WORLD METEOROLOGICAL ORGANIZATION

DATA BUOY COOPERATION PANEL

THIRTIETH SESSION

WEIHAI, CHINA
27-31 OCTOBER 2014

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

DBCP-30/ Doc. 6.2
(22-Sep-14)

ITEM: 6.2

ENGLISH ONLY

REPORT BY THE TASK TEAM ON INSTRUMENT BEST PRACTICES AND DRIFTER TECHNOLOGY DEVELOPMENTS(TT-IBPD)

(Submitted by Luca Centurioni (USA), Chair TT-IBP)

SUMMARY AND PURPOSE OF DOCUMENT

This document provides information on the issue of drifter best practices and drifter technology development per the request from the previous DBCP Session in this regard.

ACTION PROPOSED

The Meeting is invited to note the information contained in this document when discussing how it organises its work and formulates its recommendations.

Appendices: **A.** Terms of Reference of the TT-IBP

DISCUSSION

-A- DRAFT TEXT FOR INCLUSION IN THE FINAL REPORT

6.2.1 Dr Luca Centurioni (USA), Chairperson of the Task Team on Instrument Best Practices & Drifter Technology Developments (TT-IBPD), reported on the Task Team activities during the last inter-sessional period.

Drifter lifetime

6.2.2 The Panel recalled that the three main factors affecting the drifter lifetime were listed in the DBCP-29 Drifter Best Practices report. These were: 1) faulty battery packs 2) transition from Argos 2 to Argos 3 and more in general 3) increase in power consumption of the drifter's electronic. It was also noted that improvements of the drifter's endurance would take several months to a year to become apparent. During the DBCP-29 discussions on the drifter lifetime issue, best practices recommendations included:

1) Ruggedizing the battery pack;
2) Careful evaluation of the drifter's power budget;
3) Adopting real-time statistics for early identification of technical issues; and
4) Impact and vibration tests.

6.2.3 During the inter-sessional period the global drifter array rebounded from 1,013 drifters as of August 1, 2013 to 1,395 drifters as of September 16, 2014. The improvement can also be appreciated from the statistics published in the Global Drifter Program Action Group Report, also reported in tables 1 and 2 below, where the "quit" category refers to drifters that did not run-aground nor were picked-up.

Manufacturer	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
DBi	*	*	*	*	25%	15%	31%
Metocean	30%	87%	37%	67%	69%	80%	54%
Pacific Gyre	53%	37%	43%	61%	51%	134%	57%
SIO	*	*	*	*	*	20%	29%

Table 1: Percentage of "quit" drifters

Manufacturer	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
DBi	*	*	*	*	364	324	>358
Metocean	402	456	445	274	221	187	>217
Pacific Gyre	262	598	336	345	236	227	>357
SIO	*	*	*	*	*	201	>303

Table 2: Half-life of "quit" drifters

6.2.4 A clear improvement in the drifter half-life can be seen in most cases. More time is needed before we can see how close we are to the target of 450 days for 2013.

6.2.5 Reasons for the improvement include: introduction of ruggedized battery packs, careful verification through bench tests of the drifter's power budget, changes in the drifter duty cycle for the high-energy demand sensors, optimization of the Argos 3 model parameters.

6.2.6 The Panel noted that items 3 and 4 of the recommendations resulting from the DBCP-29 discussions are in progress.

Drogue detection and retention

6.2.7 As per DBCP-29 discussion, actions were taken to extend the drogue retention time. The statistics published in the in the Global Drifter Program Action Group Report and reported in tables 3 and 4 below show a moderate improvement.

Manufacturer	2007	2008	2009	2010	2011	2012	2013
DBi	*	*	*	*	279	227	>237
Metocean	>373	269	224	77	89	107	>158
Pacific Gyre	210	206	241	248	207	>228	>214
SIO	*	*	*	*	*	66	>151

Table 3: Drogue half-life (days)

Manufacturer	2007	2008	2009	2010	2011	2012	2013
DBi	*	*	*	*	0%	4%	2%
Metocean	8%	13%	6%	12%	6%	11%	9%
Pacific Gyre	8%	11%	8%	2%	4%	7%	0%
SIO	*	*	*	*	*	24%	1%

Table 4: Percentage that had drogue off < 10 days

6.2.8 The Panel noted with interest that the percent of drifters that had the drogue off after 10 days declined dramatically for the SIO drifters and the life time increased by more than 100%, and still growing. This is the result of SIO replacing the 1/8" diameter spacelay with the ¼" diameter version. However, it should be noted that Pacific Gyre is still using the 1/8" diameter spacelay but their drogue survival after 10 days has improved too. This could be due to improvements in the tether buoy attachment. More time is needed to compute the overall endurance of the drogues using the thicker spacelay, although the forcasted lifetime is ~ 270 day..

6.2.9 Dr Centurioni explained that experimentation with different tether materials is continuing and some results will be available at DBCP-31.

6.2.10 The meeting agreed on the following:

1. [To be decided by the Panel]

6.2.11 The Panel thanked Mr Centurioni and members of the Task Team for the comprehensive report. The Panel re-elected Dr Centurioni to Chair the Task Team during the next intersessional period. The full report of the Task Team is provided in Appendix A of DBCP-30 preparatory document No. 6.2, and will be included in the DBCP Annual Report for 2014.

APPENDIX A

TERMS OF REFERENCE OF THE DBCP TASK TEAM ON INSTRUMENT BEST PRACTICES AND DRIFTER TECHNOLOGY DEVELOPMENTS(TT-IBPD)

(as adopted at DBCP-28)

Note: The DBCP Evaluation Group is being merged into this Task Team.

The DBCP Task Team on Instrument Best Practices & Drifter Technology Developments shall:

On instrument best practices and quality management

1. When required by the DBCP, evaluate quality of buoy data produced by specific types of buoys, as well as functioning, efficiency;

2. Review existing practices for automatic real-time buoy data quality control, and delayed-mode buoy data quality control, and possibly suggest design changes for improvement (sensors, hardware, software, data formats) in liaison with the Task Team on technological developments;

3. Address instrument evaluation issues; suggest specific tests and / or evaluation deployments in different sea conditions to DBCP members in order to evaluate buoy quality as described in (1) above;

4. Share experience and results of evaluation with the DBCP and other interested parties;

5. Review and recommend Best Practices; work on specific technical issues in order to facilitate standardization and liaise with the other DBCP Task Teams as appropriate (e.g., DBCP recommended Argos message formats); and

6. Define specific criteria for evaluation purposes (e.g. ocean areas, definition of acceptable quality data, e.g., early failures, lifetimes, delays, accuracies, resolutions, etc.);

7. Comply with the requirements of the WMO Quality Management Framework (QMF) and quality management principles;

On drifter technology developments

8. Investigate developments in the fields of sensor technology, on-board processing, buoy hardware, hull design, energy generation and storage in order to better meet user requirements in terms of the range, reliability and quality of observed parameters and their cost-effectiveness;

9. Regularly review and document operational and upcoming satellite telemetry systems in terms of their ability to address user requirements such as bandwidth, timeliness, availability, geographical coverage, reliability, service quality, technical support, energy consumption and cost;, and make specific recommendations to the communications service providers on required / desired enhancements;

10. Review operational platform location systems, and whether they meet the user requirements;

11. Propose to the DBCP and its Executive Board any evaluation activities and pilot projects that it deems beneficial to data buoy operators;

12. Propose recommendations, both upon request and unsolicited, to the Argos Joint Tariff Agreement. Such recommendations shall be passed via the DBCP Executive Board or the DBCP as appropriate; and

13. Evaluate, test, and promote buoy designs that are resistant to vandalism;

General

14. Review all relevant JCOMM Publications to make sure they are kept up to date, comply with Quality Management terminology, and adhere to the WMO Quality Management Framework (QMF);

15. Provide the DBCP Executive Board and the DBCP, both upon request and unsolicited, with technical advice needed for addressing the issues above; and

16. Submit reports to the DBCP Executive Board and to the DBCP at its annual session that describe intersessional activities and propose a Workplan for the next intersessional period.

Membership:

The membership is open to all Panel members. The Chairperson[1], appointed by the Panel, has selected the following team members:

Dr Luca Centurioni, SIO (TT co-Chairperson)	Dr Rick Lumpkin, AOML (TT co-Chairperson)
Mr Andy Sybrandy, Pacific Gyre	
Mr Pierre Blouch, Météo-France	Ms Emily Daniel, MetOcean
Mr Shaun Dolk, NOAA / AOML	
Mr Paul Freitag, NOAA / PMEL	Mr Frank Grooters, KNMI
Mr Michel Guigue, CLS	Mr Robert Jensen, USACE
Mr Chris Marshall, Environment Canada	Mr David Meldrum, SAMS
Mr Sergey Motyzhev, Marlin Yug	
Ms Mayra Pazos, NOAA / AOML	Mr Steve Piotrowicz, NOAA
Dr M Ravichandran, INCOIS	Dr. Tim Richardson, Liquid Robotics
Mr Jean Rolland, Météo-France	Mr Jon Turton, UK Met Office
Mr R. Venkatesan, NIOT, India	Mr Bill Woodward, CLS America
Mr David Murphy, Sea-Bird Electronics, USA	Technical Co-ordinator, DBCP

The Co-chairperson is representing the manufacturers and is selected on a rotating basis.

1 The Chair and Co-Chair of the Task Team should not be in a situation of conflict of interest. Manufacturer representative may be accepted as Vice-Chair of the Task Team provided that the major drifter manufacturers agree.