



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

**OBSERVATIONS
COORDINATION GROUP
SIXTH SESSION**

Cape Town, South Africa
27 to 30 April 2015

FINAL REPORT

2015

JCOMM Meeting Report No. 121



**World
Meteorological
Organization**

Weather · Climate · Water



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission

1 NOTES

WMO Regulation 42

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

WMO Regulation 43

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation on behalf of the constituent body when the matter is, in his opinion, urgent, and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).

© World Meteorological Organization, 2015

The right of publication in print, electronic and any other form and in any language is reserved by WMO. Short extracts from WMO publications may be reproduced without authorization provided that the complete source is clearly indicated. Editorial correspondence and requests to publish, reproduce or translate this publication (articles) in part or in whole should be addressed to:

Chair, Publications Board
World Meteorological Organization (WMO)
7 bis, avenue de la Paix Tel.: +(41 22) 730 84 03
P.O. Box No. 2300 Fax: +(41 22) 730 80 40
CH-1211 Geneva 2, Switzerland E-mail: Publications@wmo.int

IOC (of UNESCO) disclaimer

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariats of UNESCO and IOC concerning the legal status of any country or territory, or its authorities, or concerning the delimitation of the frontiers of any country or territory.

This publication is available in pdf format, at the following link:
<http://www.jcomm.info/ocg-6>



WORLD METEOROLOGICAL ORGANIZATION



INTERGOVERNMENTAL OCEANOGRAPHIC
COMMISSION (OF UNESCO)

Observations Coordnation Group Sixth Session

**Cape Town, South Africa
27 to 30 April 2015**

FINAL REPORT

2015

JCOMM Meeting Report No. 121

this page left blank intentionally

C O N T E N T S

Executive summary viii

| | |
|--|---|
| 1. Organisation of the Session | 1 |
| 2. Reports from the Networks | 2 |
| 3. Observing System Development | 4 |
| 4. Development of an OCG Work Plan | 4 |
| 5. Review of the OCG-6 Session actions | 5 |
| 6. Next OCG Meeting | 5 |
| 7. Closure of the session | 5 |

| | |
|--------------|--------------------------|
| Appendix I | Agenda |
| Appendix II | Participants list |
| Appendix III | OCG Work Plan, 2015-2020 |
| Appendix IV | Acronym List |



Picture: Attendees of the OCG-6 meeting onboard the 'super SOOP' *Bark Europa* (www.barkeuropa.com) with some of the crew.

[this page left blank intentionally]

EXECUTIVE SUMMARY

The Sixth Session of the JCOMM Observation Coordination Group (OCG) was held in the conference room of the Pepper Club Hotel from 27 to 30 April 2015 at the kind invitation of the Government of South Africa, and the South African Weather Service (SAWS).

[this page left blank intentionally]

GENERAL SUMMARY OF THE WORK OF THE OCG-6 SESSION

1. ORGANIZATION OF THE SESSION

1.1. Opening of the Session

The sixth session of the JCOMM Observations Coordination Group (OCG) was opened by the co-chairperson of the Group, Dr David Legler (USA), at 0900 hours on Monday, 27 April 2015, in the conference room of the Pepper Club Hotel & Spa, Cape town, South Africa, and at the kind invitation of the Government of South Africa, and the South Africa Weather Service (SAWS).

Mr Johan Stander, JCOMM Co-President, from South Africa Weather Service, also welcomed the participants to the Session and to Cape Town on behalf of the Government of South Africa.

On behalf of the Secretary-General of the WMO, Mr Michel Jarraud, and the Executive Secretary of the Intergovernmental Oceanographic Commission (IOC), Dr Vladimir Ryabinin, the WMO and IOC Secretariat representatives also welcomed the participants to the session, and to Cape Town. They thanked the South African government and SAWS for organizing the OCG Session, and for the nice facilities offered for this event.

Dr Legler recalled the objectives of the OCG, and provided an overview of the OCG and of the goals for the meeting, which largely focused on the development of an OCG wide work plan targeting progress towards two major events during the next 5 years: JCOMM-V and Oceanobs'19. These will provide JCOMM opportunities to convey the value of JCOMM and put forth an updated vision of JCOMM for the future. Of course JCOMM will require support and resources to support new activities in support of its vision. The OCG work plan will capitalize on the strengths and synergies across the OCG networks with an eye towards activities that can be completed in advance of JCOMM V and Oceanobs'19. The Workplan is the main outcome of this meeting, and can be found in Annex IV. All reports and background documents to this meeting can be found at www.jcomm.info/ocg-6.

The list of participants in the meeting is provided in Annex II.

1.2. Adoption of the Agenda

The OCG adopted its agenda for the session based on the provisional agenda with some changes. The adopted agenda is reproduced in Annex I.

1.3. Working Arrangements

The meeting agreed its hours of work and other practical arrangements for the session. The Secretariat introduced the documentation.

2. REPORTS FROM THE NETWORKS

Each network provided a report to the OCG, which covered the following points:

- Status against targets (and change since OCG-5)
- Outlook status: anticipated changes in next 18 months against targets (if they may not be met, why not?)
- Risk assessment:
 - o What risks to sustained observations do you monitor, in areas of observing system implementation, platform/sensor performance, QC, data flow?
 - o Which risks are most likely, and what are the plans to mitigate them?

- What risks do JCOMM and/or JCOMMOPS need to address by raising visibility, raising with sponsors, etc?
- Any plans for design evolution (or motivations to change design).
- Progress against Keeley Report actions,
- Data/interoperability standards in use.

These written reports can be found on the meeting website, www.jcomm.info/ocg-6. The presentations were focussed on the forward look, and issues for discussion at OCG. The co-chairs thanked the networks for their thorough reports, and provided feedback to each of the panels below.

2.1. Argo

Excellent progress on many fronts. Argo sets the example for other networks in multiple areas. OCG encourages Argo to share its strategies for network monitoring, DOIs, and XXXX with other networks through OCG and through other opportunities. While research papers and dissertations are an excellent indicator of use of Argo in research, it would be beneficial to consider how to convey the impact of Argo in models/forecast systems/reanalyses systems (action could be joint with GSOP/GOV/etc). Planned enhancements/design evolution, should take full advantage of regional initiatives (e.g. TPOS, AtlantOS, IIOE-2), as well as OOPC/GOOS workshops (e.g. boundary currents/shelf interactions). Moreover, communicating and consulting with OOPC and OCG on changes in Targets needs improvements. Improvements in surface-layer sampling should also be considered in the larger context of complementarity with other near-surface instruments such as drifters (see recommendations for DBCP

2.2. Data Buoy Cooperation Panel (DBCP)

DBCP continues to provide routine oversight of buoy networks (drifting and fixed). The OCG is pleased to see the drifter array and TAO return to nominal performance after periods of degraded data returns. The relationship between DBCP and Oceansites is not clear (still). Both groups appear to offer similar oversight and communities of best practice. An agreement on operating principals and coordination should be considered to be developed before OCG-7. The OCG welcomed news of the increase of barometers on drifters and ongoing Pilot Project to explore the impact of these observations. Given the rapidly advancing satellite SST capabilities, are targets for the global drifter program to be revisited and updated? The OCG recommends that the PP-HRSST be examined (action Meldrum) to take on this task and where necessary engage GHRSSST and other stakeholders for satellite SST. Moreover, targets that address the requirements for satellite SST should also consider potential contributions of multiple networks (e.g. drifters, buoys, Argo floats, etc). The OCG emphasized the critical nature of complete metadata being made available for moored platforms; and encouraged the continued development and population of a metadata service at JCOMMOPS with a report on progress (perhaps captured in a metric) at OCG-7. Lastly, while recovery of TAO is great news, the TRITON array is undergoing a planned reduction in the number of platforms. Alternate observing technologies (e.g. wave gliders) will likely be explored. The OCG recommends the DBCP coordinate (or at least suggest JAMSTEC coordinate with others) the evaluation of these and other candidate technologies, possibly taking advantage of TPOS and/or related activities.

2.3. Global Sea Level Observing System (GLOSS)

The OCG thanked Gary for the GLOSS presentation. The OCG is very happy to learn the network status maps are updated monthly (although we were confused by the various products - some better descriptions are needed). The OCG is also pleased to learn that half of the GLOSS network has co-located GPS sensors.

2.4. Global Ocean Shipboard Hydrography Investigations Programme (GO-SHIP)

The OCG welcomed progress made by GO-SHIP since OCG-5. Much progress on documentation and information about the GO-SHIP program is now centrally located on the web-site. OCG supports the next decade of planned cruises. As tracking and management of GO-SHIP data remain a challenge, the OCG supports approaching SOT and/or SOOP to explore support of a center for ADCP data. The OCG is pleased to see cooperation with the IOCCP and BGC community and encourages continued cooperation. The upcoming GO-SHIP, Argo, and IOCCP workshop is a great opportunity to review observing system needs and targets, particularly for IOCCP. The OCG is pleased that GO-SHIP observations are serving as calibration sensors for profiling floats (e.g. Argo, SOCCOM) and drifters.

2.5. OceanSITES

The OCG thanks OceanSites for the oral report during the meeting. The OCG noted continued challenges with low data submission rates to its GDAC. The relationship to DBCP is unclear. We note that OceanSites attends DBCP meetings. Both groups share common challenges in observing practices, technology development, data collection/reporting in real-time and assessing data quality in delayed mode, and data management in general (we note that two distinct data models are in use). But it isn't clear if the two groups are exploring these areas for potential synergies and harmonization. The OCG co-chairs to discuss with the chairs the relationship with DBCP and OceanSites. OceanSites still lacks a clear set of missions and goals (and targets that might be included in implementation (e.g. GCOS) plans). Lack of such measures also makes it more difficult to characterize success. OceanSites might want to consider grouping their efforts into like-stations (e.g. tropical moored buoy array; transport arrays; air-sea flux product anchors/validation; etc) in order to guide its efforts and improve future planning and ability to assess fitness for purpose that is key to long-term development.

2.6. Ship Observations Team (SOT), including Voluntary Observing Ships (VOS) and Ships of Opportunity Programme (SOOP)

The OCG thanked the SOT-VOS Panel for their continuing efforts to improve the quality, quantity and timeliness of ship data, but noted that they like many other panels were encountering difficulties in ensuring continuity amongst their membership. In this context it urged the VOS Panel to be more proactive in recruiting new members and in implementing succession planning. The OCG applauded the increased number of ships now reporting to VOSclim standards, and the active rollout of automated observations and electronic logbooks by a number of participating states. Nonetheless, the large number of ship classes and the inconsistency between various sets of observations statistics was confusing and did not permit an easy identification of those areas that required action. The Panel was asked to continue its efforts to simplify the classification schemes and to improve the diagnostic potential of its statistics. One area which caused particular difficulty for climate studies was the use of call-sign masking schemes. While it was recognised that call-sign masking was required by some member states, the Panel was asked to note that the WMO did not actively encourage the widespread implementation of such schemes. In this context, the OCG endorsed the suggestion by the JCOMMOPS Ship Co-ordinator to investigate the implementation of a unique ship identifier protocol that would meet WIGOS standards. The OCG was concerned that feedback to ship's officers regarding the quality and utility of the data that they submitted was not available online, and asked the Panel to investigate means by which such feedback might in future be delivered. Overall, the OCG was pleased to note the progress that was being made against KPIs and the Keeley recommendations, and urged the Panel to continue these efforts and its endeavours to include non-NMHS-equipped ships amongst the volunteer observing fleet. The OCG also noted the Panel's requests for guidance in a number of the above areas, and agreed to include these within its future workplan.

The OCG appreciates the ongoing efforts of the SOOP IP to coordinate international efforts in support of Ship-of-Opportunity observations. The OCG encourages SOOP and the communities that utilize XBT data to engage with the planning of the Boundary-Current Workshop (CORRECT TITLE?) to further highlight the potential unique contributions of XBT-type data towards resolving/monitoring relevant features. The OCG is concerned about the latencies and challenges within the XBT data systems and strongly encourages continued development of end-to-end management systems for XBT data and metadata. The status of data flow to GTSPP was not commented on, but should be regular part of the OCG report. Moreover, up-to-date information on the state of the XBT network and instrument deployments is difficult to locate. SOOIP should be working with JCOMMOPS to identify opportunities to address this. Incorporation of new launching and communications technologies should continue to be explored to realize cost efficiencies. The OCG applauds the development of a bibliography of publications that utilize XBT data.

2.7. International Ocean Carbon Coordination Project (IOCCP)

While IOCCP is not strictly an observing network, the OCG is pleased to have IOCCP participation in the meeting. The OCG recommends IOCCP work with existing observing networks (e.g. DBPC, Argo, Oceansites, GO-SHIP) whenever possible to maximize deployment opportunities, develop and document best practices; and take advantage of existing data systems and processes. The success of this engagement should be monitored to insure it is effective. It is not clear what IOCCP data should be reported through real-time systems (e.g. GTS). Advancements in identifying EOVs/ECVs and plans to develop network targets are welcome news. The OCG is pleased to see data compilations/products (e.g. SOCAT and GLODAP) being produced and distributed. The OCG recognizes the challenges of addressing how best to treat time-series stations (many in coastal waters, some with coarse episodic sampling) and encourages continued coordination of activities and practices.

2.8. Everyone's Glider Observatory (EGO).

The OCG welcomed the opportunity to discuss the evolution of the growing international glider community. The OCG was pleased with progress by the EU in their plans for expanding the use of gliders. The OCG noted the complications and tension between the various uses (e.g. episodic sampling, process studies, repeat sections, regional emphasis with aspirations to do global sampling) which is evident in the US as well. Evidence suggests that developing best practices (e.g. data processing, quality review, etc) amongst practitioners is highly desirable and achievable. As such the OGC agreed to embrace EGO and invite it to be part of OCG once they identify an international steering team and chair.

3. OBSERVING SYSTEM DEVELOPMENT

JCOMM OCG discussed a number of integrative challenges across the networks in the area of requirements development and possible intersections with multiple networks; development of new observing capabilities and regional projects; prospects for improved data management and access across networks; and an engagement strategy for emerging observing networks. Decisions and actions are captured in the JCOMM OCG Work Plan.

4. DEVELOPMENT OF AN OCG WORK PLAN

JCOMM OCG has developed a Work Plan to capitalize on the synergies across the networks, drive

activities inter-sessionally, and provide a regular framework for meetings. The Work Plan is aligned with the Framework for Ocean Observing and complementary to the OOPC Work Plan; it is focused on a 5 year time horizon, and considering key deadlines and deliverables (such as JCOMM-5 Session, OceanObs19, etc); and will be updated following each meeting. The main areas of work target performance of individual networks as well as synergies across all of the networks contributing towards the global ocean observing system in these areas:

Requirements, Observing System Development and Best Practices, Observing System Performance, Observing System Metrics (including for risks),, Data and Information and System Monitoring through JCOMMOPS

The full Work Plan can be found in Annex 3.

5. REVIEW OF THE OCG-6 SESSION REPORT, ACTION ITEMS AND RECOMMENDATIONS

The participants reviewed and approved draft action items, noting that individual names need to be identified for each action, to devolve activity in the networks and ensure all the work does not fall on the network chairs. The actions are summarized at the end of the Work Plan (appendix III).

6. NEXT OCG MEETING.

The timing and location of the next OCG meeting requires further discussion. If we continue to meet on a the 2 year timeframe, the next session will be in 2017; following the submission of the GCOS Implementation Plan 2016, in the same year as the JCOMM-5 Session (September 2017) and halfway toward OceanObs19. The co-chairs will discuss whether it would be best to meet in association with OOPC in early 2016 to feed into the GCOS Implementation Plan, or in late 2016/early 2017 ahead of the JCOMM-5 session

7. CLOSURE OF THE SESSION

The Co-chairpersons congratulated the Group for the meeting's achievements. They thanked the South African Weather Service for hosting the Session, the participants of the meeting for their contributions to the outcome of this meeting, and the Secretariat for their support prior to and during the meeting. The WMO and IOC Secretariat Representatives thanked the SAWS, the OCG co-Chairpersons, and the participants of the meeting for their contributions to this Session and the activities of the JCOMM Observations Programme Area (OPA). The Sixth Session of the Observations Coordination Group (OCG) closed at 14:00 pm on Thursday 30 April 2015.

Annex I

Agenda

| | |
|--|---|
| <u>WORLD METEOROLOGICAL ORGANIZATION</u> | <u>INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)</u> |
| JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM) | OCG-6 / Doc. 1.2 (07.09.2015) |
| OBSERVATIONS COORDINATION GROUP (OCG) | ITEM: 1.2 |
| SIXTH SESSION | Original: ENGLISH |
| Cape Town, South Africa, 27-30 April 2015 | |

Provisional Agenda

(Submitted by the Secretariat)

Summary and purpose of the document

This document provides for the provisional agenda of the OCG Session. The final agenda will be decided by the Session under agenda item 1.2 on the basis of this provisional agenda.

**SIXTH SESSION OF THE JCOMM OBSERVATIONS COORDINATION GROUP (OCG-6)
(Cape Town, South Africa, 27-30 April 2015)**

PROVISIONAL AGENDA

Monday 27th April

1. ORGANIZATION OF THE SESSION, PRIORITIES FOR OCG (9.00– 10.30)

- 1.1 Opening of the Session, Welcome (Co-Chairs, Local Host)
- 1.2 Adoption of the Agenda (Co-Chairs)
- 1.3 Working Arrangements (Co-Chairs)

Objectives: This session will introduce the Co-Chair's future vision for OCG, key planning horizons to consider GCOS Implementation Plan, JCOMM-5, OceanObs19 and the potential for the development of an OCG Work Plan.

- 1.4 JCOMM OCG Terms of Reference (Co-Chairs)
- 1.5 Future Vision for JCOMM OCG (Co-Chairs)
- 1.6 Discussion

DOCUMENTS:

- JCOMM OCG Terms of Reference
- JCOMM OCG Draft Strawman Work Plan . (Co.Chairs, Katy Hill)

2 SETTING REQUIREMENTS FOR SUSTAINED OBSERVATIONS (11.00-12.30)

Objectives:

- 1) Describe the audience, overarching aims, and potential uses for documenting requirements by observing networks and by variable;
- 2) Assess state of progress amongst several groups in developing observing requirements; how well community inputs and goals are being incorporated/considered, and utility of requirements for the observing systems;
- 3) Develop guidance and actions for networks and JCOMMOPS to complete next steps in documenting/synthesizing requirements

- 2.1 Global Climate Observing System/Global Ocean Observing System (through OOPC) (Toshio Suga/Albert Fischer/Katy Hill)
- 2.2 WIGOS/WMO Rolling Review of Requirements (Etienne Charpentier)
- 2.3 Discussion, role of OCG in requirements processes, potential to develop an OCG Work Plan item to contribute information to these processes, utility.

DOCUMENTS:

- Summary of Requirements processes (GCOS, GOOS, WIGOS/(WMO RRR) (Etienne Charpentier, Katy Hill)
- GOOS Strategic Mapping, Rationale for Variable and Network Specification Sheets (Albert Fischer, Katy Hill)
- OOPC Variable Specification Sheets (Katy Hill)
- OOPC/OCG Draft Network Specification Sheets (Katy Hill)

3 REVIEWING AND EVOLVING NETWORK GOALS, INTERSECTIONS AND INTEGRATION. (13.30-15.30, 16.00-17.30)

Objectives: Roles of OOPC and OCG in strengthening, integrating, expanding the system; evaluating opportunities, feasibility/cost verses impact and forming pragmatic choices to improve efficiencies and/or capabilities or evolve networks.

- 3.1 Introduction, context, GOOS Development Projects, Variable based evaluations (Co-Chairs, OOPC)
- 3.2 Tropical Pacific Observing System, TPOS 2020 (Katy Hill)
- 3.3 AtlantOS (Albert Fischer)
- 3.4 Future activities:
- 3.5 Boundary Currents Shelf interactions (Bernadette Sloyan)
- 3.6 Engaging New Networks
- 3.7 Ocean Gliders: Pierre Testor
- 3.8 Submarine Networks (David Meldrum, TBC)
- 3.9 Discussion: evolving network targets to meet evolving requirements, engaging new networks, utility of Network Specifications/strategic mapping.

Documents:

- Update on TPOS 2020 (TPOS 2020 Project Office)
- Update on AtlantOS (Johannes Karstensen/Albert Fischer)
- Proposal for Boundary Currents Activity (Bernadette Sloyan, John Wilkin)
- Draft Network Specification Sheets (Katy Hill, Etienne Charpentier. JCOMMOPS)

Tuesday 28th April

4. NETWORK REPORTS (9-12.00, 14.00-15.30)

Network reports, 20 mins, focussing on forward look, issues to discuss with OCG (progress/status will be in the written reports)

- | | | |
|-----|----------------|----------------------------|
| 4.1 | Argo | (Howard Freeland) |
| 4.2 | DBCP | (Jon Turton) |
| 4.3 | GLOSS | (Gary Mitchum, by telecon) |
| 4.4 | GO-SHIP | (Sloyan/Wanninkov) |
| 4.5 | IOCCP | (Maciej Telzsewski) |
| 4.6 | OceanSITES | (Uwe Send, by video link) |
| 4.7 | SOT (VOS/SOOP) | (Chris Marshall) |

Documents:

- Reports from networks
- Network Specifications

Note: extended lunch for visit to 'Super SOOP/VOS' Yachts, the Bark Europa (www.barkeuropa.com) and the Lady Amber (<https://schoonerladyamber.wordpress.com>) which contribute to supporting the sustained observing system. We will take a hotel shuttle down to the V&A Docks.

5. MEASURING AND MANAGING PERFORMANCE, RISKS TO SUSTAINABILITY (16.00-17.30)

Objectives: identify and encourage consistent set of best practices across networks in tracking and communicating performance, implementation, and assessing risks. etc. [and ensuring that the specificities of space/time sampling of each observing network are adequately captured in EOV-level indicators of performance; and that the appropriate risk information propagates here as well]

- 5.1 Draft JCOMMOPS Network Reports (Mathieu Belbeoch)
- 5.2 Developing Variable Metrics/Variable Network Products(Kevin O'Brien (OSMC)/JCOMMOPS/OOPC
- 5.3 Summary of risk to observing system (David Legler)
- 5.4 Discussion: feedback on network and variable metrics, evolving the overall % complete metric, identifying common metrics for networks, development of a framework for assessing risks to the sustainability of the observing network.
- 5.5 Discussion: Risks to sustainability identified by networks: commonalities, mitigation approaches; value in developing a framework for assessment of risks to O.S. Sustainability and mitigation approaches?

Documents:

- Draft Network Metrics report from JCOMMOPS (JCOMMOPS)
- Draft Variable Metrics report from OSMC/OOPC (Kevin O'Brien, Mark Bourassa)

Evening: Non Hosted Dinner, Winery (Johan to provide details).

Wednesday 29th April

6. STANDARDS AND BEST PRACTICES IN MEASURING VARIABLES (SENSOR CALIBRATION, QC, ETC). (9.00-10.30)

Objectives: To capitalise on the synergies between networks, particularly in sensor/observation pathology, calibration, quality control, etc.

- 6.1 Best Practice Strawman (SST as an example) (David Meldrum)
- 6.2 Salinity Pilot Project (RMIC) (Jingli Sun)
- 6.3 Argo/GO-SHIP/IOCCP Workshop aims (Maciej Telzsewski)
- 6.4 Discussion: potential for variable focussed activities across platforms, focussing on calibration, error characteristics, etc. Potential for expanded focus on Salinity, particularly with common sensors used across platforms? Potential for variable based activities to be led/championed by a network which is strong in that area?

DOCUMENTS:

- Best Practice Strawman for SST (David Meldrum)
- RMIC Salinity Pilot Project Report (RMIC)
- Agenda for the Argo/GO-SHIP/IOCCP Workshop (Maciej Telzsewski)
- Variable Specification Sheets (Katy Hill, Etienne Charpentier)

7. JCOMMOPS FOCUS, WORKPLAN, OVERSIGHT (11.00-12.30)

Objectives: To develop an agreed plan JCOMMOPS and their activities for coming years, to address priorities, capitalising on common challenges and synergies. In particular:

- 1) seek feedback and approval of JCOMMOPS work plan;
- 2) seek feedback and approval of revised TOR for JCOMMOPS;
- 3) raise awareness of short-term and long-term goals of JCOMMOPS in support of the OCG mission; and
- 4) revisit JCOMMOPS management strategy that considers resourcing concerns of its sponsors to share management needs more equitably

- 7.1 Overview of JCOMMOPS Work Plan and Priorities (Mathieu Belbeoch)
- 7.2 Overview of the JCOMMOPS Budget and Management (Albert Fischer)
- 7.3 JCOMMOPS Terms of Reference (OCG Co-Chairs)
- 7.4 Discussion: JCOMMOPS Terms of Reference, Feedback on Work Plan, Budget.

DOCUMENTS:

- Draft JCOMMOPS Work Plan (Mathieu Belbeoch, with input from Co-Chairs, Etienne Charpentier, Tom Gross)
- JCOMMOPS Budget and Oversight (Albert, with input from Edgard Cabrera and Tom Gross)
- Draft JCOMMOPS TORS (JCOMMOPS)

8. OCG DATA MANAGEMENT AND INTEGRATION (13.30-15.30)

- 8.1. A future JCOMM Strategy for use of standards and Services (Co-Chairs)
- 8.2. TT Integrated. Marine Meteorological and Oceanographic Services for WIS (MOWIS) (Etienne Charpentier)
- 8.3. OSMC Plans for Integrated Data Access, Pilot Project (Kevin O'Brien)
- 8.4. Discussion. Progress against Keeley Report actions, data sharing protocols to improve integration, availability of QC'd data by variable, next steps.

Documents:

- TT-MOWIS Terms of Reference (Etienne Charpentier)
- Network Specifications (Katy Hill)

9. STRATEGIC EVOLUTION OF JCOMM (16.00-17.30)

- 9.0.1. International Indian Ocean Experiment (IIOE2)
- 9.0.2. JCOMM-5 and OceanObs19; Expectations and Opportunities.

- 9.1 Roundtable Discussion: new and emerging technologies and networks, potential intersections with existing Networks, JCOMM (New Sensors (esp BGC), Autonomous Platforms, Cables, etc)
- 9.2 Discussion: Aspirations of Networks to Evolve plans, intersections between networks.
- 9.3 Discussion: process for engaging new networks in JCOMM OCG (and Work Plan activities).
- 9.4 Discussion: Anticipated achievements for JCOMM-5?
 - 9.4.1 Post JCOMM-5: Evolving JCOMM Structure to meet future needs
 - 9.4.2 JCOMM Program Structure (Services, Observations, Data Management)
 - 9.4.3 OCG Structure and panels.

Documents:

- Draft Strawman of an OCG Work Plan. (Co-Chairs, Katy Hill)
- Existing OCG TORs (Etienne Charpentier)
- Existing Panel TORs (Etienne Charpentier)

Thursday 30th April

10. OPA HOUSEKEEPING (09.00-09.30)

- 10.1 Outstanding items and issues to progress offline/interessionally.
- 10.2 Succession Planning for Panel Chairs (and OCG Co-Chairs).
- 10.3 Any other business

11. DEVELOPING AN OCG WORK PLAN (09.30-10.30)

- 11.1. Discussion: Feedback on Strawman focus, discussion of key issues to progress under each item.

Documents:

- Draft Strawman OCG Work Plan (OCG Co-Chairs, Katy Hill)

12. NEXT SESSION OF THE OCG (11.00-11.30)

Note, if we stick to the 2 year timeframe, the next session will be in 2017; following the submission of the GCOS Implementation Plan 2016, in the same year as the JCOMM-5 Session (September 2017) and halfway toward OceanObs19..

13. REVIEW OF THE OCG-6 ACTION ITEMS AND RECOMMENDATIONS (11.30-12.30)

14. CLOSURE OF THE SESSION

Annex II

LIST OF Participants

Dr Howard FREELAND
Director of the Argo Program
Institute of Ocean Sciences
9860 West Saanich Road
PO Box 6000
North Saanich, BC V8L 4B2
B.C.
Canada
Tel: +1 (250)-363-6590
Fax: +1 (250)-363-6690

Dr. David LEGLER (co-Chair)
Chief, Climate Observations
National Oceanic and Atmospheric Administration / Office of Oceanic and Atmospheric Research
1100 Wayne Ave
Suite 1202
Washington DC 20910
United States
Tel: +1 301 427-2460
Fax: +1 301 427-0033

Prof. David MELDRUM (co-Chair)
Research Fellow, Technology Development
Scottish Association for Marine Science
Scottish Marine Institute
Oban, Scotland
PA37 1QA
United Kingdom
Tel: +44 1631 559 273
Fax: +44 1631 559 001

Ms Sarah NORTH
Ship Observations Manager
Met Office
FitzRoy Road
Exeter
Devon
EX1 3PB
United Kingdom
Tel: +44 (0) 1392 885 617
Fax: +44 (0) 1392 885 681

Bernadette SLOYAN
CSIRO Oceans and Atmosphere Flagship, Hobart
GPO Box 1538

Hobart TAS 7001
Australia

Mr Johan STANDER
South African Weather Service
Weather Office,
P O Box 21,
International Airport
Cape Town
7525
South Africa
Tel: +27 (0) 21 9355700
Fax: +27 (0) 21 934 4590

Dr Maciej TELSZEWSKI
IOCCP Project Director
Institute of Oceanology Polish Academy of Sciences
ul. Powstancow Warszawy 55
81-712 Sopot
Poland
Tel: +48 587 311 610
Fax: +48 58 551 21 30

Dr Pierre TESTOR
Laboratoire d'Océanographie et du Climat: Experimentation et Approches Numeriques, Institute
Pierre Simon Laplace, University Pierre and Marie Curie
4 place Jussieu
75005 Paris
France

Mr Jonathan TURTON
Head Marine Observations
Met Office
FitzRoy Road
Exeter
Devon
EX1 3PB
United Kingdom
Tel: +44 1392 886647
Fax: +44 1392 885681

Dr Rik WANNINKHOF
Principal Investigator
National Oceanic and Atmospheric Administration, Atlantic Oceanographic and Meteorological
Laboratory
4301 Rickenbacker Causeway
Miami Florida FL 33149
United States
Tel: (305)361-4379

INVITED EXPERTS

Dr D. E. HARRISON
NOAA Pacific Marine Environmental Laboratory
Laboratory
7600 Sand Point Way NE
Seattle WA 98115
United States
Tel: +1 206 526 6225
Fax: +1 206 526 6744

Dr Juliet HERMES
Manager
South African Environmental Observation Network, National Office
South Africa
Tel: +27214023547

Ms. Tamaryn MORRIS
Agulhas System Climate Array (ASCA) Coordinator
South African Environmental Observation Network, National Office
5th floor, Foretrust Building
Martin Hammerschlag Way
Foreshore
Cape Town
8012
South Africa
Tel: +27 21 402 3118
Fax: +27 865 428 928

Kevin O'BRIEN
Software Engineer
University of Washington/JISAO/NOAA/PMEL
7600 Sand point way Ne
Seattle WA 98115
United States
Tel: +1 (206) 526 6751

Steven PRITCHETT
VOS PM
NOAA
1325 East-West Highway
Silver Spring, MD
20910
Silver Spring Md
United States
Tel: +1 (301) 4279121

Mr Tshikana RASEHLOMI
Senior Scientist
South African Weather Service
Weather Office,
P O Box 21,

International Airport
Cape Town
7525
South Africa
Tel: (+27) 21 935 5700

Prof. Jianwen SI
Standardization Management
National Centre of Ocean Standard and Metrology
Jie Yuan West Road, Nankai District
Tianjin
China
Tel: +86 22 275 39505
Fax: +86 22 275 32 971

Prof. Toshio SUGA
Professor
Tohoku University, Graduate School of Science
6-3 Aramaki Aza-Aoba
Aoba-ku
Sendai
980-8578
Japan
Tel: +81 22 795 6527
Fax: +81 22 795 6530

Dr Jingli SUN
Assistant Director
National Center for Ocean Standards and Metrology
219 W. Jieyuan Rd
300112 Nankai, Tianjin
China
Tel: +86 (22) 27539517
Fax: +86 (22) 27532971

Mr. Steven WORLEY
Scientific Data Manager
National Center for Atmospheric Research
1850 Table Mesa Drive
Boulder Colorado 80305
United States
Tel: +(303) 497 12 48

Mr AI WALLACE
2-1234 West 7th Avenue
Vancouver V1H 1B6
BC
Canada
Tel: +1 604 664 9090
Fax: +1 604 664 9004

JCOMMOPS

Mathieu BELBEOCH

Argo Technical Coordinator, JCOMMOPS lead

JCOMM in-situ Observations Programme Support Centre (JCOMMOPS)

Technopole / Campus Ifremer Brest

1625 Route de Sainte Anne

Z.I. Pointe du Diable

Blaise Pascal Hall

29280 PLOUZANE

France

Tel: +33 2 29 00 85 86

Champika GALLAGE

Technical Coordinator DBCP/OceanSITES

JCOMM in-situ Observations Programme Support Centre (JCOMMOPS)

Technopole / Campus Ifremer Brest

1625 Route de Sainte Anne

Z.I. Pointe du Diable

Blaise Pascal Hall

29280 PLOUZANE

France

Tel: +33 (0)2 29 00 85 88

Mr Martin KRAMP

Ship Coordinator

JCOMM in-situ Observations Programme Support Centre (JCOMMOPS)

Technopole / Campus Ifremer Brest

1625 Route de Sainte Anne

Z.I. Pointe du Diable

Blaise Pascal Hall

29280 PLOUZANE

France

Tel: +33 2 29 00 85 87

SECRETARIAT

Mr Etienne CHARPENTIER

Scientific Officer

World Meteorological Organization

Observing and Information Systems Department

Observing Systems Division

World Meteorological Organization

7bis, av. de la Paix

Case Postale 2300

1211 Genève 2

Switzerland

Tel: +41 22 730 82 23

Fax: +41 22 730 81 28

Albert FISCHER

Head, Ocean Observations and Services section

Intergovernmental Oceanographic Commission of UNESCO

7, place de Fontenoy

JCOMM Meeting Report No. 121, ANNEX II

75732 Paris cedex 07
France
Tel: +33 1 45 68 40 40
Fax: +33 1 45 68 58 13

Dr Thomas GROSS
Programme Specialist GOOS, Web Services
Intergovernmental Oceanographic Commission of UNESCO
7, place de Fontenoy
75732 Paris cedex 07
France
Tel: +33 1 45 68 39 92
Fax: +33 1 45 68 58 12

Dr Katherine (Katy) HILL
GCOS/GOOS Programme Specialist
World Meteorological Organization
7bis, avenue de la Paix
Case Postale 2300
1211 Geneva
Switzerland
Tel: +41 (0)22 730 80 83
Fax: +41 (0)22 730 8052



JCOMM Observations Coordination Group (OCG)

Draft Work Plan, 2015-2020.

Written following the 6th Session of the JCOMM Observations
Coordination Group.

Contents

| | |
|--|----|
| 1. Introduction/Context. | 5 |
| 2. Key Horizons/Deadlines/Timelines..... | 6 |
| 3. Requirements | 7 |
| 3.1. Engage with other ocean and cryosphere observation groups..... | 7 |
| 3.2. WMO Integrated Global Observing System (WIGOS) | 8 |
| 4. Observing System Implementation..... | 12 |
| 4.1. Development of Network Specifications and Targets..... | 12 |
| 4.2. Horizon scan for emerging platforms, sensors, technologies and methodologies.... | 14 |
| 4.3. Continue to participate in new initiatives to expand ocean observing capabilities,... | 16 |
| 5. Observing System Metrics..... | 16 |
| 5.1. Assessing and reporting Observing System Performance by Variable and Network. | 16 |
| 5.2. Developing a framework for identifying and mitigating risks. | 17 |
| 6. Best Practices..... | 18 |
| 7. Data and Information | 19 |
| 7.1. Promote the adoption of consistent standards and practices for data management | 19 |
| 7.2. Continue to guide WMO through the mindset change that will allow them to be comfortable with data submitted by 3rd party organizations,..... | 21 |
| 7.3. Marine Climate Data System (MCDS) | 21 |
| 7.4. Strengthen links with the satellite community, | 21 |
| 7.5. Ensure data streams have homes and support for data management. | 22 |
| 8. JCOMMOPS..... | 22 |
| 8.1. Strengthen the planning, guidance and oversight of JCOMMOPS activities. | 23 |
| 8.2. Encourage JCOMMOPS to continue its outreach to new platform groups, such as the glider community..... | 23 |
| 8.3. Seek to assure the growth and continuity of the JCOMMOPS service, and its relationship with the NOAA OSMC. | 24 |
| 9. Summary of Work Plan actions as of 2015: | 26 |
| 10. Priorities and timeline of activities. | 31 |
| Appendix 1: Summary of existing/potential networks and contact points. | |
| Appendix 2: Summary of risks to the observing system and mitigation strategies | |
| Appendix 3: JCOMM-4 Observations Programme Area | |

1 Introduction/Context.

The Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) Observations Programme area is one of 3 JCOMM Programme Areas; the others are Services and Forecasting Systems, and the Data Management Programme Areas.

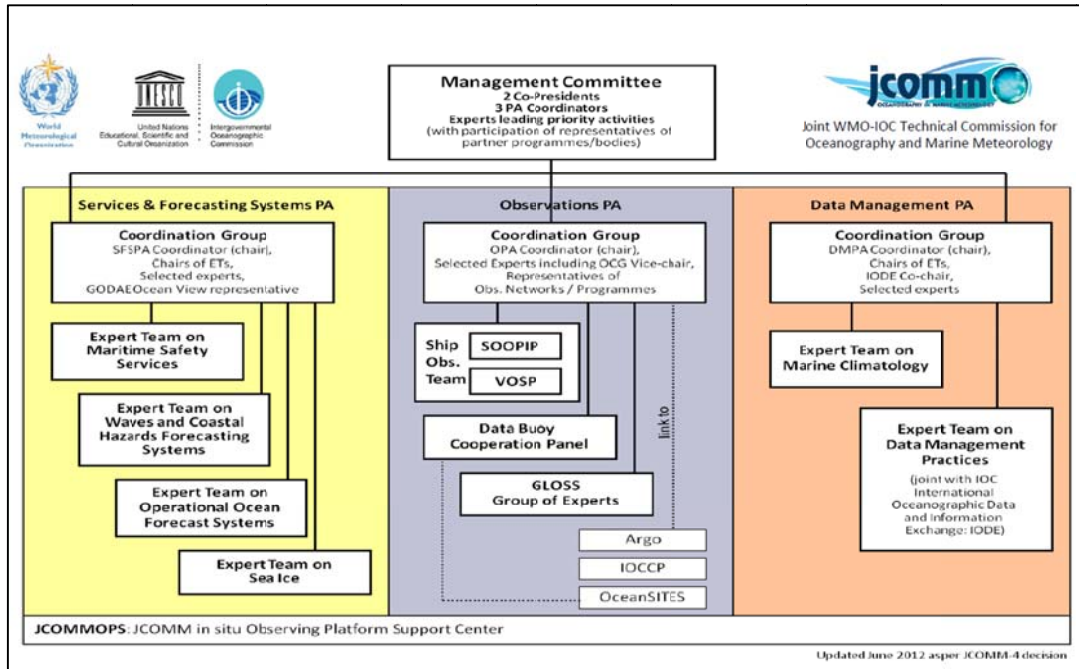


Figure 1. JCOMM Organisational structure

The Observations Coordination Group comprises representatives of the major networks involved in observing oceanography and marine meteorology. The OCG Work Plan is to identify areas where we can improve the technical coordination and implementation of the ocean observing system, and to capitalize on the strengths and synergies of the major observing networks. While there are core partners, OCG are keen to reach out to emerging networks, to build/capitalize on synergies across networks. A list of existing and emerging networks, with identified contact points, can be found in appendix 1.

While the observing networks have their own coordination mechanisms, there are many commonalities between networks and there are opportunities to further build on synergies; for instance, in reporting status metrics; deployment, logistics and ship time, sensor development and calibration, data flow, metadata standards, and quality control.

The aim of this document is to set the focus for OCG activities for the coming 5 years, under a core set of work areas where we can capitalize on the strengths and synergies across the networks. The work plan then provides a framework for the agenda of each OCG meeting, and the resulting actions, helping us to focus intersessional activity. By articulating the focus areas and coordination activities in this way, it also enables us to communicate OCG's role to the broader community and to emerging networks who may want to engage in some of the OCG Work Plan activities.

The OCG works closely with the GCOS-GOOS-WCRP Ocean Observations Panel for Climate, which focusses on setting observation requirements and observing systems design. The OOPC also implements a 5 year Work Plan (currently 2013-2018), which focusses on:

- Evaluating requirements for observations of Essential Climate Variables and Essential Ocean variables (and reporting through GCOS and GOOS), and developing variable based observing system performance metrics.
- Working with JCOMM OCG on developing network targets in response to requirements for Variables, and assessing network performance.
- Running Systems based evaluations to ensure the observing system in particular domains collectively meets requirements.

The JCOMMOPS team are charged with the technical coordination of the individual networks, with the following Vision:

'JCOMMOPS occupies a unique place as the focal point for the practical co-ordination of the in-situ ocean observing system defined by JCOMM. Its role consists of the following core objectives:

- *to assist in the implementation and deployment of the observing networks through close interaction with programme managers and platform operators, and through Capacity Development and outreach;*
- *to assist in establishing ,maintaining and verifying mechanisms for the timely exchange of data and metadata, including the facilitation of quality control and archival functions;*
- *to develop the consistent set of tools needed to monitor the status of the observing system and its attendant data and metadata distribution, so as to identify action areas and improve the overall effectiveness and development of the system.'*

JCOMMOPS also has a Work Plan in development, which will be complementary to the JCOMM OCG Work Plan, focusing on providing technical support and implementation tracking for the networks, with an emphasis on leveraging, building on synergies and opportunities across the networks.

2 Key Horizons/Deadlines/Timelines

There are a number of programmes and activities to consider when planning OCG activities to ensure they have the most impact on influencing observing system development;

The Global Climate Observing System, which has a 5-7 year planning and reporting cycle (next Implementation Plan will be developed during 2016). This plan describes requirements for the observation of Essential Climate Variables, and identifies actions for the coming 5 years to meet these requirements (i.e. network Targets).

The Global Ocean Observing System, which is developing a Strategic Map of GOOS, a living document, highlighting the interconnectedness of the system, and delivery to key application areas (Climate through GCOS, Real Time Services through JCOMM and GODAE Ocean View, and Ocean Health. Areas of the document will be updated through finite lifetime 'GOOS Development Projects', such as the Tropical Pacific Observing System (TPOS 2020) Project, and The Deep Ocean Observing Strategy (DOOS).

Requirements also need to be communicated through the WMO Rolling Review of Requirements Process, to ensure gain the attention of Met Services.

Key deadlines are as follows:

2016: GCOS Implementation Plan Update: a near-term opportunity to update network targets.

2017: JCOMM-5 Session: opportunity to revisit JCOMM and OCG Organisational Structure and seek support for observational plans/targets. (see appendix 2 for targets for OCG from JCOMM-4).

2019: OceanObs19: Opportunity to revisit the performance of the observing system, and opportunities to better meet requirements. By OceanObs19 OCG should have had all networks participate in at least one workshop that review/consider observing needs; and receive feedback on scientific and/or services requirements and how well networks meet (or could meet) those needs; and receive updated network targets

3 Requirements

To communicate and advocate for the development of the ocean observing system, requirements are developed through a number of fora to ensure that the range of stakeholders and implementers of ocean observations are engaged.

OCG primarily works with the GCOS-GOOS-WCRP Ocean Observations Panel for OOPC on setting requirements for observations. Requirements setting needs to be an iterative process which considers cost and feasibility of observations, versus their value or impact.

To enable us to communicate requirements for observations consistently through these for a, OOPC are leading the development Variable Specification Sheets are being developed to articulate the requirements for the observations of a Variable, its applications, and the processes/phenomena that need to be captured, and how the observations come together to meet these requirements. This articulation of requirements will also enable the articulation of observing system performance by variable.

OOPC has its own Work Plan (2013-2018), which is reviewed and updated every year. It focusses on setting requirements and assessing observing system performance by variable, and systems based evaluations of the observing system to guide the transition or expansion of the observing system.

3.1 Engage with other ocean and cryosphere observation groups

JCOMM OCG is responsible for the technical coordination of ocean observing networks, capitalizing on cross-network synergies. Hence, OCG needs to coordinate with and respond to other groups who are charged with setting requirements for ocean observations, including the Global Climate Observing System (GCOS) and the Global Ocean Observing System (GOOS) through the Ocean Observations Panel for Climate (OOPC), and connect to other global and regional efforts including;

- the Partnership for Observation of the Global Ocean (POGO) which focusses on coordinating and leveraging the observing activities of the major oceanographic institutions,

- the ICSU Scientific Committee for Oceanic Research (SCOR) who establish expert groups for the development of best practices.
- the ICSU Scientific Committee for Antarctic Research (SCAR) who along with SCOR, have sponsored the Southern Ocean Observing System (SOOS).

2015:

It is also important to engage with GOOS Observing System finite lifetime Development Projects (TPOS 2020, AtlantOS, IIOE-2, and DOOS) to identify opportunities to advance observing capabilities and integration across observing networks, and to ensure the outcomes are effectively integrated into observing system planning and coordination.

For example, The proposed OOPC evaluation on ‘Boundary Currents and their interaction with the shelf’ will be an opportunity to bring together open ocean and coastal observing communities, integrating satellite and in situ observations, and also strengthen the connection to modeling activities, including decadal predictability. There is also an opportunity to leverage existing observing activities, and the interests of funders; a number of whom have already expressed an interest including NOAA, NASA, IMOS, and JERICO.

The secretariat will assist in identifying connections and opportunities. Engagement is also occurring at a regional level direct through network representation.

3.2 WMO Integrated Global Observing System (WIGOS)

The implementation of the WMO Integrated Global Observing System (WIGOS) framework is focusing on 10 Key Activity Areas (KAAs) where JCOMM has a role to play as reflected in the table below:

| WIP KAA No. | WIP Key Activity Area (KAA) | JCOMM contribution to WIP KAA |
|-------------|--|---|
| 1 | Management of WIGOS implementation | <ul style="list-style-type: none"> ▪ Incorporating technical aspects of WIGOS implementation and continuing evolution into JCOMM working structures and procedures, including OCG and JCOMM Observation Panel workplans ▪ JCOMM Participating in <ul style="list-style-type: none"> • Inter Commission Group on WIGOS (ICG-WIGOS) - Mr David Meldrum (UK) • WIGOS Task Team on Regulatory Materials – Chris Marshall (Canada) • WIGOS Task Team on Metadata - Joe Swaykos (USA) |
| 2 | Collaboration with the WMO co-sponsored observing systems & international partner organizations & programmes | <ul style="list-style-type: none"> ▪ Strong collaboration established with the IOC of UNESCO for support to JCOMM ▪ IOC-WMO-UNEP-ICSU Global Ocean Observing System (GOOS) ▪ Framework for Ocean Observing (FOO) |
| 3 | Design, planning & optimized evolution | <ul style="list-style-type: none"> ▪ JCOMM Observations Programme Area (OPA), and Services and Forecasting Systems Programme Area (SFSPA) involved in the WMO Rolling Review of Requirements ▪ JCOMM OPA network design addressing <ul style="list-style-type: none"> • GCOS requirements • WMO requirements per RRR (NWP, SIA, Climate services, Ocean applications, ...) • Reviewing results, and promoting impact studies (e.g. SLP from drifters on NWP) |

| WIP KAA No. | WIP Key Activity Area (KAA) | JCOMM contribution to WIP KAA |
|-------------|---|--|
| 4 | Observing System operation & maintenance | <ul style="list-style-type: none"> ▪ JCOMM Observation Panel providing coordination (synergies, sharing of experiences) ▪ Strengthening the JCOMM in situ Observations Programme Support Centre (JCOMMOPS) <ul style="list-style-type: none"> • Technical support (e.g. Satcom, pilot projects) • Programme monitoring • Assistance with regard to data sharing & distribution ▪ Contributing to and participation at the International Forum of Users of Satellite Data Telecommunication Systems (Satcom Forum) ▪ Promoting pilot project on integration of in situ & satellite observations (GHRSSST: DBCP, SOT, Argo) |
| 5 | Quality Management | <ul style="list-style-type: none"> ▪ Promoting compliance with WMO Quality Management Framework ▪ Automatic Quality Control procedures recommended ▪ Higher level QC for delayed mode data ▪ Relaying quality information between data users and data producers <ul style="list-style-type: none"> • Best use of the data (e.g. flags) • Feedback on quality to platform operators ▪ Promoting quality information feedback mechanisms between ocean in situ & satellite observation communities (GHRSSST: DBCP, SOT, Argo) ▪ JCOMM Performance Metrics ▪ Instrument evaluation through JCOMM Task Teams ▪ Regional Marine Instrumentation Centres (RMICs) ▪ Developing Guidelines for Instrument Intercomparisons |
| 6 | Standardization, system interoperability & data compatibility | <ul style="list-style-type: none"> ▪ JCOMM consultant has been recruited to look at WMO & IOC Publications from a WIGOS integration perspective ▪ Harmonization of standards with the IOC and participating in the Ocean Data Standards and Best Practices Project (ODSBP) • http://www.oceandatastandards.org/ • Seeking broad agreement • WMO-ISO agreement is an opportunity ▪ Addressing the key areas of standardization: <ul style="list-style-type: none"> • Regarding instruments and methods of observation - Promoting establishment of RMICs in all regions - Promoting collaboration with HMEI - JCOMM focal point on CIMO matters – <ul style="list-style-type: none"> ▪ Prof. Jianwen SI, NCOSM (Chief Eng. & Director of Marine Std. Dept.) - JCOMM OPA leader on instrument inter-comparisons – - Mr Jingly SUN, NCOSM & member JCOMM OCG • Regarding WIS Information exchange: <ul style="list-style-type: none"> - Participation on the new JCOMM cross cutting Task Team on Marine Meteorological and Oceanographic Services for the WMO Information System (WIS) (TT-MOWIS) - Interoperability with the IODE Ocean Data Portal (ODP), and contribution of specific data-sets to WIS • Regarding Data Management <ul style="list-style-type: none"> - Addressing the recommendations of the Keeley report¹ (Data Systems |

1 http://www.icomm.info/index.php?option=com_content&view=article&id=331

| WIP KAA No. | WIP Key Activity Area (KAA) | JCOMM contribution to WIP KAA |
|-------------|---|--|
| | | Relevant to JCOMM) -Key role of the JCOMM Data Management Programme Area (DMPA) |
| 7 | WIGOS Operational Information Resource (WIR) | <ul style="list-style-type: none"> ▪ JCOMM Standards to be documented in the Standardization of Observations Reference Tool (SORT) • WMO No. 471, 558 • JCOMM input to WMO No. 8, 544, and 488 ▪ Observing System Capabilities Analysis and Review Tool (OSCAR) • Observational user requirements for Ocean Applications documented in OSCAR/Requirements • Ocean observing systems capabilities collected & recorded by JCOMMOPS, & made interoperable with the OSCAR/Surface (under development) |
| 8 | Data & metadata management, delivery & archival | <ul style="list-style-type: none"> ▪ JCOMM contributing to WIGOS Task Team on Metadata for definition of a WIGOS core metadata profile (Joe Swaykos) ▪ Promoting the collection and exchange of instrument/platform metadata; JCOMMOPS collecting metadata from platform operators, and holistic approach ▪ JCOMMOPS encouraging data sharing and distribution in real-time and delayed mode ▪ Promoting the flow of JCOMM observations in delayed mode through the Marine Climate Data System to the Centres for Marine Meteorological and Oceanographic Climate Data (CMOCs) ▪ Collaboration with the IODE regarding development of the IODE Ocean Data Portal (ODP) ▪ Promoting more ocean data sets to be made interoperable with the WMO Information System (WIS) and the IODE Ocean Data Portal (ODP) ▪ Data discovery metadata made available via ODP and WIS, which are interoperable (ODP acting as WIS DCPC) |
| 9 | Capacity development | <ul style="list-style-type: none"> ▪ JCOMM Capacity Building Strategy has included WIGOS implementation needs ▪ Implementation of PANGEA concept & partnership building • Developed countries providing training on data use as well as ocean instruments deployed in the region • Developing countries contributing to the implementation of the ocean observing system on their region (e.g. ship time) ▪ Regional Marine Instrumentation Centres (RMICs) playing a key role in Capacity Development • Training workshops • Liaison groups in the region • Cost-effective calibration service |
| 10 | Communications & outreach | <ul style="list-style-type: none"> ▪ JCOMM website – www.jcomm.info ▪ JCOMMOPS website – www.jcommops.org ▪ JCOMM Strategy ▪ JCOMM Observations Panel meetings are opportunities to receive information on JCOMM activities and JCOMM contribution to WIGOS implementation ▪ Communicating benefits of WIGOS (e.g. JCOMM TR No. 48, 53) |

With WMO Cg-17 decisions, the development of WIGOS will continue during its Pre-Operational Phase (2016-2019) building upon and adding to those key building blocks of the WIGOS Framework that have already been implemented, while shifting the emphasis from the global level toward implementation activities at the regional and national levels. The goal is to have Members and their partners benefit from a fully operational system from 2020. Cg-17 further decided that the WIGOS Pre-Operational Phase will focus on: (i) complementing the WIGOS Regulatory Material with necessary guidance material providing Members with those technical details that are required for the implementation; (ii) further developing the WIGOS Information Resource (WIR), with special emphasis on the operational deployment of the OSCAR/Surface database; (iii) development and implementation of the WIGOS Data Quality Monitoring System; (iv) concept development and initial establishment of Regional WIGOS Centres; and (v) national WIGOS implementation.

The Rolling Review of Requirements (RRR²) process is addressing the following application areas, of which no. 1, 4, 9, and 12 below substantially require marine meteorological and oceanographic observations:

1. Global Numerical Weather Prediction

2. High Resolution Numerical Weather Prediction
3. Nowcasting and Very Short Range Forecasting

4. Sub-seasonal to longer production

5. Aeronautical Meteorology
6. Forecasting Atmospheric Composition
7. Monitoring Atmospheric Composition
8. Providing Atmospheric Composition information to support services in urban and populated areas

9. Ocean Applications

10. Agricultural Meteorology
11. Hydrology

12. Climate Monitoring (GCOS)

13. Climate Applications (Other aspects, addressed by the Commission for Climatology)
14. Space Weather

Contact points in each Application Area above are coordinating input from their respective communities in order to (i) compile observational user requirements quantitatively in terms of space/time resolution, timeliness, uncertainty, and stability in the OSCAR Database, and (ii) conduct a critical review and produce a gap analysis reflected in a Statement of Guidance for the Application Area. Mr Gumei Liu (China) is the Point of Contact for Ocean Applications. Regarding

2 www.wmo.int/pages/prog/www/OSY/GOS-RRR.html

Climate Monitoring (GCOS), the following GCOS reports are considered as Statements of Guidance :

- [First adequacy report](#) (GCOS-48)
- [Second adequacy report](#) (GCOS-82)
- [Implementation Plan](#) (GCOS-92)
- [Satellite Supplement](#) (GCOS-107)
- [Progress Report \(2004-2008\)](#) (GCOS-129)
- [2010 update of the Implementation Plan](#) (GCOS-138)

While GCOS requirements area already well taken into account by OCG, it is important to engage the dialogue with the other Application Areas to address additional requirements.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|---|--|--|---|-----------------|
| 1 | ACTION: Work with OOPC to plan a Workshop on improve framing/designing OSEs (modeling and statistical) to inform Observing System Design. | Secretariat | Katy Hill | Early 2016 |
| 2 | ACTION: OCG to strengthen connection to ETOOFs, and invite Gumei Liu (contact point for for Ocean Applications of RRR) to the next OCG meeting. | Secretariat | Etienne Charpentier | OCG-7 |
| 3 | RECOMMENDATION: Guimei Liu to consult with OCG when preparing input and recommendations to the EGOS IP and RRR. | Secretariat | Etienne Charpentier, Gumei Liu | ? |
| 4 | ACTION: OCG to keep the WIGOS developments under review, and adjust the JCOMM contribution to WIGOS accordingly (including updating the above table as needed) | OCG Co-Chairs, representatives with link to WMO. | David Meldrum, supported by Jon Turton and Sarah North, Etienne Charpentier | |

4 Observing System Implementation

4.1 Development of Network Specifications and Targets.

To advocate for support for ocean observations, clear Network targets need to be developed and communicated through GCOS, GOOS, JCOMM and WMO Rolling Review of Requirements. Clear targets are also needed to enable us to articulate the status and performance of the observing system (see further details in section 5).

OCG will work with OOPC to develop Network Specification sheets to articulate the role of components of the observing system, highlight interdependencies, and set targets for implementation, and track implementation.

2015 Status:

A first draft of the network Specifications have been completed by most of the networks, and feedback has been provided, which included:

- Guidance and context was requested regarding what the specifications would be used for.
- Network Targets should be up front
- Some networks measure many variables (e.g. GO-SHIP), so there is a lot of detail to articulate.
- Interdependencies between networks, and the role of the network in the broader system need to be highlighted.
- Latency (in terms of requirements and delivery) will be important considerations and need to be articulated.

For Biogeochemical observations, many networks don't have agreed targets, and these networks can learn from the more developed networks regarding the target setting process. The GOOS Biogeochemistry Panel has a defined set of questions to address and requirements by variable articulated. Questions have been posed such as 'what is an adequate observing system to calculate the carbon stock of the ocean on a decadal basis?' Answering such a question is likely to require substantive further study, but will also require additional observations.

There are pragmatic steps that can be taken to set 'no regrets' targets for the observing system: what observations can be realistically undertaken by the community in the next 5-10 years, which we know the community will use, and can feed back into refining requirements in the future? While this may sound like a precautionary approach, we were reminded that Argo only took 10 years to implement.

That said, the need to spend some time focusing on setting baselines and standards was emphasized; noting the rigorous approach taken when designing the International Argo array, and the challenges faced by the community following the roll out of oxygen sensors.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|---|--|----------------------|---|-----------------|
| 5 | Recommendation: All networks to take full advantage of upcoming and planned workshops (see list/appendix) and regional activities (e.g. WCRP Sea Level Conference, TPOS, AtlantOS, etc) to revisit and update requirements and targets and incorporate these updates into GCOS implementation plan update process. | All Panels | Various depending on regional interests | Ongoing |
| 6 | ACTION: Secretariat to recommend dedicated observing session at WCRP Sea Level Conference. | Secretariat | Albert | TBD in 2016 |
| 7 | ACTION: Network Specifications to be developed with clear Network Targets by October. Network Specs to be updated by Secretariat, and sent to the Network representatives for checking. | All Panels | ? | by October 2015 |
| 8 | ACTION: Argo to discuss, improving strategy for communication/consultation of the Argo network targets with the community. Clearly articulated targets in the | Argo | Howard Freeland | by October 2015 |

| | | | | |
|----|---|------------------|-----------------------------------|-----------------|
| | Network Specification should be part of this strategy. | | | |
| 9 | ACTION OCG to work with IOCCP/GOOS Biogeochemistry (GO-SHIP, Underway) to set initial 'no regrets' targets for key Carbon networks (ahead of the GCOS IP). | IOCCP | Toste Tanhua, Rik Wanninkhof | by end 2015 |
| 10 | ACTION: OceanSITES, to clarify missions, rationale, targets for components of the observing network (for example Flux Reference Sites, Transport Arrays, Multidisciplinary Timeseries (and Tropical Moored Buoys). (October 2015) | OceanSITES | Bob Weller, Uwe Send | by October 2015 |
| 11 | ACTION: Clarity needed on relationship and division between DBCP and OceanSITES | DBCP, OceanSITES | John Turton, Uwe Send, Bob Weller | by OCG-7 |
| 12 | ACTION: GLOSS to improve clarify definition of missions and targets for the network | GLOSS, JCOMMOPS | Gary Mitchum, | by October 2015 |

4.2 Horizon scan for emerging platforms, sensors, technologies and methodologies

OCG needs to proactively engage with groups testing emerging platforms that will in due course become part of the composite observing system, and seek to establish pilot activities to help evaluate and transition them to the sustained observations arena when ready.

2015 Update:

Ocean gliders are an emerging technology for multidisciplinary observations of the coastal and open ocean, and there is a forum for community discussions called 'Everyone's Glider Observatory' (EGO, www.ego-network.org). Gliders have a high potential synergy with other GOOS networks, have a comprehensive range of mission proved sensor payloads, and can bridge spatial, temporal and variable sampling gaps (e.g. linking open ocean and coastal). EGO have attended the last two OCG meetings, and are keen to strengthen their engagement in OCG activities. Funding required for coordination activities was discussed, and it was highlighted that successful networks such as Argo, GO-SHIP and OceanSITES do not have funding for coordination activities, with each member self-funding their attendance to meetings through project funds.

The Glider Community have not yet developed a global mission; however, the role of gliders in sustained observing is likely to be discussed through development activities such as the TPOS 2020 Project, and the OOPC Boundary Current Evaluation activity. The Glider community was encouraged to engage in these activities as a pathway to articulating a global mission and targets; however, there would still be a role for the international coordination of standards and best practice, data management and capacity building among groups internationally, particularly in the coastal zone.

The OCG decided to endorse the glider community as members of OCG, and requested that formal governance be arranged, including terms of reference and a steering committee.

Other potential communities and observing platforms to engage include:

JCOMM Meeting Report No. 121, ANNEX IV

- Unmanned surface vehicles e.g. Wavegliders; technologies are on trial by various groups but no discussions yet regarding a global mission or community of practice.
- Tagged Pinnipeds; currently coordinated at a regional/project level (particularly in the Southern Ocean)

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|--|----------------------|-------------------------------------|-----------------|
| 13 | ACTION: IOCCP, DBCP to establish a discussion with BGC Moorings operators, with potential for greater coordination and connection into OceanSITES, DBCP (What they are, whether they have a home, whether they need one) | DBCP, IOCCP | (DBCP), Laura Lorenzoni? (IOCCP) | DBCP XX |
| 14 | ACTION: OCG Co-Chairs to consider how best to strengthen/broaden connections between IOCCP and OCG, particularly where common platforms are used (or could be used). | OCG, IOCCP | David Legler, David Meldrum | OCG-7 |
| 15 | ACTION: IOCCP to address DBCP-XX on new sensors (USVs, BGC Drifters, etc). | DBCP, IOCCP | ? | DBCP XX |
| 16 | ACTION: ToR and Membership for an international Glider Steering Team to be proposed and submitted by 15 June 2015, and point of contact to be nominated. | EGO | ? | |
| 17 | ACTION: OCG requests glider community to continue to develop a common approach to data processing, data model, and quality-review processes. Draw on Argo Experience | EGO | data management contact? | ? |
| 18 | RECOMMENDATION: OCG requests OOPC and GOOS to engage glider community (POC-TBD) in upcoming workshops and activities where gliders could be part of the observing strategy (i.e. TPOS 2020, IIOE2, Boundary Currents). | OOPC | ? | Ongoing |
| 18 | ACTION: Prepare strategy on how to respond to the glider/EEZ issue in case the issue pops up. Draw on Argo Experience. | EGO, Secretariat | ? | ? |
| 19 | ACTION: Networks to provide details of their succession planning: timeline for rotation of chairs, strategy for bringing through new community leaders | All Panels | | OCG-7 |

4.3 Continue to participate in new initiatives to expand ocean observing capabilities,

Where projects arise which will expand ocean observing capabilities, including lowering the cost per observation, addressing gaps, or improving integration, it was agreed that OCG should engage and encourage their development in the context of sustained observing, including the development of targets, and data and information management protocols. One example identified is the joint ITU/WMO/IOC initiative to use sub-sea comms cables for ocean observation and tsunami warning, and the increased activity in coastal regions.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|---|----------------------|--------------------------|-----------------|
| 20 | RECOMMENDATION: Continue to convey the submarine cable initiative to other forums as appropriate. Identify someone to present Green Cables initiative to IIOE2. | Co-Chairs | David Meldrum | Ongoing |

5 Observing System Metrics

5.1 Assessing and reporting Observing System Performance by Variable and Network.

Observing system metrics are needed for a range of reasons, including:

- To articulate the value/impact of ocean observations and advocate for national investment
- To articulate observing system performance against requirements (by variable), and hence areas requiring strengthening/enhancements.
- For programme managers to advocate for and prioritise ongoing investment in sustained observation
- For the day to day operations of observing networks, including managing deployments.
- To track delivery of observations including data quality, data delivery, etc.
- To track uptake and use of the observing system (linked to articulating the value/impact).

The current observing system % complete diagram has been extremely valuable in advocating to build the observing system, but is not sufficient to advocate for sustaining, expanding and strengthening it going forward.

Hence, we need to develop metrics that fall into a number of categories:

- Observing System performance by variable, such as;
 - o How well does the observing system meet requirements for x variable (i.e. capturing space/time/accuracy requirements, improving uncertainties).
 - o What is the impact/value of each network against specific requirements?
- Observing System Performance by Network, such as;
 - o Annual Level of effort metrics (Required deployments/occupations verses committed)
 - o Coverage verses target.
 - o Real time/delayed mode data delivery (% of total).
- Risks to sustainability and Mitigation approaches such as;
 - o Technological Risks (reliance on single sensors)
 - o Operational Risks (reliance on ship time, communications systems)

- Funding risks (reliance on short term funding, small number of funders)
- Uptake/Impact metrics:
 - Journal Papers
 - Projects, students,
 - Take up by Products, models, etc.

While this list is long, their development will be prioritized based on utility, and the Variable and Network Specifications will be used as a basis for metrics. OOPC and OSMC will lead on the variable based metrics, and OCG and JCOMMOPS on the network based metrics.

2015 Update:

JCOMMOPS proposed a long list of possible metrics for consideration by the networks, and proposed monthly summaries be provided to the networks for coordination purposes, and summarized reports for broader communication twice per year. The JCOMMOPS will work with the network representatives to prioritise metrics and also how best to present them. While a 'traffic light approach' was welcome for external communications, it was also suggested that knowing the 'tendency' of a metric is useful, i.e. whether it is going up or down; In general, the group felt that priorities should be metrics for network implementation status and data availability status.

OSMC presented a range of initial variable based metrics, starting with simple metrics such as proportion of contributing data points in a 5x5 degree box for each network measuring SST, to more complex and depth dependent variables.

There was some discussion on outcome metrics: i.e. how well do observations reduce uncertainty in estimates of ocean heat content, or ocean CO2 inventory.

Further work is needed on developing and implementing variable based metrics, and input/guidance is needed from OOPC. It was recommended that Kevin O'Brien be invited to the next OOPC meeting for further discussion on taking this work forward.

For the range of metrics, it was felt that putting some uncertainty around quantitative estimates would be important.

5.2 Developing a framework for identifying and mitigating risks.

Following recent experience with downturns in data availability from TAO and the Drifter Array, it is agreed that we need to be more pro-active in identifying risks to the sustained observing system, and approaches to mitigating them. In particular, we need to identify where a systems wide risk management framework would be beneficial.

2015 Update:

A list of risks to the observing system were collated following OCG-5 (see appendix II), and separated into categories

- Technological/equipment
- Operational
- Funding/support
- Data delivery.

As next steps, we need to:

- Filter out 'general worries' from those things where we can take some proactive action to mitigate.

- Distinguish between the risks that networks should manage internally (though there is probably opportunities to learn from eachothers risk management practices), from those that could benefit from being managed across the system (e.g. ship time).
- Quantify risks in terms of likelihood, and impacts/consequences in terms of severity and prioritise issues to address.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|---|---------------------------|-------------------------------|-----------------|
| 21 | ACTION: Teleconferences to be organized network by network to discuss indicators, and role of JCOMMOPS for developing observing network indicators (Drifting platforms, Ship Based, Moorings (Network reps, JCOMMOPS, Kevin). | Secretariat to coordinate | ? Rep needed for each network | ? |
| 22 | ACTION: Each network tracking use of observations to provide feedback to the Secretariat on what activities they have in this regard (Network Chairs; asap). | All Panels | ? | ASAP |
| 23 | ACTION: Variable Metrics: develop subsurface pilot variable metrics: T(z) (Kevin, Steve Worley to report to OOPC) | OOPC, OSMC | Kevin O'Brien, Steve Worley | OOPC-19 |
| 24 | ACTION: Collate risks to observing system identified in Network Reports (secretariat, during May, ahead of GOOS SC, WMO Congress). | Secretariat to coordinate | Katy Hill | by 25th May |

6 Best Practices

A Key priority of OCG is to promote the creation and timely updating of JCOMM best practice documentation. Many of the networks have a focus on the development of best practices for their network (i.e. Argo, GO-SHIP), however, driven by the need to be able to deliver ocean observations by variable, there is a need to be able to characterize and quantify the observational approaches and uncertainties across the networks, and there are also opportunities to capitalize on the best practice efforts of the individual networks to the benefit of the broader observing system. Therefore, many of the actions in this area are focused on the development and sharing of network best practice activities, and the coordination of best practice development and intercomparison activities by variable.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|--|--|------------------------------------|-----------------|
| 25 | ACTION: China RMIC to draft Template for future activities in the development of ocean observations and marine meteorological standards (calibration, intercomparison, data standards, etc), for discussion/approval at OCG (China RMIC to discuss | China RMIC, OCG Co-Chairs, Secretariat | David Meldrum, Etienne Charpentier | ? |

| | | | | |
|----|--|---------------|---|---|
| | requirements with David Meldrum, Secretariat). | | | |
| 26 | ACTION: JCOMM OCG requests the China RMIC consider existing best practice documentation within Network (e.g. GO-SHIP) , and engaging in international community best practice activities (e.g. QUARTOD, SCOR Working Groups for Oxygen, Nutrients, etc.) | China RMIC | | ? |
| 27 | ACTION: Networks to identify best practice docs P.O.C. for best practice of documentation (should be in (by ...) | All Panels | ? | ? |
| 28 | ACTION: Workplan – establishing JCOMM traceability system ? this needs to be discussed with OCG management (RMIC/AP & OCG co-Chairs; OCG-6) | OCG Co-Chairs | | |
| 30 | ACTION: OCG encourages China RMIC Work to be presented to WESTPAC, NEAR-GOOS, SEA-GOOS (China RMIC) | RMIC | | |

7 Data and Information

A strong focus on data and information management is essential if the full value of investment in sustained observations is to be realized. While JCOMM has a Data Management Programme area, and we also need to be cognicent of the activities of the Intergovernment Ocean Data Exchange (IODE), the majority of global observing networks have developed their own data management and delivery activities and while some are working well, for some networks/observation types data management needs to be strengthened; More importantly, we need to leverage what is working well and better integrate our data management and delivery across the ocean observing networks to deliver observations by variable, to the best (and known) quality, in a form which is fit for purpose for key applications.

7.1 Promote the adoption of consistent standards and practices for data management

Strengthened activity is needed amongst the observing networks to facilitate discoverability and accessibility of integrated data for the research, forecast, and end-user communities as well as for product development. The Keeley Report, which includes a chapter on each network and also each variable, is a good starting point, but we need to develop a forward strategy and work programme building on this report.

By improving consistent standards and best practices, we are able to strengthen integration across the observing system, through activities such as NOAA OSMC's ERDDAP data integration project. At the JCOMM OCG meeting, NOAA OSMC presented the results/benefits of ERDDAP, and it was enthusiastically received by the Network representatives. It was recommended that the ERDDAP project be presented at a number of ocean observing fora in the coming year to answer queries and questions from the community.

The main aim is to ensure we can compare datasets from different observing system in a consistent way, and move towards delivering datasets by variable of best quality.

JCOMM Meeting Report No. 121, ANNEX IV

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|---|--|--|-------------------------------|
| 31 | RECOMMENDATION: JCOMM Task Team on Table Driven Codes works with EGO to develop BUFR template for glider data which draws out biogeochemical data from NetCDF Files (Jon Turton, David Berry). | EGO, JCOMM DBCP | Jon Turton, David Berry, (DM POC for EGO) | |
| 32 | RECOMMENDATION: Keeley actions for DBCP. TT DM, TOP, and OceanSITES to respond, report on progress for next DBCP meeting in October. | DBCP | John Turton, Champika Gallage | DBCP XX Session, October 2015 |
| 33 | ACTION: DBCP to provide a summary of strategy for development and completeness of Metadata records for the components of DBCP at next OCG meeting. (DBCP DM TT) | DBCP | Jon Turton | |
| 34 | ACTION: Unique IDs (WIGOS Identifiers) to be developed for all ocean observing platforms. Plan needed for how this will be done, and who will be engaged (JCOMMOPS in cooperation with WIGOS) | JCOMMOPS, WIGOS | Mathieu Belbeoch, Martin Kramp, | Timeframe? |
| 35 | RECOMMENDATION: Unique IDs for Data records: topic for discussion a future meeting (after platform unique IDs). | Co-Chairs, Secretariat | David Legler, David Meldrum, Katy Hill, Etienne Charpentier. | OCG-7 Session. |
| 36 | RECOMMENDATION: OCG is strongly supportive of the data integration activity using ERDDAP and led by OSMC. OCG strongly encourages the networks to work with OSMC to support this activity and establish ERDAP servers on their GDACs. | All Panels | Data Management | Follow up at OCG-7. |
| 37 | ACTION: OCG Encourages ERDDAP to be presented at relevant upcoming panel meetings, fora and conferences. | OSMC | Kevin O'Brien | Ongoing. |
| | Invitation for presentation of ERDDAP at the DBCP scientific and Technical Symposium (invitation from DBCP chair to OSMC). | DBCP | Jon Turton/Champika Gallage | DBCP XX October 2015 |
| 38 | ACTION: Small team: to develop activity outline, vision for implementation of ERDDAP. Kevin O'Brien (OSMC), Steve Worley (OOPC), Mathieu Belbeoch (JCOMMOPS), Etienne Charpentier (WMO), Benjamin Pfeil (Carbon). | OOPC, IOCCP, OSMC, JCOMMOPS, Secretariat | Steve Worley, Benjamin Pfeil, Kevin O'Brien, Mathieu Belbeoch, Etienne Charpentier | Timeline? |

7.2 Continue to guide WMO through the mindset change that will allow them to be comfortable with data submitted by 3rd party organizations,

The Global Telecommunications System, GTS, is the communication system of choice for Real time data, and is particularly used by operational forecast centers to initialize models (including ocean forecasting and seasonal forecasting). However, the GTS system, coordinated through WMO, is coordinated through Meteorological and Hydrological Services, and while much of the ocean data sent to the GTS is collected by non-NHMS's; and while they provide data onto the GTS, they are not able to access it to even verify what is delivered. Planning is underway for the success to the GTS, The WMO information System (WIS).

A JCOMM Cross Cutting Task Team for Meteorological and Oceanographic Services within WIS (TT MOWIS) is being established, and there may be some potential to engage TT MOWIS on this issue.

JCOMM OCG is working with WMO to develop a system that will allow such '3rd party' organizations to have access to the WIS/GTS data for verification purposes.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|---|---------------------------------|--------------------------|-----------------|
| 39 | ACTION: OCG to keep OCG up to date on the development of TT-MOWIS, and expectations/benefits of engagement from non-IODE/WMO Data centres and infrastructure. | OCG Representative, Secretariat | Etienne Charpentier | Ongoing. |

7.3 Marine Climate Data System (MCDS)

The MCDS is building a system to assure the flow of delayed mode marine meteorological and oceanographic climate data to long term archives at WMO-IOC Centres for Marine meteorological and Oceanographic Climate data (CMOCs) through Data Acquisition Centres (DACs) and Global Data Assembly Centres (GDACs), including existing ones. CMOC/China has been established by Cg-17 (2015), and it is foreseen to also establish the International Comprehensive Ocean-Atmosphere Data-Set (ICOADS of USA) as a CMOC. CMOCs will make their historical records discoverable and visible through the WMO Information System (WIS).

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|---|---------------------------------|--------------------------|-----------------|
| 40 | ACTION: Etienne/OCG Representative to keep OCG up to date on the development of the MCDS and on MCDS requirements with regard to the provision of delayed mode data to the MCDS | OCG Representative, Secretariat | ?, Etienne Charpentier | Ongoing |

7.4 Strengthen links with the satellite community,

We have a tendency to think about Satellite observations separately from the in situ observing system and there is a strong need to consider satellites as an integrated component of the observing system for the benefit of both, especially ;

- For *in situ* validation of EOVs/ECVs,

- In anticipation of new satellite mission capabilities and potential for complementary in situ observations to ensure we exploit observations to the full (e.g. resolving diurnal cycle, mesoscale variability, new salinity missions) , and
- for integrated product development.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|---|------------------------|------------------------------|-----------------|
| 41 | RECOMMENDATION: Integration of in situ and remote sensing observations (satellites, HF radars) should be considered as part of upcoming development projects (TPOS 2020, AtlantOS, Boundary Currents/shelf connections) | OOPC | Bernadette Sloyan, Katy Hill | Ongoing |
| 42 | ACTION: OCG to consider having integration of satellite and in-situ data be the thematic focus of a future OCG meeting. | Co-Chairs, Secretariat | | OCG-7 |
| 43 | ACTION Request representation from JCOMM TT Satellite Requirements at next OCG | Co-Chairs, Secretariat | | OCG-7 |

7.5 Ensure data streams have homes and support for data management.

The management of ocean data has mainly developed through platform based observing programmes; while many data-streams are well managed, some data-streams, particularly delayed mode data, does not have a home within a data centre. JCOMM OCG needs to identify the critical data-streams without a home, and work with the data centres to seek adequate curation of these data-streams.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|---|------------------------|--------------------------|-----------------|
| 43 | ACTION Request representation from JCOMM TT Satellite Requirements at next OCG | Co-Chairs, Secretariat | | OCG-7 |
| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
| 44 | ACTION: GO-SHIP to discuss inclusion of GO-SHIP underway data, including shipboard ADCP in GOSUD. | GO-SHIP | ? | |
| 45 | ACTION: GO-SHIP to approach data centres to seek home for LADCP (and ancillary data) | GO-SHIP | ? | |

8 JCOMMOPS

JCOMMOPS provides technical coordination to many of the JCOMM OCG networks. Recently the JCOMMOPS secretariat has transitioned from Toulouse to Brest, and has established a

consolidated secretariat. JCOMMOPS gets guidance from a number of groups; the networks they serve (and the each serve more than one), OCG chairs, and the secretariat.

8.1 Strengthen the planning, guidance and oversight of JCOMMOPS activities.

It was decided that a structure for JCOMMOPS oversight is required, and a JCOMMOPS roundtable has been formed, comprising the network chairs, the OCG chairs, JCOMMOPS and the secretariat. This mechanism is design to be a management board, providing oversight to JCOMMOPS through quarterly telecons.

In addition, a JCOMMOPS work plan is under development, to be discussed and agreed by the roundtable. IN addition, given an expanded JCOMMOPS secretariat, the JCOMMOPS terms of reference need to be revisited and revised to reflect their broader activity.

Each of the Round Table telecons will be be focused on a specific topic. The June 2015 telecon will be focused on discussing how to invest the €100K of co-invested funds from Brest, with an initial recommendation that it is focused on centralized ‘common infrastructure’ JCOMMOPS activities, including administrative support for the team.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|--|--------------------------------------|--------------------------|--|
| 45 | RECOMMENDATION: Future JCOMMOPS Round tables to be focused on a specific topics. | Secretariat | | |
| 46 | ACTION: Set timetable for quarterly roundtable telecons, and focus topics | Secretariat, Co-Chairs | Katy Hill | |
| 47 | ACTION: OCG Co-Chairs/Secretariat/JCOMMOPS to revisit JCOMMOPS terms of reference, and update for discussion (for discussion at OCG-7, Approval at JCOMM-5). | OCG Co-Chairs, JCOMMOPS, Secretariat | Katy Hill | For Discussion at OCG-7, for approval at JCOMM-5 |
| 48 | ACTION: Next JCOMM Round Table to focus on the budget for Brest funds, and updated JCOMMOPS Work Plan (timeline: during May). | Secretariat, Co-Chairs, JCOMMOPS, | | June 2015 |
| 49 | ACTION: A Future JCOMM Round table to focus in Use metrics. | Secretariat | Katy Hill | TBD |

8.2 Encourage JCOMMOPS to continue its outreach to new platform groups, such as the glider community.

We are beginning to see the broader benefits of bringing the technical coordination of observing networks under one roof within JCOMMOPS, building and capitalizing on the synergies across the observing networks.

2015 Update:

A cross JCOMMOPS work plan will help articulate the benefits of connecting this coordination activity to potential new networks; As the glider community has decided to formalize its coordination under an 'Everyone's Glider Observatory' Steering Committee, and also formalize its membership under JCOMM OCG. In addition, funding for Glider coordination has been secured as part of the European programme Atlantos. Discussions are underway regarding whether this coordinator could be hosted with JCOMMOPS, to capitalize on synergies in cross network coordination.

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|----|---|---|--|-----------------|
| 50 | ACTION: JCOMMOPS, EGO, OCG Co-Chairs and IOC/WMO Secretariat to discuss hosting of a Glider TC at JCOMMOPS. | JCOMMOPS, EGO, OCG Co-Chairs, Secretariat | Pierre Testore (EGO) | |
| 51 | ACTION: OCG to advise JCOMMOPS on priorities for engagement of new networks. | OCG Co-Chairs | | |
| 52 | ACTION: Develop Strategy for engaging Shipping Community, capitalizing on JCOMMOPS resources in Brest: Harmonisation of terminology for SOOP/VOS, technology, | JCOMMOPS, SOT, IOCCP | Martin Kramp (JCOMMOPS), ? (SOT), Rik Wanninkhof (IOCCP) | |
| 53 | ACTION: Encourage participation of relevant networks in the Ship Owners Forum, (OCG-7) | JCOMMOPS, SOT, IOCCP | | |
| 54 | ACTION: Provide Indian Ocean summary of observing activities for IIOE2 (during May) | JCOMMOPS | | |

8.3 Seek to assure the growth and continuity of the JCOMMOPS service, and its relationship with the NOAA OSMC.

As the JCOMMOPS activity grows, we need to ensure that effective planning and oversight is in place to ensure the observing community gets maximum benefit from this coordination research, and also the JCOMMOPS team have clarify on their work plan and priorities going forward. In addition, we need to ensure effective coordination and communication between JCOMMOPS and OSMC, and ensure there is a clear separation/hand off of activities.

To foster communication across JCOMMOPS partners and to assist the smooth running of JCOMMOPS, financial and administrative support should be considered as part of the JCOMMOPS 'common infrastructure.

| | | | | |
|----|---|-------------|--------|---------------|
| 55 | ACTION: One financial report on JCOMMOPS incomings/outgoings to be provided to all networks annually. Initial report will be delivered by (?) | Secretariat | Albert | ? |
| 56 | ACTION: JCOMMOPS to map proposed activities for Brest funds against JCOMM Vision/Objectives (JCOMMOPS, by next JCOMMOPs Round table). | JCOMMOPS | | end May 2015. |

JCOMM Meeting Report No. 121, ANNEX IV

| | | | | |
|----|---|--------------------------|---|---------------|
| 57 | ACTION: Proposal for 'common infrastructure' activities to be developed by JCOMMOPS/Secretariat for discussion with panel executive groups, and approval at a future JCOMMOPS round table. To include: admin/finance support, IT activities, OSMC and JCOMMOPS cooperation. | JCOMMOPS, Secretariat | | end May 2015. |
| 58 | ACTION: Drifter program to work with JCOMMOPS for deployment planning in conduction with other network deployment opportunities. | DBCP, JCOMMOPS, | ? (DBCP Drifters), Champika Gallage, Martin Kramp (JCOMMOPS) | Ongoing |

9 Summary of Work Plan actions as of 2015:

The Work Plan actions for 2015 are summarized in the table below. An online version of this table, where progress will be updated periodically, is available [here](#).

| | Action/Recommendation | Responsible Panel(s) | Responsible panel member | Deadline/Status |
|---|--|--|--|-----------------|
| 1 | ACTION: Work with OOPC to plan a Workshop on improve framing/designing OSEs (modeling and statistical) to inform Observing System Design. | Secretariat | Katy | Early 2016 |
| 2 | ACTION: OCG to strengthen connection to ETOOFs, and invite Gumei Liu (contact point for for Ocean Applications of RRR) to the next OCG meeting. | Secretariat | Etienne | OCG-7 |
| 3 | RECOMMENDATION: Guimei Liu to consult with OCG when preparing input and recommendations to the EGOS IP and RRR. | Secretariat | Etienne | ? |
| 4 | ACTION: OCG to keep the WIGOS developments under review, and adjust the JCOMM contribution to WIGOS accordingly (including updating the above table as needed) | OCG Co-Chairs, representatives with link to WMO. | David Meldrum, supported by Jon Turton and Sarah North | |
| 5 | Recommendation: All networks to take full advantage of upcoming and planned workshops (see list/appendix) and regional activities (e.g. WCRP Sea Level Conference, TPOS, AtlantOS, etc) to revisit and update requirements and targets and incorporate these updates into GCOS implementation plan update process. | All Panels | Various depending on regional interests | Ongoing |
| 6 | ACTION: Secretariat to recommend dedicated observing session at WCRP Sea Level Conference. | Secretariat | Albert | TBD in 2016 |
| 7 | ACTION: Network Specifications to be developed with clear Network Targets by October. Network Specs to be updated by Secretariat, and sent to the Network representatives for checking. | All Panels | ? | by October 2015 |
| 8 | ACTION: Argo to discuss, improving strategy for communication/consultation of the Argo network targets with the community. Clearly articulated targets in the Network Specification should be part of this strategy. | Argo | Howard Freeland | by October 2015 |
| 9 | ACTION OCG to work with IOCCP/GOOS Biogeochemistry (GO-SHIP, Underway) to set initial 'no regrets' targets for key Carbon networks (ahead of the GCOS IP). | IOCCP | Toste Tanhua, Rik Wanninkhof | by end 2015 |

JCOMM Meeting Report No. 121, ANNEX IV

| | | | | |
|----|---|------------------|-----------------------------------|-----------------|
| 10 | ACTION: OceanSITES, to clarify missions, rationale, targets for components of the observing network (for example Flux Reference Sites, Transport Arrays, Multidisciplinary Timeseries (and Tropical Moored Buoys). (October 2015) | OceanSITES | Bob Weller, Uwe Send | by October 2015 |
| 11 | ACTION: Clarity needed on relationship and division between DBCP and OceanSITES | DBCP, OceanSITES | John Turton, Uwe Send, Bob Weller | by OCG-7 |
| 12 | ACTION: GLOSS to improve clarify definition of missions and targets for the network | GLOSS, JCOMMOPS | Gary Mitchum, | by October 2015 |
| 13 | ACTION: IOCCP, DBCP to establish a discussion with BGC Moorings operators, with potential for greater coordination and connection into OceanSITES, DBCP (What they are, whether they have a home, whether they need one) | DBCP, IOCCP | (DBCP), Laura Lorenzoni? (IOCCP) | DBCP XX |
| 14 | ACTION: OCG Co-Chairs to consider how best to strengthen/broaden connections between IOCCP and OCG, particularly where common platforms are used (or could be used). DONE! | OCG, IOCCP | David Legler, David Meldrum | OCG-7 |
| 15 | ACTION: IOCCP to address DBCP-XX on new sensors (USVs, BGC Drifters, etc). | DBCP, IOCCP | ? | DBCP XX |
| 16 | ACTION: ToR and Membership for an international Glider Steering Team to be proposed and submitted by 15 June 2015, and point of contact to be nominated. | EGO | ? | |
| 17 | ACTION: OCG requests glider community to continue to develop a common approach to data processing, data model, and quality-review processes. Draw on Argo Experience | EGO | data management contact? | ? |
| 18 | RECOMMENDATION: OCG requests OOPC and GOOS to engage glider community (POC-TBD) in upcoming workshops and activities where gliders could be part of the observing strategy (i.e. TPOS 2020, IIOE2, Boundary Currents. | OOPC | ? | Ongoing |
| 18 | ACTION: Prepare strategy on how to respond to the glider/EEZ issue in case the issue pops up. Draw on Argo Experience. | EGO, Secretariat | ? | ? |
| 19 | ACTION: Networks to provide details of their succession planning: timeline for rotation of chairs, strategy for bringing through new community leaders | All Panels | | OCG-7 |
| 20 | RECOMMENDATION: Continue to convey the submarine cable initiative to other forums as | Co-Chairs | David Meldrum | Ongoing |

JCOMM Meeting Report No. 121, ANNEX IV

| | | | | |
|----|---|--|---|-------------|
| | appropriate. Identify someone to present Green Cables initiative to IIOE2. | | | |
| 21 | ACTION: Teleconferences to be organized network by network to discuss indicators, and role of JCOMMOPS for developing observing network indicators (Drifting platforms, Ship Based, Moorings (Network reps, JCOMMOPS, Kevin). | Secretariat to coordinate | ? Rep needed for each network | ? |
| 22 | ACTION: Each network tracking use of observations to provide feedback to the Secretariat on what activities they have in this regard (Network Chairs; asap). | All Panels | ? | ASAP |
| 23 | ACTION: Variable Metrics: develop subsurface pilot variable metrics: T(z) (Kevin, Steve Worley to report to OOPC) | OOPC, OSMC | Kevin O'Brien, Steve Worley | OOPC-19 |
| 24 | ACTION: Collate risks to observing system identified in Network Reports (secretariat, during May, ahead of GOOS SC, WMO Congress). | Secretariat to coordinate | Katy Hill | by 25th May |
| 25 | ACTION: China RMIC to draft Template for future activities in the development of ocean observations and marine meteorological standards (calibration, intercomparison, data standards, etc), for discussion/approval at OCG (China RMIC to discuss requirements with David Meldrum, Secretariat). | China RMIC, OCG Co-Chairs, Secretariat | David Meldrum, Etienne Charpentier | ? |
| 26 | ACTION: JCOMM OCG requests the China RMIC consider existing best practice documentation within Network (e.g. GO-SHIP) , and engaging in international community best practice activities (e.g. QUARTOD, SCOR Working Groups for Oxygen, Nutrients, etc.) | China RMIC | | ? |
| 27 | ACTION: Networks to identify best practice docs P.O.C. for best practice of documentation (should be in (by ...) | All Panels | ? | ? |
| 28 | ACTION: Workplan – establishing JCOMM traceability system ? this needs to be discussed with OCG management (RMIC/AP & OCG co-Chairs; OCG-6) | OCG Co-Chairs | | |
| 30 | ACTION: OCG encourages China RMIC Work to be presented to WESTPAC, NEAR-GOOS, SEA-GOOS (China RMIC) | RMIC | | |
| 31 | RECOMMENDATION: JCOMM Task Team on Table Driven Codes works with EGO to develop BUFR template for glider data which draws out biogeochemical data from NetCDF Files (Jon Turton, | EGO, JCOMM DMBP | Jon Turton, David Berry, (DM POC for EGO) | |

JCOMM Meeting Report No. 121, ANNEX IV

| | | | | |
|----|--|--|--|--------------------------------------|
| | David Berry). | | | |
| 32 | RECOMMENDATION: Keeley actions for DBCP. TT DM, TOP, and OceanSITES to respond, report on progress for next DBCP meeting in October. | EGO, JCOMM DBCP | Jon Turton, David Berry, (DM POC for EGO) | |
| 33 | ACTION: DBCP to provide a summary of strategy for development and completeness of Metadata records for the components of DBCP at next OCG meeting. (DBCP DM TT) | DBCP | John Turton, Champika Gallage | DBCP XX Session, October 2015 |
| 34 | ACTION: Unique IDs (WIGOS Identifiers) to be developed for all ocean observing platforms. Plan needed for how this will be done, and who will be engaged (JCOMMOPS in cooperation with WIGOS) | JCOMMOPS, WIGOS | Mathieu Belbeoch, Martin Kramp, | Timeframe? |
| 35 | RECOMMENDATION: Unique IDs for Data records: topic for discussion a future meeting (after platform unique IDs). | Co-Chairs, Secretariat | David Legler, David Meldrum, Katy Hill, Etienne Charpentier. | OCG-7 Session. |
| 36 | RECOMMENDATION: OCG is strongly supportive of the data integration activity using ERDDAP and led by OSMC. OCG strongly encourages the networks to work with OSMC to support this activity and establish ERDAP servers on their GDACs. | All Panels | Data Management | Follow up at OCG-7. |
| 37 | ACTION: OCG Encourages ERDDAP to be presented at relevant upcoming panel meetings, fora and conferences. Invitation for presentation of ERDDAP at the DBCP scientific and Technical Symposium (invitation from DBCP chair to OSMC). | OSMC DBCP | Kevin O'Brien Jon Turton/Champika Gallage | Ongoing. DBCP XX October 2015 |
| 38 | ACTION: Small team: to develop activity outline, vision for implementation of ERDDAP. Kevin O'Brien (OSMC), Steve Worley (OOPC), Mathieu Belbeoch (JCOMMOPS), Etienne Charpentier (WMO), Benjamin Pfeil (Carbon). | OOPC, IOCCP, OSMC, JCOMMOPS, Secretariat | Steve Worley, Benjimin Pfeil, Kevin O'Brien, Mathieu Belbeoch, Etienne Charpentier | Timeline? |
| 39 | ACTION: OCG to keep OCG up to date on the development of TT-MOWIS, and expectations/benefits of engagement from non-IODE/WMO Data centres and infrastructure. | OCG Representative, Secretariat | ?, Etienne Charpentier | Ongoing |
| 40 | ACTION: Etienne/OCG Representative to keep OCG up to date on the development of the MCDS and on MCDS requirements with regard to the provision of delayed mode data to the MCDS | OCG Representative, Secretariat | ?, Etienne Charpentier | Ongoing |

JCOMM Meeting Report No. 121, ANNEX IV

| | | | | |
|----|---|---|--|--|
| | | | | |
| 41 | RECOMMENDATION: Integration of in situ and remote sensing observations (satellites, HF radars) should be considered as part of upcoming development projects (TPOS 2020, AtlantOS, Boundary Currents/shelf connections) | OOPC | Bernadette Sloyan, Katy Hill | Ongoing |
| 42 | ACTION: OCG to consider having integration of satellite and in-situ data be the thematic focus of a future OCG meeting. | Co-Chairs, Secretariat | | OCG-7 |
| 43 | ACTION Request representation from JCOMM TT Satellite Requirements at next OCG | Co-Chairs, Secretariat | | OCG-7 |
| 44 | ACTION: GO-SHIP to discuss inclusion of GO-SHIP underway data, including shipboard ADCP in GOSUD. | GO-SHIP | ? | |
| 45 | ACTION: GO-SHIP to approach data centres to seek home for LADCP (and ancillary data) | GO-SHIP | ? | |
| 45 | RECOMMENDATION: Future JCOMMOPS Round tables to be focused on a specific topics. | Secretariat | | Ongoing |
| 46 | ACTION: Set timetable for quarterly roundtable telecons, and focus topics | Secretariat, Co-Chairs | Katy Hill | Ongoing |
| 47 | ACTION: OCG Co-Chairs/Secretariat/JCOMMOPS to revisit JCOMMOPS terms of reference, and update for discussion (for discussion at OCG-7, Approval at JCOMM-5). | OCG Co-Chairs, JCOMMOPS, Secretariat | Katy Hill | For Discussion at OCG-7, for approval at JCOMM-5 |
| 48 | ACTION: Next JCOMM Round Table to focus on the budget for Brest funds, and updated JCOMMOPS Work Plan (timeline: during May). | Secretariat, Co-Chairs, JCOMMOPS, | | June 2015 |
| 49 | ACTION: A Future JCOMM Round table to focus in Use metrics. | Secretariat | | |
| 50 | ACTION: JCOMMOPS, EGO, OCG Co-Chairs and IOC/WMO Secretariat to discuss hosting of a Glider TC at JCOMMOPS. | JCOMMOPS, EGO, OCG Co-Chairs, Secretariat | Pierre Testore (EGO) | |
| 51 | ACTION: OCG to advise JCOMMOPS on priorities for engagement of new networks. | OCG Co-Chairs | | |
| 52 | ACTION: Develop Strategy for engaging Shipping Community, capitalizing on JCOMMOPS resources in Brest: Harmonisation of terminology for SOOP/VOS, technology, | JCOMMOPS, SOT, IOCCP | Martin Kramp (JCOMMOPS), ? (SOT), Rik Wanninkhof (IOCCP) | |

JCOMM Meeting Report No. 121, ANNEX IV

| | | | | |
|----|---|-----------------------|--|---------------|
| 53 | ACTION: Encourage participation of relevant networks in the Ship Owners Forum, (OCG-7) | JCOMMOPS, SOT, IOCCP | | |
| 54 | ACTION: Provide Indian Ocean summary of observing activities for IIOE2 (during May) | JCOMMOPS | | |
| 55 | ACTION: One financial report on JCOMMOPS incomings/outgoings to be provided to all networks annually. Initial report will be delivered by (?) | Secretariat | Albert | ? |
| 56 | ACTION: JCOMMOPS to map proposed activities for Brest funds against JCOMM Vision/Objectives (JCOMMOPS, by next JCOMMOPs Round table). | JCOMMOPS | | end May 2015. |
| 57 | ACTION: Proposal for 'common infrastructure' activities to be developed by JCOMMOPS/Secretariat for discussion with panel executive groups, and approval at a future JCOMMOPS round table. To include: admin/finance support, IT activities, OSMC and JCOMMOPS cooperation. | JCOMMOPS, Secretariat | | end May 2015. |
| 58 | ACTION: Drifter program to work with JCOMMOPS for deployment planning in conduction with other network deployment opportunities. | DBCP, JCOMMOPS, | ? (DBCP Drifters), Champika Gallage, Martin Kramp (JCOMMOPS) | Ongoing |

10 Priorities and timeline of activities.

- 2015: Finalise Network Specs (Clear Targets),
Initial BGC 'No Regrets' Network Targets
Network Metrics development
- 2016: **GCOS IP (OOPC Lead: drawing on Variable and Network Specifications),**
Possible workshop/activity on Designing/Framing OSEval Experiments?
WCRP Conference on Sea Level,
Possible workshop: Boundary Currents?,
- 2017: JCOMM-5 Initial input (March)
JCOMM-5, (November)
Initial Outcomes: TPOS 2020 Backbone TT (TP Design),
- 2018
- 2019: **OceanObs19 (Sept)**

Appendix IV: Acronym list

ABE-LOS IOC Advisory Body on the Law of the Sea
ACCESS African Centre for Climate and Earth System Science
ADB AOML Data Buoy
ADOS Autonomous Drifting Ocean Station
AG DBCP Action Groups
AIC Argo Information Center
ALD UNESCO Appointment of Limited Duration
AOML NOAA Atlantic Oceanographic and Meteorological Laboratory (USA)
AP Air Pressure
Argo Argo Profiling Float Pilot Project
ASCLME Agulhas and Somali Current Large Marine Ecosystems
AST Argo Steering Team
ATLAS Autonomous Temperature Line Acquisition System
BAS British Antarctic Survey
BOM Bureau of Meteorology (Australia)
BUFR FM 94 BUFR GTS format: Binary Universal Form for Representation of meteorological data
BUOY FM 18 BUOY GTS format: Report of a buoy observation
CB Capacity-Building
CBS Commission for Basic Systems (WMO)
CCHDO CLIVAR and Carbon Hydrographic Data Office
CCI Commission for Climatology (CCI)
CDIP Coastal Data Information Program
CDMP Climate Database Modernization Programme (USA)
Cg Congress (WMO)
CIMO Commission on Instruments and Methods of Observation (WMO)
CLIVAR Climate Variability and Predictability (WCRP)
CLS Collecte Localisation Satellites (France)
CMR Christian Michelsen Research (Norway)
CONOPS WIGOS Concept of Operations
CRREL *Cold Regions Research and Engineering Laboratory (USA)*
CSV Comma Separated Values format
DAR Data Discovery, Access and Retrieval service (WMO WIS)
DART Deep-ocean Assessment and Reporting of Tsunami (buoy)
DB Data Buoy
DBCP Data Buoy Co-operation Panel (WMO-IOC)
DB-TAG E-SURFMAR Data Buoy Technical Advisory Group
DCP Data Collection Platform
DCPC Data Collection and Production Centres (WMO WIS)
DCS Data Collection System
DMCG Data Management Coordination Group (JCOMM)
DMPA Data Management Programme Area (DMPA)
EB DBCP Executive Board
EBD Equivalent Buoy Density
EC Executive Council
ECMWF European Centre for Medium-Range Weather Forecasts
EEZ Exclusive Economic Zone
EIG Economic Interest Group
EUMETNET Grouping of European Meteorological Services
EOV Essential Ocean Variable
ER Expected Result
E-SURFMAR Surface Marine programme of the Network of European Meteorological Services, EUMETNET
ET/AWS CBS / IOS Expert Team on Requirements for Data from Automatic Weather Stations (WMO)

ETCCDI joint CLIVAR / CCI / JCOMM Expert Team on Climate Detection and Indices
ET/DRC CBS Expert Team on Data Representation and Codes (WMO)
ET/EGOS CBS / IOS Expert Team on the Evolution of the Global Observing System (WMO)
ETDMP Expert Team on Data Management Practices (JCOMM)
ETMC Expert Team on Marine Climatology (JCOMM)
ETSI Expert Team on Sea Ice (JCOMM)
ETWS Expert Team on Wind Waves and Storm Surge (JCOMM)
EUMETNET Network of European Meteorological Services
EUMETSAT European Organization for the Exploitation of Meteorological Satellites
EuroSITES European integrated network of open ocean multidisciplinary observatories
FAD Fish Aggregation Device
FAO Food and Agriculture Organization
FG First Guess Field
FOAM Forecasting Ocean Assimilation Model (United Kingdom)
GCC Global Collecting Centre (of MCSS)
GCOS Global Climate Observing System
GDAC Global Data Assembly / Acquisition Centre
GDP Global Drifter Programme
GEO Group on Earth Observations
GEOSS Global Earth Observation System of Systems
GFCS Global Framework for Climate Services
GHR SST GODAE High-Resolution SST Pilot Project
GIS Geographical Information System
GISC Global Information System Centres (WMO WIS)
GLOSS Global Sea-level Observing System (JCOMM)
GODAE Global Ocean Data Assimilation Experiment (GOOS)
GOOS Global Ocean Observing System (IOC, WMO, UNEP, ICSU)
GOS Global Observing System (WMO)
GPS Global Positioning System
GPSRO GPS Radio Occultation
GSOP CLIVAR Global Synthesis and Observations Panel
GSM Global System for Mobile Communications
GSSC GOOS Scientific Steering Committee
GTS Global Telecommunication System (WWW)
HMEI Association of Hydro-Meteorological Equipment Industry
HRPT High Resolution Picture Transmissions
HRSST DBCP/GHR SST High Resolution SST Pilot Project
IABP International Arctic Buoy Programme
IBPIO International Buoy Programme for the Indian Ocean
ICG Intergovernmental Coordination Group
ICG/IOTWS ICG for the Indian Ocean Tsunami Warning and Mitigation System (IOC)
ICOADS International Comprehensive Ocean-Atmosphere Data Set (USA)
ICSU International Council for Science
ICT-IOS CBS Implementation / Coordination Team on the Integrated Observing System
ICTT-QMF Inter Commission Task Team on Quality Management Framework
ID Identification Number
IGDDS Integrated Global Data Dissemination Service (satellite)
I-GOOS Intergovernmental IOC-WMO-UNEP Committee for GOOS
IHO International Hydrographic Organization
IMB Ice Mass Balance
IMEI International Mobile Equipment Identity
IMO International Maritime Organization
InaGOOS Indonesian Global Ocean Observing System
IndOOS Indian Ocean Observing System
IOC Intergovernmental Oceanographic Commission (of UNESCO)
IOCCP International Ocean Carbon Coordination Project
IODE International Oceanographic Data and Information Exchange (IOC)

IPAB WCRP-SCAR International Programme for Antarctic Buoys
IPP Iridium Pilot Project
IPY International Polar Year (2007-2008)
ISABP International South Atlantic Buoy Programme
ISDM Integrated Science Data Management (formerly MEDS, Canada)
ISO International Organization for Standardization
IT Information Technology
ITP International Tsunameter Partnership
ITT Invitation To Tender
JAMSTEC Japan Agency for Marine-Earth Science and Technology
JCOMM Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JCOMM-III Third Session of JCOMM (Marrakech, Morocco, 4-11 November 2009)
JCOMMOPS JCOMM *in situ* Observations Programme Support Centre
JTA Joint Tariff Agreement (Argos)
KML Keyhole Markup Language
LOI Letters of Intent
LUT Local User Terminal (Argos)
MAN JCOMM Management Committee
MCSS Marine Climatological Summaries Scheme
MDT Modelling Development Team
MEDS Marine Environmental Data Service (Canada, now ISDM)
META-T Water Temperature instrument/platform Metadata Pilot Project (JCOMM)
METOP Meteorological Operational satellites of the EUMETSAT Polar System (EPS)
MOFS Met-Ocean Forecasts and Services
MOI Mauritius Oceanography Institute
MOU Memorandum of Understanding
MSC Meteorological Services of Canada
NAVOCEANO Naval Oceanographic Office (USA)
NC National Centres (WMO WIS)
NCDC NOAA National Climatic Data Center (USA)
NCEP NOAA National Center for Environmental Prediction (USA)
NCOSM National Centre of Ocean Standards and Metrology (China)
NDBC NOAA National Data Buoy Center (USA)
NESDIS NOAA National Environmental Satellite Data and Information Service (USA)
NFP National Focal Point
NIOT National Institute of Ocean Technology (India)
NMDIS National Marine Data and Information Service (China)
NMHS National Meteorological and Hydrological Service
NOAA National Oceanic and Atmospheric Administration (USA)
NODC National Oceanographic Data Centre
NPDBAP DBCP-PICES North Pacific Data Buoy Advisory Panel
NPOESS National Polar-orbiting Operational Environmental Satellite System (USA)
NSF National Science Foundation (USA)
NWP Numerical Weather Prediction
NWS NOAA National Weather Service (USA)
OceanSITES OCEAN Sustained Interdisciplinary Timeseries Environment observation System
OCG Observations Coordination Group (JCOMM)
OCO NOAA Office of Climate Observation (USA)
ODAS Ocean Data Acquisition Systems
ODASMS ODAS Metadata Service (operated by China on behalf of JCOMM)
ODINAFRICA Ocean Data and Information Network for Africa (IODE)
ODP Ocean Data Portal (IODE)
ODT Observation Development Team
OGP Oil and Gas Producers
OOPC Ocean Observations Panel for Climate (GCOS-GOOS-WCRP)
OPA Observations Programme Area (JCOMM)
OPAG Open Programme Area Group

OPAG-IOS CBS OPAG on the Integrated Global Observing System
OPSC Observing Programme Support Centre
OPSCOM Argos Operations Committee
OSE Observing System Experiment
OSMC NOAA Observing System Monitoring Center (USA)
PA Programme Area (JCOMM)
PANGEA Partnerships for New GEOSS Applications
PGC Principal GTS Co-ordinator (DBCP)
PICES North Pacific Marine Science Organization
PICO Panel for Integrated Coastal Observations
PIRATA Pilot Research Moored Array in the Tropical Atlantic
PMEL NOAA Pacific Marine Environmental Laboratory (USA)
PMO Port Meteorological Officer
PMOC Principal Meteorological or Oceanographic Centres responsible for quality control of buoy data (DBCP)
PMT Platform Messaging Transceivers
POGO Partnership for Observation of the Global Oceans
PP-WMD Pilot Project on Wave Measurement from Drifters
PP-WET JCOMM Pilot Project on Wave measurement Evaluation and Test from moored buoys
PTT Platform Transmitter Terminal (Argos)
QA Quality Assurance
QC Quality Control
QMF WMO Quality Management Framework
QMS Quality Management Systems
RAMA Indian Ocean Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction
RMICWMO-IOC Regional Marine Instrument Centre
RMS Root Mean Square
RNODC Responsible Oceanographic Data Centre (IODE)
RNODC/DB RNODC for Drifting Buoys
RRR Rolling Review of Requirements
RTMC VOSClm Real-Time Monitoring Centre
RUDICS Iridium Router-Based Unrestricted Digital Interworking Connectivity Solution
RV Research Vessel
SADC South African Development Community
SAMS Scottish Association for Marine Science
SAT Site Acceptance Test
SAWS South African Weather Service
SBD Short Burst Data (Iridium)
SC Steering Committee
SCAR Scientific Committee on Antarctic Research
SCG Services Coordination Group (JCOMM)
SeaDataNET Pan-European infrastructure for Ocean & Marine Data Management
SFSPA JCOMM Services and Forecasting Systems Programme Area
SIA Seasonal to Inter-annual Forecast
SIO Scripps Institution of Oceanography (University of California, USA)
SLP Sea Level Pressure
SMOS Soil Moisture and Ocean Salinity mission
SOBP Southern Ocean Buoy Programme
SOC Specialized Oceanographic Centre (JCOMM)
SoG Statements of Guidance
SOOP Ship-Of-Opportunity Programme
SOOPIP SOOP Implementation Panel (JCOMM)
SOT Ship Observations Team (JCOMM)
SPA JCOMM Services Programme Area (now SFSPA)
SSA WMO Special Service Agreement
SSG Scientific Steering Group

SST Sea-Surface Temperature
STIP Stored Tiros Information Processing
SVP Surface Velocity Programme (of TOGA and WOCE, replaced by GDP) drifter
SVP-B SVP barometer drifter
SVP-BS SVP drifter with salinity
SVP-BTC SVP drifter with temperatures in depth
SVP-BW SVP barometer and wind at a drifter
TAO Tropical Atmosphere Ocean Array
TC Technical Co-ordinator
TD Technical Document
TIP Tiros Information Processing
TIP Tropical Moored Buoys Implementation Panel
TOGA Tropical Atmosphere and Global Ocean programme
TOWS-WG Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems
TRITON Triangle Trans-Ocean buoy network
TT Task Team
TT-CB DBCP Task Team on Capacity-Building
TT-DM DBCP Task Team on Data Management
TT-MB DBCP Task Team on Moored Buoys
TT-IBP DBCP Task Team on Instrument Best Practices & Drifter Technology Developments (merged the TT-QM & TT-TD)
TT-QM DBCP Task Team on Quality Management (now merged into TT-IBPD)
TT-TD DBCP Task Team on Technological Development (now merged into TT-IBPD)
TT-TDC DMPA Task Team on Table Driven Codes
UN United Nations
UNESCO UN Educational, Scientific and Cultural Organization
UNFCCC United Nations Framework Convention on Climate Change
URL Uniform Resource Locator
USA United States of America
USD United States Dollar
VAR Value Added Reseller
VOS Voluntary Observing Ship (JCOMM)
VOSClm VOS Climate Project
WCRP World Climate Research Programme
WCC-3 World Climate Conference 3
WDIP WIGOS Test of Concept Development and Implementation Plan
WDIS WIGOS Development and Implementation Strategy
WIGOS WMO Integrated Global Observing System
WIS WMO Information System
WMO World Meteorological Organization (UN)
WOCE World Ocean Circulation Experiment
WWW World Weather Watch (WMO)
XBT Expendable BathyThermograph
WML Extensible Markup Language

[this page left blank intentionally]