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COMMISSION (OF UNESCO)

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OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)
SHIP OBSERVATIONS TEAM

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PROGRAMME PROMOTION, CAPACITY BUILDING, AND INFORMATION EXCHANGE

(Submitted by the Secretariats with input from Hester Viola, Graeme Ball, Pierre Blouch, and Daniel Manns)

Summary and purpose of document

This document provides information regarding SOT programme promotion, capacity building, and information exchange. It provides information regarding the production of the SOT annual report, the development and maintenance of websites (e.g. highlights of the major changes since SOT-III) and electronic mailing lists, the certificates that maybe presented to ships participating in SOT observing programmes, publications and brochures, and Capacity Building activities.

ACTION PROPOSED

The Ship Observations Team is invited to:

- (a) Review the document and provide comment as appropriate;
- (b) Provide suggestions to improve the website including adding new content;
- (c) Advise the coordinator on additional actions required as necessary and well as on changes required for the mailing lists (Appendix E);
- (d) Advise the WMO Secretariat regarding the format of the SOT annual report;
- (e) Issue certificates to ships participating in SOT observing programmes as appropriate;
- (f) consider previous Capacity Building initiatives as a backbone for future activities on these domains;
- (g) take their recommendations into account and make specific recommendations or take specific actions accordingly to establish an effective mechanism in enhancing countries to actively participate in operational observing programmes;

- (h) define a clear strategy for future Capacity Building initiatives close related with SOT activities.

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- Appendices:**
- A. SOT Flyer
 - B. An example of the SOT Certificate of Appreciation
 - C. An example of the VOSlim Certificate of Participation
 - D. JCOMMOPS web site developments during the intersessional period
 - E. SOT Mailing lists
 - F. Table of contents of the SOT annual report
 - G. Goa Plan of Action 2005
 - H. PMO-III's Programme
 - I. Summary Report on the Training and capacity Building Workshop for the Eastern Indian Ocean
 - J. Prospectus for training and Capacity Building Workshops in 2007 to Benefit Eastern Africa and Indian Ocean Rim Nations

DISCUSSION

1. SOT annual report

SOT Annual report for 2005 was compiled by the WMO Secretariat and published on CD-Rom as JCOMM Technical Publication No. 32 (WMO/TD-No. 1346). It is also available via the web at:

<http://www.wmo.int/web/aom/marprog/Wordpdfs/Jcomm-TR/J-TR-32-SOT-ANN-2005/index.html>

The annual report contains the following:

- The list of national reports that have been submitted to the Secretariat
- The annual report itself. The table of contents is reproduced in Appendix F.

The annual report for 2006 is about to be compiled.

The SOT is invited to comment on the format of the report and to make specific recommendations to the WMO Secretariat in this regard.

2. Websites

The following websites and web applications exist for SOT and its component programmes:

Web sites

JCOMMOPS	http://www.jcommops.org/
SOT	http://www.jcommops.org/sot
SOOPIP. SOOPIP Line Sampling Indicators Application	http://www.jcommops.org/soopip/ http://wo.jcommops.org/cgi-bin/WebObjects/SOOPIndicators
VOS	http://www.bom.gov.au/jcomm/vos/
VOSClim	http://www.ncdc.noaa.gov/oa/climate/vosclim/vosclim.html
E-SURFMAR	http://surfmar.meteo.fr/
ASAPP (drat)	http://www.jcommops.org/sot/asapp/

Web Mapping applications

SOT Monthly (draft)	http://w4.jcommops.org/WebSite/SOTM/
SOOPIP Monthly	http://w4.jcommops.org/WebSite/SOOPM/

SOOPIP Annual (ie SOOP Survey)	http://w4.jcommops.org/WebSite/SOOPM/
GOOS/JCOMM Monitoring Map	http://w4.jcommops.org/WebSite/GOOS

2.1 SOT website

2.1.1 Changes to Website

Some cosmetic changes were made to <http://www.jcommops.org/sot/> for consistency with other JCOMMOPS hosted sites. Contact details were updated.



2.1.2 SOT Monthly Mapping

A draft monthly map for SOT was created (headings and reported dates are incorrect, but data is updated at the end of each month from the GTS data received at JCOMMOPS (via Meteo France). Review of this is sought by Team members.

<http://w4.jcommops.org/WebSite/SOTM/>

Includes the following layers (updated at the end of each month)

- ASAP GTS Data (Last Location)
- VOS GTS Data (Last Location)
- SOOP Drops on GTS (by originating GTS centre)

NB For users of Geographic Information Systems (GIS) - A Web Map Service (WMS) is available for this mapping application. Details are available from the Technical Coordinator.

Monthly status maps for VOS:

New VOS Monthly (static map generated at the end of the month)

VOS Ship Locations:

http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=GTSM_VOS

Feedback was sought from Panel Members on these maps.

2.2 VOS Web site

2.2.1 Background

The need for a dedicated JCOMM VOS website was recognised at the first meeting of the JCOMM Observations Coordination Group (OCG-I), La Jolla, 2002. Subsequent to that meeting, the WMO Secretariat made a request to Graeme Ball and the Australian Bureau of Meteorology develop, maintain and host the JCOMM VOS website. Both parties agreed to the request from the WMO Secretariat.

2.2.2 Overview

The website was originally developed around the VOS Framework Document, the Final Report from SOT-I, plus material from WMO Regional PMO Training Workshops held in Melbourne, 1999, and Cape Town, 2000.

Since its inception in 2001, the website has undergone some structural change and is now based around five (5) themes:

1. The Voluntary Observing Ship Scheme;
2. Port Meteorological Officers;
3. Supplementary Programmes;
4. Operational resources; and
5. General Information.

The homepage of the VOS website is shown below and accessible at <http://www.bom.gov.au/jcomm/vos/>.



Voluntary Observing Ship Scheme

A component of the Ship Observations Team within the Observations Programme Area of JCOMM
(Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology)



Optimised for a minimum screen resolution of 1024 x 768 pixels
External links will open in a new browser window



All pages use valid HTML 4.01 and CSS 2.0, and conform to Level A WCAG 1.0

The JCOMM VOS website use cascading style sheets (CSS 1.0) to define the page structure and formatting, is fully compliant with W3C coding specifications (HTML 4.01), and voluntarily conforms to Level A of the Web Content Accessibility Guidelines (WCAG 1.0) for visitors with disabilities.

2.2.3 Structure

1. VOS Scheme

- a. Introduction
- b. Rationale
- c. Existing System
- d. Data Management
- e. Real-time Data Quality
- f. Automation of Observations
- g. Relation to the GOOS
- h. Other Activities
- i. Coordination

2. Port Meteorological Officers

- a. Introduction
- b. Location of the PMO
- c. Function of the PMO

3. Supplementary Programmes

- a. VOSclim
- b. ASAP
- c. SOOP

4. Operational Resources

- a. Ship Directories
- b. Electronic Logbook Software

- c. Communications
- d. Promotional Material
- e. Certificates & Awards
- f. VOS Monitoring
- g. Ship Inspection Resources
- h. National Observing Practices
- i. National Focal Points

5. Information

- a. VOS Quick Reference Guides
- b. VOS Publications
- c. WMO No. 47 XML Schema
- d. SOT Meeting Reports
- e. JCOMM Meetings & Workshops
- f. JCOMM & related Websites
- g. National VOS & PMO Websites
- h. Complementary Marine Websites

2.2.4 Major changes since SOT-III

1. Improved organization of the miscellaneous links and resources under new top-level categories:
 - a. Operational Resources; and
 - b. Information.
2. Completed the following Action Items from SOT-III during Q4, 2005:
 - a. Added the SOT Recruitment Flyer;
 - b. Added the SOT Recruitment Presentation; and
 - c. Added the generic Sot Certificate of Appreciation.
3. Added (Q3, 2006) details of national observing practices for barometers and barographs on behalf of the *Task Team on Instrument Standards*.
4. Added (Q4, 2006) the VOS Quick Reference Guides for Port Meteorological Officers and VOS Program Managers developed by the Chairs of the SOT and the VOSP.
5. Added (Q2, 2006) the foreign-VOS Inspection Form.
6. Progressively added links to monitoring resources provided by:
 - a. The RSMC (VOS QM);
 - b. The RTMC (VOSClim QM); and
 - c. Meteo France (VOS QM and multiple recruitment)
7. For WMO No. 47 Metadata version 3, added (Q3, 2006):
 - a. XML Schema and supporting documentation;
 - b. Documentation as described in the report by the Task Team on Metadata for WMO No. 47.
8. Added the Final Report from SOT-III, Brest, 2005.

2.2.5 Improvements

Like any good website, the content of the VOS website must remain fresh and continually evolving so that the requirements of the VOS community continue to be satisfied.

Already under consideration:

1. As discussed and demonstrated at PMO-III, provide a clickable map showing PMO locations with popup PMO contact details, including photograph.
2. Depending on the outcome of discussion during VOSP regarding cooperation and integration with related programmes, include profiles of other programmes under “Supplementary Programmes” with links to the respective programme websites.
3. Include links to more VOS and/or PMO websites. This is dependent on national focal points providing details about relevant websites. A submission facility is available on the VOS website to add a new link.

2.3 E-SURFMAR

2.3.1 The Marine Observers’ Log

A new website has been developed to store phenomena type reports, principally drawn from TurboWin electronic logbooks. Called ‘WikiLog’, it is based on the open source software Wikimedia and is hosted by Météo-France. Observations are archived by category and date. The main categories are observations of astronomical phenomena in the high and low atmosphere, observations of marine life, and any other made at sea that may be of scientific interest. Although the website was only set up a few months ago, more than 400 observations have already been logged thanks largely to the contributions made by the UK Met Office and KNMI.

The WikiLog website is not static. Any one with a recognized interest in marine observing, can make a request to open an account and add observations directly if they so wish. Comments and discussion can also be added against each observation. It should be noted that all material included on the website is subject to copyright provisions which must closely be observed.

The WikiLog address is : <http://esurfmar.meteo.fr/wikilog/>

Further information is also available at <http://esurfmar.meteo.fr/wikisurf/index.php/North-001>

2.3.2 Repository for articles relating to marine observing activities

A repository for articles relating to marine observing activities has been hosted on the E-SURFMAR website. This sub-site has been developed as an alternative to an international newsletter which, whilst still desirable, would require considerably more resources.

By the end of February 2007, three articles were posted on the website. Potential authors are invited to submit their articles to Pierre Blouch (Météo-France) or to ask him to open an account on the website in order they publish their articles themselves.

The ‘Articles’ homepage is:

http://surfmar.meteo.fr/wikisurf/index.php/Marine_Observing_Articles

2.3 VOSClm website

VOSClm web site is accessible via the following URL:

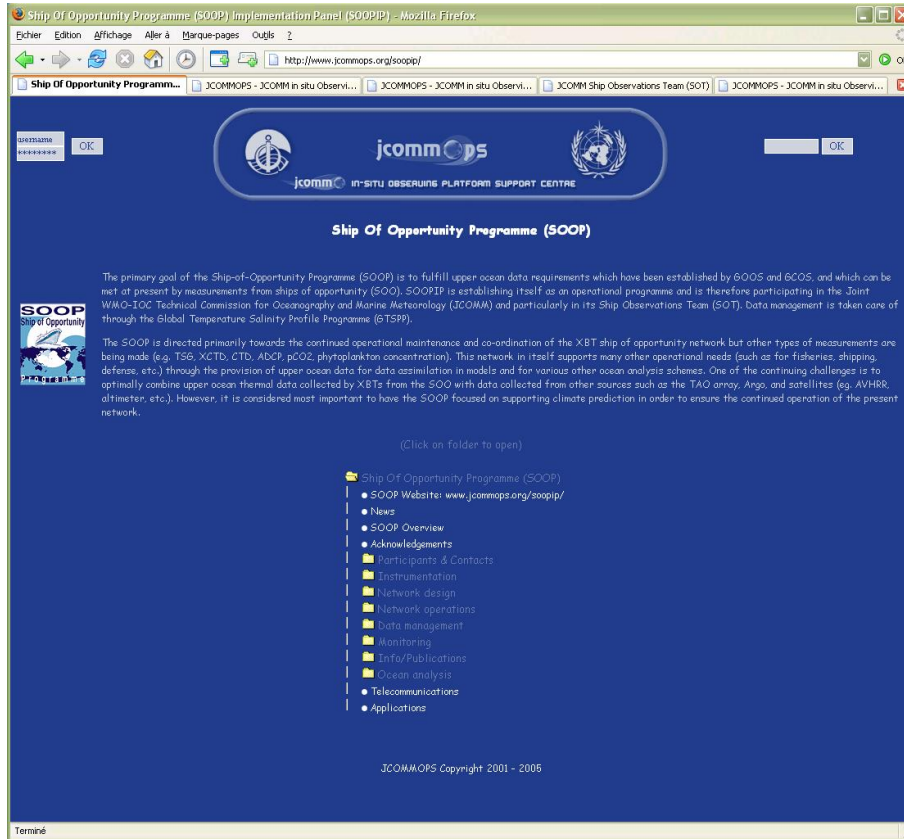
<http://www.ncdc.noaa.gov/oa/climate/vosclim/vosclim.html>

2.4 SOOP website

2.4.1 Changes to Website

Only minor cosmetic changes were made to the SOOPIP (<http://www.jcommops.org/soopip/>) to remove/replace out of date information, altered some wording and made the look and feel more

consistent. Contact details were updated.

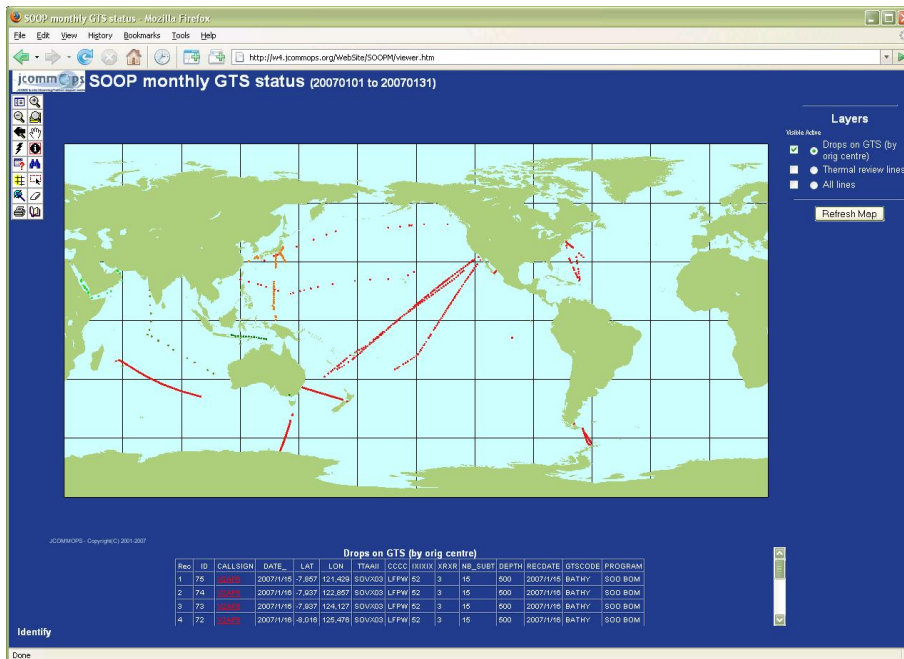


2.4.2 SOOP Monthly Mapping

A draft monthly map for SOT was created. Review of this is sought by Team members.

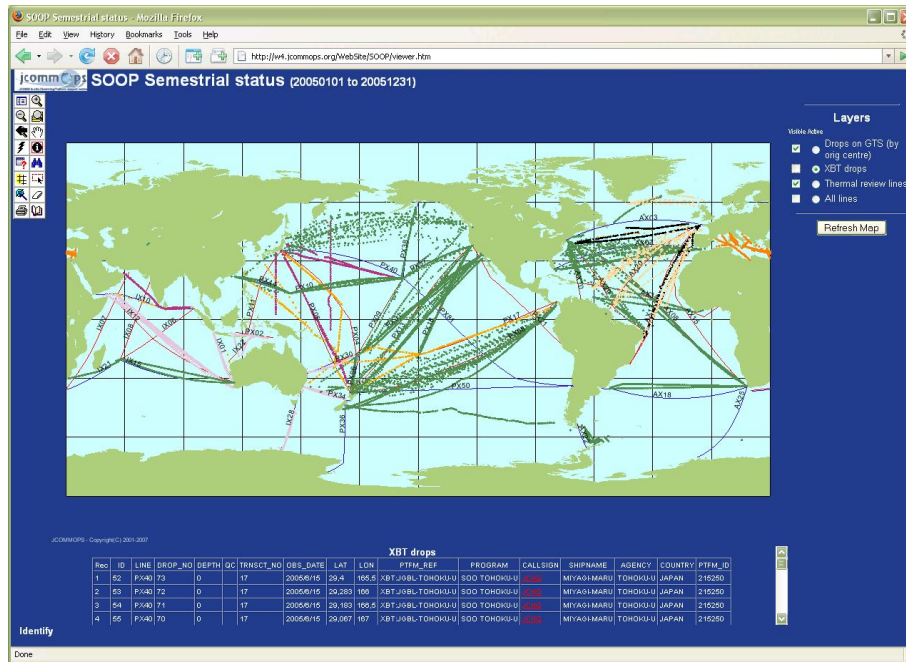
<http://w4.jcommops.org/WebSite/SOOPM/>

Colours/symbols updated to be consistent with other JCOMMOPS web mapping tools



2.4.3 SOOP Survey Mapping (Semestrial/Annual Line Sampling)

Semestrial/Annual summary for SOOP was updated for 2005 SOOP Survey. <http://w4.jcommops.org/WebSite/SOOP/>
Colours/symbols updated to be consistent with other JCOMMOPS web mapping tools.

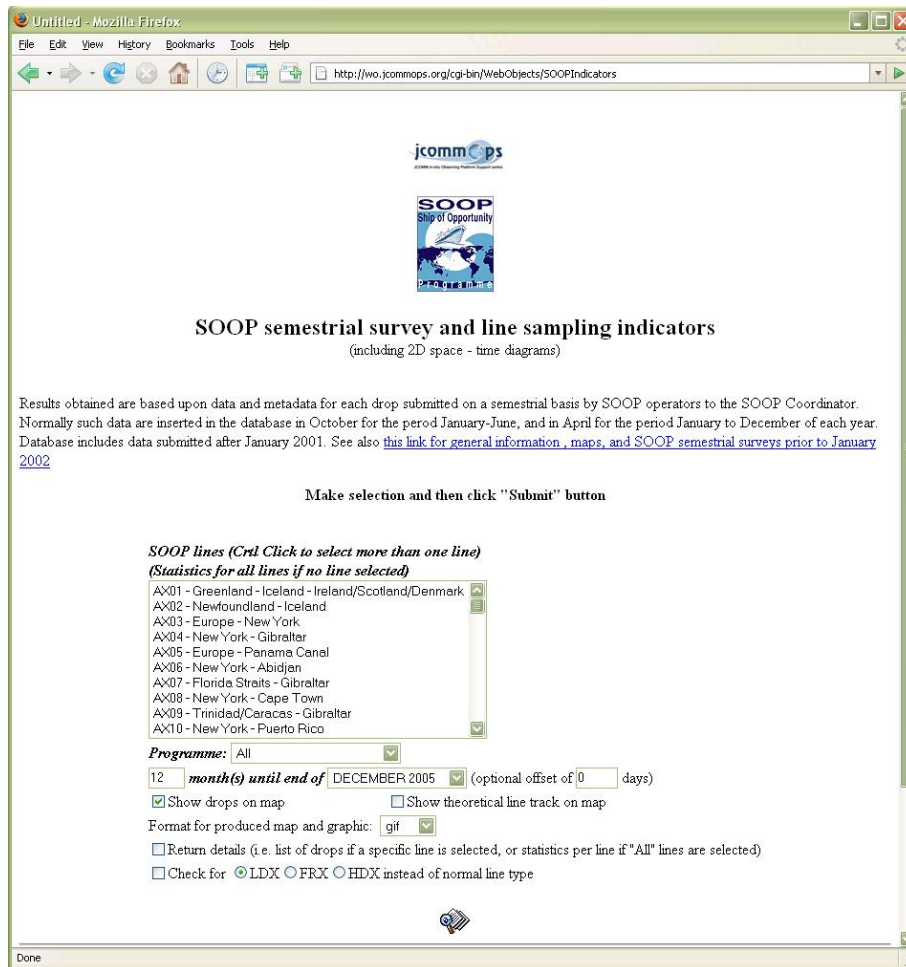


- **Proposed changes**

Based on discussions with web development staff at IRD France there will be a full transition from URL the <http://www.brest.ird.fr/soopip/> (to be removed) to make the official website address : <http://www.jcommops.org/soopip/>.

2.4.4 SOOPIP Line Sampling Indicators

No Changes were made to <http://wo.jcommops.org/cgi-bin/WebObjects/SOOPIndicators> (though the JCOMMOPS database is updated - the data for SOOP sampling in 2005 was loaded into the database and some data for 2006)



- **Proposed Changes**

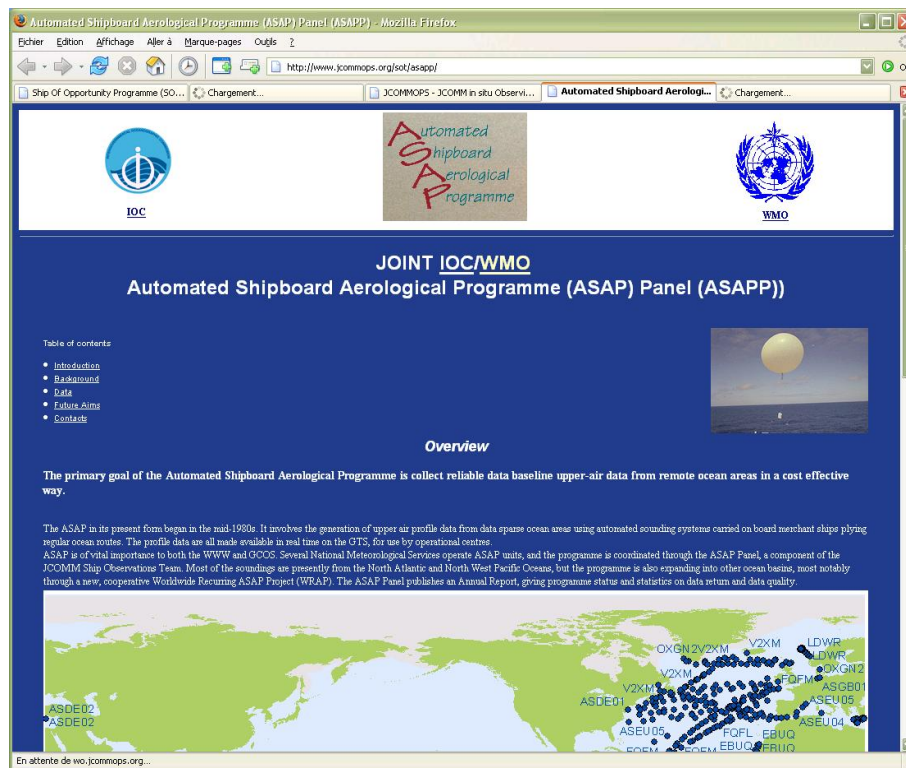
Based on discussions with many stakeholders of SOOPIP, the consensus seems to be, that an Annual SOOP Report would be sufficient, rather than production of the Survey twice a year (semestrial). Changes in wording will be required on this web application, based on the proposed transition to an “Annual SOOP Report” rather than a “Semestrial Survey”.

A requirement for summary maps of sampling success eg ftp://ftp.jcommops.org/SOOP/Maps/200512-12-SOOP_COMMENT_UOT.png has been expressed. These could be incorporated in SOT web mapping applications if there is a need.

2.5 ASAP website

2.5.1 New Draft Website

A draft web site was created for ASAP (<http://www.jcommops.org/sot/asapp>) based on the action from SOT III (V/5.1.1).



- **Proposed changes**

This draft website is to be reviewed by Chairs. Feedback sought from Panel Members also. Once website is finalised, create links from other sites such as VOS website, JCOMMOPS website, SOT website.

2.5.2 Monthly status maps for ASAP

New ASAP Monthly (static map generated at the end of the month)

ASAP Observations:

http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=GTSM_ASAP

Feedback was sought from Panel Members on these maps.

2.6 JCOMMOPS website

2.6.1 Changes to Website

JCOMMOPS web site was entirely re-designed and re-structured to better serve the in situ met/ocean observing community in terms of support for implementation and operations, and in terms of monitoring. This is the result of a 4-year gradual effort since establishment of JCOMMOPS by JCOMM-I in June 2001.

Since the TC SOT position was vacant during the period February to June 2006, developments directly relating to JCOMMOPS, as a whole, slowed down during the last intersessional period.

See Appendix D for details regarding the JCOMMOPS website developments in the intersessional period.

- **Proposed changes**
 - Finalise all interactive web mapping applications.
 - Incorporation of Pub 47 metadata entry tools
 - Updates to some wording

3. Mailing lists

3.1. New mailing list

The following mailing list was established during the last intersessional period:

- VOSclim mailing list (vosclim@jcommops.org)

3.2 Mailing lists in place

The following mailing lists are now therefore available for the SOT:

Mailing list	Purpose	How to register	Contact point
sot@jcommops.org	General purpose mailing list for the SOT	Contact the JCOMMOPS Coordinator	support@jcommops.org
soopip@jcommops.org	General purpose mailing list for the SOOP Implementation Panel	Contact the Coordinator of SOOP	support@jcommops.org
soopip_tech@noumea.ird.nc	Technical issues regarding the Ship Of Opportunity Programme	Contact David Varillon, IRD, Nouméa	David Varillon, varillon@noumea.ird.nc
vos@jcommops.org	VOS National Focal Points	Contact the JCOMMOPS Coordinator	support@jcommops.org
vosclim@jcommops.org	VOSclim contact points	Contact the JCOMMOPS Coordinator	support@jcommops.org
pmo@jcommops.org	Port Meteorological Officers (PMO)	Contact the JCOMMOPS Coordinator	support@jcommops.org

3.2. People presently registered with the mailing lists are listed in the Appendix E.

3.3. SOT Members are invited to check the email addresses of registered people and suggest any corrections or deletions if needed to the appropriate person as mentioned above. SOT Members interested in being part of one or more of the mailing lists are invited to register with the appropriate person as well.

4. Certificates to ships participating in the SOT

Ships generally participate in SOT observing programmes on a voluntary basis. The SOT acknowledges

that whilst some NMSs conduct VOS Award Schemes or provide gifts or other inducements from time to time, these ships and their crews deserve to be formally recognised at the international level for their efforts.

The following certificates authorised by the SOT, maybe used in addition to any national award schemes:

1. SOT Certificate of Appreciation, and
2. VOSClm Certificate of Participation.

4.1 SOT Certificate of Appreciation

The SOT Certificate of Appreciation was approved at SOT-III (Brest, 2005). At the same time, SOT-III approved the criteria developed by the *Task Team on VOS Recruitment and Programme Promotion* for issuing the certificate. The criteria for awarding the SOT Certificate of Appreciation are:

1. A ship participating in either the VOS, VOSClm, SOOP or ASAP is eligible to receive a SOT Certificate of Appreciation, regardless of whether the ship has previously been presented with a Certificate of Participation from a programme or project in the SOT.
2. The SOT Certificate of Appreciation is independent of any national recognition or award scheme.
3. Separate Certificates of Appreciation maybe presented to a ship that is involved in multiple observing programmes if the operating agency/country is different for each program, e.g. VOS for GB and SOOP for AU.
4. The SOT Certificate of Appreciation remains the property of the ship even after the ship has been de-recruited from the programme for which the certificate was issued.

The certificate and instruction can be downloaded in a single compressed file from the VOS website:

http://www.bom.gov.au/jcomm/vos/download/sot_certificate_of_appreciation.zip

An example of the SOT Certificate of Appreciation is at Appendix B.

4.2 VOSClm Certificate of Participation

The VOS Climate (VOSClm) Project aims to provide a high quality sub set of marine meteorological data suitable for use in climate research and prediction. Suitable ships are recruited to participate in the project on the basis of their observing record, their trading routes, and their instrumentation

A VOSClm Certificate of Participation should be issued to each participating ship. The certificate and instructions can be downloaded separately from the VOSClm website:

<http://lwf.ncdc.noaa.gov/oa/climate/vosclim/vosclim-survey.html>

As the name suggests, the certificate is for participation and hence it should be recovered when the ship, for whatever reason, ceases to be a member of the VOSClm.

An example of the VOSClm Certificate of Participation is at Appendix C.

5. Promotional Publications and brochures (*input from Graeme Ball*)

A range of promotional material developed by SOT or provided by WMO is available to help national programme managers recruit ships to participate in SOT sampling programmes.

All material described in this report are available for download from the following link on the JCOMM VOS website: <http://www.bom.gov.au/jcomm/vos/resources.html#operational4>

5.1 Recruitment presentation

Originally developed by Steve Cook, Chair of the SOOPIP, for national ship recruitment purposes, the presentation has been 'internationalised' for use by all SOT observing programmes.

The presentation is aimed particularly at ship owners and fleet managers. It provides an overview of the SOT observing/sampling programmes, and the important roles that ships play in sampling the atmosphere and oceans for the benefit of detecting climate change and improving our understanding of the link between the oceans and the atmosphere.

5.2 Recruitment flyer

Approved at SOT-III, the single page flyer succinctly explains the value that ships play in sampling the oceans or atmosphere for the SOT.

The flyer maybe used directly to encourage ships to participate in sampling programmes for the SOT, or as an insert in magazines or trade publications.

The SOT flyer is shown at Appendix A.

5.3 Programme Brochures

Many of the sampling programmes in the SOT have produced informational brochures.

The colour brochures for the VOS, VOSclim and the ASAP are particularly aimed at ship's personnel and provide a detailed overview of the respective programme or project.

6. Capacity Building

6.1. JCOMM Capacity Building

6.1.1 At the top level, JCOMM assists countries to enhance their capacities in marine data collection, data management and provision of marine meteorological and oceanographic services. Building capacity is a high priority activity directed at ensuring that maritime nations cannot only contribute meaningfully to JCOMM's various programmes but also gain optimum benefits from the global system. The capacity building activity, in direct consultation and cooperation with the three JCOMM Programme Areas, has the mandate to coordinate the delivery of training, facilitate the transfer of technology, assist in providing equipment and work closely with the capacity building programmes of donor countries and other UN Agencies. In structural terms, the JCOMM Capacity Building activity is supported by and delivered through three Capacity Building Rapporteurs, attached to each of the three Programme Areas, and reporting to the Management Committee through a single designated representative.

6.1.2 At present, capacity building work is concentrated in two areas:

- Specialized training; and
- Regional cooperative development projects.

6.1.3 In recognizing the importance of capacity building and of the need to enhance coordination and cooperation in capacity building activities, a JCOMM Capacity Building Strategy had been prepared and published. Recalling the role of the Task Team on Resources (TTR) and the difficulties to formulate and make such a team function, the Fifth Session of the Management Committee (MAN-V, Geneva, October 2006) established an *ad hoc* Working Group to identify and setup a mechanism for raising CB resources. A rigorous CB strategic plan would be developed for MAN's review. This would provide a coherent framework for all future JCOMM capacity building projects, compatible with similar work under

other programmes of WMO and IOC; substantial capacity building activities of direct relevance to JCOMM are undertaken under a number of other WMO and IOC programmes, including GOOS, GCOS, IOC TEMA and IODE; and the WMO Education and Training, Technical Cooperation, Voluntary Cooperation and Satellite Programmes.

6.2. Training Workshops close related with SOT activities

IOGOOS/JCOMM Western Indian Ocean XBT Training Workshop (Goa, India, October 2005)

6.2.1 The International “IOGOOS/JCOMM Western Indian Ocean Expendable Bathythermograph (XBT) Training Workshop” was hosted by the National Institute of Oceanography (NIO), GOA, India, from 5 to 7 October 2005, with a total of 50 participants including 15 foreign nationals and 35 Indians. The participants in this workshop did cover the Operational Managers and Technical Support staff from regional (Indian Ocean) Expendable Bathythermograph (XBT) programmes, shipping agencies, transportation officials, ship crews, port ship greeters, Port Meteorological Officers (PMO), scientists, custom officials and research students. The IOC, Paris supported the workshop with complete funding through its Regional Office in Perth, Australia. With the funding provided, the Shipboard Environmental (data) Acquisition System (SEAS) was procured for its demonstration at the workshop and its utilization on Western Indian Ocean XBT lines by the NIO personnel.

6.2.2 This course covered topics like various aspects dealing with the XBT temperature measurements; XBT data quality control measures; facilitating and use of specially procured Shipboard Environmental (data) Acquisition System (SEAS). The main goals of this Workshop were:

- (i) To build the very much needed regional capacity to enhance XBT observations in the sparsely sampled western Indian Ocean and to ensure that these operations are sustained;
- (ii) Re-establish XBT line route IX-08 (Mumbai and Mauritius);
- (iii) Re-establish XBT line route IX-06 (Mauritius to Malacca Straits);
- (iv) Re-establish XBT line route IX-21 (Cape of Good Hope to Mauritius);
- (v) Re-establish XBT line route IX-15 (Fremantle to Mauritius);
- (vi) Provide SEAS (Shipboard Environmental (data) Acquisition Systems) unit training for regional technical support staff;
- (vii) Develop logistical support procedures including the import of scientific instrumentation into country(s);
- (viii) Develop recruiting procedures for Voluntary Observing Ships.

6.2.3 It was expected that this workshop would significantly enhance in-situ ocean observations in the sparsely sampled Western Indian Ocean, provide complementary data to that currently being provided by Argo floats and other existing and planned in-situ networks, fill an existing gap for the “Global Earth Observation System of Systems (GEOSS)” ten-year implementation plan, and build the desperately needed regional capacity to ensure that these XBT operations are sustained in the Western Indian Ocean.

6.2.4 Based on participants’ suggestions, it was proposed a “Goa Plan of Action 2005” (provided in Appendix G). One of the outcomes of this workshop was to put forward the recommendation by the members to the resumption of IX-8 XBT line for the sustainable XBT observations along this line that helps cover the equatorial and western Indian Ocean in the context of Indian Ocean climate and monsoon variability research. In general, this scientific proposal requested for: 1) funding support for procurement of XBTs; 2) to cover travel costs for technical/scientific personnel to board the merchant vessels at the port of embarkation and return to the institute from the port of disembarkation; and 3) the service costs towards the real time data transmission on the use of SEAS via GTS or Inmarsat or Internet, etc. From the Shipping Corporation of India (SCI) participants, it was learnt that the most important issue appeared to be the resumption of ships along the IX-8 shipping route for a longer period either by the Shipping Corporation of India or other private liners, before submitting the scientific proposal to the appropriate national funding agency. Therefore, fixing of specific time frame for XBT measurements along IX-8 is entirely dependent upon the availability ships and the availability of full funding support to meet all the logistics from the national agencies. During the workshop, it was anticipated that progress in this area would be made after knowing from SCI about the availability of

ships along IX-8 for scientific observations. This was expected to occur when NIO and SCI meet in December 2005, per the "Goa Plan Of Action 2005" milestone to successfully achieve the goals of this workshop.

6.2.5 Meanwhile, the participating member from Kenya pointed out about the availability of a regular cargo ship from Mombasa port to Mauritius port. This member and the Director of Mauritius Institute of Oceanography (MIO) also expressed their interests to take up the XBT measurements along this shipping route in the western Indian Ocean. While there are a lot of other measures to be considered on this shipping route, this was an excellent idea of considering this shipping route for sustainable XBT measurements in the western Indian Ocean.

Third International Port Meteorological Officers Workshop (Hamburg, Germany, March 2006)

6.2.6 At its third session, Brest, 7-12 March 2005, the SOT had reinforced the view that the work of Port Meteorological Officers (PMOs) was crucial for voluntary ship observations and VOS Panel. A third International PMO workshop (PMO-III) sponsored by DWD was therefore held at BSH, Hamburg, Germany, 23-24 March 2006. PMOs play a fundamental and very essential role in the programmes coordinated under the SOT, therefore harmonizing the way in which PMOs operate is crucial to achieving the aims of SOT.

6.2.7 The PMO-III's Programme is provided in Appendix H. Representatives from developing countries had been invited and financially supported by WMO. Major aims for the workshop were to convey important recent developments (e.g. regarding WMO publication No. 47, enhanced PMO communications), as well as promoting global standards of service. The main objectives of this Workshop were:

- (i) Facilitate networking amongst PMOs;
- (ii) Understanding the role of JCOMM, the SOT and the VOS Panel;
- (iii) Understanding of VOSClm, its goals and requirements;
- (iv) Understanding the role and changing functions of PMOs;
- (v) Understanding the need for common standards;
- (vi) Increasing awareness of changes in technology and the methods used by other PMOs or countries;
- (vii) Increasing awareness of planned changes to WMO Publication No. 47;
- (viii) Increasing awareness of the range of VOS monitoring tools;
- (ix) Increasing awareness of inter-PMO methods of communications;
- (x) Increasing awareness of VOS promotional material.

6.2.8 The workshop made a few recommendations related to Capacity Building, i.e.:

- to approach maritime colleges at the national level and promote SOT & PMO activities;
- to offer, thanks to USA, a web based ship metadata collection/editing and display system;
- and
- to organize International PMO workshops every 3 to 4 years.

6.2.9 USA has tentatively offered to host the next workshop.

Training and Capacity Building Workshop for the Eastern Indian Ocean (Bali, Indonesia, June 2006)

6.2.10 A Training and Capacity Building Workshop for the Eastern Indian Ocean was convened during 7-10 June 2006 in Bali, Indonesia, organized by the Republic of Indonesia South East Asia Center for Ocean Research and Monitoring (SEACORM) and the NOAA Office of Climate Observation (OCO). The summary report is reproduced in Appendix I. Representatives from developing countries had been invited and financially supported by WMO.

6.2.11 A prospectus for training and Capacity Building Workshops in 2007 to Benefit Eastern Africa and Indian Ocean Rim Nations is provided in Appendix J.



Appendix/ices:

APPENDIX A

SOT FLYER

APPENDIX B

AN EXAMPLE OF THE SOT CERTIFICATE OF APPRECIATION

APPENDIX C

AN EXAMPLE OF THE VOSCLIM CERTIFICATE OF PARTICIPATION

APPENDIX D

JCOMMOPS WEBSITE DEVELOPMENTS IN THE INTERSESSIONAL PERIOD

Home page contains latest news, list of meetings, and a number of useful buttons (contacts, documents, links, help) on the right menu. At the top, you have direct links to WMO, IOC, JCOMM, DBCP, Argo, and SOT web sites through the corresponding logos.

There is a small search box on top which permits to quickly search for information within JCOMMOPS database (e.g. contacts, platforms, agencies, documents, news, etc.). This tool is very efficient and quick. For example, if you enter a person's name or a WMO number in that box and click "OK", the system will search in the database for contacts or platforms that match the text entered.

Main menu and web site structure appears at the top just below the logos. Web site is now divided in 5 main sections:

1. Implementation:

This section includes comprehensive information on relevant observational programme implementation, and particularly the DBCP, SOOP, SOT, and the Argo programmes. Section includes information on requirements (GCOS-92, WWW, UOT review, GOSIC), the Global Telecommunication System (GTS), deployment opportunities, list of manufacturers (platforms, XBTs, instruments, satellite transmitters), satellite data telecommunication providers (review, Argos, etc.).

2. Monitoring:

Links to appropriate JCOMM web sites, including JCOMM Network Status, platform query and monitoring (direct JCOMMOPS database access), GTS monitoring information and statistics (received GTS observations, SOOP semestrial survey), quality information (buoy monitoring statistics, buoy and ship data quality information relayed by monitoring centres), and list of some useful direct URLs to JCOMMOPS web site.

3. Map room:

JCOMMOPS global maps (static and dynamic maps, by platform type and by variable) and maps produced elsewhere (MEDS, GDP).

4. Instrumentation:

Instruments, manufacturers, metadata, standards, and instrument evaluation.

5. Data:

Information on how to get access to the data by platform type, plus GTS information, and a list of data centres.

- Web site moved to Apple Xserve G5 dual processor 2.3GHz server.
- Scripts for uploading new version of WMO publication 47 in JCOMMOPS database written
- Link to JCOMM networks status (http://www.jcommops.org/network_status/)
- New monitoring tools added:
 - Query SOOP lines
 - Query SOOP line types
 - Query observational platforms
 - Query Ships
 - Query WMO numbers
 - Query GTS Statistics

New developments implemented during the intersessional period included:

- Creation of Upper Ocean Thermal data maps by country. These are produced on a semestrial basis. See Appendix A
- Platform life-time application upgraded
- Making dynamic web site more reliable
- Import BUFR tables in JCOMMOPS database and provide for web query form. See Appendix A.
- Technical specifications for research cruise database written (for POGO). Such an application would be very useful to manage deployment opportunities
- Production of a daily ice edge layer for the GIS
- Set up of an initial operational procedure with CLS to monitor main web applications' status to ensure 24/7 services.
- Contact details updated and mailing lists /User groups maintained.

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ANNEX XII - USEFUL PMO (PORT METEOROLOGICAL OFFICER) CONTACTS

ANNEX XIII - LIST OF ACRONYMS

APPENDIX G

GOA PLAN OF ACTION 2005

- 1. October, 2005:** Western Indian Ocean XBT Training Workshop, Goa India;
- 2. October, 2005:** IOC Provides NIO With SEAS Equipment, NOAA Provides SEAS Training and Inmarsat Communications Costs when SEAS is operationally contributing to a revitalized IX-8 XBT Line;
- 3. November, 2005:** NOAA Commences Shipping of 5 Cases of XBTs to NIO to Support 50% of IX-8 and notifies Goa customs to expect Shipment;
- 4. December, 2005:** NIO Convenes Meeting with SCI in Goa "The Next Generation of Indian Ocean Observations";
- 5. January, 2006:** IX-8 Ship Identified, Logistical Arrangements Commenced;
- 6. January, 2006:** NOAA's 5 Cases of XBTs arrive at NIO to Support 50% of IX-8;
- 7. March, 2006:** Eastern Indian Ocean Capacity Building Workshop, "Use of Ocean Observations to Enhance Sustainable Development", Bali;
- 8. April, 2006:** IX-8 Operational, Unrestricted Data Available in Real-Time Over GTS and the Internet;
- 9. June, 2006:** Follow-up Western Indian Ocean Training and Capacity Building Workshop in Mauritius;
- 10. October 2006:** SOOPIP Meeting at SOT-4, IX-8 Results Presented along with Other Indian Ocean XBT Lines.

APPENDIX H**PMO-III's PROGRAMME**

Time	Day 1
09:00:00	Welcome
09:15:00	Introduction
09:45:00	Ship recruitment
10:30:00	Morning Tea
11:45:00	VOSClm
11:30:00	Coding issues
12:00:00	Metadata and VOS database demonstration
13:00:00	Lunch
14:30:00	Observations
15:00:00	Afternoon Tea
15:15:00	Electronic logbook software
16:00:00	Telecommunications
16:30:00	Ship inspections
17:30:00	Close day 1
Time	Day 2
09:00:00	Monitoring procedures
09:45:00	Ship security issue
10:30:00	Morning Tea
10:45:00	Information exchange
11:15:00	Other PMO Activities
12:00:00	General discussion
13:00:00	Lunch
14:30:00	National presentations
15:00:00	Afternoon Tea
15:15:00	National presentations (continued)
17:30:00	Close workshop

APPENDIX I

**SUMMARY REPORT ON THE TRAINING AND CAPACITY BUILDING WORKSHOP
FOR THE EASTERN INDIAN OCEAN**

**First Annual Meeting
IOGOOS-InaGOOS/JCOMM/GEOSS
“Use of Ocean Observations to Enhance Sustainable Development”
Training and Capacity Building Workshop for the Eastern Indian Ocean
7-10 June, 2006, Bali, Indonesia**

The Indian Ocean Global Ocean Observing System (IOGOOS), Indonesian GOOS (InaGOOS), the IOC-WMO Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) and the Global Earth Observation System of System (GEOSS) “*Use of Ocean Observations to Enhance Sustainable Development - Training and Capacity Building Workshop for the Eastern Indian Ocean*” was successfully initiated, organized and convened by the Republic of Indonesia South East Asia Center for Ocean Research and Monitoring (SEACORM) and the United States National Oceanic and Atmospheric Administration (NOAA) Office of Climate Observation (OCO) during 7-10 June 2006 at the Discovery Kartika Plaza Hotel, Bali Indonesia as a *Partnerships with NOAA for GEOSS Applications* (PANGEA) Capacity Building workshop.

At the most recent Asia-Pacific Economic Cooperation (APEC) Ocean-related Ministerial Meeting (AOMM-2) in Bali Indonesia 16-17 September 2005, the Ocean Ministers focused their discussions around the theme of “*Our Coasts, Our Oceans-an Action Plan for Sustainability*”. The Ministers recognized that sustainable economic growth and the well-being and resilience of their communities are impossible without healthy and productive oceans and coasts. The *Bali Plan of Action*, “*Towards Healthy Oceans and Coasts for the Sustainable Growth and Prosperity of the Asia-Pacific Community*”, contains practical Ministerial commitments for ensuring the sustainable management of the marine environment and its resources, providing for sustainable economic benefits from the oceans and enabling sustainable development of coastal communities. On the final day of the AOMM-2, NOAA Administrator VADM Conrad Lautenbacher and Minister of Marine Affairs and Fisheries (DKP) VADM Freddy Numberi signed a Letter Of Intent between the two organizations. One item of the Letter of Intent, which was served by this June 2006 Bali workshop, is to explore further opportunities to carry out joint work on ocean-climate research, ocean observations and applications that help to implement the Global Earth Observation System of Systems (GEOSS) for the Western Pacific and Indian Ocean.

In harmony with the AOMM-2 *Bali Plan of Action*, the Indonesia-NOAA Letter of Intent, and consistent with the principles of the Global Earth Observation System of Systems (GEOSS), the objectives of this Bali Capacity Building workshop were successfully achieved to advance the development of Eastern Indian Ocean and Indonesian Seas in-situ ocean observation systems while also demonstrating socio-economic benefits to regional users and decision-makers on how these data can be more effectively applied to benefit human safety, reduce risks from and enhance resiliency to climate and natural disasters, enhance fisheries and agricultural sector productivity towards achieving sustainable development in Indonesia and Regional communities.

One of NOAA’s principal constraints to expanding moorings into the Indian Ocean is the limited availability of shiptime for instrument deployments. To remedy this, NOAA seeks partnerships with regional institutes to share resources, rather than chartering shiptime for mooring deployments. PANGEA Partnerships are being built on the premise of exchanging Regional shiptime for U.S. expert applications training of ocean data and information for socio-economic benefits in economic sectors including fisheries, agriculture, climate and coastal risk management, water resource management, community resiliency and marine multi-hazards. In addition to increasing both in-situ ocean observational data and their applications, by demonstrating practical economic benefits of ocean information to diverse Ministries, increased funding support for regional ocean observing systems can be realized. It is expected that this approach will build a more sustainable and fruitful capacity in the region than simply chartering shiptime.

A total of 55 colleagues, including 11 government officials and applications experts from the United States and 44 Indonesians from a wide agency representation, participated in the Bali Capacity Building workshop. The American representatives were from the US National Oceanic and Atmospheric Administration (NOAA), the International Research Institute for Climate and Society (IRI) and Florida Sea Grant College Program with an invited expert from the Canadian Government's Department of Agriculture. Indonesian Government officials, decision-makers and academicians represented the Southeast Asia Center for Ocean Research and Monitoring (SEACORM), Agency for Marine Affairs and Fisheries (DKP), Research Center for Marine Technology (BRKP), Research Center for Maritime Territories & Non-living Resources, Agency for the Assessment and Application of Technology (BPPT), Agency for Metrological and Geophysics (BMG), National Coordination Agency for Survey and Mapping (BAKOSURTANAL), Ministry of Research and Technology (RISTEK), Ministry of Agriculture (DEPTAN), Bogor Agricultural Institute (IPB), Bandung Institute of Technology (ITB), Gajah Mada University, Jogjakarta and the Ministry of Energy and Mineral (PPGL-DEM).

The first two full days of this Capacity Building workshop consisted of scientific and applications presentations on the following topics (please see the final agenda below):

- Ocean Observing systems of the Indonesian seas,
- NOAA's global ocean observation program and expansion into the Indian Ocean,
- Coastal risk management and resiliency,
- Emerging partnership between Indonesia's Sea Partnership Program and US Sea Grant Program,
- Ocean Data interpretation and management,
- Managing climate risks,
- Lessons learned: Building Regional Extension and Education Capacity for Coastal Ocean Observing Systems in the United States,
- Increasing the Effectiveness of Ocean Observations for Enhancing Resiliency and Reducing Risk,
- Climate Related Socio-Economic Impacts Over the Long Term for Fisheries Production and Agricultural Production & Food Security,
- Long-term Monitoring of the Indonesian Throughflow and the Indian Ocean Dipole,
- RANET: Radio and Internet for the Communication of Hydro-Meteorological and Climate Information for Development,
- Tsunami Detection and Deep ocean Assessment and Reporting of Tsunami Stations,

The concluding half-day session of the workshop was held on the morning of 9 June, with a draft "Outline of Activities-2006" proposed by the Indonesian Team to include;

1. The deployment of 2 NOAA ATLAS Climate Moorings (please see Figure 1 as proposed by NOAA for cruise track of November 2006 Deployments.) and 1 NOAA DART II Buoy in 2006 on board the Indonesian R/V Baruna Jaya I,
2. A September 2006 follow-on PANGEA Capacity Building workshop titled "The Application of Ocean and Climate Data for Fisheries" in Bandung for Indonesian stakeholders & end-users on training of ocean and climate data processing, management, numerical modeling and assimilation for fisheries applications (this was successfully convened 4-8 September 2006 at

the National Institute for Technology in Bandung Indonesia (ITB) by four US Fisheries applications experts with 50 Indonesian participants),

3. Preparation of Terms of Reference for a long term Memorandum of Understanding (MOU) planned to be signed during the summer of 2007 in Indonesia;
4. Planning for the next annual Indonesian workshop in 2007,
5. NOAA's Eastern Indian Ocean instrument deployment priorities for 2007 (please see Figure 2) including ATLAS Climate moorings and possibly DART Tsunami moorings.

Planned collaboration between NOAA and the Indonesian Agency for the Assessment and Application of Technology (BPPT) will include the deployment of 2 additional ATLAS moorings at 4°N, 90°E and 8°N, 90°E from RV *Baruna Jaya-1* during November 2006 (please see Figure 1.). The ship time required to deploy these buoys is estimated to be 16 days, assuming a cruise beginning in Jakarta and ending in Jakarta and a ship speed of 10 kt. NOAA will provide all mooring equipment while BPPT would provide the ship time. The deployment cruise would provide the opportunity for training of Indonesian technicians in the deployment of ATLAS climate moorings and instrumentation and on-site evaluation of the data. Sustained multinational resources are required to develop and maintain the GOOS moored array. It is hoped that this initial collaboration will prove beneficial to all participants and lead to a long-term and expanded US/Indonesian and similar Regional Partnerships contributing to the in-situ Indian Ocean observing system.

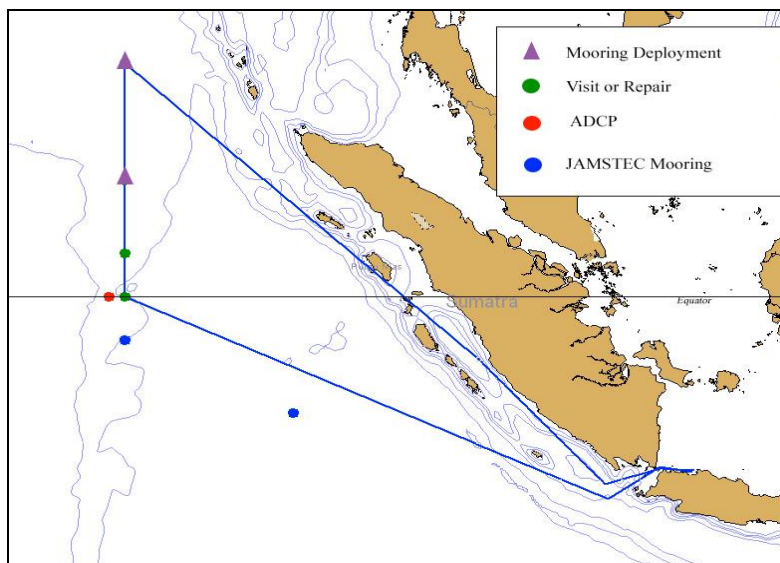


Figure 1. Scheduled November 2006 NOAA ATLAS Mooring Deployments on Indonesian R/V *Baruna Jaya-1*

Plans for 2007 and the Future

To maintain the momentum achieved with the two Capacity Building workshops held in Indonesia in 2006, a follow-on PANGAEA Workshop is planned in Indonesia during the summer of 2007 for Capacity Building in an economic sector that will soon be determined. During a business meeting in Bandung in September 2006 NOAA has already presented its shiptime priority requests aboard the Indonesian R/V *Baruna Jaya* for deployments and maintenance of its ATLAS Climate moorings during the Autumn of 2007 and possibly NOAA's Deep Ocean Assessment and Reporting of Tsunamis (DART) moorings during April 2007.

Based on the success of the PANGAEA Partnership with Indonesia, to fully implement the CLIVAR/IOGOOS Indian Ocean Panel (IOP) Mooring Design for the Indian Ocean as shown in Figure 3, it will be necessary to establish similar partnerships with India, China, and Malaysia. To build capacity in the Western Indian Ocean, Partnerships with African Nations such as Kenya, Tanzania and South

Africa will be needed. Towards this, NOAA looks forward to pursuing this closely with JCOMM's Capacity Building Programme Area.

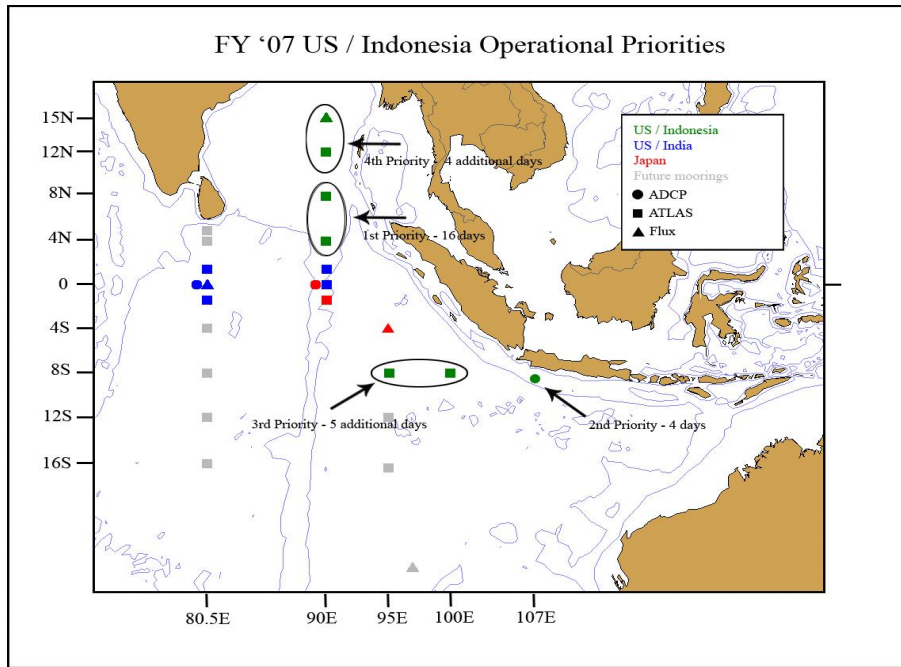


Figure 2. NOAA Shiptime Priorities Requested Aboard Indonesian R/V Baruna Jaya for 2007

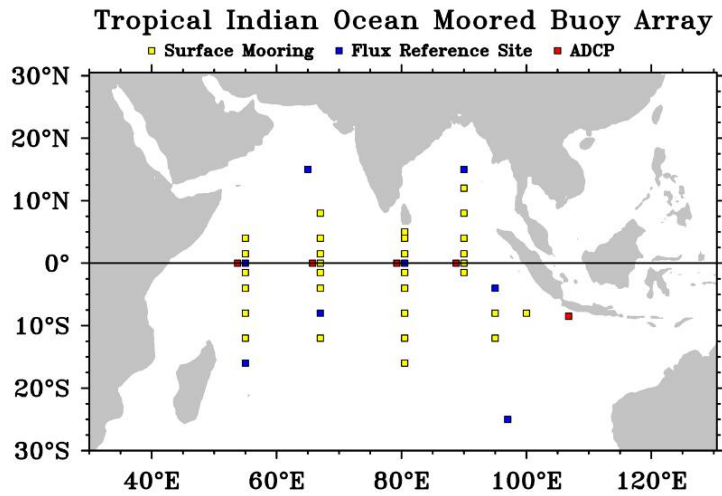


Figure 3. IOGOOS/CLIVAR Indian Ocean Panel for Climate (IOP) Indian Ocean Mooring Design

APPENDIX J

“PROSPECTUS FOR TRAINING AND CAPACITY BUILDING WORKSHOPS IN 2007 TO BENEFIT EASTERN AFRICA AND INDIAN OCEAN RIM NATIONS”**Partnerships for New GEOSS Applications (PANGEA)**

In early November 2006, the Indonesian Research Vessel *Baruna Jaya-1* set out from Jakarta for a sixteen day cruise with two United States National Oceanic and Atmospheric Administration (NOAA) ATLAS met-ocean buoys onboard for deployments off the west coast of Sumatra. These two NOAA moorings were successfully deployed along 90E at 4N and 8N and are now providing new sources of near real-time ocean data, not only for climate but also for other marine services and applications. Earlier this year, U.S. ocean data applications experts from the International Research Institute for Climate and Society (IRI) and the U.S. Sea Grant Extension Program conducted two training workshops in Indonesia. In Bali (June) for the socio-economic applications of ocean information for climate risk management and agricultural applications, and in Bandung (September) for the use of ocean data for sustainable fisheries in Indonesia and regional waters.

Plans are now underway to convene a 2007 PANGEA “Data Dissemination and Applications” workshop in Indonesia in exchange for *Baruna Jaya-1* sea days to deploy additional NOAA moorings and to provide annual maintenance on those moorings deployed in 2006. In addition to this year’s PANGEA workshops with Indonesia, a regional XBT applications training workshop was also conducted in Goa India in October 2005 and ship time aboard India’s National Institute of Oceanography (NIO) research vessel *Sagar Kanya* was provided to deploy four NOAA moorings in the eastern Indian Ocean to measure marine meteorology and subsurface conditions.

Each of these activities is an element of the new PANGEA initiative - Partnerships for New GEOSS Applications. They are designed to build sustainable capacity in maritime regions by conducting in-country, practical, socio-economic applications training by U.S. experts to decision-makers, policy and budget administrators, scientists and end-users, in exchange for regional ship time for the deployment of new in-situ ocean observations. This proposal will continue previous successes, and implement training and ocean observations for Eastern Africa and Indian Ocean rim Nations.

PANGEA provides multiple benefits by: 1. Providing expert applications training to users and decision-makers in the region, 2. Demonstrating the practical socio-economic importance of ocean information to administrative budget and policy officials, and 3. Increasing regional in-situ ocean observations for numerous cross-cutting applications that impact the region.

The PANGEA Partnerships provide socio-economic benefits for various economic sectors including; fisheries, agriculture, climate and coastal risk management, water resource management, community resiliency and marine multi-hazards. A more sustainable capacity for the region can be achieved through the increases in both near real-time in-situ ocean observational data and information as well as the more effective applications of existing and new data.

PANGEA builds on and complements other existing capacity building programs by promoting the use of ocean observations to ensure regional socio-economic sustainability through:

- Annual and repeatable training workshops conducted in exchange for annual sea days aboard PANGEA partner’s ships for deployments and routine maintenance of ocean observations,
- In-country practical applications training of ocean data provided to large and diverse groups of regional participants, rather than a few selected individuals traveling to a workshop far away. This approach maximizes the retention time of the information, versus potentially losing the expertise as trained employees shift to different positions or organizations,
- New sources of ocean observational data are established by deploying new instruments,
- Required resources such as ship time and training are shared between Partners,
- Applications training of ocean data can be tailored to specific socio-economic sectors required by individual Nations and Regions,
- Developing maritime Nations are empowered to effectively contribute to the Global Earth Observing System of Systems (GEOSS) by offering their oftentimes underutilized ships to deploy observational equipment provided by their PANGEA partners,

- Provides opportunities for training of ship crews in the deployment of moorings and instrumentation and the on-site evaluation of data,
- Government Officials responsible for making policy and setting budgets are invited to participate in PANGEA workshops and receive demonstrations on the importance and effectiveness of ocean data on their region's socio-economic development and sustainability. This approach ensures ocean observations are viewed not only as important for science, but also for economic prosperity, and are therefore deemed a high priority for fiscal decisions,
- Customs Officials are invited to PANGEA workshops to learn about the science, applications and plans for ocean observations in the region, this has proved effective in facilitating the shipments of ocean instruments into the region.

Immediate Need for Western Indian Ocean PANGEA Workshops in 2007

The Indian Ocean is unique among the three tropical ocean basins since it is blocked at 25°N by the Asian land mass. Seasonal heating over this land mass sets the stage for dramatic monsoon wind reversals and intense summer rains over the Indian subcontinent and adjoining areas of Southeast Asia. Recurrence of these summer monsoon rains is critical to agricultural production that provides life-sustaining support for hundreds of millions of people in the region. The resulting oceanic thermal structure produces feedbacks to the overlying atmosphere, which affect not only the monsoon circulation and rainfall patterns, but also weather and climate in remote parts of the globe, including influencing western U.S. long-term precipitation patterns through atmospheric teleconnections.

Despite the importance of the Indian Ocean in the regional and global climate system, it is the most poorly observed and least understood of the three tropical oceans. U.S. participation in the development of a sustained observing system in the Indian Ocean has lagged compared to the other two basins for a variety of logistical, scientific, and historical reasons. One of NOAA's principal constraints to expanding moorings into the Indian Ocean is the limited availability of ship time for instrument deployments. However, the importance of the Indian Ocean for understanding and predicting seasonal and longer-term climate variability throughout the world has been underscored by several recent discoveries. Among these are the Indian Ocean Dipole (IOD), which is an ENSO-like positive/negative fluctuation involving coupled ocean-atmospheric interactions in the Indian Ocean region. In positive IOD phase years, precipitation increases in the central and southern portion of the African continent, causing floods, while in negative IOD phase years, it decreases, causing drought conditions.

This past summer the Indian Ocean experienced the strongest IOD ever documented. In response to this extreme positive phase of the IOD, Indian Ocean African Nations such as Kenya, record floods struck Somalia, Ethiopia, Uganda and Tanzania later in Autumn. The United Nations stated that at least 723,000 Kenyans were affected by the flooding, including tens of thousands of Somali refugees. While 96 victims fell to flooding in Somalia, 300,000 were displaced from their homes. Millions of others were effected by the extreme flooding due to destroyed farmlands, disrupted food supplies, cut off villages and washed away roads. Somalian officials also issued warnings for outbreaks of waterborne diseases, particularly cholera. Conversely, in the summer of 2005, Kenya and most of eastern Africa suffered from a severe drought. It was attributed mostly to a negative IOD phase when the eastern Indian Ocean had warmer than average temperature anomalies.

It is important to note that for this summer's event the world's first successful IOD prediction was modeled four months earlier, April 2006, by the Japan Frontier Research Center for Global Change (FRCGC) Climate Variations Research Program using FRCGC's *Earth Simulator* super-computer. While an effective forecast was made this year, FRCGC and other modelers believe more accurate and timely predictions of the IOD and associated precipitation patterns can be achieved if enhanced ocean observations are available for model assimilation. FRCGC is confident that extreme short precipitation events are predictable at least a season in advance with increased ocean observational data. Improved forecasts will help to provide more advanced and reliable warnings to Eastern Africa and alleviate IOD associated natural disasters around the world.

Therefore, while PANGEA partnerships are a practical and effective means to enhance and apply ocean observations for sustainable development globally, and rapid progress has been made recently in implementing the CLIVAR/Indian Ocean GOOS (IOGOOS) Indian Ocean Observing System (IndOOS) in the Eastern Indian Ocean, the most immediate need for 2007 is to now build capacity for the Western Indian Ocean to benefit African Nations bordering the Indian Ocean.

The WMO/IOC Data Buoy Cooperation Panel (DBCP) considers it critical to develop its capacity building activities, as the technology and global coordination for operational activities are now considered sufficiently mature. Also, the Global Climate Observing System (GCOS) recently organized the "Climate Information for Development Needs: An Action Plan For Africa". PANGEA is consistent with both DBCP and GCOS objectives and would complement their other capacity building activities, in this vital region, such as data management and scientific workshops.

Towards this, during the DBCP meeting in La Jolla CA USA this past October, constructive discussions were held with representatives from the Kenyan and South African Meteorological services regarding establishing PANGEA Partnerships for East Africa and the Indian Ocean Region in 2007. A core element of PANGEA Partnerships are in-country applications training workshops.

Kenya and South Africa PANGEA Workshops for 2007

In harmony with the goals set forward by GEOSS, GCOS, DBCP and IOGOOS/CLIVAR, the principal objectives of two PANGEA workshops for 2007 are to advance the implementation and applications of western Indian Ocean in-situ ocean and marine meteorological observational data for:

- Improving Eastern Africa precipitation forecasts,
- Enhancing ocean observations in the western Indian Ocean and increasing data for model assimilation,
- More effectively applying ocean and model data to mitigate natural hazards due to extreme precipitation such as floods and droughts,
- Enhancing resiliency and reducing risk from extreme precipitation events,
- Increasing adaptation options,

Workshop Dates, Budgets and Deliverables: Proposed dates include weeklong workshops during the third quarter of CY 2007, one in Kenya and one in South Africa. Funding is being requested from the WMO in the amount of USD50,000 for each workshop to support: air travel, daily expenses and hotel accommodations for 25 local and regional participants and several U.S. applications training experts; expenses associated with the meeting venue and related logistics; and workshop report production and distribution. Each workshop report will include a summary of all material presented, participant feedback and recommendations. As with other PANGEA workshops, U.S. experts will provide in-country applications training in Kenya and South Africa in exchange for ship time to deploy NOAA moorings in the western Indian Ocean in support of the existing IndOOS implementation plan.

Invited Participants: Kenyan and South African Decision-makers and end-users for water management, health, agriculture, hazards management; Operational Meteorologist and Oceanographers, Climate and Precipitation Modelers, Policy and Budget Officials, Customs Officers, Research Scientists. It is anticipated that regional Representatives from nearby Nations will also be invited to participate as appropriate.

Participating National and Regional organizations will include: Japan FRCGC, Kenyan Meteorological Service, Famine Early Warning System (FEWS), Kenyan Marine Research Institute, Igad Climate Prediction and Applications Centre (ICPAC, formerly Drought Monitoring Centre-DMC), University of Nairobi, South African Weather Service, South African Development Community (SADC), United States NOAA, Florida Sea Grant, and others.

Potential workshops topics will include (to be tailored to National requirements): Eastern Africa's ocean observation requirements and their societal applications, state-of-the-art precipitation modelling using Indian Ocean data, Development of an Indian Ocean moored buoy array, Accessing and using ocean data, Regional coordination activities, Increasing the effectiveness of Ocean observations for enhancing resiliency and reducing risk, Climate risk management: Ongoing demonstrations in East Africa, Preparation of intercessional training, Action items and long-term partnership Terms of Reference.