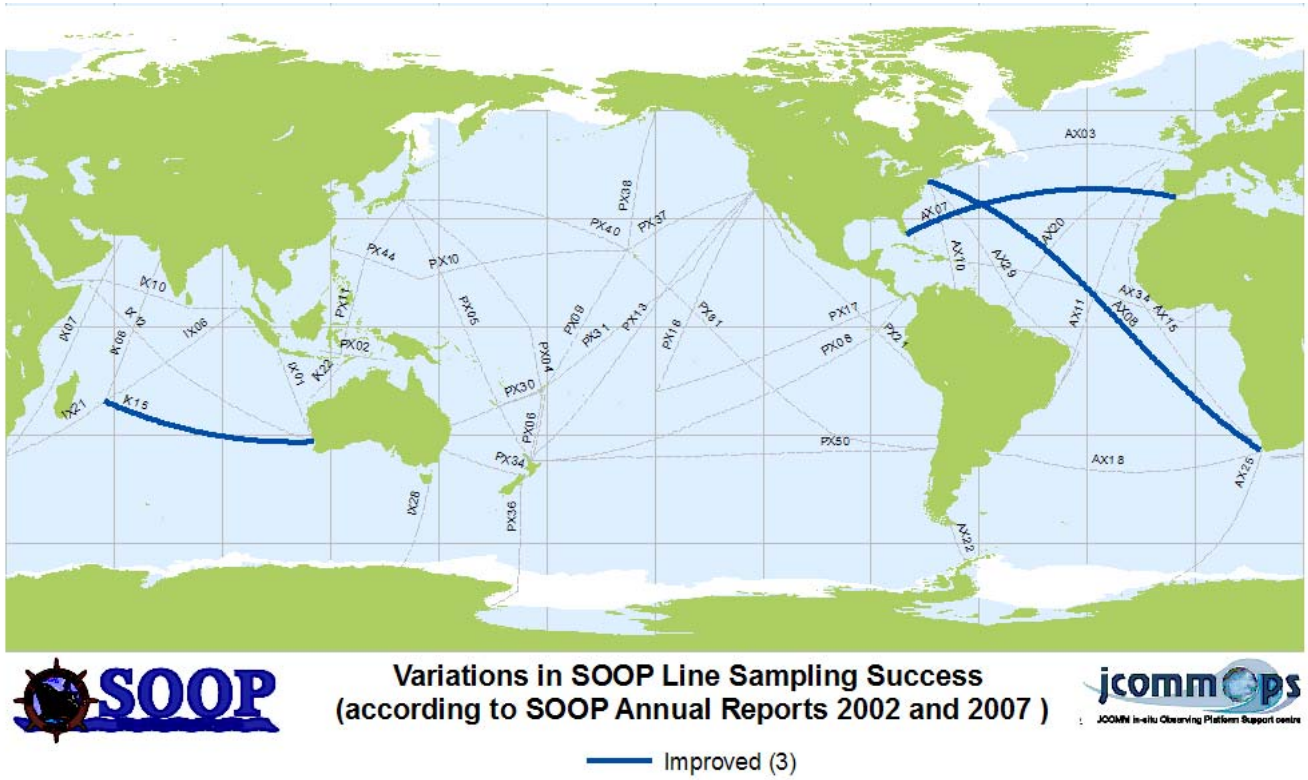


Table and Figure 3 - UOT SOOP Lines which have been Consistently Good or over sampled for 6 Years (8)

	2002	2003	2004	2005	2006	2007		Trend
AX10	50% Sampled	Oversampled	Well Sampled	Well Sampled	Well Sampled	Well Sampled	AX10	Consistently Good
IX01	Well Sampled	Oversampled	Well Sampled	Well Sampled	Well Sampled	Well Sampled	IX01	Consistently Good
PX06	Well Sampled	Oversampled	50% Sampled	Well Sampled	Well Sampled	Well Sampled	PX06	Consistently Good
PX10	Well Sampled	Well Sampled	Well Sampled	Well Sampled	Well Sampled	Well Sampled	PX10	Consistently Good
PX34	Well Sampled	Well Sampled	Well Sampled	Undersampled	Well Sampled	Well Sampled	PX34	Consistently Good
PX40	Well Sampled	Well Sampled	Well Sampled	Well Sampled	Well Sampled	50% Sampled	PX40	Consistently Good
PX44	Well Sampled	Well Sampled	Well Sampled	Well Sampled	Well Sampled	Well Sampled	PX44	Consistently Good
AX22	Oversampled	Well Sampled	Oversampled	Oversampled	Oversampled	Oversampled	AX22	Consistently Over

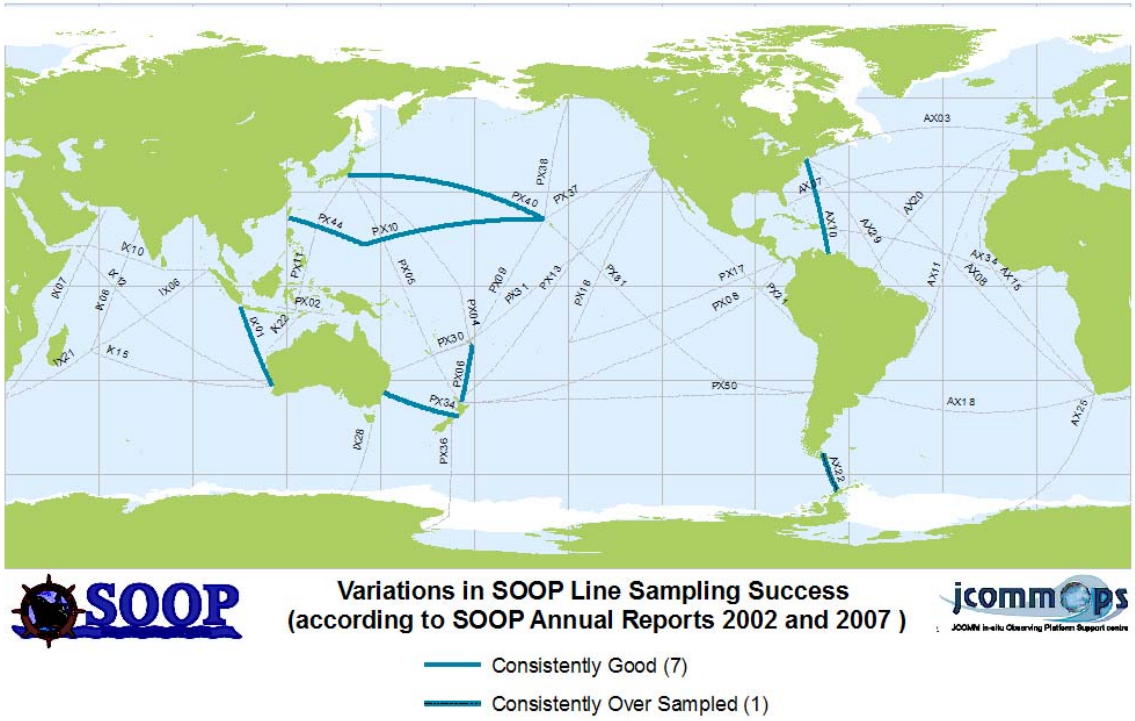


Table and Figure 4 - UOT SOOP Lines which have Fluctuated in Sampling Success during the 6 years (11)

	2002	2003	2004	2005	2006	2007		Trend
AX03	Well Sampled	50% Sampled	Undersampled	Well Sampled	Undersampled	Not Sampled	AX03	Fluctuated
AX11	Well Sampled	Undersampled	Well Sampled	Undersampled	Well Sampled	50% Sampled	AX11	Fluctuated
AX18	Not Sampled	Undersampled	Well Sampled	Well Sampled	Well Sampled	Undersampled	AX18	Fluctuated
AX25	Not Sampled	Not Sampled	50% Sampled	Not Sampled	50% Sampled	Undersampled	AX25	Fluctuated
AX29	Undersampled	50% Sampled	Well Sampled	50% Sampled	Undersampled	Not Sampled	AX29	Fluctuated
IX12	50% Sampled	Well Sampled	Well Sampled	Oversampled	Undersampled	Well Sampled	IX12	Fluctuated
IX21	Not Sampled	Not Sampled	Well Sampled	Undersampled	50% Sampled	50% Sampled	IX21	Fluctuated
PX08	Undersampled	50% Sampled	Oversampled	Well Sampled	Well Sampled	Undersampled	PX08	Fluctuated
PX30	Well Sampled	50% Sampled	Well Sampled	Undersampled	Well Sampled	Well Sampled	PX30	Fluctuated
PX31	Undersampled	Undersampled	Well Sampled	50% Sampled	Well Sampled	50% Sampled	PX31	Fluctuated
PX37	Well Sampled	Well Sampled	Well Sampled	Not Sampled	Well Sampled	Not Sampled	PX37	Fluctuated

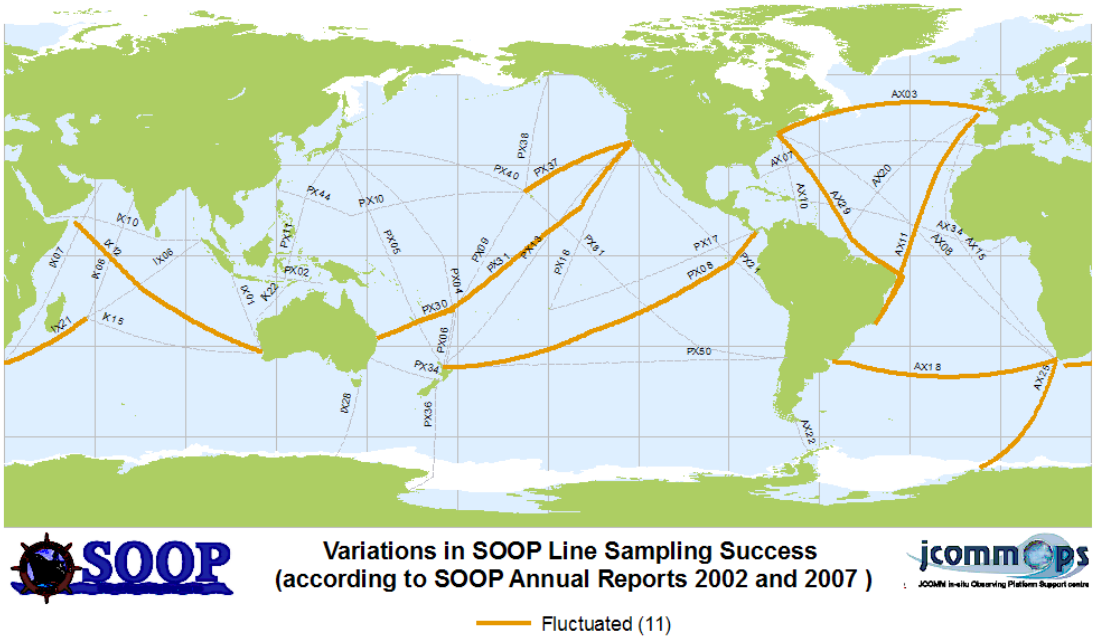


Table and Figure 5 - UOT SOOP Lines which were Consistently Bad or not sampled for 6 Years (7)

	2002	2003	2004	2005	2006	2007		Trend
IX06	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Undersampled	IX06	Consistently Bad
IX07	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	IX07	Consistently Bad
IX08	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Undersampled	IX08	Consistently Bad
IX09	50% Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	IX09	Consistently Bad
PX04	Undersampled	Not Sampled	Undersampled	Undersampled	Undersampled	Undersampled	PX04	Consistently Bad
PX11	Well Sampled	Not Sampled	Not Sampled	Not Sampled	Undersampled	Undersampled	PX11	Consistently Bad
PX21	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	PX21	Not Sampled
PX36	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	PX36	Not Sampled

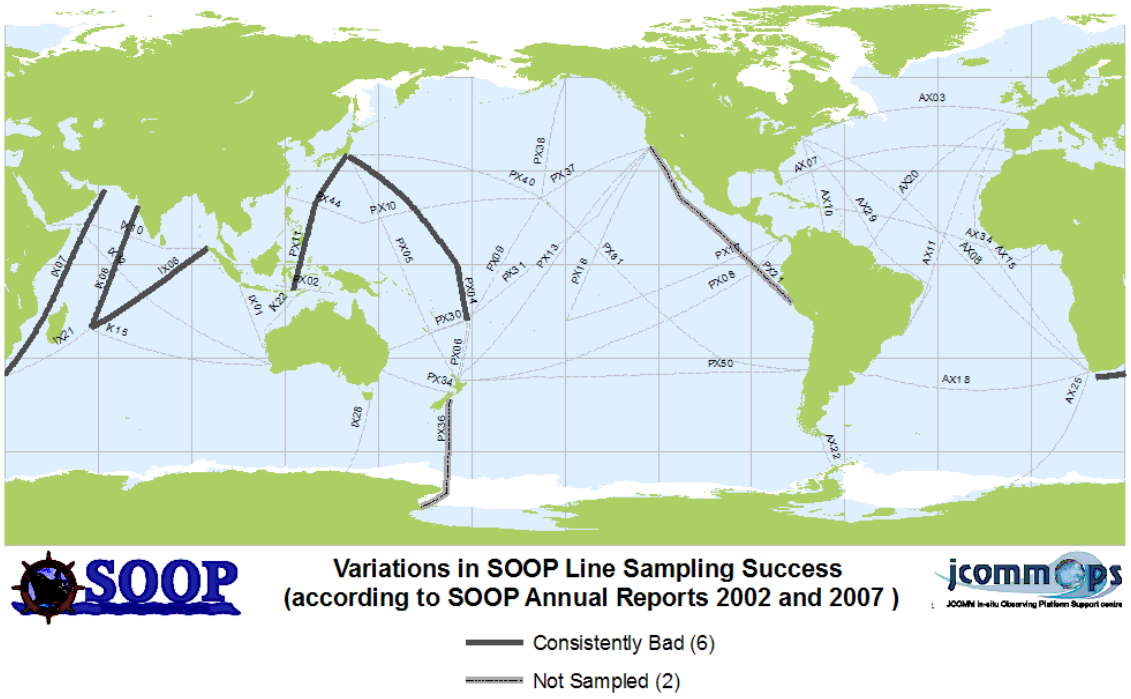
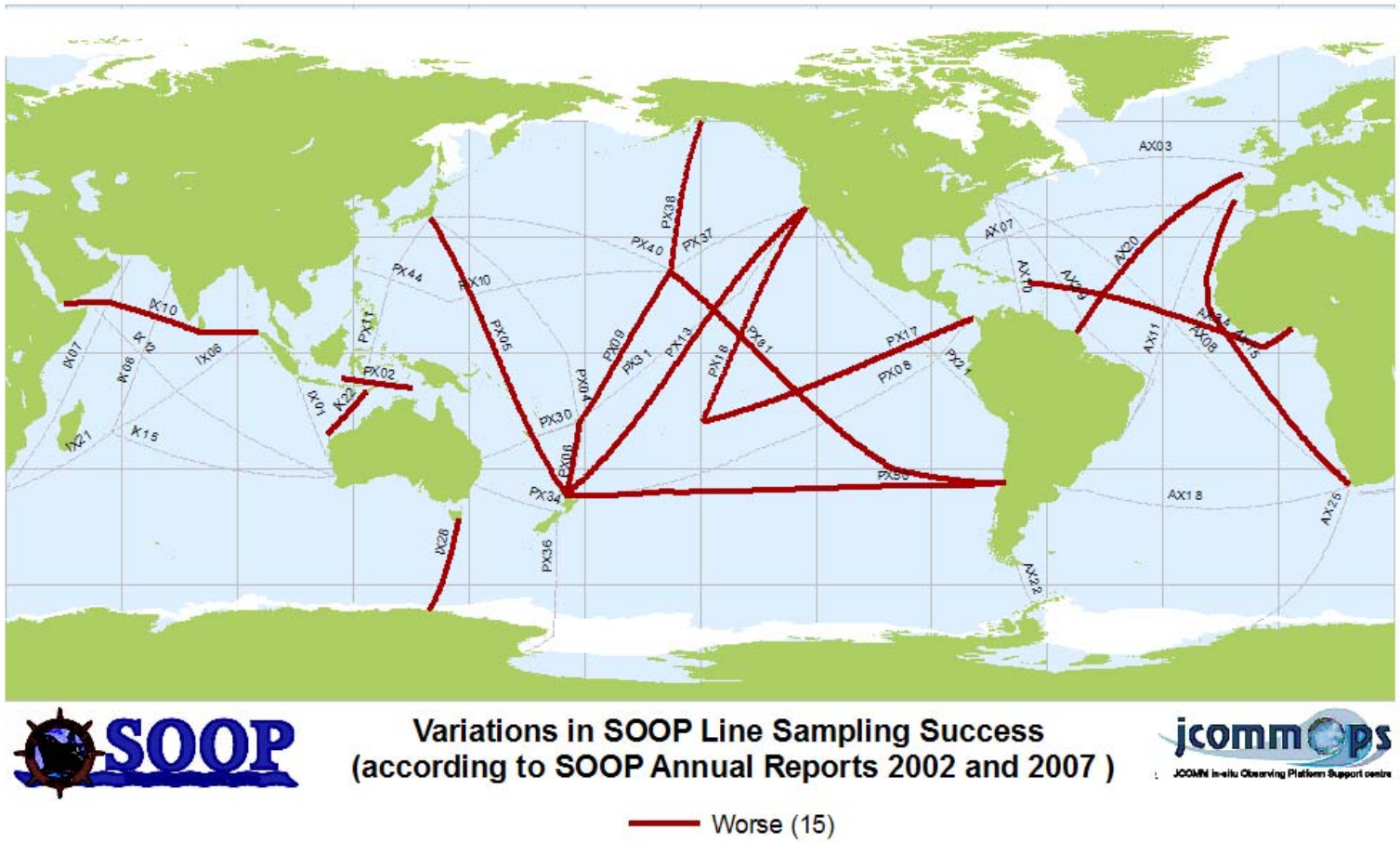


Table 6 - UOT SOOP Lines on which the Line Sampling Success has become Worse over 6 years

	2002	2003	2004	2005	2006	2007		Trend
AX15	50% Sampled	Undersampled	Well Sampled	Not Sampled	Undersampled	Undersampled	AX15	Worse
AX20	50% Sampled	Undersampled	Not Sampled	Undersampled	Undersampled	Undersampled	AX20	Worse
AX34	Not Sampled	Not Sampled	Not Sampled	Undersampled	Undersampled	Not Sampled	AX34	Worse
IX10	Undersampled	Oversampled	Undersampled	Undersampled	Undersampled	Undersampled	IX10	Worse
IX22	Well Sampled	Undersampled	50% Sampled	Undersampled	Undersampled	Undersampled	IX22	Worse
IX28	Oversampled	50% Sampled	50% Sampled	Undersampled	50% Sampled	50% Sampled	IX28	Worse
PX02	Oversampled	50% Sampled	Well Sampled	Well Sampled	Well Sampled	50% Sampled	PX02	Worse
PX05	Undersampled	Well Sampled	50% Sampled	Undersampled	Undersampled	Undersampled	PX05	Worse
PX09	50% Sampled	Well Sampled	50% Sampled	Undersampled	Not Sampled	Not Sampled	PX09	Worse
PX13	Well Sampled	Oversampled	Well Sampled	Well Sampled	Well Sampled	50% Sampled	PX13	Worse
PX17	Well Sampled	Undersampled	50% Sampled	Undersampled	Undersampled	Undersampled	PX17	Worse
PX18	Well Sampled	Well Sampled	Well Sampled	Well Sampled	Undersampled	Undersampled	PX18	Worse
PX38	Well Sampled	Well Sampled	Well Sampled	Undersampled	Undersampled	50% Sampled	PX38	Worse
PX50	Well Sampled	50% Sampled	Not Sampled	Undersampled	Not Sampled	Undersampled	PX50	Worse
PX81	Well Sampled	Undersampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	PX81	Worse

Figure 6 - UOT SOOP Lines on which the Line Sampling Success has become Worse over 6 years



SOOP Operator	2002	2003	2004	2005	2006	2007
Australia BOM	1855	1756	1868	2115	1595	1782
Germany BSH	1014	617	551	589	535	431
Australia CSIRO	984	1107	1179	482	872	1406
France IRD (Brest)	984	386	769	715	542	674
France IRD (Nouméa)	1180	685	873	784	443	234
Japan JMA	292	263	247	244	50	245
Japan JMA/JAMSTEC	960	650	502	587	622	406
Mediterranean MOON	-	-	-	1587	524	660
India NIO	112	-	-	0	121	341
USA SEAS	7635	8097	10332	8700	5463	3877
USA SEAS/SIO	3516	2818	5644	5012	6965	7653
USA SIO	1999	1718	918	601	212	193
Japan TOHOKU-U	455	240	361	341	341	206
Total	**20986**	**18337**	**23244**	**21757**	**18285**	**18108**

Table 7 - Total Number of drops submitted to JCOMMOPS for

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APPENDIX E

TESTING BUFR ENCODING OF XBT OBSERVATIONS AT AOML

(Submitted by Derrick Snowden, Chairperson META-T, Francis Bringas NOAA/AOML, Joaquin Trinanes NOAA/AOML, and Hester Viola, JCOMMOPS)

1. In the previous year, NOAA/AOML and NOAA/NCEP collaborated to test the software necessary to encode and decode XBT observations in BUFR. The test focused on two scenarios differing in the number of XBT profiles included in a BUFR GTS bulletin. The first scenario considered multi-profile bulletins while the second scenario considered single profiles bulletins. The multi-profile bulletin contained 9 profiles. The purpose was to know if NCEP could decode them and to identify any problem that could arise during this process. The profiles were real profiles obtained from the incoming SEAS XBT profiles arriving at AOML. Since the WMO/Commission on Basic Systems had not yet approved an XBT BUFR template for operational use, the test implemented an 'ad-hoc' template that included some of the most important data/metadata elements being discussed at the time including quality flags for the global profile and for each depth level. The exact template used is shown below:

0 0-01-011 = IA5; Ship or mobile land station identifier
1 0-01-019 = IA5; Long Station or site name
2 0-01-036 = table; Agency in charge of operating the Observing platform
3 0-04-001 = Year
4 0-04-002 = Month
5 0-04-003 = Day
6 0-04-004 = Hour
7 0-04-005 = Minute
8 0-05-002 = Latitude (coarse accuracy)
9 0-06-002 = Longitude (coarse accuracy)
10 0-02-032 = table; Indicator for digitization
11 0-22-067 = table; Instrument type for water temperature profile measurement
12 0-22-068 = table; Water temperature profile recorder types
13 0-08-080 = table; Qualifier for GTSPP quality flag
14 0-33-050 = table; Global GTSPP quality flag
15 1-04-000 = Delayed replication of 4 descriptors - can't expand
16 0-31-002 = Extended delayed descriptor replication factor
17 0-07-062 = Depth below sea/water surface
18 0-22-042 = Sea/water temperature
19 0-08-080 = table; Qualifier for GTSPP quality flag
20 0-33-050 = table; Global GTSPP quality flag

2. The master table version was 11, BUFR Edition 3 (we decided to test this version first as most of the data being assimilated by NCEP is v3), Data Category is 31 (Oceanographic data).

3. The NCEP personnel involved in the test were Christine Caruso, Scott Jacobs and Michelle M. Mainelli. During the test phase NCEP indicated that they successfully decoded both scenarios however, since the operational procedures at NCEP were still focused on the BATHY ASCII code, no real assimilation of the data took place.

4. To develop the encoder, AOML used the MEL BUFR library, as provided by Dr. Louis Hembree. The source code is free, easy to implement and use. From our perspective, to move from this experiment into an operational scenario should take a few simple steps once a template has been approved.

5. The software allows to easily use any new template a few changes are needed. In fact, the template structure is one of the arguments provided to the encoder and no hard coding is needed.

6. A similar effort within the IOOS Hurricane Intensification DIF project has been carried out. This time, thousands of synthetic T/S profiles were encoded into various BUFR files, each of them containing about 8K profiles. NCEP told us that they expected maximum message lengths of 50KB and therefore we had to encode the profiles again but this time creating smaller BUFR files (average size ~22KB/~200 T/S profiles each). The template structure was very simple and adapted to the main purpose of the project:

We have used an ad-hoc template comprising the following descriptors:

0 0-04-001 = Year
1 0-04-002 = Month
2 0-04-003 = Day
3 0-05-002 = Latitude (coarse accuracy)
4 0-06-002 = Longitude (coarse accuracy)
5 1-03-000 = Delayed replication of 3 descriptors
6 0-31-002 = Extended delayed descriptor replication factor
7 0-07-062 = Depth below sea/water surface
8 0-22-042 = Sea/water temperature
9 0-22-064 = per thousand; Salinity

7. At this stage of the project, NCEP is working on assimilating these profiles. The source code to move the netcdf profiles to BUFR has been publicly released and is available from the IOOS website.

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APPENDIX F

TESTING BUFR ENCODING OF TSG OBSERVATIONS AT AOML

(Submitted by Derrick Snowden, Chairperson META-T, Francis Bringas NOAA/AOML, Joaquin Trinanes NOAA/AOML, and Hester Viola, JCOMMOPS)

1. Efforts have been made to encode TRACKOB BUFR bulletins. The data source are the near-real-time TSG reports received at AOML from the NOAA fleet and SOOP. The encoding takes place after the QC has been applied and used 'ad-hoc' and the "308010" templates. The latter is a simple copy of FM 62 VIII Ext. TRACKOB and therefore, contains limited metadata. Although we have successfully encoded and decoded these BUFR bulletins, they still have not been used outside AOML for decoding purposes. The software used to encode/decode the bulletins is based on the MELBUFR package, which provides a complete set of functions to deal with BUFR format.

2. Future work on this field will address three main concerns:

- Participate in a group survey of the metadata needs for complete documentation and long term preservation of TSG data
- Establish collaboration with NCEP and at least one operational centre to define a BUFR TSG data distribution scheme within the testing framework. Two-way communication can greatly improve results and speed up the testing phase.

3. Define a new template that includes metadata required by all known user communities. As was described before, limited metadata are included within the current TRACKOB TAC bulletins. Our purpose is to expand the range of descriptors in the template to include other important metadata such as instrument type, intake depth, external reference SST, among others.

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APPENDIX G

MONITORING REPORTS BY GTSPP AND GOSUD

(submitted by Charles Sun, Chairperson, GTSPP, with contribution from Loic Petit de la Villeon, Chairperson, GOSUD)

1. GTSPP (January 2009)

1.1 The Global Temperature and Salinity Profile Programme (GTSPP) is a joint program of the International Oceanographic Data and Information Exchange committee (IODE) and the Joint Commission on Oceanography and Marine Meteorology (JCOMM). IODE and JCOMM are technical committees of the Intergovernmental Oceanographic Commission and the World Meteorological Organization.

1.2 Over past two year period 2007–2008, GTSPP continued to deal in greater volumes of data. The Integrated Science Data Management (ISDM) of Canada managed Real-time data. The number of BATHYs reported steadily increased from 24,855 in 2007 to 27,775 in 2008, while the number of TESACs was 1,630,360 to the end of 2008, dramatically increased from 821,321 in 2007. A new data set of 6,869 CTD profiles derived from marine mammals was made available the first time since July 2008. The data are useful because they get high data return from areas far to south between 60° S and 70°S where data are very little.

1.3 The U.S. National Oceanographic Data Center (NODC) provided the data processing services for delayed mode data and maintenance of the Continuously Managed Database (also known as the GTSPP archive). Delayed mode data include the full resolution data from XBTs or CTDs from the ships, or fully processed and quality controlled data from the organizations that provided the real time low-resolution data to the GTS (Global Telecommunication System). The numbers of the delayed-mode measurements added to the archive were 12,737 and 62,252 in 2007 and 2008, respectively.

1.4 GTSPP continued to improve its capabilities of serving the GTSPP data for operations and climate research. The GTSPP data sets were available at GTSPP's Web site at *http://www.nodc.noaa.gov/GTSPP/*. The usage statistics of the GTSPP data transferred for 2008 increased to 1,557.33GB from 927.409GB in 2007; while the average number of distinct hosts served was 20,238 per year in 2007and 2008.

1.5 GTSPP collaborated with a number of international programs. In particular, it managed the XBT data collected by the operators of the Ship-of-Opportunity Programme (SOOP), which is a subprogram of the Ship Observations Team (SOT) of JCOMM. GTSPP developed a strategy for linking XBT profiles to the SOOP XBT survey lines that were sampled and has been working closely with SOOP to assist in proper documentation of the XBT fall rate in the CMD. GTSPP produced monthly real-time maps including data density maps. GTSPP published a catalogue of the data collected, statistics of data on the GTS from various sources and monitoring reports for each ocean basin. In addition, GTSPP also publishes a monthly ship report that contains errors found. This is then sent to the operators for corrections

1.6 GTSPP also collaborated with the Argo program to fix GTS reports from Argo floats that were reporting pressure instead of depth to the GTS. GTS also worked with the World Ocean Database project and the CLIVAR-Carbon Hydrographic Office (CCHDO) to pull CCHDO data from the Internet quarterly for providing the fully quality controlled high quality CTD data to the Argo CTD Reference Database used for delayed-mode quality control of Argo salinity data.

In May 2007, Mr. Bob Keeley resigned from the GTSPP Chair position. Dr. Charles Sun, NODC, assumed Mr. Keeley's responsibility of managing GTSPP. The GTSPP Steering Group met

twice in conjunction with the Argo Data Management Team meetings over the last intersessional period. The most recent meeting of GTSPP took place at the East-West Center, Honolulu, Hawaii, USA on 27 October 2008. Topics discussed at the meeting included, but were not limited to, the XBT fall rate issue, GTSPP data formats, evaluation of a Cyclical Redundancy Check (CRC) in identification of real-time and delayed mode duplicates, identifying GTSPP data product centres and delayed-mode data assembly centres, cooperation with other programs, and the future of GTSPP. A summary report of the meeting can be found at the GTSPP Web site at http://www.nodc.noaa.gov/GTSPP/document/reports/index.html.

1.7 2009-2010 WORK PLAN

GTSPP will continue its operations in 2009 – 2010. The following table shows the highlights of the activities planned for the period from 2009 to 2010. The tasks listed for completion in 2009 may spill into 2010 or 2011 depending on competing work pressures. Tasks listed as continuing are activities that are expected to continue into the future.

Action item description	*To be implemented by*	*Deadline date*	*Requested from other sources*
2009			
Continue to acquire profiles and make real- time & delayed mode profile data available.	*ISDM and NODC*	*continuing*	*ISDM and NODC*
Continue production of metrics in support of JCOMM OPA and SOT	*ISDM*	*continuing*	*ISDM*
Evaluation of the use of a CRC in real-time and delayed mode duplicates identification	*NODC*	*continuing*	*NODC*
Continue discussions to find data product centres & delayed-mode data assembly centres	*GTSPP Steering Group*	*Continue*	*None*
Complete bi-annual report for 2007 - 2008	*NODC and ISDM*	*April 2009*	*NODC and ISDM*
Prepare a paper on the CRC tag implementation	*GTSPP Steering Group*	*September 2009*	*NODC*
Update the GTSPP RT QC Manual	*NODC and ISDM*	*March 2009*	*NODC and ISDM*
Update the GTSPP NetCDF format in compliance with the Climate Forecast NetCDF conventions	*NODC*	*June 2009*	*NODC*
Collaborate with Argo in making profile data from other instruments available in Argo format	*NODC*	*November 2009*	*NODC*

Action item description	*To be implemented by*	*Deadline date*	*Requested from other sources*
2010			
Convene a two-day workshop for design and requirements of adapting objective analysis (OA)-like tests and serving the GTSPP data via the WMO Integrated Global Observing Systems (WIGOS)	*ISDM, SISMER, and NODC*	*May 2010*	*ISDM, SISMER, and NODC*
Implement a BUFR read-write capability for ocean profile data	*ISDM*	*November 2010*	*ISDM*
Document the procedure of processing the CTD data derived from marine mammals	*ISDM, SISMER, and NODC*	*November 2010*	*ISDM, SISMER, and NODC*
Continue the feasibility study of serving the GTSPP data via the WIGOS	*SISMER, CORIOLIS, and NODC*	*November 2010*	*SISMER, CORIOLIS, and NODC*

2. GOSUD (January 2009)

2.1 During the Sixteenth Session, November 2000, of the IOC Committee on International Oceanographic Data and Information Exchange (IODE), the Committee adopted Recommendation IODE XVI.10 establishing the Underway Sea Surface Salinity Data Archive Pilot Project and its steering group.

2.2 The objectives of the Pilot Project were to:

(i) acquire, quality control, store in standard format, and disseminate the collected, mostly by cargo vessels, underway sea surface salinity data
(ii) establish close co-operation with relevant data centres to build a database and develop data management procedures and standards
(iii) build a comprehensive archive for underway sea surface salinity data including appropriate metadata
(iv) develop and implement procedures for quality assessment of real-time and delayed-mode data based on the Global Temperature-Salinity Profile Program experience
(v) provide data and information online to users in a timely fashion;
(vi) ensure safeguarding of high-resolution delayed-mode data
(vii) co-operate with data collectors to improve the data acquisition systems and to provide information on the data they provide;
(viii) maintain close links with other data collection and management programmes such as JCOMM and SOOP; and
(ix) prepare proposals for the archiving of all potentially available underway data types.

2.3 Later, IODE and GOSUD decided to expand the project to other parameters with salinity as the priority

2.4 In 2006, consideringthe strong interest to develop synergies between the US Shipboard Automated Meteorological and Oceanographic System (SAMOS project) and GOSUD, it was decided to make a joint effort, in order to improve access to high quality underway meteorological and near-

surface data collected by research vessels and merchant ships and to identify common potential data providers.

2.5 The GOSUD data structure is based on a GDAC, Global Data Assembling Center-that centralizes and distributes the data. The data are provided to the GDAC either directly through national contributions or through the GTS (trackob format). The Coriolis data centre hosted by Ifremer-France operates the GOSUD GDAC. The US-NODC (Silver Spring, Maryland) holds the data in their long-term ocean archive. Additionally, the US-NODC continuously mirrors the GDAC FTP data server.

2.6 ISDM (Canada) provides a monitoring function, comparing what is circulating on the GTS and what is available at the GDAC. The objective is to identify new potential sources of data.

In 2008, the data (960,086 locations) from 67 vessels have been gathered at the GOSUD-GDAC. In 2007, the data (598,330 locations) from 40 vessels were available at the GDAC. The amount of data that have been collected has significantly increased from 2007 to 2008. That means that the GOSUD's effort to enlarge the network to new data providers produced positive results. For the moment, most of the data that are archived in the GDAC are near real-time data. One of the challenges of years 2009-2010 will be the ability of the project to produce a delayed mode dataset.

2.7 The GOSUD team met five timesThey held their first three meetings in conjunction with the Argo Data Management meetings. In 2006, it was decided to hold the first joint meeting with the US Shipboard Automated Meteorological and Oceanographic System (SAMOS) Project (see http://samos.coaps.fsu.edu). The primary SAMOS objective is improving access to high-quality underway meteorological and near-surface ocean data collected at high-temporal frequency on research vessels and merchant ships.

2.8 The second joint meeting was held in Seattle –June 2008. From the meeting, eight recommendations were directly linked to GOSUD activities:

(i) Expand access to underway meteorological and TSG observations in remote ocean regions and marginal seas. The scientific users' community must determine critical regions for increased monitoring. (ii) Encourage efforts to develop new and make available historical upper-ocean and meteorological observations for use by developing nations.
(iii) Develop a global data discovery system to identify which research and selected merchant vessels are participating in GOSUD/TSG, SAMOS, PCO^2, radiation and other underway ocean and atmospheric sampling programs.
(iv) Vessels providing underway TSG data should routinely report both intake temperature (sea temperature) and the salinometer temperature (used to calculate salinity).
(v) Initiate effort for vessels making underway TSG measurements to collect daily bottles samples of water to monitor TSG performance and to elaborate a delayed-mode data set.
(vi) Promote the recognition of underway seawater sampling (via GOSUD and AOML) as a critical of the Global Ocean Observing System.
(vii) Maintaining and distributing metadata for meteorological and TSG measurements (e.g., height/depth) is critical for all applications (e.g., data assimilation, satellite validation, etc).
(viii) Assess the impact of TSG data in forecast models.
(ix) Collect results of past and current research to evaluate the importance of TSG observations.
(x) Build best practice guides and continuing education materials to support the needs of technical personnel on the front lines of data collection at sea.

2.9 One strong conclusion from the meeting was that GOSUD should form a closer relationship with the scientific community to identify which observational parameters GOSUD should acquire and from which oceanic regions to acquire them. CLIVAR is one such scientific community.

2.10 In March 2007, Dr. Thierry Delcroix resigned from his GOSUD co-chair position. Mr. Loïc

Petit de la Villéon was nominated as co-chair of GOSUD assuming the chair position with Mr. Bob Keeley.

2.11 The Work Plan for 2009-2010 will focus on (i) Continue to enlarge the network of data collectors and providers; (ii) Start the process of elaborating a delayed-mode dataset; and (iii) Take in account the scientific needs and the satellite community requirements (SMOS and AQUARIUS validation).

2.12 Considering the importance of a high-quality surface data set that could serve both needs of operational community, scientific community and satellite community, the Committee invites all potential contributors to serve the GDAC. This could include near real-time data and/or historical data.

2009-2010 WORK PLAN

Action item description	*To be implemented by*	*Deadline date*	*Requested from other sources*
Continue to collect TSG data and find new data providers	*Co-chairs*	*Continuous*	*GDAC*
Achieve the annual report for 2008	*Co-chairs*	*April 2009*	*None*
Review the proposal for a New Format	*All*	*March 2009*	*None*
Organize the 1st transfer of Ferry Box data to GDAC		*March 2009*	
Effectively set up the data transfer from AOML to GDAC		*March 2009*	
Implement the New format	*GDAC*	*May 2009*	*GDAC*
Distribute the first delayed mode dataset	*GDAC and IRD*	*June 2009*	*GDAC*
Identify existing products which integrate ocean surface data	*All*	*Continuous*	*None*
Make the project more visible	*Co-chairs*	*Continuous action and OceanObs 09 (September 2009)*	
Look into the next steps to have GOSUD as a permanent program instead of a pilot project	*Co-Chairs (Keeley)*		

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