WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

DATA BUOY COOPERATION PANEL

DBCP-31/ Doc. 5
(28 Sept. 2015)

THIRTYFIRST SESSION

ITEM: 5

GENEVA, SWITZERLAND
19-23 OCTOBER 2015

ENGLISH ONLY

REPORT BY THE TECHNICAL CO-ORDINATOR

(Submitted by theTechnical Coordinator, Champika Gallage, JCOMMOPS)

SUMMARY AND PURPOSE OF DOCUMENT

This document provides information on the work undertaken by the Technical Coordinator of the DBCP during the last intersessional period.

ACTION PROPOSED

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

Appendices: **A.** Monthly Maps for August 2015

B. Data availability on the GTS

C. Proposed Performance metrics

D. Technical Coordinator non-routine Tasks

-A- DRAFT TEXT FOR INCLUSION IN THE FINAL REPORT

5.1 The Technical Coordinator (TC), Ms Champika Gallage reported on her activities on behalf of the Panel during the last intersessional period from 1 September 2014 to 31 August 2014.Ms. Champika Gallage first started as the new TC of the Data Buoy Cooperation Panel (DBCP) on 27th October 2014 by attending the DBCP-30 meeting held in Weihai, China as a fixed-term employee at United Nations Educational, Scientific and Cultural Organization (UNESCO).

5.2 The panel noted that new TC recruitment process took longer than expected. Thus there was no overlap period for training. New TC, Ms. Gallage received two days training from the outgoing TC Ms Kelly Stroker on the last week of Ms Stroker's employment with DBCP. TC also received guidance from Etienne Charpentier, WMO Secretariat and by Robert Weller and Uwe Send, co-chairs of OceanSITSEs program.

5.3 First couple of months of Ms Gallage's time was spent essentially in getting familiar with routine TC tasks and administrative work with UNESCO. Some of her time also was spent on moving the JCOMMOPS office from CLS Brest building to the IFREMER Campus, Brest, which is the new permanent office location for JCOMMOPS.

5.4 On average, the TC spends 70% of her time on DBCP-related matters and 30% of her time as OceanSITES Project Office. During the previous year, Ms. Gallage's time as TC was spent on the following:

- Familiarizing with JCOMMOPS database and tools
- Familiarizing with DBCP community , platforms, operators and networks
- Travelling to meet with various DBCP Members, Action Groups, and Teams
- Review database design, metadata loading and reporting on new JCOMMOPS website
- Collecting, and preparing metadata to ingest to the new JCOMMOPS database
- Maintaining metadata in the JCOMMOPS database
- Producing monthly maps and GTS timeliness reports
- Provide user assistance
- Assisting Panel members with technical and programmatic issues
- Updating and maintaining DBCP and OceanSITES websites
- Maintaining mailing lists, contact details and user groups on DBCP, JCOMMOPS, and OceanSITES websites
- Monitoring the Quality-Control Relay traffic
- Tracking all buoy deployments, and mooring maintenance/installations
- Preparing for and attending meetings
- Preparing meeting reports and documents

5.5 The TC outlined the current status of the data buoy network. During the past 12 months, the average number of drifting buoys reporting onto the Global Telecommunications System (GTS) was 1504 per month, 407 moored buoys and 102 fixed platforms (Figure 1). During the intersessional period, the average number of drifting buoys has increased by 14%. The current number of operational drifters on the GTS for August, 2015 is at 1555 (Figure 2).

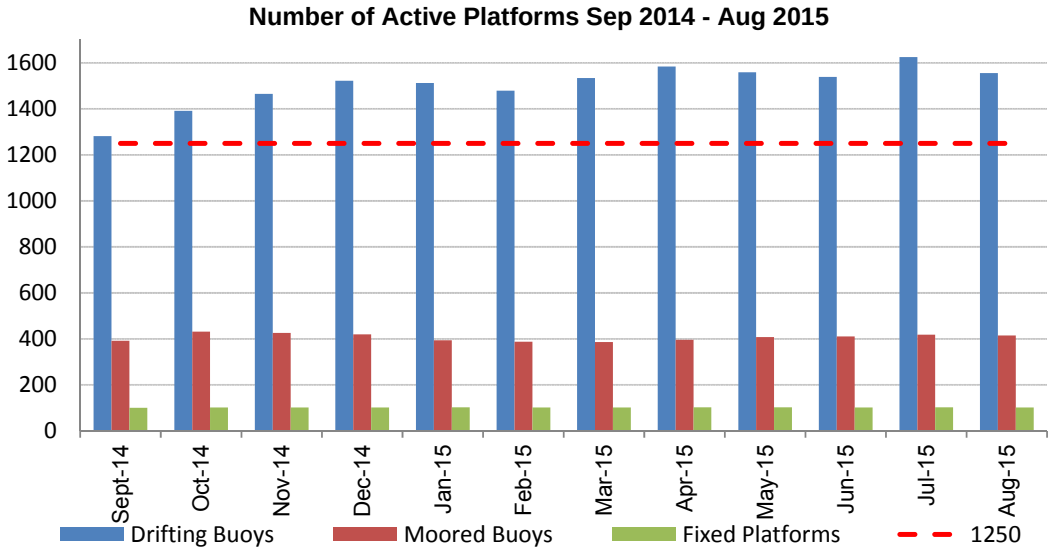

Figure 1 - Number of operational drifting and moored buoys during the last intersessional period

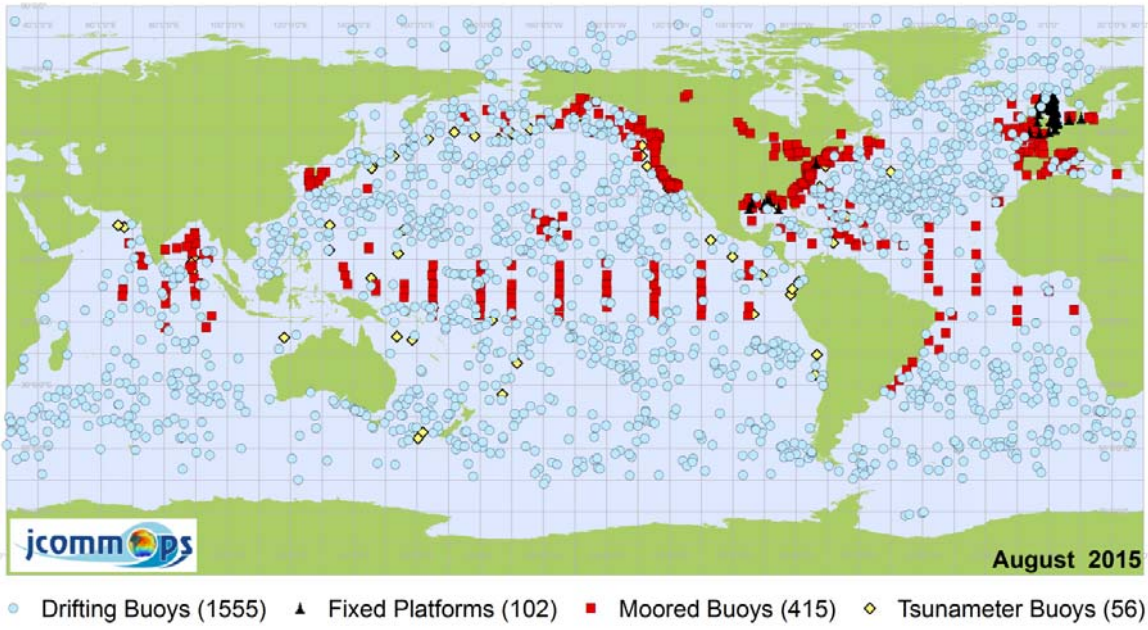

Figure 2 - Status of the operational array in August 2015.

The number of barometer drifting buoys is around 55% which is a 5% increase from the previous reporting period. While the total number of drifting buoys reporting on the GTS has increased marginally throughout the intersessional period, the percentage increase of barometer buoys has been steady at 55% (Figure 3). For the moored buoys, the number of barometer equipped platforms has not changed significantly throughout the intersessional period.

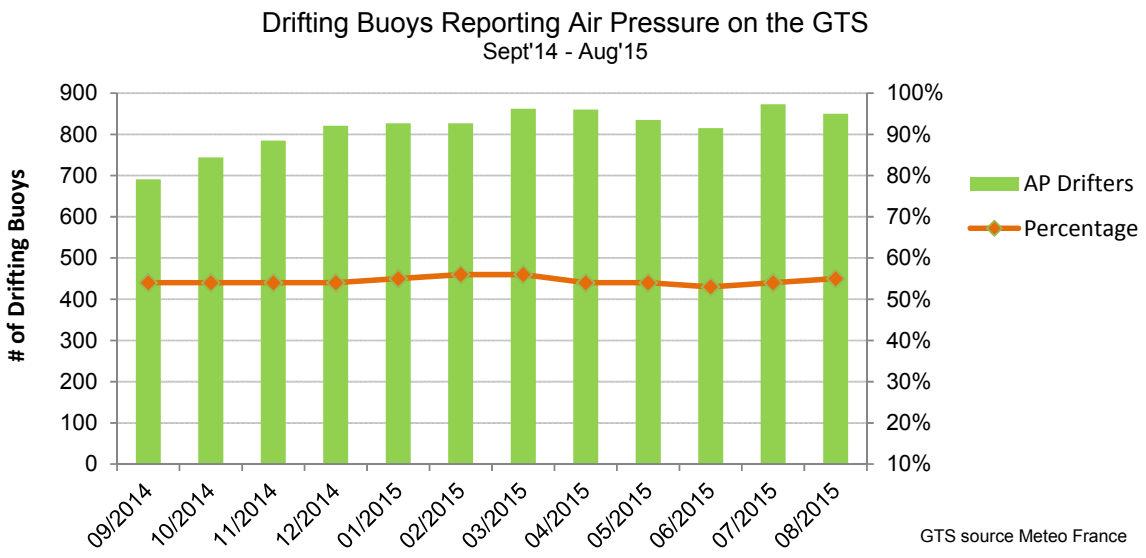

Figure 3 - Status of Barometer drifting buoys during the last intersessional period.

5.6 The Technical Coordinator reported that among the drifting and moored buoys reporting on the GTS in BUOY or BUFR formats, the following variables were measured in Aug 2015. Wave measurements are not available due to a data decoding error at the source. TC is working with Meteo-France to resolve this issue and the wave data information will be available in coming months.

Variable	Any	Air P	P Tend	SST	Air T	Hum	Wind Dir	Wind Speed	Sub/T	SSS	Sub/Sal	Sub/Cur
Drifting Buoys	1555	850	597	1453	57	6	6	3	19	256	14	0
Moored Buoys	415	249	215	364	318	161	310	310	114	54	105	16
Fixed Platforms	102	90	90	9	89	83	92	64	3	0	0	1

5.7 The TC reported that she modified few monthly maps in this intersessional period. Deploying Country map has been updated with the entire array of active drifting buoys with their country of deployment, which is a better representation of countries contribution to their coastal waters and the Global Drifter Program (GDP). As the GDP relies heavily on its international partnerships for the deployment of instruments, it was agreed that international partnerships should be recognized. (Figure 4)

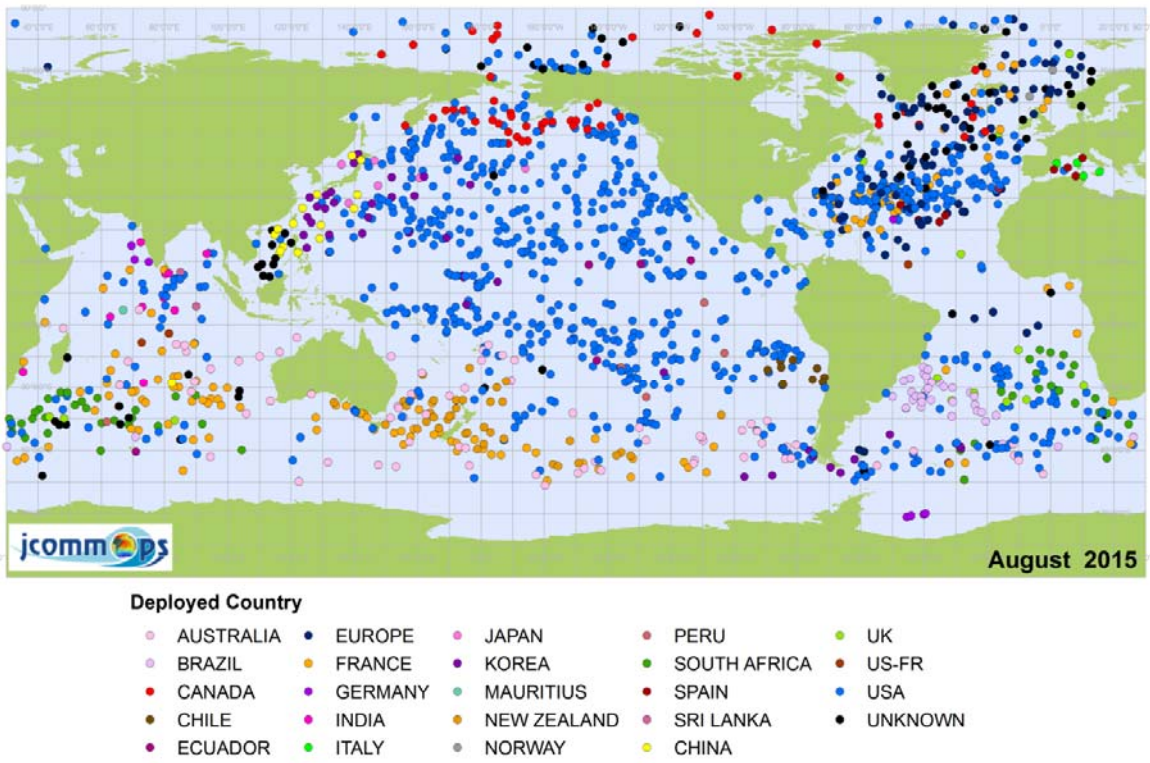

Figure 4 - Map showing country of deployment for drifting buoys active during August 2015.

5.8 In addition to the changes shown above, the DBCP TC has also created separate maps with sensor information. Network maps with sensor information on DBCP website are replaced with single map for each sensor type. This will provide easy access and improved readability.

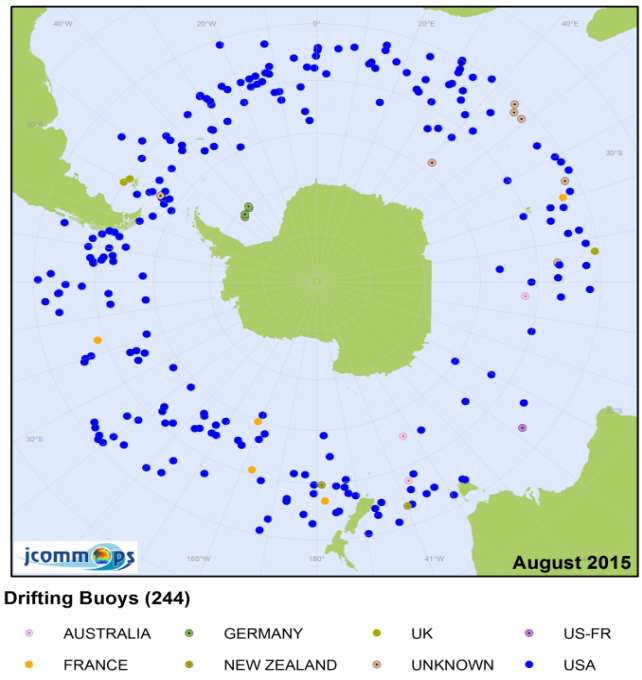

Figure 5 – Southern Ocean Drifting Buoys in August 2015.

5.9 TC informed the panel that she created two new maps to better focus on the Southern

Ocean deployments. New maps are with polar view showing the currently active drifting buoys with their last location and the drifter buoy density in the area. (Figure 5)

5.10 The TC reminded the panel that Deep-Ocean Assessment and Reporting of Tsunami (DART) Buoys will continue as usual to the JCOMMOPS database. The locations of these buoys are included on the monthly maps and in the reporting. The data for these buoys does not come through the normal GTS chains and is not collected by Météo-France or the Integrated Science Data Management (ISDM, Canada). Currently TC is relying on information received from National Data Buoy Center (NDBC). An automated process for receiving this information or adding the Tsunami buoys to the normal GTS chains is required. TC is investigating on possibilities (***action; TC, with NDBC or Météo France; DBCP-32***).

5.11 The TC reported on the status of the Tropical Atmospheric Ocean (TAO) buoy array. Starting from November 2014, the TAO array has been operating around 80% data availability throughout the rest of the period. This is 30% progress in TAO data availability from last reporting period. TC also highlighted the changes to the TAO data which is currently reporting in BUFR format. NDBC announced its move to report TAO data in BUFR format starting from 02nd March 2015. In the mean time, ASCII formatted messages in FM18 BUOY format will continue to be distributed under the same headers as usual from the TAO array.

5.12 The Southern Ocean Buoy Programme (SOBP), as part of the DBCP Implementation Strategy, aims to have 300 operational drifting buoys with barometers distributed across the Seas south of 40^{o}S. As of August 2015, there were 244 drifters in the Southern Ocean and 221 (90%) of these were barometer drifters. Little progress has been made compared to the August 2014 number which was 216. There were a total of 117 drifting buoys deployed in the Southern Ocean during the last intersessional period and DBCP members should continue to look for deployment opportunities in this region (***action; DBCP Members; asap***).

5.13 The TC emphasized the importance to get the notifications on network and service changes out to a broader community who use the data flowing through the GTS in downstream. Most of the time the network/platform/data flow change notification information only gets to the meteorological centres who has direct access to the GTS. (***action; Buoy Operators provide network and service change notices to DBCP to post them on different notification streams ; DBCP-32***)

5.14 The Panel noted the importance of developing the performance metrics for the DBCP networks. The TC outlined the organization of such metrics with proposed indicators. A single Key Performance Indicator (KPI) can be applied across the various network Categories (i.e. Network data availability). Further, secondary KPIs can be defined for each different network; global drifter array, tropical moored buoy array, national/coastal moored buoy network, Arctic/Antarctic buoys, and Tsunami buoys. Appropriate Task Teams (TT) or Action Groups (AG) can work on the secondary KPI development. The KIPs should capture the performance of network status, data delivery, and international cooperation, instrumentation, and operation aspects of the buoy arrays. TC requested the panel to review the proposed approach and provide feedback. (***action; Pannel review and provide feedback on categories of networks and draft indicators list; asap)***

5.15 The TC reported on the progress of data submitting in the Binary Universal Form for the Representation of Meteorological Data (BUFR). Migration to BUFR was scheduled to be complete at the end of Nov 2014. In April DBCP requested all drifting buoy data providers to use latest BUFR template TM315009 starting from July 01st. Many members provide drifting buoy data in BUFR format with multiple element descriptors which have become a challenge for the DBCP Global Data Assembly Center (GDAC). Details of these challenges are discussed in the document no.10.2. TC provided statistics on the percent of drifting and moored buoys currently reporting to the GTS using Table Driven Codes (TAC) and BUFR and mentioned that if there are questions regarding the migration please contact TC.

5.16 With increasing number of data providers moving to BUFR, there have been several changes to the bulletin headers. TC has updated the bulletin header file and made it available through the DBCP website. DBCP members are encouraged to review the document and provide updates to the TC.

5.17 One of the high priority activities for TC during the intersessional period was to establish a method to collect moored buoy metadata. Accordingly, TC established a process to collect moored buoy metadata and provided the information to the community with a request to submit data. Following the DBCP request in February 2015, 15 agencies from 13 countries have provided metadata on moored buoys. Compiled metadata files and data submission instructions are accessible through a FTP site.

5.18 The TC highlighted the importance of receiving metadata and deployment information in timely fashion at the DBCP. Timely platform metadata availability has become more important with the new JCOMMOPS website to provide up-to-date and accurate information to the community. TC has reminded the community to provide deployment information and metadata through usual channels until the new website is launched, which will provide tools to upload this information. ***(action; Buoy Operators provide deployment and platform metadata information to DBCP; DBCP-32***)

5.19 The TC reminded the panel the importance of correct handling of WMO identifications to report the data on to the GTS. DBCP platforms use five-digit WMO identification (WMO ID) numbers to report data in TAC format to the GTS. WMO IDs can be reassigned within the guidelines provided by the WMO. However, there were instances that members were not following the WMO ID reassign guidelines that lead to difficulties in data archiving and metadata management. Therefore, the TC proposed to have more centralized and controlled WMO number management by WMO secretariat or within JCOMMOPS.

5.20 The new TC, Champika Gallage, wish to thank the DBCP Members, for their support and understanding during this intersessional period where it has been on-the-job learning period in her new position.

5.21 **The meeting made the following recommendations**:

(i.) The panel recommended for the manufacturers to provide information to JCOMMOPS on models, formats, and shipments;

(ii.) The panel recommended it's members to continue providing buoy deployment information to the Technical Coordinator in the agreed upon format;

(iii.) The panel recommended it's members to continue providing buoy metadata information to the Technical Coordinator in the agreed upon format;

(iv.) The Panel recommended to follow guidelines proposed to better handle WMO IDs;

(v.) The panel recommended members who are not yet transmitting data to the GTS in BUFR format to start doing so using appropriate data formats; and

(vi.) The panel recommended the moored buoy operators to provide Moored Buoy metadata in the appropriate data format to the TC

5.22 **The meeting decided on the following action items**:

(i.) The TC to work with NDBC or Météo France on an automated process for receiving tsunameter information. (***action; TC, NDBC or Météo France; DBCP-32***);

(ii.) The Panel requested the Technical Coordinator to work with Iridium VARs to obtain drifting and moored buoy data (***action; TC; DBCP-32***);

(iii.) DBCP members should provide deployment information to the TC in timely manner. (***action; Buoy Operators)***

(iv.) DBCP members should look for deployment opportunities in the Southern Ocean (***action; DBCP Members; asap***).

(v.) Panel review and provide feedback on categories of networks and draft indicators list (***action; Panel members; asap***)

-B- BACKGROUND INFORMATION

This report covers the activities of the Technical Coordinator of the DBPC for the period of 1 September 2014 to 31 August 2015.

1 During the period from 1 September 2014 to 31 August 2015, Ms. Champika Gallage worked as Technical Coordinator (TC) of the Data Buoy Cooperation Panel (DBCP) from the new JCOMMOPS location in Brest France, on contract to UNESCO. On average, the TC spends 70% of her time on DBCP-related matters and 30% of her time as OceanSITES Project Office.

2 The TC reminded the panel that new JCOMMOPS office is now located at IFREMER, Brest France from February 2015. There is one recent addition to the group, as the Coordinator, Science & Communication to assist with regular JCOMMOPS activities. Currently JCOMMOPS has six full time employees one with contract ending in November 2015.

3 During the previous year, Ms. Gallage's time was spent on the following:

- Familiarizing with JCOMMOPS database and tools
- Familiarizing with DBCP community , platforms, operators and networks
- Travelling to meet with various DBCP Members, Action Groups, and Teams
- Review database design, metadata loading and reporting on new JCOMMOPS website
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- Monitoring the Quality-Control Relay traffic

- Tracking all buoy deployments, and mooring maintenance/installations
- Preparing for and attending meetings
- Preparing meeting reports and documents

Other details on the work that the TC performs can be found in the Terms of Reference for the Technical Coordinator of the DBCP, ANNEX IV, APPENDIX IV of the full meeting report.

Current status of the data buoy network

4 The TC outlined the current status of the data buoy network. During the past 12 months, the average number of drifting buoys reporting onto the Global Telecommunications System (GTS) was 1504 per month, 407 moored buoys and 102 fixed platforms (Figure 6). During the intersessional period, the average number of drifting buoys has increased by 14%. The number of barometer drifting buoys is in slow but steady increase over the years as shown in Table1. The number of moored buoys has stayed the same with 60% of the platforms reporting pressure measurements. The TC has started to evaluate the performance of fixed platforms in this intersessional period. There was an average of 102 fixed platforms reporting on the GTS with 87% of them with atmospheric pressure measurements. TC is continuously working on adding new platforms to the DBCP database.

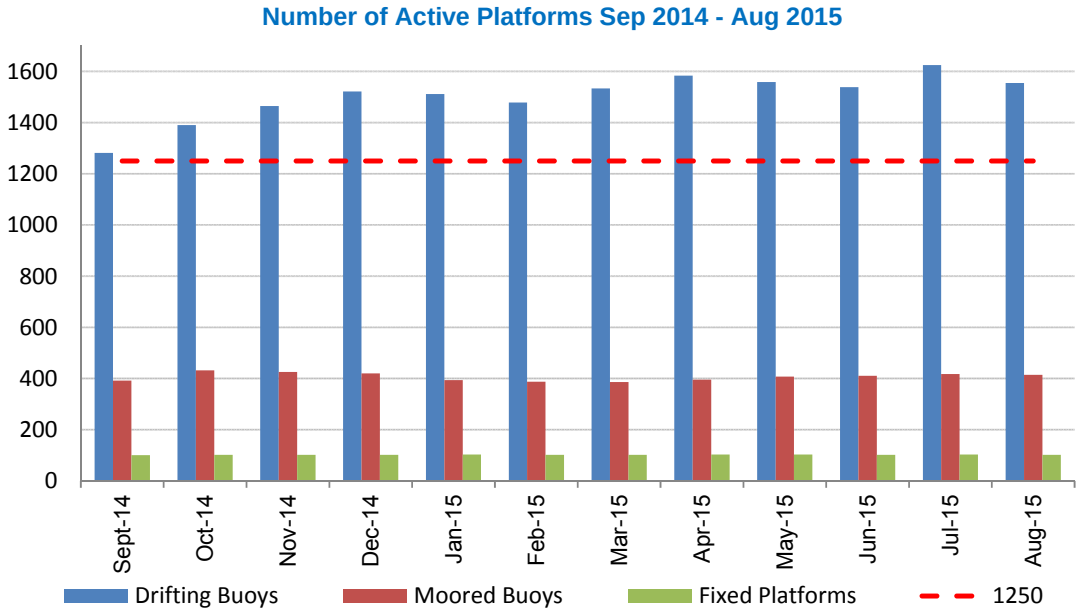

Figure 6 - Operational drifters moored buoys and fixed platforms on the GTS during the period August 2014-Aug 2015. Number of drifters verified and confirmed through Météo-France GTS. Target line of 1250 shown for reference.

	2012-13	2013-14	2014-15
Average number of Drifting Buoys	1168	1340	1504
% of barometer buoys	40%	50%	54%
Average number of Moored buoys	453	406	407
% of barometer buoys	-	-	59%

Average number of Fixed platforms	-	-	102
% of barometer buoys	-	-	85%

Table 1: Average number of platforms deporting on the GTS and the percentage of platforms reporting atmospheric pressure over the last few years.

The current number of operational drifters on the GTS for August, 2015 is at 1555 (Figure 7) where 60 of them are equipped with barometers. There were 415 moored buoys were reporting on the GTS during August with 60% of those were reporting atmospheric pressure. Number of fixed platforms reporting on the GTS were 102 and 89% of those were provided atmospheric Pressure values.

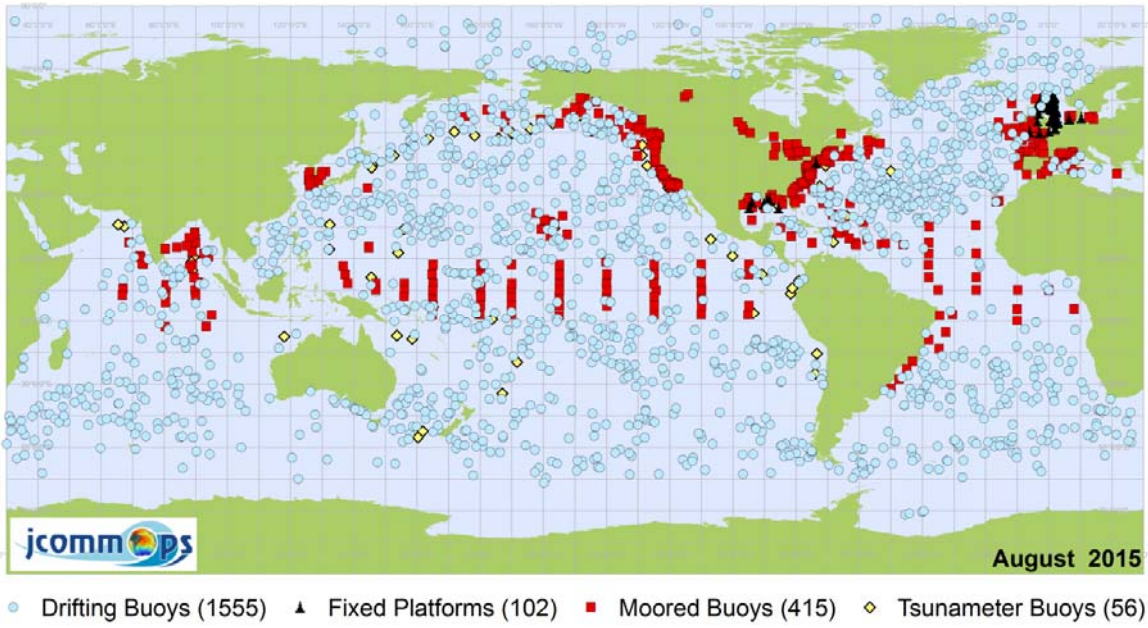

Figure 7- Drifting and Moored buoy monthly status map for Aug 2014. (GTS information received from Météo-France)

Figure 8 below illustrates the growth of drifting buoy and moored buoy networks together with number of barometer drifting buoys. It is apparent that there is a steady increase in total number of drifting buoys and the barometers drifters over the years after the significant decrease in 2012-13. Drifting buoy array has now reached the same level it was in 2010 with much higher number of barometers drifters. Total number of moored buoys has not changed significantly over the past few years.

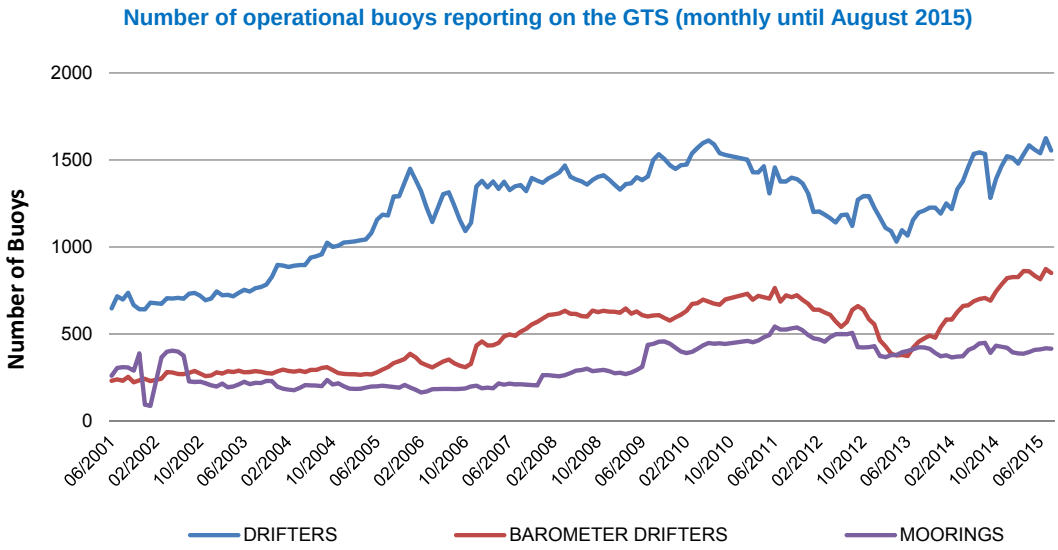

Figure 8 - Number of operational buoys reporting on the GTS since 2001.

The status of the moored buoy network from each contributing country in August 2015 and August 2014 is shown in Figure 9. There is a slight reduction in total number of moored buoys in August 2015 compared to August 2014. There are 12 countries contributing to the moored buoy network in August 2015 while there were 16 countries provided moored buoy data to the GTS in August 2014.

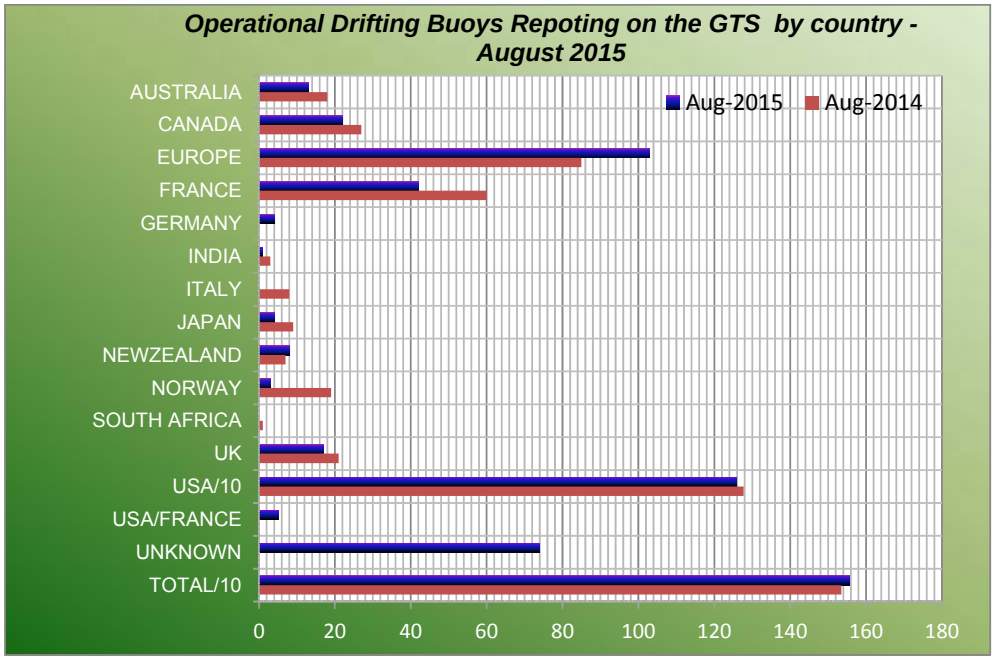

Figure 9-Number of moored buoys per country in Aug 2014 and Aug 2015.

One of the major concerns of the moored buoy operators is finding resources to maintain the systems. With budgetary constraints and increasing ship-time costs, it has become a challenge to maintain the moored buoy array. As a result, reduced maintenance frequency, omission of bigger platforms and harder to maintain stations has seen more frequent. There are few initiatives in progress to address above-mentioned challenges; new observing platforms (wave gliders, profiling gliders), robust and easy to maintain platform designs (Self-Contained Ocean Observations Payload SCOOP , from NDBC).

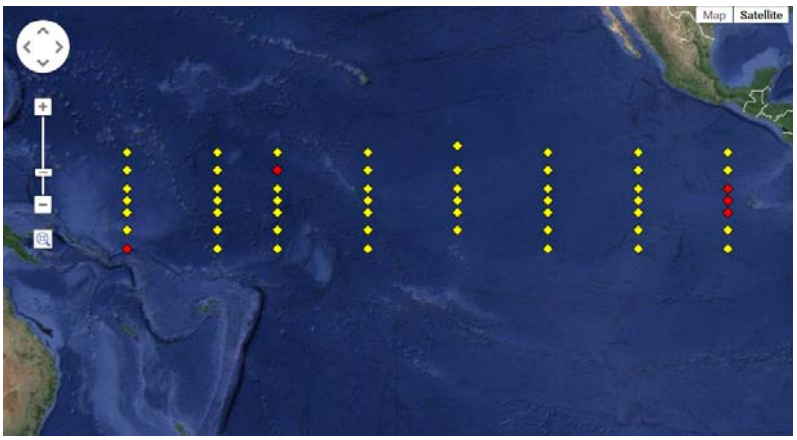

Figure 10 - TAO array status in August 2015.

Data availability of TAO array has improved from last reporting period after launching the NOAA service cruises to maintain TAO array in late 2014. TAO array is now at targeted 80% data availability. Performance of the TAO array has improved from 50% low in July 2014 to 80% at the end of August 2015 (Figure 10 and Figure 11).

TAO array is currently reporting data on the GTS in BUFR format under the bulletin headers "IOBF08 KWNB" for all TAO stations with a nominal position east of 180 and "IOBG08 KWNB" for all TAO stations with a nominal position on or west of 180. NDBC announced its move to report TAO data in BUFR format starting from 02nd March 2015. In the mean time, ASCII formatted messages in FM18 BUOY format will continue to be distributed under the same headers as usual from the TAO array.

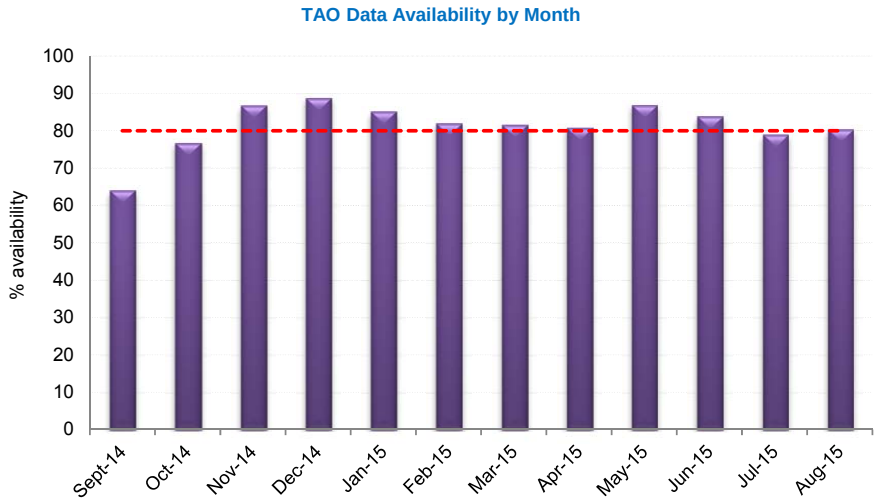

Figure 11 - TAO array data availability September 2014-August 2015.
(Data source: NDBC monthly statistics)

The status of the drifting buoys per country from August 2014 and August 2015 are shown in Figure 12. The total number of drifters has slightly increased from 1535 August 2014 to 1555 in August 2015. Currently there are ten countries contributing to the Drifting buoy network.

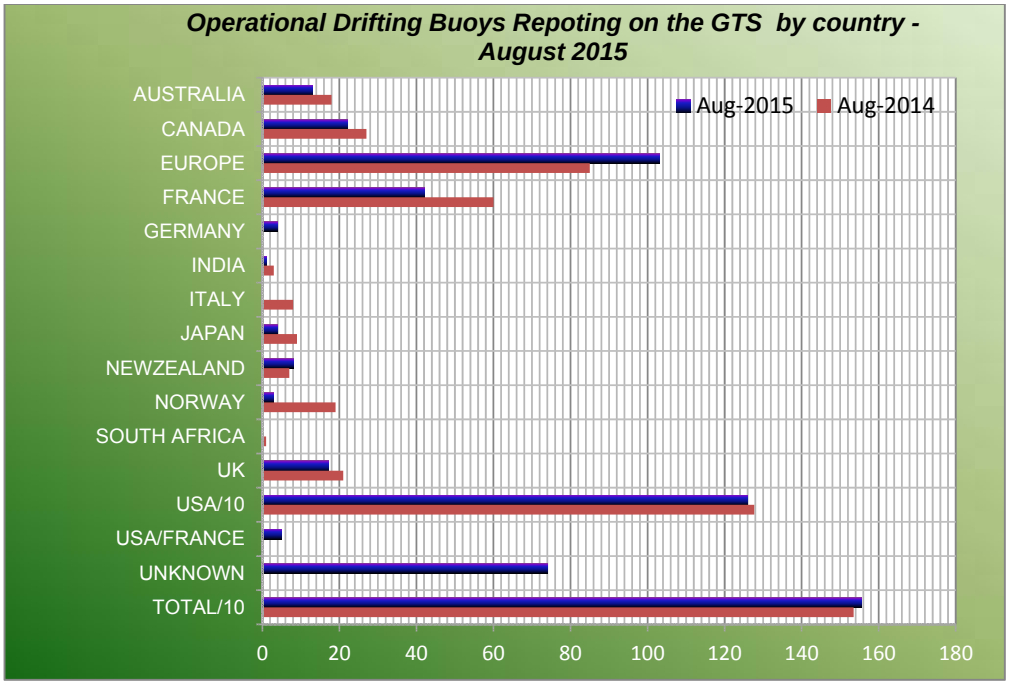

Figure 12 -Number of drifting buoys per country in August 2014

Variables measured from boys and reporting on the GTS

5 Amongst the drifting buoys, moored buoys and fixed platforms reporting on the GTS in BUOY (or BUFR) format, the following variables (Table 2) were measured in August 2015. The number of drifters reporting Air Pressure is at 55% (Figure 13). Wave measurement information is not available due to a data decoding error in the data received from Meteo-France. TC has been working with Meteo-France to resolve this issue.

Variable	Any	Air P	P Tend	SST	Air T	Hum	Wind Dir	Wind Speed	Sub/T	SSS	Sub/Sal	Sub/Cur
Drifting Buoys	1555	850	597	1453	57	6	6	3	19	256	14	0
Moored Buoys	415	249	215	364	318	161	310	310	114	54	105	16
Fixed Platforms	102	90	90	9	89	83	92	64	3	0	0	1

Table 2 - Drifting buoy, Moored buoy and Fixed platform variables reported on the GTS during August 2015.

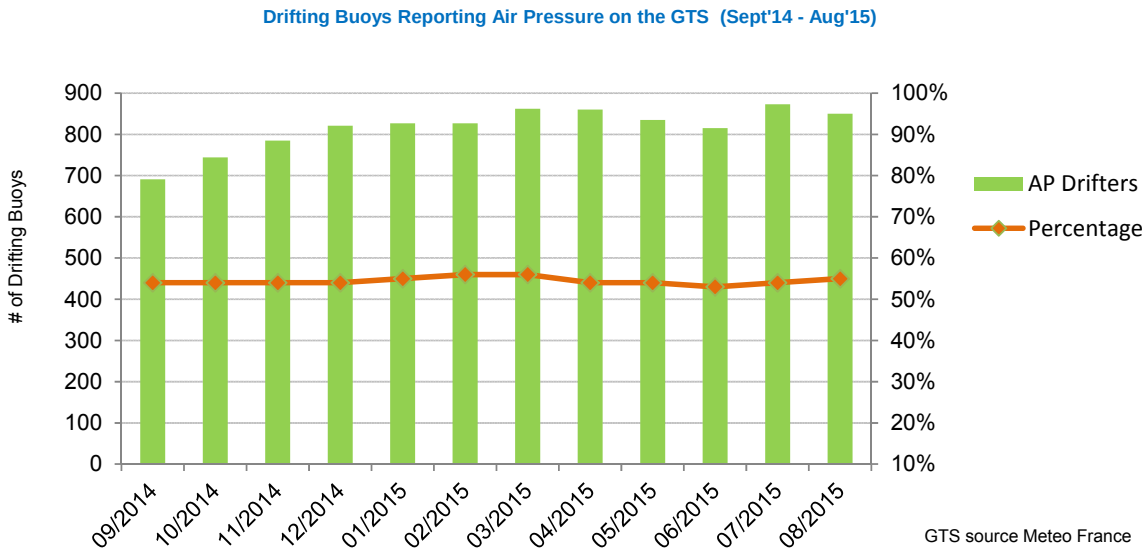

Figure 13 - Number of drifting buoys reporting Air Pressure on the GTS during September 2014-Augut 2015. The number of barometers has been holding at 55%.

Updates to Monthly Maps

6 The TC reported that TC modified few monthly maps in this intersessional period. Deploying country map has updated with the entire array of active drifting buoys with their country of deployment (Figure 14), which is a better representation of a particular countries contribution to their coastal waters and the Global Drifter Program (GDP). As the GDP relies heavily on its international partnerships for the deployment of instruments, it was agreed that international partnerships should be recognized

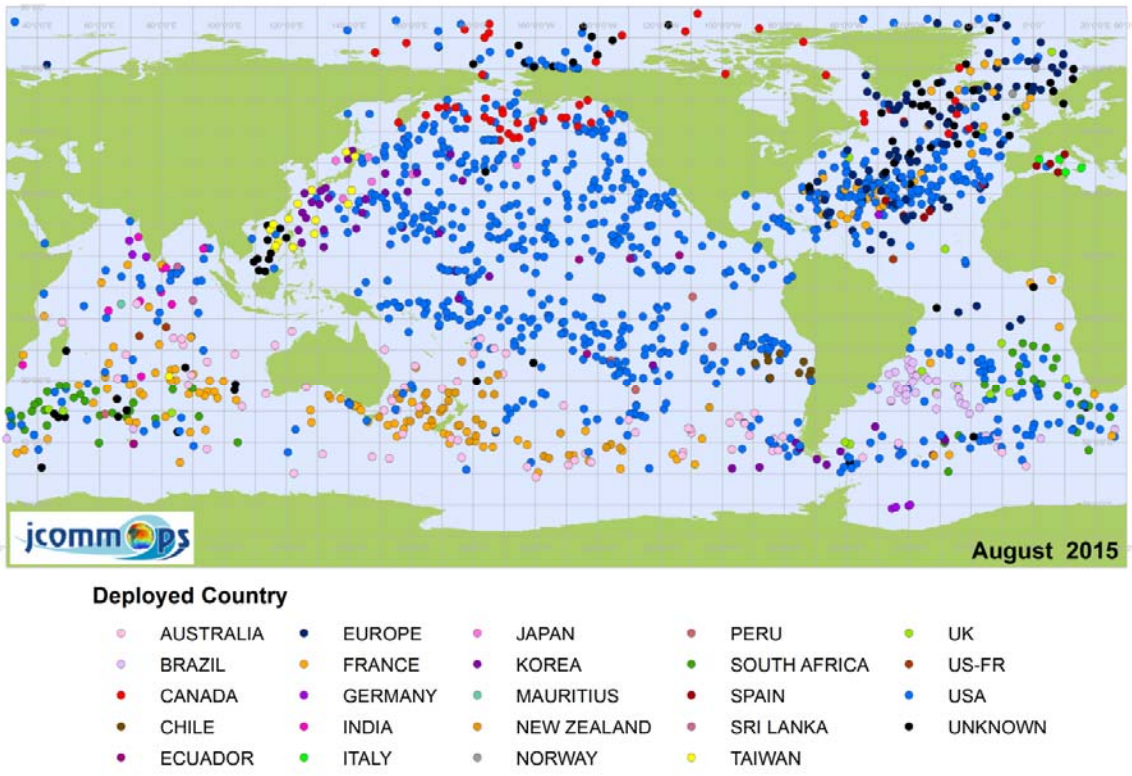

Figure 14 - Map showing country of deployment for drifting buoys active during August 2015.

In addition to the changes shown above, the DBCP TC also has created separate maps with sensor information. Network maps with sensor information on DBCP website are replaced with single map for each sensor type. This will provide easy access and improved readability.

TC informed the panel that TC created 2 new maps to better focus on the Southern Ocean deployments. New maps are with polar view showing 1.) Currently active drifting buoys with their last location and 2.) Drifting buoy density in 5X5 degree grid (Figure 15). These can both be found on the normal maps page in the DBCP site and it is recommended that these maps to continue.

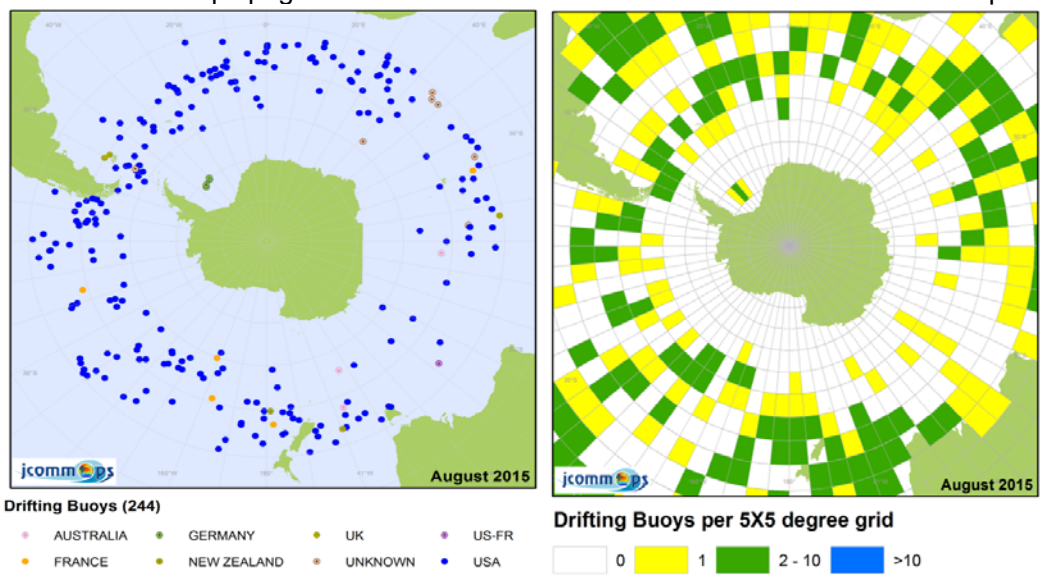

Figure 15 – Southern Ocean Drifting Buoy locations and density in 5X5 degree grid in August 2015.

Tsunameters

7 During the last intersessional period the Technical Coordinator had added Tsunami Buoys to the JCOMMOPS new database. The locations of these buoys are included in monthly maps (Figure 16).

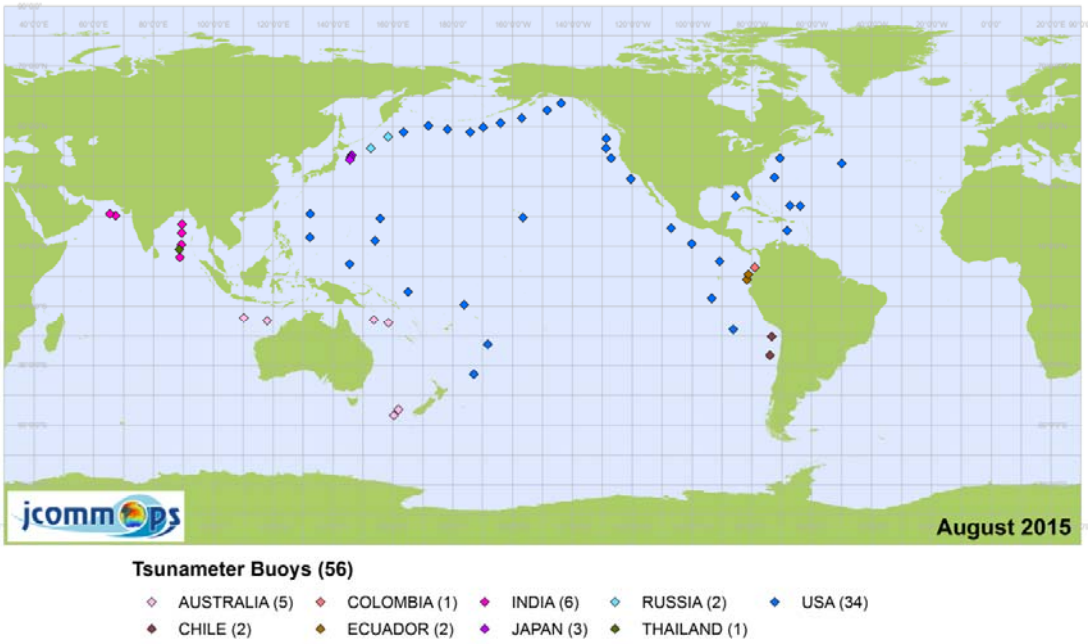

Figure 16 - Operational Tsunami Buoys in August 2015. Location information received from NOAA/NDBC or international partners.

Tsunameter buoys will be held separately as the data from these are not decoded by Meteo-France or ISDM. Investigations by TC revealed that majority of tsunameter data goes to the GTS in DART (a technology specific) format, thus neither Meteo-France nor ISDM decode the data. This problem will disappear once tsunameter data become available in BUFR format. TC relies on the regular tsunameter buoy information from NDBC. Figure 17 shows the tsunameter water column height data availability percentages over last year.

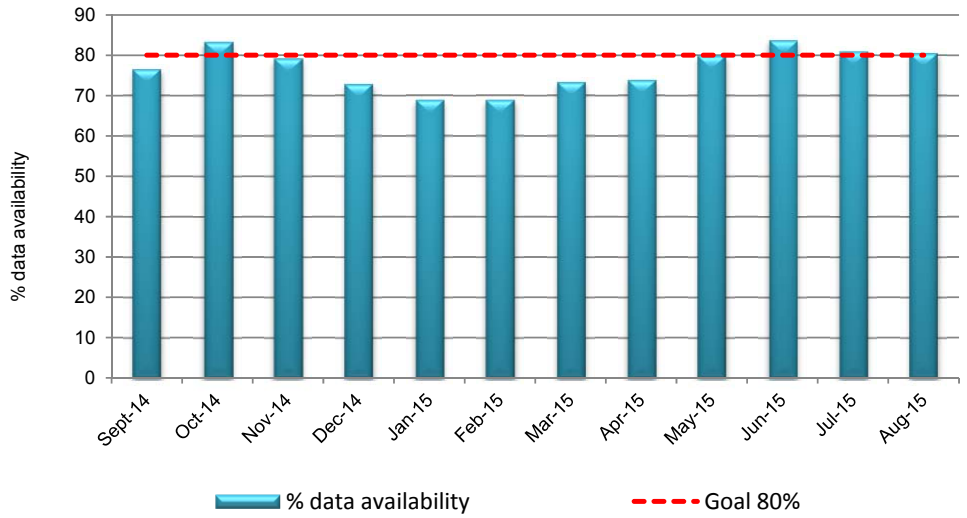

Figure 17 – Tsunameter buoy water column heights data availability during Sept 2014 to August 2015
(data source: NDBC monthly DART reports)

There has been some validation work on BUFR template for Tsunameter data (TM306027). Results reveal that the current BUFR format is very much technology specific focused on DART system. Since there are new technologies out there now may not fit with the existing BUFR template. Therefore the issue with the tsunameter data format needs to be addressed.

Southern Ocean Buoy Programme (SOBP)

8 The Southern Ocean Buoy Programme (SOBP), as part of the DBCP Implementation Strategy, aims to have 300 operational drifting buoys with barometers distributed across the Seas south of 40°S. During August 2015, there were 244 drifters in the Southern Ocean and 221 (90%) of these were barometer drifters (Figure 18). Little progress has been made compared to the August 2014 number which was 216. There were a total of 117 drifting buoys deployed in the Southern Ocean during the last intersessional period and DBCP members should continue to look for deployment opportunities in this region.

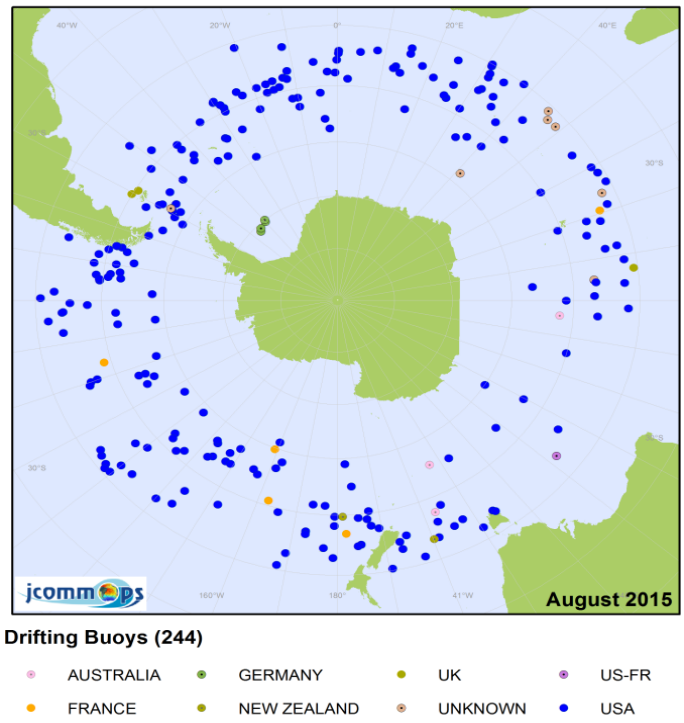

Figure 18 – Active drifting buoys during Aug 2015 in the Southern Ocean below 40°S.

The deployment plans last year were for 236 buoys with Barometers (including 30 upgrades) to be deployed south of 40°S. As it is very difficult to predict deployment opportunities, firm commitments are difficult and this exact numbers of SVPB buoys versus SVPs are also difficult to predict.

Country	Planned	Additional Upgrades	Total	Comment
Australia	5		5	
Canada (IPAB)	12		12	AWI Polarstern cruise to Weddell Sea (ANT 30-3), Dec 2014 - Jan 2015
France		20	20	Plans to deploy in SOBP Indian Ocean
New Zealand	7	10	17	Upgrades provided by GDP
South Africa			0	
UK	12		12	- 7 - HRSST-2 units and will be deployed north of 40S in warmer Atlantic waters - 5 to bedeployed south of 40S in the Southern Atlantic. - All will be Iridium drifters with barometers.

USA	170		170	- 10 SVPB drifters will be deployed in the S. Indian Ocean, by the R/V Kaharoa - 30 SVPB drifters will be deployed in the S. Pacific Ocean, by the R/V Araon - 20 SVPB drifters will be deployed in the Drake Passage, by the R/V LM Gould - 20 SVPB drifters will be deployed in the S. Pacific Ocean, by the Chilean Navy - 20-25 SVPB drifters will be deployed in the S. Indian Ocean, in cooperation with Meteo-France - 30 SVPB driftes will be deployed in the S. Atlantic Ocean, in cooperation with the South African Weather Service - 10 SVPB drifters will be deployed in the S. Pacific Ocean, in cooperation with the New Zealand Met Service - 30 SVPB drifters will be deployed in the Drake Passage, in cooperation with Christian Reiss
Total	**206**	**30**	**236**	

Table 3- Barometer Drifter deployments planed for the period August 2014 to July 2015 as agreed at DBCP-30.

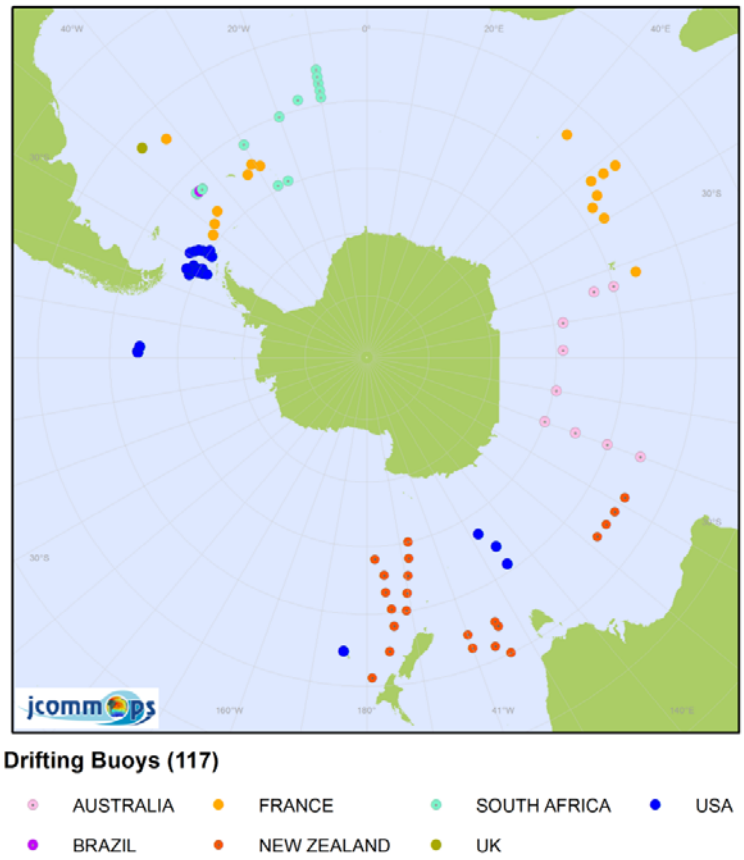

Figure 19 – Drifting buoy deployment location in South of 40^{0}S during August 2014 -July 2015

The actual deployments during this intersessional period totalled 117 (Figure 19). Eight different countries have contributed by purchasing and deploying the buoys (Table 4).

The differences in planned vs deployed were due to a few factors; it is a difficult location to find deployment opportunities, therefore each year, these projections are a bit of wishful thinking. While each of the deployment opportunities listed did occur, the number of deployments varied from the proposed plan. Some of the deployments ended up being north of 40S (by a few degrees).

Country	Buoys Purchesed or deployments	Additional (Baro)Upgrades	Total	Comment
Australia (ABOM)	5	1	6	Deployed 4 more buoys from USA
Brazil	0	0	0	Deployed 2 buoys from USA
Chile	0	0	0	Deployed 2 buoys from USA
France		8	8	Deployed 8 more buoys from USA
New Zealand	0	0	0	Deployed 23 buoys from USA
South Africa	0	0	0	Deployed 14 buoys from USA
UK	1	0	1	
USA	99	0	99	
Unknown	3	0	3	
Total	108	9	117	

Table 4 - Actual barometer drifter deployments during the period August 2014 to July 2015.

The plans for August 2015 – July 2016 are shown in Table 5 below. As mentioned above, the southern ocean is the trickiest basin to predict deployment numbers. According to the GDP, there are normally few opportunities, limited lead times, and shipping difficulties, which makes it difficult to seed these areas. There are several new opportunities for deployments in the Southern Ocean that are being arranged within JCOMMOPS with the Ship Coordinator, Martin Kramp. The details on these deployments will be available in Doc 9.2 – Deployment Opportunities.

Country	Planned # of deployments	Additional (Baro)Upgrades	Total	Comment
USA (AOML)	15	0	15	15 SVPB's will be deployed east of NZ, from the R/V Kaharoa
USA (AOML)	30	0	30	30 SVPB's will be deployed at approx. 55S,155W, from the R/V Araon.
Australia (ABOM)	5	4	9	It is possible that some additional ABOM baro upgrades (deployed out of Cape Town by SAWS and La Reunion by Meteo France) may also be deployed south of 40S
France	15	00	15	South of Indian Ocean
New Zealand	00	10	10	5 SVPBs will be deployed for AOML
USA (AOML)	05	00	05	Deploy by NZ
USA (AOML)	17	00	17	Deploy by South Africa
Brazil	0	14	14	The drifters will be deployed at each crossing of navy vessel through Drake
Total	87	28	115	

Table 5 - Barometer Drifter deployment plans for the period August 2015 to July 2016 as proposed to be agreed at DBCP-31.

Network/Service Change Notifications

9 During this intersessional period few questions came up on how best to notify the buoy data user community on network and service changes. This particular question was raised related to the operational changes notification on TAO reduced resolution position data not being reached out to the research and non-operational users. Normal practice for service change notifications is to post them on the GTS. However, notifications on the GTS are directly accessible only to the national service centers. There are number of notification mechanisms available through WMO which are accessible by the general public; WMO METNO Messages system, World Weather Watch Operational Newsletter and JCOMM notifications. Therefore TC suggest the DBCP community to share their service change notifications with TC where TC can make arrangements to publish the notifications on above mentioned WMO notification systems which are accessible by broader audience.

Performance Indicators

10 The Panel noted the importance of developing the performance metrics for the DBCP networks. The TC outlined the organization of such metrics with proposed indicators. A single Key Performance Indicator (KPI) can be applied across the various network Categories (i.e. Network data availability). Further, secondary KPIs can be defined for each different network; global drifter array, tropical moored buoy array, national/coastal moored buoy network, Arctic/Antarctic buoys, and Tsunami buoys. Appropriate Task Teams (TT) or Action Groups (AG) can work on the secondary KPI development. The KIPs should capture the performance of network status, data delivery, and international cooperation, instrumentation, and operation aspects of the buoy arrays. TC requested the panel to review the proposed approach and provide feedback. List of network categories and proposed KPIs are included in Annex.

BUFR Migration

11 The TC reported on activites related to the BUFR migration during this intersessional period. The migration to BUFR was scheduled to be complete at the end of Nov 2014. In April 2015, DBCP requested all drifting buoy data providers to use latest BUFR template TM315009 to submit data to the GTS starting from 01st July2015 Majority of drifting buoy operators currently provide data in BUFR format however with multiple element descriptors which have become a challenge for the DBCP Global Data Assembly Center (GDAC), MEDS. Further details on this issue is included in the report by the task team on data management document no 6.1. The TC provided statistics on the percent of drifting and moored buoys currently reporting to the GTS using TAC and/or BUFR (Figure 20). By August 2015, 98% of the drifting buoys reporting in BUFR on the GTS. 91% of buoys are still sending data in BUFR and TAC while 7% is yet to be converted to BUFR. Most of the centres sending data in BUFT and TAC will stop sending TAC messages to the GTS by early 2016. Only 30% of moored buoys are currently reporting data in BUFR format to the GTS. The TC mentioned that links to access information on BUFR templates and a BUFR validation tool are now available through DBCP website. TC further mentioned that if there are questions regarding the migration to please contact the TC.

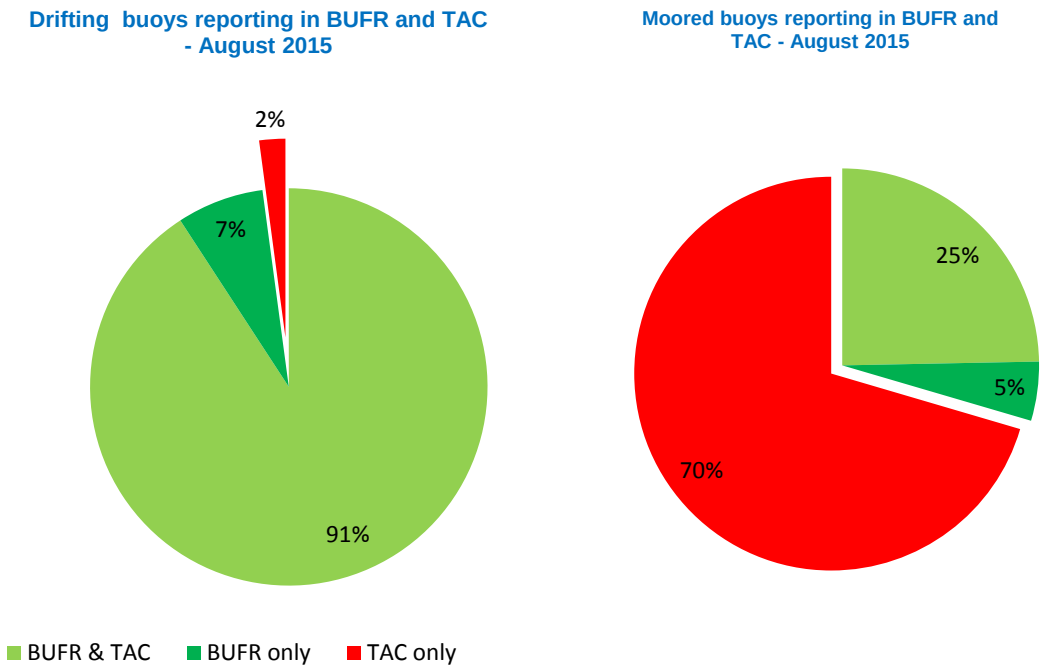

Figure 20 - Percentages of messages on the GTS in MUFR and TAC from Drifting and Moored Buoys in August 2015

GTS Bulletins

12 There is a goal for ISDM and Météo-France to fully compare data going onto the GTS at least twice per intersessional period. In the inter-sessional period, one comparison was carried out in December 2014 and revealed two sources of discrepancies in counts of sub datasets at both centers. First one was that one buoy's messages didn't end with 7777, as required; which posed problems at the Canadian meteorological center which does the routing of BUFR messages to ISDM based on bulletin headers. The buoy owners have been notified and ISDM have found a workaround for this problem. The second source was that some centers weren't using unique bulletin headers for multiple bulletins sent simultaneously. This has been fixed in late January 2015. Second comparison took place in September 2015 and revealed slight discrepancies in total number of unique messages received. This is partly due to the addition of BUFR messages converted from FM13 under ISS headers (ISDM did not receive the ISS headers prior to the comparison), and in part due to the interpretation of non-standard encoded WMO identifiers in BUFR messages and non-buoy platforms (light vessels, oil rigs) reporting with WMO Identifiers typically reserved for buoys. ISDM and Météo-France are currently working on resolving these discrepancies. Details of these comparisons are in document no 10.2 and also will be discussed during the Task Team in Data Management.

Moored Buoy Metadata

13 One of the high priority activities for TC during this intersessional period was to launch a method to collect moored buoy metadata. Accordingly, TC established a process to collect moored buoy metadata with the guidance from Moored Buoy Metadata Task Team (MB-TT). Moored buoy metadata format was developed and finalized by the MB-TT. TC had prepared an instruction manual and provided the information to the community with a request to submit data. Following the DBCP request in February 2015 with a deadline in April 2015, 15 agencies from 13 countries have provided the metadata (Table 6). Compiled metadata files and data submission instructions are accessible through a FTP site.

Country	#of records	Institute
France	28	Meteo-France
Portugal	5	Hydrographic Institute
Italy	15	Italian Institute for Environmental Protection and Research
Greece	10	HELLENIC NATIONAL METEOROLOGICAL SERVICE (EMY)
Korea	11	Action officer / Marine Meteorology Division / KMA
Germany	14	Federal Maritime and Hydrographic Agency (BSH)
USA	226	PMEL-PIRATA
USA	120	PMEL-RAMA
New Zealand	No MBs	NIWA / UoO Research Centre for Oceanography
Japan	11	Global Environment and Marine Department Japan Meteorological Agency
INDIA	19	NIOT
USA	23	NOAA/PMEL/OceanSITES
Brazil	6	Navy Hydrographic Center
Canada	50	Environment Canada
Chile	23	Hydrographic and Oceanographic Service of the Chilean Navy

Table 6-Moored buoy metadata submission by different agencies

The TC highlighted the importance of receiving metadata and deployment information in timely fashion at the DBCP. Timely platform metadata availability has become more important with the new JCOMMOPS website to provide up-to-date and accurate information and statistics to the community. Currently, TC relies on number of sources to collect the information; AOML deployment log, Iridium buoy information from Meteo-France and Scotia Weather, International Arctic Buoy Program (IABP). Yet there are some gaps such as deployment date, manufacture, deploying country, etc. TC has reminded the community to provide deployment information and metadata through usual channels until the new website is launched, which will provide tools to upload metadata information.

WMO number allocation

14 DBCP platforms use five-digit WMO ID numbers to report data in TAC format onto the GTS. WMO IDs can be reassigned within the guidelines provided by the WMO. However, there were instances that members were not following the WMO ID reassign guidelines which leads to difficulties in data archiving and metadata management. For example some instances the WMO number were reassigned from one platform to another within a day, and WMO IDs for drifting buoys are allocated to fixed platforms. Therefore, the TC propose number of guidelines to follow and requested panel approval (Table 7), to have more centralized and controlled WMO number management by WMO secretariat or within JCOMMOPS. The TC also requested the members to use moored buoy WMO IDs for Fixed platforms and not the drifting buoy WMO IDS.

WMO IDS for Drifting Buoys	Current Practice	Proposal
TAC only	A1bwnnn 5 digit IDs Reuse as needed	**Avoid reuse of IDs whenever and wherever possible**
TAC & BUFR	A1bw((00)nnn 5 digit IDs for TAC reposting	**Never to reuse the 5 digit IDS**

	Ad “00” to convert the ID to a 7 digit for BUFR reporting	
BUFR only	A1bwnnnnn = A1bw(00nnn Add “00” to convert the currently allocated ID to a 7 digit	**Use only 7 digit numbers with nnnnn ≥ 1000 for all new deployments reporting only in BUFR format**

Table 7 – Proposed guidelines to handle WMO IDs

TC priorities

15 The priorities and actions as outlined at the previous DBCP Session were addressed as following.

1. To put in place an automated process for receiving information on the status of the tsunami buoys or adding tsunami buoys to the normal GTS chains

   Discussions continued with NDBC and Meteo-France on the topic. Tsunami buoys are reporting on the GTS using unique data formats and Meteo-France does not decode these particular data. Long-term solution will be to use BUFR format for data distribution.

2. To develop as high priority a system to ingest moored buoy metadata, and to make these metadata available via the JCOMMOPS web-site

   System is in place to collect moored buoy metadata. First request went out to the community in Feb 2015. 15 agencies from 13 countries have provided the data. Metadata and instructions documents available through ftp site. JCOMMOPS is working on to establish tools to directly ingest the metadata into new website.

3. Work with Iridium VARs to obtain drifting and moored buoy data

   Iridium VAR, ScotiaWeather and DBCP had discussed this issue and came to an agreement to share the data. Details to be worked out during next intersessional period.

4. Coordinate with relevant JCOMM OPA Panels and Associated Programmes for completing the document and maintaining relevant sections up to date. To complete, review and publish on the JCOMM website in electronic form as a JCOMM Technical Report the document “An Oceanographer’s Marine Meteorologist’s Cookbook for submitting Data in Real Time and In Delayed Mode.

   Document was reviewed by some experts and the draft document is ready to be published. Some sections need to be completed and this will take place in due cause.

5. Encourage dissemination of the Chinese moored buoy data on GTS and to report at the next Panel Session

   Discussions with number of Chinese delegates reveal that the best option is to address the issue at a higher level of WMO/IOC. TC is in the process of preparing the documentation package.

6. Approach the manufacturers and seek their participation in buoy data evaluations, and in the PP-WET for the wave measuring buoys, and to report at the next Panel Session

   Not started yet

7. Investigate timeliness of the moored array and determine the best way to represent these in the reports

   In progress

8. Capture new metadata from GTS statistics for migration to BUFR
   Analysis of BUFR migration and related information provided in the TC report 5.15

9. Register (manual or automatic) in JCOMMOPS all platform deployments or maintenance, and cruises

   Platform deployments are being registered. Deployment and maintenance information to be included in the JCOMMOPS web portal.

10. Gather feedback from DBCP members regarding new web based monitoring dashboard

    Web testers are been identified and the web testing will begin in October 2015.

11. All regular tasks as outlined in the Terms of Reference for the Technical Coordinator of the DBCP

_____

Appendices : 4

APPENDIX A

DBCP MONTHLY MAPS – AUGUST 2015

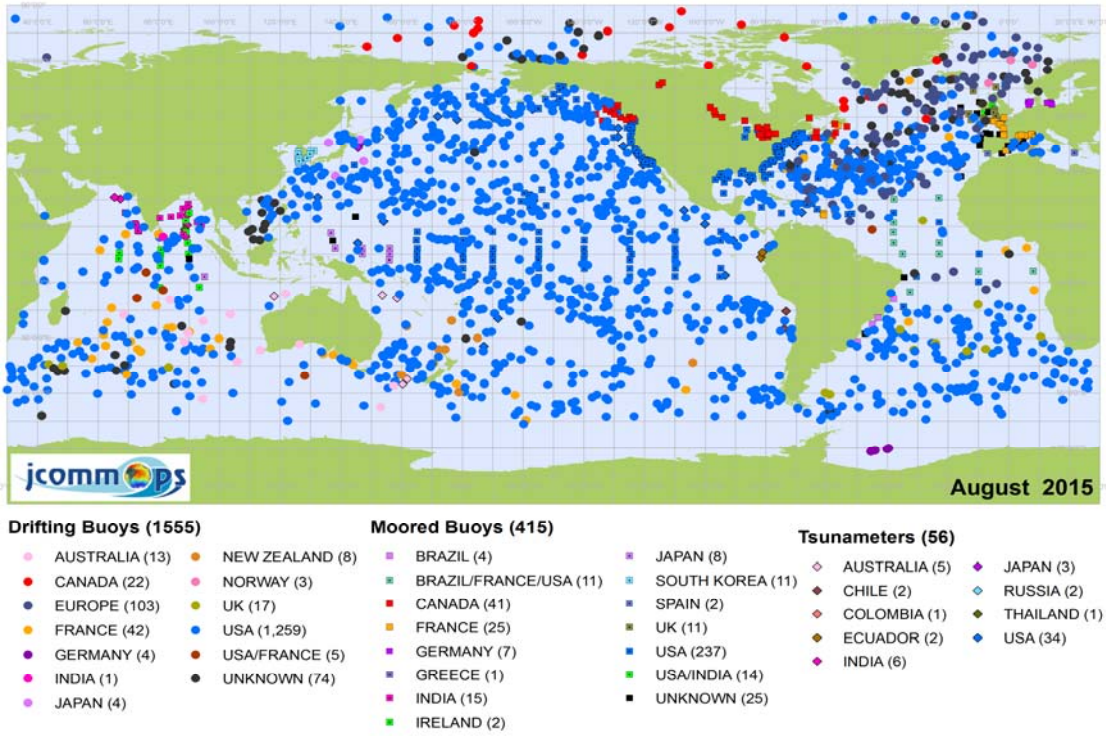

Figure 20 - Buoy networks by country reporting in August 2014.

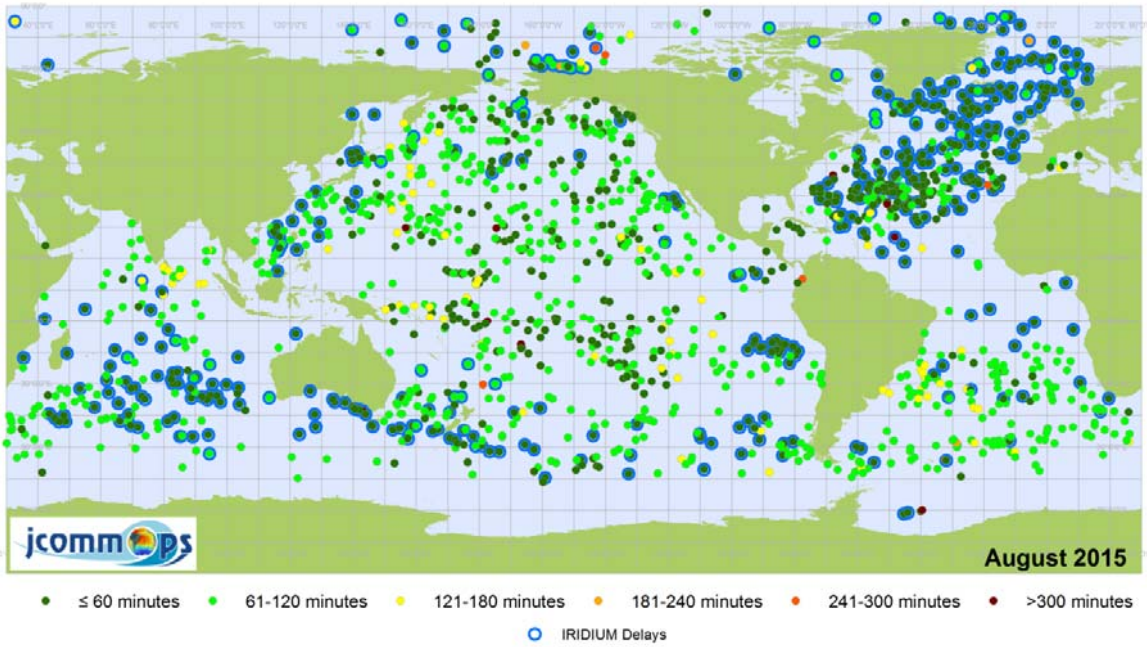

Figure 21 - GTS delays for drifting buoys reporting during August 2015. Iridium drifters outlined in blue.

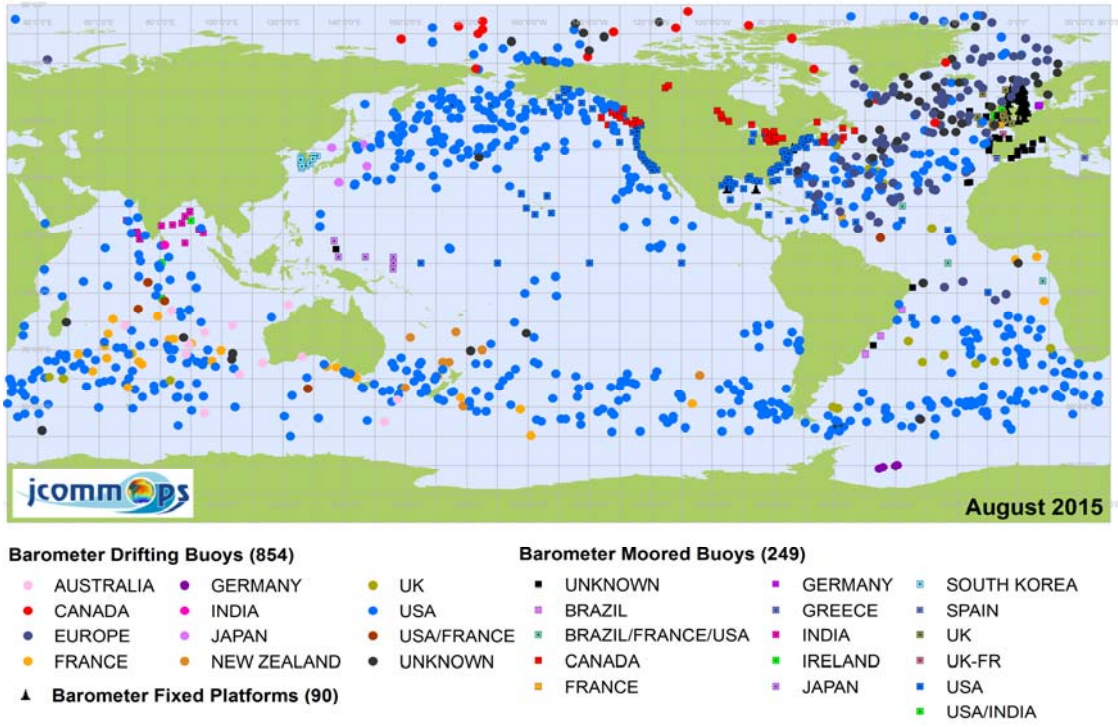

Figure 22 - Drifting and Moored buoys reporting Atmospheric Pressure during August 2015.

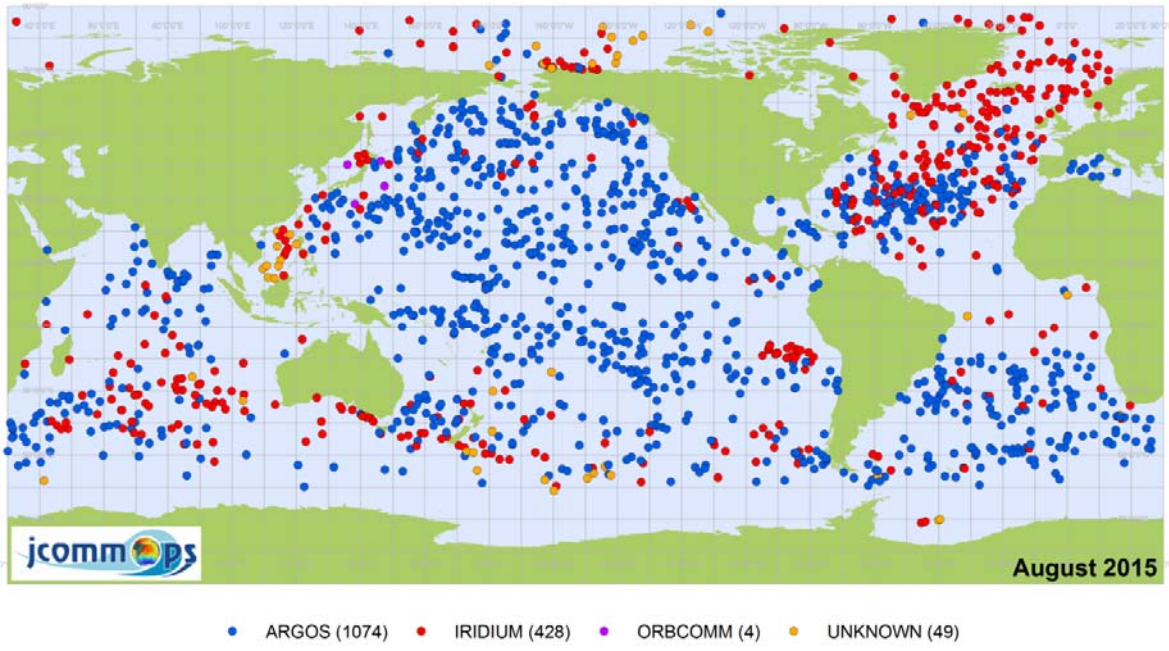

Figure 23 - Drifting Buoy by satellite communications system reporting on the GTS during August 2014.

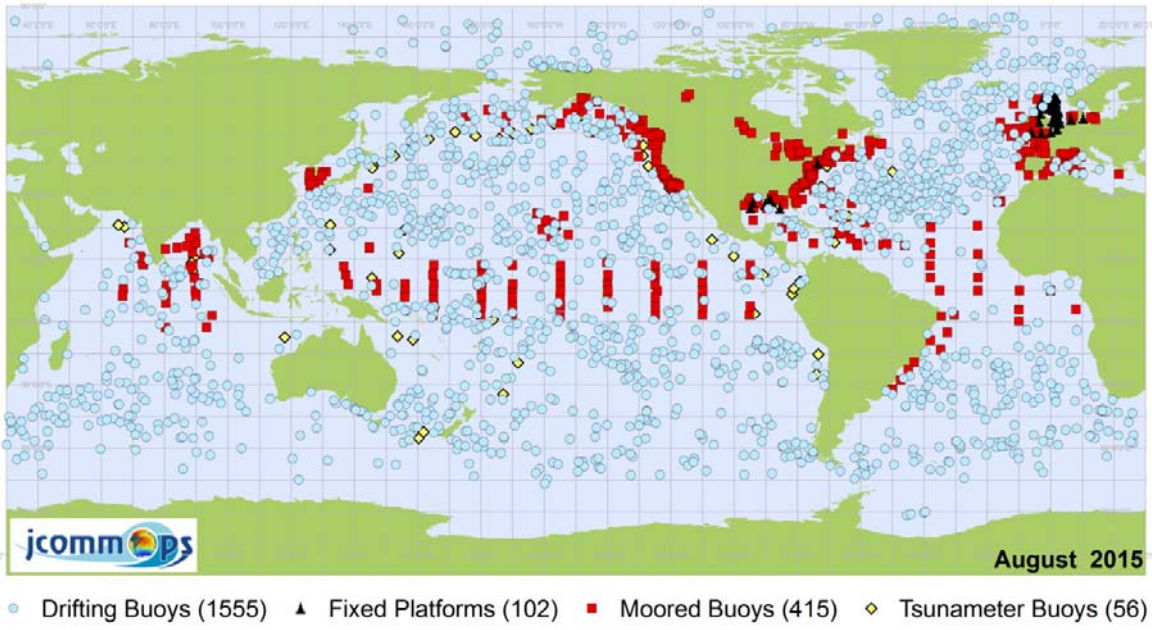

Figure 24 – Map by platform type reporting on the GTS during August 2015

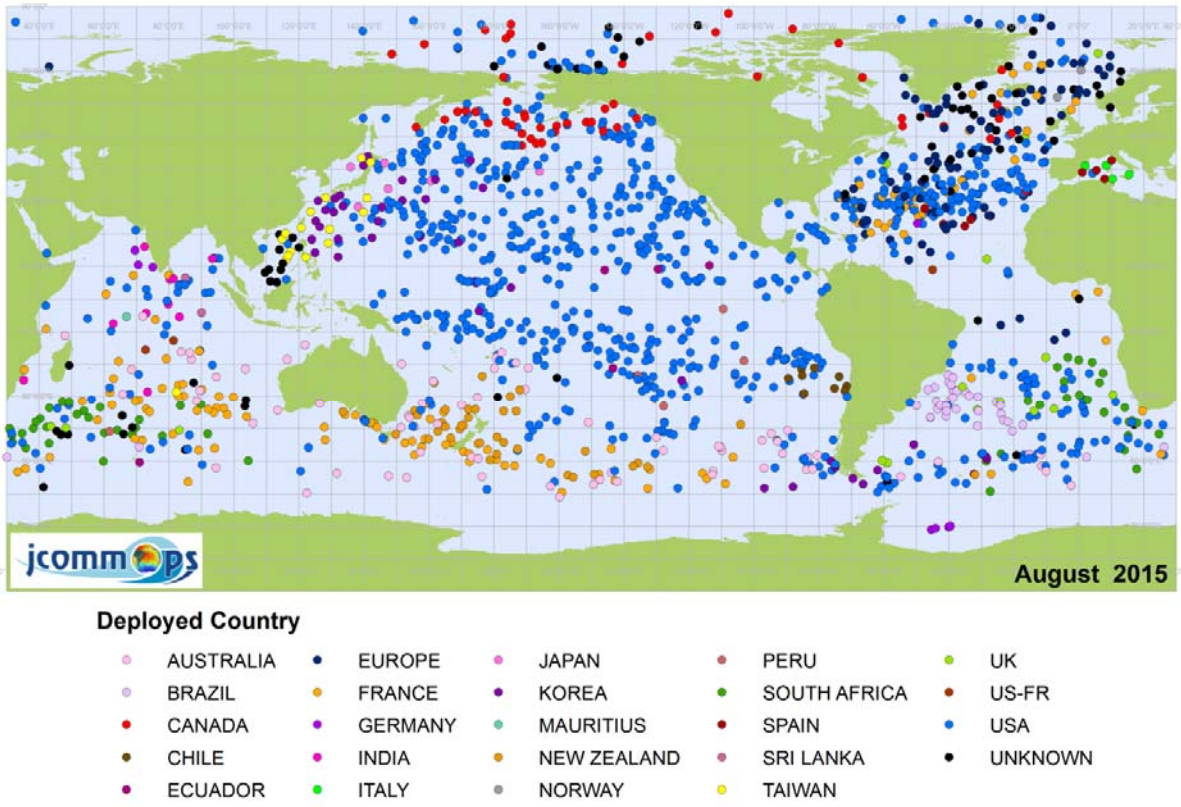

Figure 25 - Map showing country of deployment for all drifting buoys reporting on the GTS during August 2015

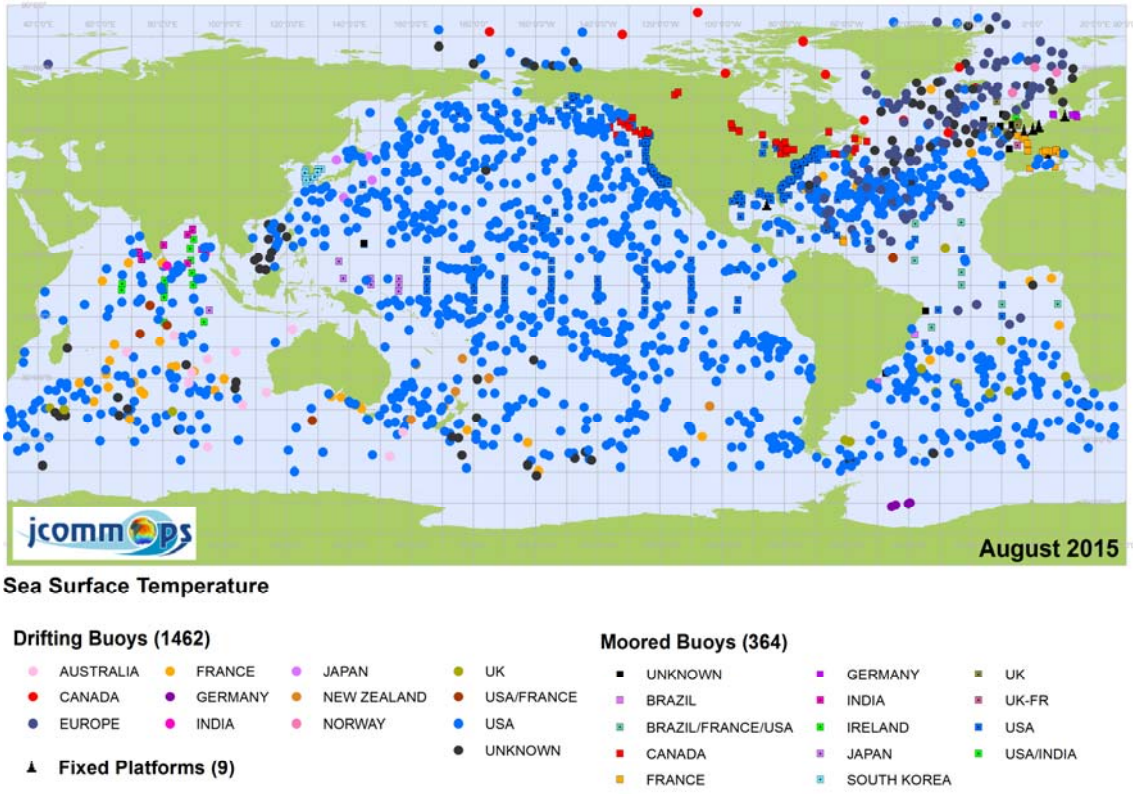

Figure 26 – Drifting buoys reporting sea surface temperature by country – August 2015

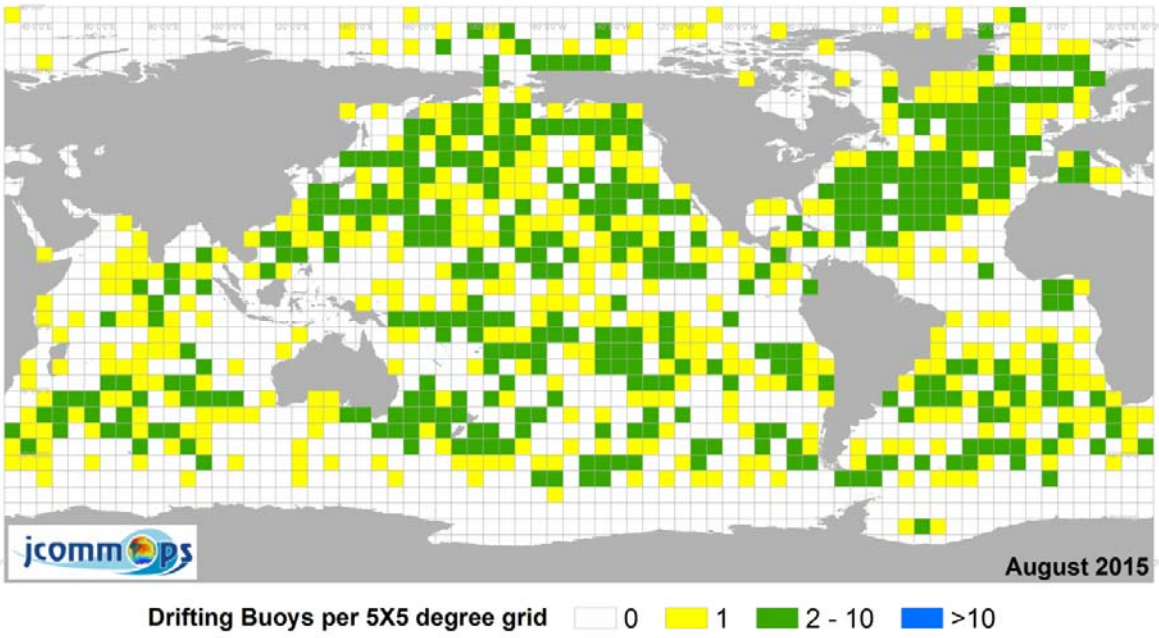

Figure 27 - Buoy density map for drifting buoys. Areas need deployments are shown in white and yellow.

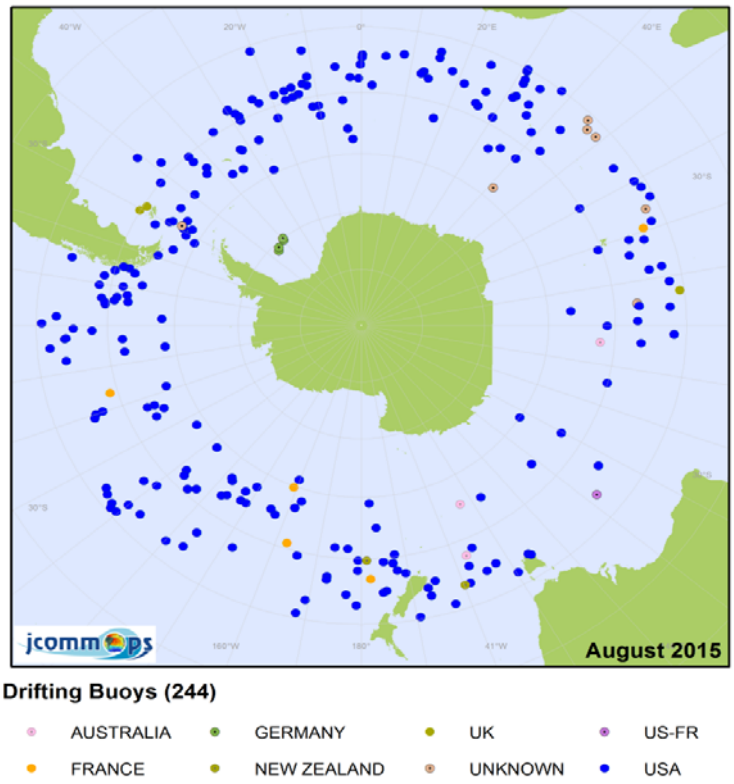

Figure 28 – Drifting buoys in south of 40^{0}S reporting on the GTS in August 2015

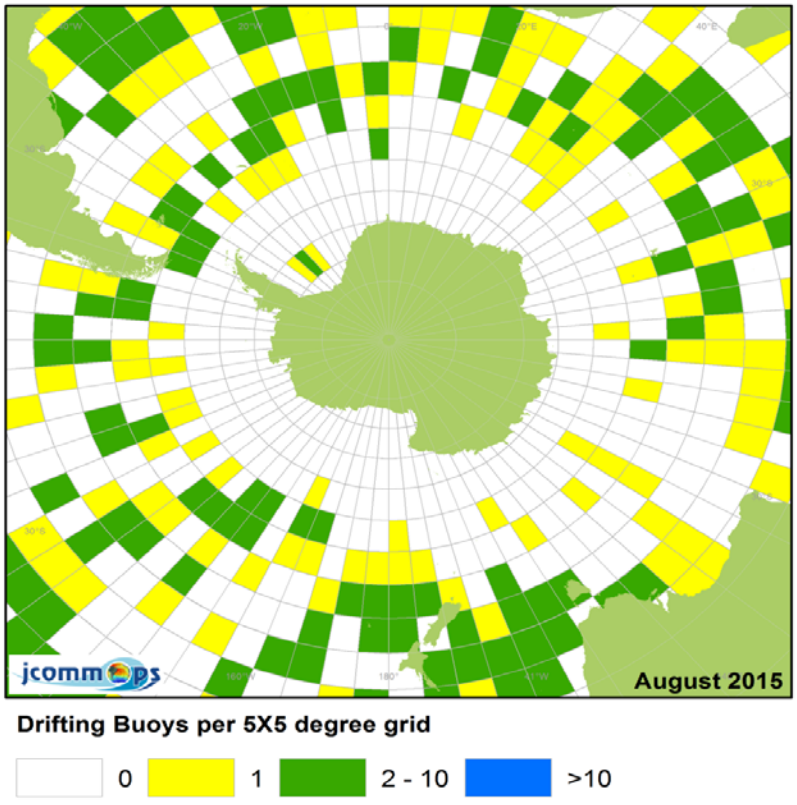

Figure 29 – Density of Drifting buoys in south of 40^{0}S reporting on the GTS in August 2015.

APPENDIX B
Data availability on the GTS

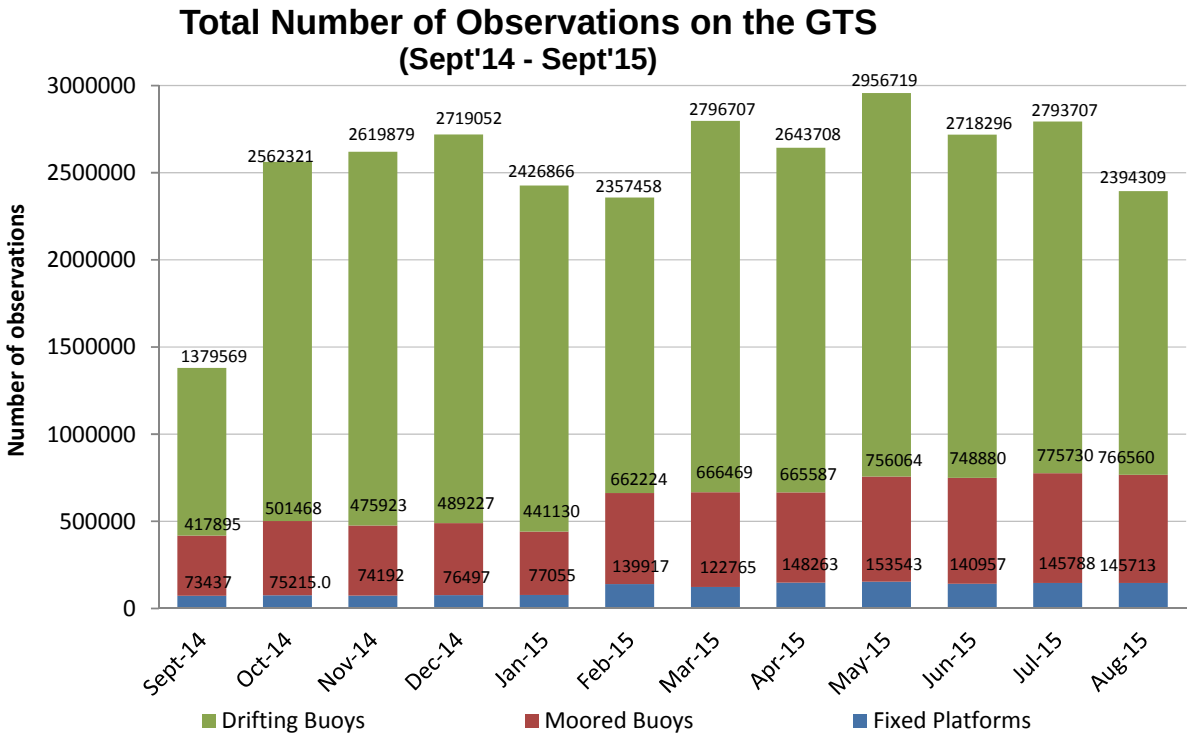

Figure 30 –Number of observations by platform type on the GTS in – September 2014-August 2015.

Proposed Performance metrics

- A single standard Key Performance Indicator (KPI) applied across the various categories – e.g. Network Data Availability

- A simplified performance measurement methodology and complimentary performance target. To promote reporting accuracy and consistency among the various operators in DBCP community it is required to communicate a simplified methodology for calculating and reporting the KPI

- The performance targets should be targeted to the category only and not to the individual operating components supporting that category

Suggested metrics for DBCP networks

(1) Global Surface Drifting Buoy Network

The basic metrics for the array are:
- 1,250 drifters in 5 x 5 degree configuration (outside of the near-equatorial band)
- At least 50% barometer drifters (although the GCOS requirement is for all drifters to have barometers)
- Average drifter lifetimes of at least 450 days.

Proposed Indicators;

- Number of active drifting buoys (outside of near equatorial band and high latitudes, say10 ºN to 60 ºN and 10 ºS to 60 ºS): green ≥ 1,250, red < 1,250

- Density: % number of 5 x 5 degree boxes outside of near equatorial band and high latitudes occupied. Green ≥ 90%, Amber 75% to 90%, red < 75%.

- Median lifetime of operating drifters outside of near equatorial band and high latitudes: green ≤ 150 days, red ≥ 300 days, amber 150 to 300 days

- (I don't think we need the number if drifters deployed each year because if we get better lifetimes then we need fewer drifters to meet the target.)

- % of active drifters delivering data in real-time to GTS; green ≥ 90% (not worth specifying which format as everything will have to go BUFR), red ≤ 80%, amber 80% to 90%

- % of active drifters delivering air pressure data to GTS; green ≥ 80%, red ≤ 40%, amber 40% to 80% (could have similar metric for SST)

- % of active drifters for which their metadata have been submitted to JCOMMOPS; green ≥ 90%, Amber 75% to 90%, red < 75%

- Network data availability

(2) Global Tropical Moored Buoy Network

TIP report 2014 notes the targets are Tropical Pacific Ocean: 70 moorings; Tropical Atlantic Ocean: 19 moorings and Tropical Indian Ocean: 46 moorings.

Proposed indicators for each ocean;

- % of the target number of moorings that are active; green ≥ 90%, red ≤ 75% and amber 75% to 90%.

- % of active moorings delivering data in real-time to GTS; green ≥ 90%,red ≤ 80%, amber 80% to 90%

- (I suspect it would start to get complicated to start looking at what variables are being delivered to GTS as the moorings have both surface (met) and sub-surface instruments. But we made need to consider this is due course – hopefully it will become much easier to extract such information once all data are in BUFR 3-15-008)

- % of active number of (active?) moorings for which their metadata have been submitted to JCOMMOPS; green ≥ 90%, amber 75% to 90%, red < 75%

- Network data availability

(**3) National/coastal Moored Buoy Networks**

Specific targets for these are difficult to be defined as they are primarily operated for national purposes, nonetheless statistics suggest that there are typically around 300 such moored buoys (excluding the tropical moored buoys).

Proposed Indicators;

- Number of active moored buoys operating and delivering real-time data to GTS, green ≥ 300, red ≤ 200, amber 200 to 300.

- % of active moored buoys for which their metadata have been submitted to JCOMMOPS; green ≥ 90%, amber 75% to 90%, red < 75%

- Network data availability

(It might be possible to breakdown into the variables that are being disseminated once all GTS data are in BUFR 3-15-008, e.g. air pressure, air temp, wind, SST, waves) – e.g. this could be derived from stats that the Met Office produce as a lead centre for monitoring the quality of surface marine data (we use these stats to derive a quality and completeness score for our moored buoy network)

- Number of countries operating moored buoys (current number is around 10) and the % of them delivering their data to GTS.

(4) **Arctic/Antarctic buoys Buoy Networks**

Areas north of 60 ºN and south of 60 ºS and to separate out the two as the targets are different: Arctic (250km x 250 km), Antarctic (500km x 500 km). This should allow the target number of buoys for each area to be determined.

Proposed Indicators for each area;

- Number of active drifting buoys
- Density: % number of 250km (or 500km) boxes occupied. Green ≥ 90%, Amber 75% to 90%, red < 75%
- % of active buoys delivering data in real-time to GTS; green ≥ 90%, red ≤ 80%, amber 80% to 90%
- % of active buoys delivering air pressure data to GTS; green ≥ 80%, red ≤ 40%, amber 40% to 80% (could have similar metric for temperature (air and/or SST)
- % of active buoys for which their metadata have been submitted to JCOMMOPS; green ≥ 90%, Amber 75% to 90%, red < 75%
- Network data availability

(5) **Global Tsunami Buoy Network**

In 2014 ITP report indicates that current plans are for 90 tsunami buoys with 12 countries operating such buoys.

Proposed Indicators;

- Number of active tsunami buoys operating and % of these delivering real-time sea-level data to GTS, green ≥ 80% of target, red ≤ 40%, amber 40% to 80%
- % of active tsunami buoys for which their metadata have been submitted to JCOMMOPS; green ≥ 90%, amber 75% to 90%, red < 75%
- Number of countries operating tsunami buoys and the % of them delivering sea-level data to GTS.
- Network data availability

APPENDIX D

Technical Coordinator non-routine Tasks

The following is a short list of highlighted items specific TC DBCP non-regular tasks undertaken during the intersessional period.

These tasks are in addition to the normal monthly maps, metadata and database updates and tracking down drifter and mooring deployments and maintenance, and monthly teleconferences.

1. **October 2014**
   1. Started work with DBCP on October
   2. Attended DBCP-30 meeting in Weihai, China

2. **November 2014**

   3. Attended OceanSITES Steering team meeting in Recife, Brazil
   4. Physical move to Brest France
   5. Completed administrative work with UNESCO as a new employee

3. **December 2014**

   1. Meeting with WMO Secretariat to discuss the work plan with E Charpentier
   2. Attended WIGOS Quality Monitoring workshop at Geneva

4. **January 2015**

   1. WIGOS-OSCAR meeting with Timo from WMO and Joel from Swiss Met to map the architecture of JCOMMOPS and OSCAR
   2. Meeting with Pierre Blouch from Meteo-France to learn how the data flow works and the products shared with DBCP
   3. Teleconference with Diane Stanitski NOAA, to discuss the terms of reference of Project Office, OceanSITES
   4. Completed basic safety training “Basic Security in the Field II” for new employees with UNESCO
   5. Attended POGO 16 meeting in Spain and presented the JCOMMOPS overview and specifics of the ship coordination.

5. **February 2014**

   1. Mission to Toulouse to meet with CLS to discuss DBCP related activities
   2. Developed DBCP data hierarchy to organize the new JCOMMOPS database with DBCP platforms
   3. WIGOS-OSCAR teleconferences with WMO and Swiss Met to discuss OSCAR-JCOMMOPS data compatibility
   4. Developed moored buoy metadata collection mechanism

6. **March 2013**

   1. Moored buoy metadata template revision to accommodate requests from the buoy community
   2. Review and update the “List of GTS bulletin headers for buoy data”
   3. Mission to AOML, NDBC, and ISDB

7. April 2015

1. Attended EGU conference in Vienna Austria and presented the poster titled "The OceanSITES program of fixed open-ocean time series" on behalf of Uwe Send and Robert Weller.
2. Attended the OCG 6 meeting in CapeTown South Africa
3. Reviewed moored buoy metadata template to accommodate requests from the community.

8. May 2015

1. Mission to Koror, Palau - First Pacific Islands Training Workshop on Ocean Observations and Data Applications (PI-1),
2. Attended - E-SURFMAR meeting in Rome, Italy

9. June 2015

1. Attended IABP annual meeting in Seattle, WA, USA
2. Attended the Ocean Science Day program held at IOC and had side meetings with Albert Fischer, Tom Gross Adoté Blim Blivi (Vice-Chair of IOC/UNESCO), Cesar Toro(Secretary of the IOC Sub-Commission for the Caribbean), Mika Odido (IOC Sub Commission for Africa and the Adjacent Island States UNESCO – Kenya), and Zhu Wenix

10. July 2015

1. Populated the JCOMMOPS new database with OceanSITES and Tsunameter metadata
2. Routine tasks

11. August 2015

1. Routine tasks, maps, and begin preparations for DBCP-30