



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

**OBSERVATIONS
COORDINATION GROUP
SEVENTH SESSION**

Esporles, Mallorca, SPAIN

4 to 6 April 2016

FINAL REPORT

2016

JCOMM Meeting Report No. 126

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United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission

JCOMM OBSERVATIONS COORDINATION GROUP SEVENTH SESSION

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NOTES

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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).

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GENERAL SUMMARY OF THE WORK OF THE OCG-6 SESSION

The Seventh session of the JCOMM Observations Coordination Group was held at IMEDEA in Esporles, Majorca, at the kind invitation of the Mediterranean Institute for Advanced Studies (IMEDEA) and Balearic Islands Coastal Observing and Forecasting System (SOCIB). The meeting was held overlapping with the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC).

1. ORGANIZATION OF THE SESSION

1.1. Opening of the Session

The seventh 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 the 4th April.

Dr Joaquin Tintore, Director of SOCIB, and representing IMEDEA and Ms Maria Jose Guerrero from the Spanish National Institute of Meteorology, (AEMET) welcomed the participants to the Session on behalf of the government of Spain.

On behalf of the Secretary-General of the WMO, Mr Petteri Talaas, 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 Esporles. The Spanish Government, and IMEDEA/SOCIB for organizing the OCG Session.

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 review of the OCG work plan targeting progress towards two major events during the next 5 years: JCOMM-V and Oceanobs'19. These activities will provide OCG opportunities to convey the value of observations to JCOMM and put forth an updated vision for JCOMM observations for the future. Of course JCOMM will require support and resources to support new activities in support of its vision. The overlapping session with OOPC focused on the development of network specifications, and particularly the network based actions to go into the GCOS Implementation Plan under development in 2016. 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 updated 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-7.

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.

1.4. JCOMM OCG Workplan

The JCOMM OCG Workplan formed the basis of the Agenda, with focussed discussions on how to progress activities capitalising on cross network synergies in the areas of Requirements, Implementation (focussed on activities of the networks, engaging new networks and GRAs), JCOMMOPS, Best Practices, Data Management and Integration. As JCOMM-5 is coming up in 2017, this was also a substantial focus of discussion.

Implementation: Reports from the networks, Other observing coordination activities

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

- Brief update on status and activities since OCG-6.
- Progress towards OCG work plan objectives, actions,
- Development and report on Metrics: implementation, delivery, risks, impact (publications/outputs).

These written reports can be found on the meeting website, www.jcomm.info/ocg-7. The presentations were focussed on the forward look, and issues for discussion at OCG. The co-chairs thanked the networks for their thorough reports. Issues were raised and discussed in the context of the work plan.

1.5. Joint day: JCOMM OCG and OOPC

The day focussed on the status and development of the Essential Ocean Variable (EOV) Specifications and Network Specifications, which are the building blocks of GOOS planning (the strategic mapping) and reporting through various avenues, including the GCOS Implementation Plan. The EOV and Network Specifications were drawn on to write the ocean section of the GCOS Implementation Plan, including articulating requirements for ECVs and ECV based actions (what we want to deliver) network specifications, particularly network missions and targets were used to develop network based actions. The joint day discussions fed directly into the OOPC meeting (see www.ioc-goos.org/oopc19). The GCOS Implementation Plan will be out for public review over the summer.

2. REVIEW OF THE OCG-7 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).

Next OCG Meeting.

The timing and location of the next OCG meeting requires further discussion.

3. CLOSURE OF THE SESSION

The Chair congratulated the Group for the meeting's achievements. They thanked the IMEDEA 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 IMEDEA, the OCG Chair, and the participants of the meeting for their contributions to this Session and the activities of the JCOMM Observations Programme Area (OPA).

ANNEX I

AGENDA

Monday 4th April 2016

Organization of the Session, Priorities

Opening and welcome (OCG Chair, Local Hosts, JCOMM co-president, Nadia)

Opening remarks will cover preparation of JCOMM-5, expectations of OCG, review focus, structure of JCOMM Programme Areas, and identification of deliverables to JCOMM-5

1.1 Adoption of the agenda

1.2 Working arrangements

Requirements (GCOS, GOOS, JCOMM Services)

GCOS Implementation Plan drafting process and status, role of EOVS Specifications, Network Specifications requirements for inputs from OCG (Bernadette Sloyan, OOPC co-chair)

JCOMM services, priorities, emerging areas, requirements, products (Nick Ashton)

WMO Integrated Global Observing System (WIGOS), activities, priorities for engagement. and Rolling Review of Requirements (RRR) (Guimei Liu, Jon Turton).

Discussion :

2.1.1 Requirements changes since 2010

2.1.2 Change/refinement of network targets

2.1.3 Ready to move to EOVS/ECV targets and how?

Implementation (development of network Specifications, clear missions and Targets)

Review progress by current networks: risk assessment, action items, metrics etc

Progress in establishing Glider Network (Pierre Testor)

IOCCP: Progress in developing network targets, performance metrics, activity relevant to OCG Work Plan; request for coordination help from JCOMMOPS

TPOS 2020: New requirements, technology, interim plan, transition-Implications for JCOMM (Katy/David)

4 Revisit JCOMM-V :

SWOT analysis of current JCOMM structure and activities,

OCG contributions, including proposed changes to organization (Nadia/David)

Tuesday 5th April

1. Review outstanding MAN-12 and OCG-6 Actions

Coastal networks engagement in JCOMM

6.1. GRAs, coordination of coastal observing networks, synergies with OCG work plan (Glenn Nolan)

6.2. IMEDEA/SOCIB Activities (Joaquim Tintore, Ananda Pascual)

6.3. HF Radar (Hugh Roarty)

6.4. Discussion: recommendations, actions to foster engagement with coastal networks and GRAs

Engagement of other observing networks

7.1. Revisit list of networks of potential interest with OCG

- 7.2. Review engagement strategy towards targeted networks/observing efforts
- 7.3. Possible actions for OCG

JCOMMOPS and Network Metrics.

- 8.1. Review progress on JCOMMOPS work plan, new website, metrics development (Mathieu Belbeoch)
- 8.2. Review of Network Metrics/Targets in Network Specifications
- 8.3. Feedbacks and discussions

Best Practices (see draft Vice Chair TORs)

Vision for OCG best practices (OCG co-chair, Albert)

Data Management and Integration (see draft Vice Chair TORs)

- 10.1. Data integration progress, connections to other activities (Steve Worley, Kevin O'Brien)
- 10.2. Links to JCOMMOPS (Kevin, Mathieu)
- 10.3. Product development (David Legler, Nick Ashton)
- 10.4. Connections to DMPA, TT-MOWIS (Steve Worley, David Legler?)
- 10.5. Open access to GTS project (David)
- 10.6. Way forward

JCOMM-5 Revisited.

- 11.1. Proposals for change: structure, emphasis, integration and process
- 11.2. Next steps to develop proposals for JCOMM-V
- 11.3. OCG governance – identifying additional co-chairs

12. OCG-7 Wrap up

Wednesday 6th April Joint day of OCG and OOPC

J1: Observational Requirements

- J1.1 High level drivers for sustained ocean observations and context for the GCOS IP, GOOS (Albert, Mark Dowell)
- J1.2 Draft GCOS IP Ocean Section Action Items (Bernadette)
- J1.3 Discussions: consequences for EOVs/ECVs, requirements of networks, requirements of and need for network specification sheets

J2: Network missions/targets

- J2.1 Review of Draft GCOS IP 2016 Action Items
- J2.2 Emerging networks and technologies (OCG chair, Glenn Nolan)
- J2.3 Progress in developing initial “no regrets” targets for biogeochemistry? (Maciej Telszewski)
- J2.4 Develop methods/techniques to enable reporting against action items
 - J2.4.1 JCOMMOPS
 - J2.4.2 Data Management
 - J2.4.3 Metadata requirements

ANNEX II

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ANNEX III**ACTIONS FROM OCG-7**

Number	Action	Leads	Timeline/Deadline
1. JCOMM-5			
	JCOMM-5 Session, October 2017; Chairs will distill conversation, suggestions, and identity input to be provided to MAN-13. ;	Chairs	MAN-13 (Oct 2016)
2. Requirements			
1	ACTION: Bob Weller to look at the Sensible and Latent Heat Fluxes EOVS Specification: should this include radiative fluxes? (Shortwave/longwave). For discussion/agreement with Mark Bourassa	Bob Weller, Mark Bourassa	2nd May
2	ACTION Nick Ashton, Bob Weller, Jon Turton to look at Swail et al. document on requirements for Wave Observations. Draft suggestions to scope a possible Waves obs workshop to reconcile expressed wave requirements vs possible observations, and recommend OCG observing activities in OCG (proposal to be circulated for discussion at upcoming Roundtable and presentation at JCOMM MAN, October 2016).[KH1]	Nick Ashton, Bob Weller, Jon Turton, Val Swail	MAN-13
3	ACTION: RRR and EOVS specifications should be as consistent as possible; and, communications between OCG/OOPC and RRR not ideal to encourage consistency. OOPC/OCG is updating requirements. RRR to be sent updated EOVS specification sheets and asked to identify major differences for discussion by OOPC/OCG (Guimei Liu).	Guimei Liu	OOPC-20, OCG-8
4	RECOMMENDATION (OOPC/GOOS SC/OCG): Requirements setting and development activities need continued discussion to insure requirements reflect inputs from developmental projects such as. TPOS 2020, DOOS, OOPC planned BCs activity. Moreover, the requirements need constant attention and review by OOPC, OCG, WMO/RRR, etc. (Secretariats to encourage dialogue amongst groups, and further develop and document, improved transparent processes GOOS and OOPC and OCG are using regarding requirements)	OOPC	
3. Networks.			
Argo			
5	RECOMMENDATION: OOPC to consider status of Argo pilot activities, role in multiplatform mix for key phenomena (this is being pursued through TPOS 2020, Boundary Currents/shelf seas activities).	OOPC	

	6	RECOMMENDATION: Ensure planning for Argo pilots is informed by activities in TPOS 2020, EMODNET, AtlantOS, etc.	Argo ST	Ongoing
	7	RECOMMENDATION: OCG to assess and encourage increased consistency of data parameters, conventions, and metadata standards across networks to enhance integration and interoperability (Address in part through Data Management interoperability pilot activity, best practices documentation, and through an agenda item at OCG-8: chairs to monitor progress).	OCG Chairs.	
DBCP/OceanSITES				
	8	DECISION: OCG accepts proposal that OceanSITES is a Community of Practice and are welcomed to continue participating in OCG meetings and activities (chair to communicate).	OceanSITES Chairs/OCG Chair	OceanSITES (April 2016)
	9	ACTION: Clarify relationship between OceanSITES and DBCP as overlapping activities, including areas of collaboration/commonality. OceanSITES are encouraged to engage in DBCP to improve best practices and share technologies, etc. (OCG and DBCP Chairs and OceanSITES Co-Chairs to discuss at upcoming meetings: OceanSITES April 2016, DBCP 32, October 2016).	DBCP, Ocean SITES Co-Chairs to discuss at upcoming meetings	OceanSITES (April 2016), DBCP (October 2016)
	10	RECOMMENDATION: In the absence of OceanSITES plans motivating time series observations, or identifying the requirements that sensors on moorings are addressing in EOVS specs (e.g. air-sea fluxes and ocean transports), OCG suggests to OOPC (and other GOOS Panels) that through evaluations activities, they engage the research community to develop and synthesize such plans to establish targets for OceanSITES (possibly organizing around air-sea fluxes; transport arrays, regional observing systems and developmental activities (e.g. SOOS, AtlantOS, TPOS, GRAs), and multidisciplinary time series stations)).	OOPC, OceanSITES Co-Chairs	OOPC/ OceanSITES to report on this at OCG-8
GLOSS				
	11	ACTION: JCOMMOPS and GLOSS to discuss timeline for connecting GLOSS metadata information into JCOMMOPS infrastructure	Mathieu Belbeoch, Gary Mitchum	JCOMMOPS Roundtable, May 2016
	12	DECISION: OCG endorses incremental expansion of high-quality GLOSS core network beyond initial slate of stations to other stations that could be improved to meet the higher level of standards.		
	13	ACTION: GLOSS to write a 2-pager, explaining and justifying the expansion, for approval from OCG and discussion with OOPC	Gary Mitchum	OCG-8 (noting OOPC need input this month for GCOS IP).

	14	ACTION: GLOSS to keep OCG and OOPC apprised of changes to GLOSS (OCG-8 GLOSS report)	Gary Mitchum	OCG-8
GO-SHIP:				
	15	RECOMMENDATION: OCG encourages activities to broaden capacity development in support of GO-SHIP, including multinational collaborations for occupying GO-SHIP lines and training activities, leveraging and coordinating with similar programs like POGO.	Bernadette Sloyan, Rik Wanninkhof, Martin Kramp	
Ship Observations Team				
	16	ACTION: Teleconference (SOT Chair, VOS/PMO Coordinators and others) to flesh out issues regarding coordinating ship-board activities to minimize disruption to VOS crew and operators.	Chris Marshall, Martin Kramp,	
	17	ACTION: Multiple Networks are using/would like to use commercial ships as observing platforms (Argo, Drifters, CPR, SOOP-XBT, VOS, pCO ₂ , radiation, etc). There is potential benefit to coordinating, packaging up needs, and coordinating this plan and coordinating engagement with potential ships. An initial telecon will focus on the scope/scale of this issue (Chris Marshall, Sarah North, Rik Wanninkhof, Martin Kramp, to organize discussion during next JCOMMOPS round table, and possible actions to be taken up at SOT meeting (April 2017), and recommendation to OCG-8)	Chris Marshall, Martin Kramp,	SOT (April 2017), Report to OCG-8
Gliders				
	18	Recommendation: OCG very pleased with progress made by Glider group. The glider group to rename their group in response to concerns regarding current acronym.	Pierre Testor	OCG-8
	19	ACTION: Distribute draft glider group TOR and membership to OCG for feedback and approval (OCG secretariat, complete by JCOMMOPS RoundTable call in May)	Secretariat	JCOMMOPS Round Table May 2016
	20	ACTION: OCG to consider and provide feedback on draft proposal for a global array of gliders to observe Boundary Current regions. The proposal includes network specification re. role of Gliders in Global Sustained observing System (as input to OOPC Boundary Currents activity).	OCG Members	June 2016 (ahead of Glider meeting in September 2016)
IOCCP				
	21	ACTION: SOT to discuss/agree including SOOP-CO ₂ as a component of SOT. Report on at next JCOMMOPS roundtable.	Chris Marshall, Sarah North, Rik Wanninkhof, Martin Kramp,	JCOMMOPS Round Table (May 2016)
	22	ACTION: Request JCOMMOPS to work with IOCCP to scope possible IOCCP support at JCOMMOPS, in particular for tracking of observation implementation. Estimates of	JCOMMOPS and IOCCP/Rik and Maciej	

		resources at JCOMMOPS, and potential impacts of proposed IOCCP actions on outstanding activities also needs to be articulated		
TPOS 2020				
	23	ACTION: OCG members to participate in public review of interim plan, mid 2016 (Katy to circulate opportunity later this year).	Secretariat to circulate	Around July 2016
	24	ACTION: OCG members to be kept informed regarding potential role of JCOMM OCG in TPOS 2020 transition activities, including any possible Transition Team task team	Chair, TPOS 2020 Co-Chairs, Secretariat.	
COASTAL: GRA Connection				
	26	ACTION: Discuss how EuroGOOS can assist in release of Data from European Tide Gauges(Gary Mitchum, Glenn Nolan).	Gary Mitchum, Glenn Nolan	
	27	Recommendation: OOPC to engage GRAs re. Open Ocean-Shelf (Boundary Currents) evaluation activity	Bernadette Slovan, John Wilkin to contact GRF Chair	
	28	Recommendation: OOPC to present Boundary Currents activities to GRAs (e.g. Webinar, through a GRA telecom, attendance at a GRF meeting? (action TBD for John))	John Wilkin, Tim Moltmann	
COASTAL: HF Radar				
	29	ACTION: DBCP to consider whether the HF Radar should be considered as part of the DBCP Waves pilot project in part to address questions regarding validation of HF Radar wave information	Jon Turton	DBCP-32, October 2016
	30	RECOMMENDATION: OCG Exec and GEO-HF Radar COP to explore potential for HF Radar to engage in OCG work plan (and related) activities such as:	OCG Chair, Hugh Roarty	OCG-8
		· Standards and best practices (drawing on existing best practices experience and documentation, and potential for OCG to review/approve HF Radar guides)		
		· Calibration/ validation, and quality control by EOVS (i.e. DBCP Waves: PP-WET) (see Action29)		
		· Engaging in the OOPC boundary current activity (action to be discussed with OOPC)		
		· Connection with Services Area (ETWCH/ETOFS) (action to be discussed with SFPA/Nick)		
	31	ACTION: GEO HF Radar COP and JCOMM OCG exec to consider whether JCOMM HF Radar to be proposed as a Joint JCOMM/GEO group.	OCG Chair, Hugh Roarty	OCG-8
	32	ACTION: Review ocean applications section on HF radar in WMO Statement of Guidance	Guimei Liu, Hugh Roarty	OCG-8
7. Engaging new				

networks.			
33	ACTION: Initiate dialogue with animal tracking community to discuss potential for JCOMM OCG engagement.	Sam Simmons	OCG-8
34	ACTION: Consider invitation to the animal tracking community (sensor data collection) to discuss coordination activities, standards/best practices, data and QC, EEZ issues and other areas of potential intersection with OCG. (secretariat)	Secretariat	OCG-8
8. JCOMMOPS			
35	ACTION: JCOMMOPS web tool needs an easier-to-find front page description/introduction to JCOMMOPS (JCOMMOPS)	JCOMMOPS	
36	ACTION: Develop and distribute a regular update on status of the JCOMM observing system by the start of 2017:	JCOMMOPS, Secretariat to solicit representatives from networks	Update September Roundtable, January 2017
	o Identify a team from OCG to develop draft design/focus of the report (each network to nominate a representative; Secretariat to solicit for representatives		
	o Secretariat to develop a proposed mailing list to IOC members and WMO JCOMM members		
37	RECOMMENDATION: OCG Urges registration/adoption of Unique IDs for platforms and requests JCOMMOPS to work with networks to make a formal change request to JCOMM V (JCOMMOPS)	JCOMMOPS	
38	ACTION: Networks to decide whether they want network brochures in consultation with JCOMMOPS, and as appropriate, develop brochures for distribution.	JCOMMOPS	
39	ACTION: Advance development of Risk Assessment metrics. Secretariat to distribute latest draft of white paper to OCG exec for further revision	Secretariat	Ahead of a JCOMMOPS Round Table
40	ACTION: Start tracking progress by all OCG networks towards use of BUFR in reporting real-time data on the GTS (JCOMMOPS to solicit/compile info, and impediments including lack of appropriate template)	JCOMMOPS, Jon Turton	Ongoing. Report to OCG-8
9. Best Practices.			
41	ACTION: OCG Representatives to provide feedback on RMIC Proposal for a Framework of the Global Ocean Observations Standard System (including Guides for calibration seawater dissolved oxygen and nutrients).	Secretariat	1st May
42	ACTION: OCG to consider request for RMIC Coordination Committee and communicate decision to JCOMM-Man (during upcoming OCG call)	OCG Chair/Vice Chair	Ahead of a JCOMMOPS Roundtable

43	ACTION: IOCCP to provide links to Best Practices Documentation and development activities; i.e. SCOR Working Group on Nutrients:	Maciej, RMIC/AP	
44	ACTION: Secretariat to collate list of Standards and Best Practices documentation used within the community from the Network/Element Specifications.	Secretariat (Katy) with guidance from Bob Weller, Bernadette Sloyan.	
45	ACTION: Secretariat to identify list/links to relevant IOC/WMO level best practices/regulatory documentation.	Secretariat (Long)	
46	ACTION: Schedule further discussion of accepting non JCOMM standards manuals as JCOMM Technical Reports during upcoming JCOMM quarterly telecom	OCG Chair/Vice Chair	Ahead of a JCOMMOPS Round Table
47	ACTION: Discuss/respond to request to accept QARTOD manuals as JCOMM Technical Reports, during upcoming JCOMM quarterly telecom	OCG Chair/Vice Chair	
48	RECOMMENDATION to JCOMM-MAN: Input is sought on identification and focus of RMICs, and JCOMM OCG requests consultation when RMICs are proposed.	OCG Chair,	MAN-13
10. Data Management.			
49	ACTION: Refine the vision for Data Integration EOv activity in a few pages (max) and distribute to OCG members	Steve Worley, Kevin O'Brien	Dec Roundtable
50	ACTION: Networks to nominate a representative to become part of a small team to further scope the proposed EOv-focused Data Integration Activity. This team to work with OCG Exec in development of initial proposal to be reviewed by Networks.	OCG Members to nominate	
51	ACTION: Report on Data Integration EOv activity to DMPA meeting (June) by Webex (Kevin O'Brien, Steve Worley)	Kevin O'Brien, Steve Worley	DMPA Meeting, June 2016
52	ACTION: Report on Data Integration EOv activity to US IOOC (Interagency Ocean Observation Committee), and GOOS GRA Chair	OCG Chair, Secretariat	
53	ACTION: Seek interest from OCG networks in Open access GTS activity (David to distribute description; Networks to contact Nadia/David, cc Secretariat).	OCG Chair, JCOMM Co-President	

ANNEX IV

SUMMARY OF PROGRESS AGAINST ACTIONS FROM OCG-6

Green = complete, Yellow = underway, Red = due.

	Action/Recommendation	Responsible Panel(s)	Responsible panel member	Deadline/Status	
Requirements					
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	Deferred. activity being taken forward through a small group working intersessionally
2	ACTION: OCG to strengthen connection to ETOOFs, and invite Gumei Liu (contact point 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	Ongoing	
Observing System Implementation					
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	All Panels	Argo: Howard Freeland; GO-SHIP: Bernadette Sloyan; DBCP:	by October 2015	Deadline for this activity has been delayed until early next year, so we can

	updated by Secretariat, and sent to the Network representatives for checking.		Jon Turton; OceanSITES: Uwe Send ; SOT (VOS/SOOP) Chris Marshall +Bec Cowley, Gustavo Goni for SOOP);		benefit from drawing on the Variable Specifications (to be finalized by OOPC This year).
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	
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	Jon Turton, Uwe Send, Bob Weller	by OCG-7	OceanSITES is an Action Group on DBCP. The action groups are independent and self-funded bodies, but are supported by DBCP-TC. DBCP provides the opportunity/forum to develop synergies and best practices across the various action groups in line with wider JCOMM goals.
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	DBCP, IOCCP	(DBCP), Laura Lorenzoni?	DBCP XX, October 2015	First need to identify who

	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)		(IOCCP)		they are.
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, October 2015	
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 appropriate. Identify someone to present Green Cables initiative to IIOE2.	Co-Chairs	David Meldrum	Ongoing	
Observing System Metrics					

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	
Best Practices					
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 Co-Chairs			

	OCG management (RMIC/AP & OCG co-Chairs; OCG-6)				
30	ACTION: OCG encourages China RMIC Work to be presented to WESTPAC, NEAR-GOOS, SEA-GOOS (China RMIC)	RMIC			
Data and Information					
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 DMBP	Jon Turton, David Berry, (DM POC for EGO)	Expect to progress in 2016	
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)	by October 2015, DBCP XX session	
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, Champika Gallage	To be discussed at DBCP-31 Session, October 2015. Systems for drifters and moored buoys are in place. First need to define what metadata variables are needed for other systems (e.g. fixed platforms, gliders) - ensuring consistency with moored buoys & Pub47 where there is overlap.	
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	Co-Chairs, Secretariat	David Legler, David Meldrum, Katy	OCG-7 Session.	

	meeting (after platform unique IDs).		Hill, Etienne Charpentier.		
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	
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	
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	
JCOMMOPS					
43	ACTION Request representation from JCOMM	Co-Chairs, Secretariat		OCG-7	

	TT Satellite Requirements at next OCG				
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,		DONE	
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			
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			
55	ACTION: One financial	Secretariat	Albert	?	

	report on JCOMMOPS incomings/outgoings to be provided to all networks annually. Initial report will be delivered by (?)				
56	ACTION: JCOMMOPS to map proposed activities for Brest funds against JCOMM Vision/Objectives (JCOMMOPS, by next JCOMMOPS Round table).	JCOMMOPS	Mathieu Belbeoch	DONE	
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		to be presented at roundtable #4	
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	

ANNEX V

WORK PLAN: 2015-2020.

2016 UPDATE



**OBSERVATIONS
COORDINATION GROUP
SEVENTH SESSION**

**Esporles, Mallorca, SPAIN
4 to 6 April 2016**

Work Plan: 2015-2020.

2016 Update

Updated following the 7th Session of the JCOMM
Observations Coordination Group.

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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.

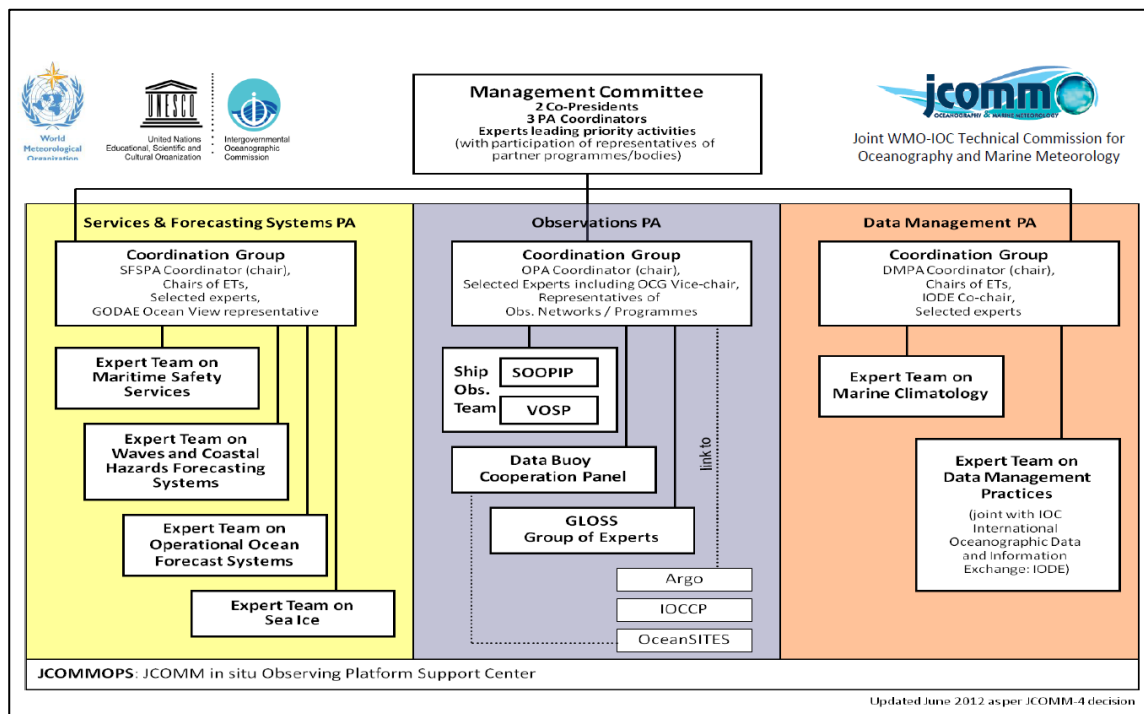


Figure 1. JCOMM Organisational structure

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

Update 2016

GCOS Implementation Plan

The GCOS Implementation plan has been drafted with key input from the JCOMM Observations coordination Group. Mostly through the Network Specification sheets, which includes the articulation of network missions and targets, which went on to inform the GCOS IP actions. The approach to the document was discussed at the OCG meeting, and the members will be invited to review the IP mid-2016.

JCOMM-V.

The focus of JCOMM-5 was discussed. As at each JCOMM session, groups are reformed and refocused, it is an opportunity to propose some organizational changes. The JCOMM President highlighted how the meeting would be focused, and what the co-Presidents hope to get out of the meeting. In particular, the OCG discussed the benefits of Cross programme area connections and the potential to strengthen them ahead of the next JCOMM MAN and in preparation for making recommendations on improved organization of JCOMM and the JCOMM-5 Session.

1.	JCOMM-5 Session, October 2017; Chairs will distill conversation, suggestions, and identity input to be provided to MAN-13.	Chairs	MAN-13 (Oct 2016)
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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, verses 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.

2016 Update

OCG had direct engagement with OOPC through an overlapping meeting. This year, it was mostly focused on developing input for the GCOS Implementation Plan, including discussions on requirements for existing ECVs, proposed ECVs and network Targets. The proposed new ECVs are Ocean Surface Vector Stress, and Sensible and Latent Heat Fluxes (note, this was later changed to Ocean Surface Heat Fluxes).

The Boundary Currents workshop is planned for 2017, and OCG members are encouraged to engage.

1	ACTION: Bob Weller to look at the Sensible and Latent Heat Fluxes EOVS Specification: should this include radiative fluxes? (Shortwave/longwave). For discussion/agreement with Mark Bourassa	Bob Weller, Mark Bourassa
4	RECOMMENDATION (OOPC/GOOS SC/OCG): Requirements setting and development activities need continued discussion to insure requirements reflect inputs from developmental projects such as. TPOS 2020, DOOS, OOPC planned BCs activity. Moreover, the requirements need constant attention and review by OOPC, OCG, WMO/RRR, etc. (Secretariats to encourage dialogue amongst groups, and further develop and document, improved transparent processes GOOS and OOPC and OCG are using regarding requirements)	OOPC

3.2 Engaging with JCOMM Services

2016 Update:

Nick Ashton presented on Services Programme Area activities, and the need and opportunities to better connect up the 3 programme areas. OCG discussed the potential for identifying exemplar activities which connect up observations, data management and services delivery, including the potential for the chairs of the programme areas to discuss opportunities with the co-presidents in the run up to JCOMM-5.

Wave observations were highlighted as an area where some effort by OCG was needed to capitalise on developments in observing platforms and technologies, to better deliver to services requirements, building on a task team which sits within DBCP ([Wave Measurement Evaluation and Testing](#)). A small subgroup was identified to scope how to take such an activity forward.

Other examples of cross programme area connections will be discussed with the co-presidents in the run up to the JCOMM V session.

2	ACTION Nick Ashton, Bob Weller, Jon Turton to look at Swail et al. document on requirements for Wave Observations. Draft suggestions to scope a possible Waves obs workshop to reconcile expressed wave requirements vs possible observations, and recommend OCG observing activities in OCG (proposal to be circulated for discussion at upcoming Roundtable and presentation at JCOMM MAN, October 2016).[KH1]	Nick Ashton, Bob Weller, Jon Turton, Val Swail	MAN-13
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3.3 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).

2016 Update.

Discussions re, partnerships focused on the potential for networks (particularly GO-SHIP) to partner with POGO for capacity building initiatives, and expanding the number of agencies who are able to engage in POGO (see section 4).

3.4 WMO and the WMO Integrated Global Observing System (WIGOS)

WIGOS is a programme to bring the existing WMO observing systems (that have developed separately) under a consistent framework to improve efficiency and coordination, as such it is a 'system of systems'. An important aspect for JCOMM will be the interfaces between WIGOS and non-WMO observing systems (such as Argo and OceanSITES).

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

1. Management of WIGOS implementation
2. Collaboration with the WMO co-sponsored observing systems & international partner organizations & programmes
3. Design, planning & optimized evolution
4. Observing System operation & maintenance
5. Quality management
6. Standardization, system interoperability & data compatibility
7. WIGOS Operational Information Resource (WIR) (including OSCAR the Observing System Capabilities Analysis and Review Tool)
8. Data & metadata management, delivery & archival

9. Capacity Development (including development of RMICs, Regional Marine Instrumentation Centres)

10. Communications & outreach

The WIGOS pre-operational phase priorities for the period 2016-2019 are:

1. National WIGOS Implementation
2. Regional WIGOS Centres
3. WIGOS Information Resource - OSCAR
4. WIGOS Data Quality Monitoring System
5. WIGOS Regulatory and Guidance material

For WIGOS implementation each country (WMO Member) should have a designated national WIGOS focal point who should be the contact point for other national observing networks that can/wish to exchange data. WIGOS numbers will provide a unique reference to each individual station/platform, including national/other networks that have their own numbering system. For exchange of data. For data exchange the WMO Information System (WIS), that includes GTS, is the telecoms infrastructure used by WIGOS. However, data can only be exchanged on the GTS in agreed WMO formats, where Table Driven Codes such as BUFR and GRIB will replace the legacy Traditional Alphanumeric Codes that are being phased out. BUFR provides an opportunity to overcome the limitations of the old TAC (e.g. low precision, only physical variables, no quality flags) and to develop templates for new platforms (e.g. autonomous surface vehicles) that better map to the platform's capabilities. BUFR templates presently exist for VOS data, moored buoys, drifters, Argo floats, XBT data, ship-based CTD profiles, thermosalinograph data, sub-surface gliders

Within two JCOMM Regional WIGOS centres have been established at NMDIS, Tianjin, China and NDBC, Gulfport, US.

OSCAR (<http://www.wmo-sat.info/oscar/>) is a database developed to allow the performance of critical reviews by comparing observing system capabilities with technology-free user requirements, it has three components: OSCAR/Requirements (well established), OSCAR/Space (well established) and OSCAR/Surface (still under development). OSCAR/Requirements supports the WMO RRR process, with 12 application areas defined each with a designated point of contact: where Guimei Liu is the contact for Ocean Applications. OSCAR/Surface will enable a step change in metadata access for surface based (and sub-surface) observing systems. However, a key challenge will be to populate OSCAR/Surface with all the mandatory metadata. For marine/ocean networks we define metadata specific to the networks and platform types; this will be collected through JCOMMOPS who will then submit the required metadata to OSCAR, which will be the 'official' repository of WIGOS metadata. Having all the metadata in one place will allow for a more complete analyses of our overall observational capability, however many data users will still require the more extensive metadata held by JCOMMOPS (and/or network GDACS).

Data quality monitoring – for 'traditional' surface marine data from VOS and buoys, near real-time comparison are made against NWP background fields. The UK Met Office is a WMO lead centre for monitoring the quality of surface marine observations at UK Met Office (with monthly reports) and Meteo-France provide the EUMETNET QC tools and monitoring statistics. However, for oceanographic data, the data are used to validate the models rather than the models to validate the data. For T&S profiles well specified real-time and delayed-mode QC systems are in place and oxygen is emerging, but QC of other bio-geochemical variables (chlorophyll, nitrate etc.) is still an area of active development.

In terms of WIGOS Regulatory and Guidance material: Technical Regulations impose definite requirements and strong recommendations upon Members, using the words ‘shall’ and ‘should’ to express these precise meanings; Manuals describe detailed technical specifications, using the same language as above, and are considered to be ‘dynamic’ annexes to the Technical Regulations, with the same regulatory significance, whilst Guides typically offer implementation guidance, case studies, advice on best practice and the like, and carry no regulatory weight, even if the words ‘shall’ and ‘should’ are used.

OCG has appointed Jon Turton as a vice chair for managing the connection to WMO/WIGOS and the Rolling Review of Requirements, and to help manage and prioritise engagement with WMO activities.

3	ACTION: RRR and EOVS specifications should be as consistent as possible; and, communications between OCG/OOPC and RRR is not ideal to encourage consistency. OOPC/OCG is updating requirements. RRR to be sent updated EOVS specification sheets and asked to identify major differences for discussion by OOPC/OCG (Guimei Liu).	Guimei Liu and OOPC	OOPC-20, OCG-8
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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.

2016 Update:

Reports from networks are provided for each meeting, and feedback is provided by the OCG (reports available at www.jcomm.info/ocg7). In addition, the networks are working on a consistent set of Network Specifications. A full set of Network Specifications will be available by the end of 2016. This year, the OCG particularly acknowledged the efforts of GLOSS in taking feedback from OCG-6 onboard, and progressing activities to clarify missions, targets and data availability.

Two key activities have been identified where we can approve coordination across OCG: The use of volunteer observing ships and ships of opportunity; and the engagement between IOCCP and the observing networks.

Many of the networks utilize ships either for taking observations (Volunteer Observing Ship Network, SOOP XBT, CO2, CPR), or deploying equipment (such as drifters and Argo). Each network has their own approach to engaging with shipping companies, and often this engagement is led at a principle investigator/individual level. As the ability to take autonomous observation from underway vessels from ships, as does the desire for groups to engage with the shipping industry. Therefore, it was decided that an assessment of underway observation and deployment activities (existing and planned) should be carried out, including existing/proposed engagement with the shipping industry, with a view towards improved coordination across the networks and a consistent approach to engaging the shipping industry. Further discussions also needed regarding how expanded underway observing activities be coordinated and marketed.

IOCCP has been represented at OCG meetings for a number of years, and there is movement towards a more organic connection between IOCCP and the other OCG panels, as the measurements being coordinated through IOCCP are generally combined with other network activities (e.g. GO-SHIP, OceanSITES, Argo), or would benefit from greater coordination with established groups (i.e. Ship observations team with SOOP CO2). Initially, it was decided that the SOOP CO2 programme participates in the Ship Observations Team –Ships of Opportunity Programme, and also works with JCOMMOPS to bring their observation information into the JCOMMOPS web tool.

4.2. Specific Network activities.

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

4. Brief update on status and activities since OCG-6.
5. Progress towards OCG work plan objectives, actions,
6. Development and report on Metrics: implementation, delivery, risks, impact (publications/outputs).

4.2.1. Argo

Currently the Argo Array is looking very healthy, though there is concern that some key investment lines are not keeping pace with ongoing costs, and/or be in decline (e.g., US, Australia, Japan). Efforts internationally focused on lifting performance of the array across the board, drawing on the experience of the higher performing implementation groups. However, there are concerns about the array given future investment trajectories.

The programme also is continuously reviewing the design of the array in response to requirement, and to address gaps. Ensuring global completeness is highlighted as the first priority; to deliver a spatially complete 3x3 degree array, including marginal seas and the seasonal ice zone, around 3800 floats are needed. Increasing densities in Equator, boundary regions are currently being trialed, but there aren't rigorously tested requirements at this stage. Improved performance metrics are under development in consultation with JCOMMOPS, focused on number of floats, plus float coverage, in order to better track and communicate the array status.

In addition, testing and development activities are underway; Deep Argo floats are undergoing platform testing and pilot testing. Regional pilots are underway, and the community is working towards a global design. Bio-geochemical (BGC) Argo floats are being tested through numerous deployments: sensor and metadata specifications are complete. A report from a recent [Bio-Argo workshop](#) should further crystallize plans for a global array.

Argo sought advice on the process for reviewing proposed design evolution. OCG advised that OOPC has responsibility for reviewing observing system design, and recommended Argo engage proactively in relevant reviews and design projects such as TPOS 2020, DOOS, and the OOPC planned Boundary currents activity.

The challenge of skyrocketing complexity of data streams due to novel float payloads is having an impact on delivery of core delayed mode data. Argo needs to balance welcoming new data with maintaining core array performance. Options under consideration include excluding complex payload floats from Argo GDACs, versus keeping all data at the GDACs, noting that novel data would not be in the required Argo netCDF format or QC'd. These options need further discussion in the community.

Argo requests that all Argo float deployments should be connected to national Argo programmes, and welcomed efforts in OCG to share the burden across networks in defining metadata standards, parameters and conventions; as other networks such as OceanSITES and GO-SHIP also have to deal with a broad range of parameters. This will be progressed, in part, through the OCG Standards and best Practices activity.

BGC-Argo are working on 50-100 float deployments to test feasibility, and working on data standards. The delayed mode QC requires at least 1 year of data. Sensor technology is still very volatile. There is discussion whether to make a distinction between Bio-Argo and BGC-Argo. Many biogeochemical floats fit into the Argo mission relatively well, whereas some (Bio-Argo) floats fit less well and have different mission design, including profiling frequency and park depth, to time with diurnal cycle.

Argo			
5	RECOMMENDATION: OOPC to consider status of Argo pilot activities, role in multiplatform mix for key phenomena (this is being pursued through TPOS 2020, Boundary Currents/shelf seas activities).	OOPC	
6	RECOMMENDATION: Ensure planning for Argo pilots is informed by activities in TPOS 2020, EMODNET, AtlantOS, etc.	Argo ST	Ongoing
7	RECOMMENDATION: OCG to assess and encourage increased consistency of data parameters, conventions, and metadata standards across networks to enhance integration and interoperability. (Address in part through Data Management interoperability pilot activity, best practices documentation, and through an agenda item at OCG-8: chairs to monitor progress).	OCG Chairs.	

4.2.2. Data Buoy Cooperation Panel (DBCP)

The global drifter array has recovered in terms of the number of operating drifters following the rectification of manufacturing issues which reduced the drifter lifetimes. New targets and metrics have been agreed, including metrics for global coverage, data delivery, annual deployments, network age and half-life. Issues which are currently being addressed include technology development to improve reliability/cost effectiveness, efforts to increase drogue lifetime. Development activities include evaluating higher resolution SST measurements for satellite cal/val, and the development of wave measurement capabilities.

The national/coastal moored buoy network, is basically a 'network of networks' operated by over 15 countries for national requirements. Hence there is a wide variation in buoy designs and capability. Core measurements are the standard surface metocean variables, although some also include wave spectra and sub surface observations on the mooring line. Moored buoy targets are under discussion and would include % operating moored buoys and data delivery metrics. For Arctic/Antarctic Buoys and the Global Tsunami buoy network, similar metrics have been proposed and will be reviewed by relevant DBCP Action Groups. Metrics for the global tropical moored buoy network would be addressed by OceanSITES.

Challenges for DBCP moored buoys include securing ship time for maintenance, vandalism, inclusion of wave measurement, and metadata collection/organization. Currently, DBCP does not have complete metadata for the metocean moored buoys, and it is not possible to get a picture of what is being measured across the networks. A focused effort by JCOMMOPS will be needed to establish a metadata directory, and ongoing effort to keep it up to date, this will require resources.

Migration to BUFR format for exchange of data on the WMO GTS is underway. OCG requested regular updates on progress of this migration from all relevant panels and networks. Various DBCP members are also evaluating the potential for unmanned surface vehicles to be used for metocean data collection.

4.2.3. OceanSITES

The OceanSITES mission was outlined as: ‘ to collect, deliver and promote the use of high-quality data from long-term, high-frequency observations at fixed locations in the open ocean. OceanSITES typically aim to collect multidisciplinary data worldwide from the full-depth water column as well as the overlying atmosphere.’

The rationale for OceanSITES is that time series observations at critical or representative locations are one essential element of a global ocean observing system to complement a range of other approaches. They can provide a unique view of the full temporal behavior of a system; accurate reference and long-time baseline data; and the maximum possible range of interlinked variables from the seafloor to the atmosphere while enabling shared resources.

While most sites are moorings, some are also ship based time-series. They include: Fluxes Sites, Multidisciplinary timeseries, Tropical Moored Arrays and Transport Arrays. A recent highlight is the progress made in establishing sites in the Southern Ocean: the Southern Ocean Timeseries (SOTS, Australia) and the Ocean Observatories Initiative (OOI) south of Chile.

Following recommendations from OCG, OceanSITES are working on performance metrics. However, this requires further discussion. OceanSITES are considering having inter-disciplinary task teams to focus on the development of targets, design best practice etc. However, OceanSITES is an umbrella for a number of individual programmes and P.I's and the specific designs of sites is very heterogeneous, so this is the start of a conversation.

OceanSITES have started by focusing on defining the mission and targets for Fluxes sites. They are seeking help on requirements from the community. In parallel, they are working on standardizing OceanSITES metadata to be able to characterize what is being measured and where in the existing array.

During the discussion, the availability of OceanSITES data was discussed. Data from several OceanSITES surface moorings are being withheld from GTS to allow the OceanSITES data to be used as unique validation data. However, it was pointed out that if not on GTS then operational centres can't access the data for model validation. Assimilating or withholding data (for validation) is a decision made by each individual forecasting centre. This strategy needs clarifying in consultation with GSOP, to ensure OceanSITES have optimum operational impact.

The OceanSITES group requested that it not be considered part of DBCP, but continue as a community of practice. It was agreed that OceanSITES can continue as a programme/community of practice under the JCOMM OPA rather than an Action Group under but should connect to DBCP on areas of common interest. OceanSITES is a time-series was encouraged to move forward with articulation of fitness for purpose. This will allow the community to better assess fitness for purpose.

DBCP/OceanSITES			
8	DECISION: OCG accepts proposal that OceanSITES is a Community of Practice and are welcomed to continue participating in OCG meetings and activities (chair to communicate).	OceanSITES Chairs/OCG Chair	OceanSITES (April 2016)
9	ACTION: Clarify relationship between OceanSITES and DBCP as overlapping activities, including areas of collaboration/commonality. OceanSITES are encouraged to engage in DBCP to improve best practices and share technologies, etc. (OCG and DBCP Chairs and OceanSITES Co-Chairs to discuss	DBCP, Ocean SITES Co-Chairs	OceanSITES (April 2016), DBCP (October 2016)

	at upcoming meetings: OceanSITES April 2016, DBCP 32, October 2016).		
10	RECOMMENDATION: In the absence of OceanSITES plans motivating time series observations, or identifying the requirements that sensors on moorings are addressing in EOVS specs (e.g. air-sea fluxes and ocean transports), OCG suggests to OOPC (and other GOOS Panels) that through evaluations activities, they engage the research community to develop and synthesize such plans to establish targets for OceanSITES (possibly organizing around air-sea fluxes; transport arrays, regional observing systems and developmental activities (e.g. SOOS, AtlantOS, TPOS, GRAs), and multidisciplinary time series stations)).	OOPC, OceanSITES Co-Chairs	Timeline?

4.2.4. Global Sea Level Observing System (GLOSS)

The evolution of the GLOSS programme has brought about confusion regarding the different aims, activities, and information/data portals of GLOSS. This includes the distinction between datasets and data streams, and interpreting the different network status maps. This was discussed in detail at OCG-6 and in follow up calls. The programme also has multiple web presences due to their connection to multiple data centres. This is currently being addressed, and GLOSS are working with JCOMMOPS to bring GLOSS metadata into the JCOMMOPS platform.

GLOSS is moving towards clarification of missions and targets, though this is a complex task requiring agreement from the team of GLOSS experts. GLOSS requirements were initially focused on climate (tracking El Nino, not sea level rise!) and now many stations are tsunami warning, extreme events, regional ocean processes, sea level rise and sea level acceleration. Each of these processes (or phenomena) have somewhat different requirements, and the tide gauge stations often operate on different time scales, latency, and levels of quality control (where latency and quality are inversely related).

Therefore, GLOSS proposes moving away from defining data streams in terms of fast delivery or delayed mode, and to focus on frequency/quality of the data. Data will be described as hourly, daily or monthly delivery, and flagged by level of quality control.

Missions/requirements are currently being defined, including design targets and delivery requirements, e.g. for altimeter calibration and validation, tsunamis and extreme events, regional variability, long term change. The OCG congratulated GLOSS on the efforts to respond to recommendations made at the last OCG meeting, and were encouraged by the progress made in a short space of time.

GLOSS			
11	ACTION: JCOMMOPS and GLOSS to discuss timeline for connecting GLOSS metadata information into JCOMMOPS infrastructure	Mathieu Belbeoch, Gary Mitchum	JCOMMOPS Roundtable, May 2016
12	DECISION: OCG endorses incremental expansion of high-quality GLOSS core network beyond initial slate of stations to other stations that could be improved to meet the higher level of standards.		

13	ACTION: GLOSS to write a 2-pager, explaining and justifying the expansion, for approval from OCG and discussion with OOPC	Gary Mitchum	OCG-8 (noting OOPC need input this month for GCOS IP).
14	ACTION: GLOSS to keep OCG and OOPC apprised of changes to GLOSS (OCG-8 GLOSS report)	Gary Mitchum	OCG-8

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

The Go-SHIP Programme has defined its mission as a global repeated survey of 61 lines every 7-8 years. In addition, the programme has defined a 'GO-SHIP associated' class of cruises which conform to a broader (though still stringent) definition.

For the 2012-2023 decadal survey: Near 90% of lines are planned, committed or implemented. GO-SHIP has also had success in bringing on board new partners. Notably Ireland in following a meeting in Galway. There are however still challenges in securing commitments in the Indian Ocean and North Pacific. The GO-SHIP programme has made efforts to engage in the Indian Ocean Expedition II, but have had limited progress in ensuring GO-SHIP lines will be included.

The challenges of sustaining GO-SHIP were discussed, given broader concerns about resourcing and ship infrastructure. GO-SHIP's strategy is focused on bringing onboard new nations, and this was the rationale for defining GO-SHIP associated routes; as a platform for engagement. The Korean and Indian organisations are showing potential to step up more. In addition, GO-SHIP is encouraging multinational collaborations to occupy lines. The Ship Coordinator is helping to facilitate these. GO-SHIP were encouraged by OCG to work with POGO's capacity building programmes.

The value of GO-SHIP in the context of other networks was discussed also, for instance, it was discussed whether OceanSITES timeseries should be established where two GO-SHIP lines cross. In addition, the value of deploying BioArgo floats on GO-SHIP lines to enable the calibration and validation of float data was discussed.

GO-SHIP:			
15	RECOMMENDATION: OCG encourages activities to broaden capacity development in support of GO-SHIP, including multinational collaborations for occupying GO-SHIP lines and training activities, leveraging and coordinating with similar programs like POGO.	Bernadette Sloyan, Rik Wanninkhof, Martin Kramp	OCG-8

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

The VOS programme have been also working on developing targets, though has found this challenging as the main aim is to get as many observations as possible. Currently have 2000 vessels operating, and 40% delivering data in BUFR format. However, 90% of observations are coming from just 7 nations.

Progress is being made in tracking metadata; the Pub47 database (ship call signs and metadata) is being transitioned to JCOMMOPS. Historically, JCOMMOPS had trouble obtaining XBT metadata, but this is now being addressed through improvements in launching technologies and improved real-time data communications.

Given the expansion of the number of organisations and P.I's and types of observations being taken (or could be taken) on commercial vessels, discussions are underway within SOT to improve the coordination and promotion of activities utilizing commercial ships; this includes:

- Branding: SOOP/VOS activities would benefit from being promoted in a complimentary way under a single banner.
- Coordination of engagement with ships and shipping companies (both contact with shipping companies and on -ship activities). Currently, it is common to have multiple communities and observing groups approaching ship operators and captains. SOOP/VOS/JCOMMOPS feels this could be better coordinated to improve relationships and recruitment. This discussion should be expanded to include networks using commercial ships for deployments.

The OCG recommended the development of an engagement strategy for commercial ships that describes plans for uses of such ships across all of OCG networks and how such a program should coordinate interaction with ships while in port.

Ship Observations Team			
16	ACTION: Teleconference (SOT Chair, VOS/PMO Coordinators and others) to flesh out issues regarding. coordinating ship-board activities to minimize disruption to VOS crew and operators.	Chris Marshall, Martin Kramp,	21 June 2016 OCG telecon to include Martin
17	ACTION: Multiple Networks are using/would like to use commercial ships as observing platforms (Argo, Drifters, CPR, SOOP-XBT, VOS, pCO ₂ , radiation, etc.). There is potential benefit to coordinating, packaging up needs, and coordinating these plan and coordinating engagement with potential ships. An initial telecon will focus on the scope/scale of this issue (Chris Marshall, Sarah North, Rik Wanninkhof, Martin Kramp, to organize discussion during next JCOMMOPS round table, , and possible actions to be taken up at SOT meeting (April 2017), and recommendation to OCG-8)	Chris Marshall, Martin Kramp,	Report to OCG-8, SOT (April 2017)

4.3. Broader engagement with projects and programmes

4.3.1. International Ocean Carbon Coordination Project (IOCCP)

The IOCCP presented an update on the various ocean carbon related observing activities. The need to broaden the connections between IOCCP and the OCG was emphasized, as most of the observations are carried out on existing platforms and networks: hence, continued and further coordination is needed between IOCCP components and individual networks. In line with OCG activities, IOCCP are working on a Network Specification for SOOP-CO₂, and initiated a request that SOOP-pCO₂ become part of the Ship Observations Team, and capitalizing on the activities to improve coordination across commercial ship based activities, and associated JCOMMOPS network tracking. This was considered a positive move by OCG, and IOCCP and SOT were encouraged to discuss SOOP-CO₂ could be incorporated into SOT activities.

IOCCP			
21	ACTION: SOT to discuss/agree including SOOP-CO ₂ as a component of SOT. Report on at next JCOMMOPS roundtable.	Chris Marshall, Sarah North, Rik Wanninkhof, Martin	JCOMMOPS Round Table (May 2016)

		Kramp,	
22	ACTION: Request JCOMMOPS to work with IOCCP to scope possible IOCCP support at JCOMMOPS, in particular for tracking of observation implementation. Estimates of resources at JCOMMOPS, and potential impacts of proposed IOCCP actions on outstanding activities also needs to be articulated	JCOMMOPS and IOCCP/Rik and Maciej	

4.3.2. TPOS 2020

The Tropical Pacific Observing System 2020 project is developing recommendations which need to be taken up by both the sustained observing community and the research community. A phased reporting process has been established with an Interim plan being released in 2016, which will enable the observing networks to consider the trajectory of the project and its recommendations. In parallel to the release of the interim plan, a transition process for considering and implementing recommended changes to the observing networks will be developed and submitted to the OCG for review. OCG members are encouraged to review the interim plan (available during mid 2016), and also engage in discussions regarding transitioning the observing system.

TPOS 2020			
23	ACTION: OCG members to participate in public review of interim plan, mid 2016 (Katy to circulate opportunity later this year).	Secretariat to circulate	Around July 2016
24	ACTION: OCG members to be kept informed regarding potential role of JCOMM OCG in TPOS 2020 transition activities, including any possible Transition Team task team	Chair, TPOS 2020 Co-Chairs, Secretariat.	

4.4. 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.

4.4.1. Progress in establishing an International Glider networks.

Under the umbrella of Everyones Glider Observatory (EGO), progress has been made in implementing OceanObs19 recommendations. Since the last OCG meeting, the terms of reference and membership for an international Gliders Steering Team have been agreed, and a Data Management Team has also been agreed. The OCG congratulated the chair on his efforts in pushing forward the development of the International Glider Steering Team and encouraged the group to move forward with scheduling a first face to face meeting of the steering team, which is proposed for September 2016 in association with the EGO conference, and focus on developing a forward work plan.

The Glider Steering Team requested feedback on how best to move towards a global glider network design, including core observations (or tiers of observations). The OCG recommended engaging with the expert panels of GOOS, and in particular in upcoming evaluation activities such as OOPC's Boundary Current-Shelf Interactions activity.

OCG will continue to engage new groups into OCG as they move towards global coordination, and where there is mutual benefit to their engagement. Ahead of the next meeting, discussions with the Animal Tagging community will commence (focusing on those tags which also take physical ocean

data). OCG will also keep track of progress in the use and coordination of autonomous/unmanned vehicles and assess whether to engage key groups in the future.

Gliders			
18	Recommendation: OCG very pleased with progress made by Glider group. The glider group to rename their group in response to concerns regarding current acronym.	Pierre Testor	OCG-8
19	ACTION: Distribute draft glider group TOR and membership to OCG for feedback and approval (OCG secretariat, complete by JCOMMOPS RoundTable call in May)	Secretariat	JCOMMOPS Round Table May 2016
20	ACTION: OCG to consider and provide feedback on draft proposal for a global array of gliders to observe Boundary Current regions. The proposal includes network specification re. role of Gliders in Global Sustained Observing System (as input to OOPC Boundary Currents activity).	OCG Members	June 2016 (ahead of Glider meeting in September 2016)

4.4.2. Animal Tagging with physical sensors.

OCG will continue to engage new groups into OCG as they move towards global coordination, and where there is mutual benefit to their engagement. Ahead of the next meeting, discussions with the Animal Tagging community will commence (focusing on those tags which also take physical ocean data). OCG will also keep track of progress in the use and coordination of autonomous/unmanned vehicles and assess whether to engage key groups in the future.

Animal Tagging			
33	ACTION: Initiate dialogue with animal tracking community to discuss potential for JCOMM OCG engagement.	Sam Simmons	OCG-8
34	ACTION: Consider invitation to the animal tracking community (sensor data collection) to discuss coordination activities, standards/best practices, data and QC, EEZ issues and other areas of potential intersection with OCG. (secretariat)	Secretariat	OCG-8

4.5. 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 communications cables for ocean observation and tsunami warning, and the increased activity in coastal regions.

2016 Update.

OCG is also initiating conversations regarding its engagement with the coastal observing community, and how to take the relationship forward for mutual benefit of both OCG and coastal observing activities. The GOOS Regional Alliances are increasing activities to connect up GRA work and capitalize on synergies in terms of the measurement of common EOVS, and use of common networks. They identified 3 major observing platforms which are used across many of the GRAs. Gliders (with whom OCG has already engaged), HF Radar, and Animal tagging. The need to connect up open ocean and coastal observations was particularly highlighted. Open ocean observations are well coordinated, and many groups are taking very coastal observations, but there is a gap in terms of connecting up the observations across the shelf in many cases.

The HF Radar community (coordinated through a GEO Community of Practice) has been encouraged to engage proactively in OCG activities, and in particular articulating how HF Radar fits into the broader sustained observing activities and product development for surface currents and sea state/waves. The discussion flowed through to the OOPC meeting which followed, particularly encouraging the HF Radar community to engage in the upcoming OOPC Evaluation activity on boundary currents and their interaction with the shelf.

COASTAL: GRA Connection			
26	ACTION: Discuss EuroGOOS can assist in release of Data from European Tide Gauges (Gary Mitchum, Glenn Nolan).	Gary Mitchum, Glenn Nolan	
27	Recommendation: OOPC to engage GRAs re. Open Ocean-Shelf (Boundary Currents) evaluation activity	Bernadette Sloyan, John Wilkin to contact GRF Chair	
28	Recommendation: OOPC to present Boundary Currents activities to GRAs (e.g. Webinar, through a GRA telecom, attendance at a GRF meeting? (action TBD for John))	John Wilkin, Tim Moltmann	
COASTAL: HF Radar			
29	ACTION: DBCP to consider whether the HF Radar should be considered as part of the DBCP Waves pilot project in part to address questions regarding validation of HF Radar wave information	Jon Turton	DBCP-32, October 2016
30	RECOMMENDATION: OCG Exec and GEO-HF Radar COP to explore potential for HF Radar to engage in OCG work plan (and related) activities such as:	OCG Chair, Hugh Roarty	OCG-8
	• Standards and best practices (drawing on existing best practices experience and documentation, and potential for OCG to review/approve HF Radar guides)		
	• Calibration/ validation, and quality control by EOVS (i.e. DBCP Waves: PP-WET) (see Action29)		
	• Engaging in the OOPC boundary current activity (action to be discussed with OOPC)		
	• Connection with Services Area (ETWCH/ETOFS) (action to be discussed with SFPA/Nick)		
31	ACTION: GEO HF Radar COP and JCOMM OCG exec to consider whether JCOMM HF Radar to be proposed as a Joint JCOMM/GEO group.	OCG Chair, Hugh Roarty	

32	ACTION: Review ocean applications part on HF radar in WMO Statement of Guidance	Guimei Liu, Hugh Roarty	Timeline?
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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)
 - o Funding risks (reliance on short term funding, small number of funders)
- Uptake/Impact metrics:
 - o Journal Papers
 - o Projects, students,
 - o 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.

2016 Update.

Progress has been made with networks on developing priority metrics to track progress and performance. These have been built into the new JCOMMOPS web tool, which is a sophisticated and comprehensive tool for tracking the status and performance of observing systems on demand. The tool is currently being tested and iterated with the networks and broader user community.

35	ACTION: JCOMMOPS web tool needs an easier-to-find front page description/introduction to JCOMMOPS (JCOMMOPS)	JCOMMOPS	
36	ACTION: Develop and distribute a regular update on status of the JCOMM observing system by the start of 2017:	JCOMMOPS, Secretariat to solicit representatives from networks	
	o Identify a team from OCG to develop draft design/focus of the report (each network to nominate a representative; Secretariat to solicit for representatives)		
	o Secretariat to develop a proposed mailing list to IOC members and WMO JCOMM members		
37	RECOMMENDATION: OCG Urges registration/adoption of Unique IDs for platforms and requests JCOMMOPS to work with networks to make a formal change request to JCOMM V (JCOMMOPS)	JCOMMOPS	
38	ACTION: Networks to decide whether they want network brochures in consultation with JCOMMOPS, and as appropriate, develop brochures for distribution.	JCOMMOPS	
40	ACTION: Start tracking progress by all OCG networks towards use of BUFR in reporting real-time data on the GTS (JCOMMOPS to solicit/compile info, and impediments including lack of appropriate template)	JCOMMOPS, Jon Turton	Ongoing. Report to OCG-8

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.

2016 Update.

An initial draft risk assessment report was developed by the secretariat, prioritizing the risk types across the OCG, and potential for cross-OCG mitigation strategies. The OCG Executive will discuss how to take forward this activity intersessionally.

39	ACTION: Advance development of Risk Assessment metrics. Secretariat to distribute latest draft of white paper to OCG exec for further revision	Secretariat	Ahead of a JCOMMOPS Round Table
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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.

2016 Update:

The terms of reference for a Vice Chair to oversee the Standards and Best Practices area have been agreed by the executive, and OCG are now seeking nominations to fill this role. In addition, China RMIC presented on their proposed activities; the main recommendation from OCG was that these need to be better plugged into existing community level international coordination activities.

41	ACTION: OCG Representatives to provide feedback on RMIC Proposal for a Framework of the Global Ocean Observations Standard System (including Guides for calibration seawater dissolved oxygen and nutrients).	Secretariat	1st May
42	ACTION: OCG to consider request for RMIC Coordination Committee and communicate decision to JCOMM-Man (during upcoming OCG call)	OCG Chair/Vice Chair	Ahead of a JCOMMOPS Roundtable
43	ACTION: IOCCP to provide links to Best Practices Documentation and development activities; i.e. SCOR Working Group on Nutrients:	Maciej, RMIC/AP	
44	ACTION: Secretariat to collate list of Standards and Best Practices documentation used within the community from the Network/Element Specifications.	Secretariat (Katy) with guidance from Bob Weller, Bernadette Sloyan.	
45	ACTION: Secretariat to identify list/links to relevant IOC/WMO level best practices/regulatory documentation.	Secretariat (Long)	
46	ACTION: Schedule further discussion of accepting non JCOMM standards manuals as JCOMM Technical Reports during upcoming JCOMM quarterly telecom	OCG Chair/Vice Chair	Ahead of a JCOMMOPS Round Table
47	ACTION: Discuss/respond to request to accept QARTOD manuals as JCOMM Technical Reports, during upcoming JCOMM quarterly telecom	OCG Chair/Vice Chair	Ahead of a JCOMMOPS Round Table
48	RECOMMENDATION to JCOMM-MAN: Input is sought on identification and focus of RMICs, and JCOMM OCG requests consultation when RMICs are proposed.	OCG Chair,	MAN-13

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 cognizant of the activities of the Intergovernmental 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.

Update 2016:

In the past year, OCG has mainly focused on the development of data integration approaches through the use of ERDDAP, and demonstrating their utility to the observing community. This needs to be taken to the next level through active engagement of network representatives in planning some pilot activities (perhaps focused on one or two EOVS, or a region/application), including identifying metrics for success. The DMPA needs to be engaged on these activities, which may help to bridge the activities of the two programme areas.

49	ACTION: Refine the vision for Data Integration EOVS activity in a few pages (max) and distribute to OCG members	Steve Worley, Kevin O'Brien	Timeline?
50	ACTION: Networks to nominate a representative to become part of a small team to further scope the proposed EOVS-focused Data Integration Activity. This team to work with OCG Exec in development of initial proposal to be reviewed by Networks.	OCG Members to nominate	
51	ACTION: Report on Data Integration EOVS activity to DMPA meeting (June) by Webex (Kevin O'Brien, Steve Worley)	Kevin O'Brien, Steve Worley	DMPA Meeting, June 2016
52	ACTION: Report on Data Integration EOVS activity to US IOOC (Interagency Ocean Observation Committee), and GOOS GRA Chair	OCG Chair, Secretariat	

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.

Update 2016:

The JCOMM OCG Chair has been working with the JCOMM Co-President Nadia Pinardi to develop a vision for an Open GTS node to enable the broader community to access GTS datastreams.

53	ACTION: Seek interest from OCG networks in Open access GTS activity (David to distribute description; Networks to contact Nadia/David, cc Secretariat).	OCG Chair, JCOMM Co-President	
37	RECOMMENDATION: OCG Urges registration/adoption of Unique IDs for platforms and requests JCOMMOPS to work with networks to make a formal change request to JCOMM V (JCOMMOPS)	JCOMMOPS	
40	ACTION: Start tracking progress by all OCG networks towards use of BUFR in reporting real-time data on the GTS (JCOMMOPS to solicit/compile info, and impediments including lack of appropriate template)	JCOMMOPS, Jon Turton	Ongoing. Report to OCG-8

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).

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.

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.

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 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.

2016 Update:

Much of the discussion at the OCG meeting was focused on the development of the JCOMMOPS webtool, and feedback from the OCG members.

35	ACTION: JCOMMOPS web tool needs an easier-to-find front page description/introduction to JCOMMOPS (JCOMMOPS)	JCOMMOPS
36	ACTION: Develop and distribute a regular update on status of the JCOMM observing system by the start of 2017:	JCOMMOPS, Secretariat to solicit representatives from networks

	o Identify a team from OCG to develop draft design/focus of the report (each network to nominate a representative; Secretariat to solicit for representatives	
	o Secretariat to develop a proposed mailing list to IOC members and WMO JCOMM members	

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.

2016 Update.

Discussions underway to include GLOSS Metadata in JCOMMOPS web tool (see GLOSS action). Discussions also underway with Gliders, HF Radar community re. the potential for a coastal technical coordinator position.

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'.

2016 Update:

JCOMMOPS staff compliment has grown to include 3 full time technical coordinators, a admin/communications staff, plus IT staff. This has led to a step change in the capability at JCOMMOPS, and in particular allows staff to work across network areas, and common infrastructure to be developed, including centralized administrative support.

38	ACTION: Networks to decide whether they want network brochures in consultation with JCOMMOPS, and as appropriate, develop brochures for distribution.	JCOMMOPS
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9. Priorities and timeline of activities.

2016: GCOS IP (OOPC Lead: drawing on Variable and Network Specifications~~s~~),

Finalise Network Specifications

2017: JCOMM-5 Initial input (March)

Possible workshop: Boundary Currents?

WCRP Conference on Sea Level,

JCOMM-5, (November)

Initial Outcomes: TPOS 2020 Backbone TT (TP Design),

2018

2019: OceanObs19 (Sept)

ANNEX VI:

LIST OF ACRONYMS

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	<i>Cold Regions Research and Engineering Laboratory (USA)</i>
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 <i>in situ</i> 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
 RMIC WMO-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 VOSclim 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
 SOOIP 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 Bathy Thermograph
WML Extensible Markup Language

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