INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

Thirteenth Observation Coordination Group (OCG-13)

https://goosocean.org/ocg-13
Online Meeting
May 31 - June 3, 2022

Final Report

UNESCO

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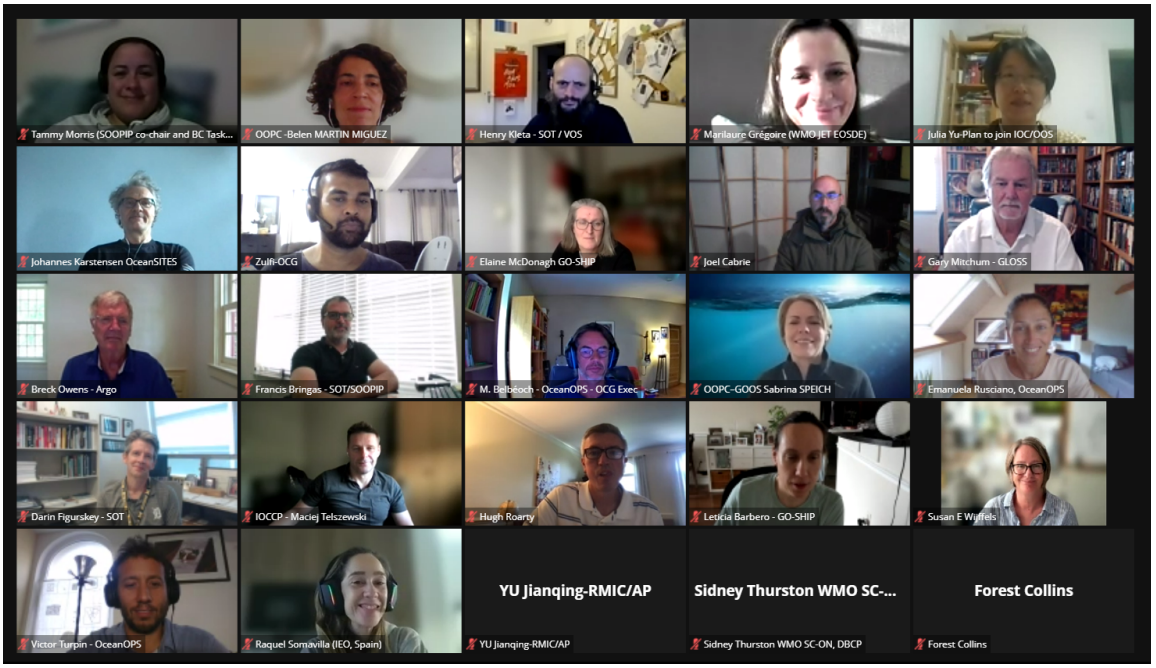
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Executive Summary

The Thirteenth Observing Coordination Group Meeting was held 31 May - 3 June 2022, virtually with 55 online attendees. The GOOS Observation Coordination Group (OCG) is charged to review, advise on, and coordinate across the global ocean observing networks to strengthen the effective implementation of a global ocean observing system (GOOS) and global marine observing system[1]. OCG works with 12 global *in-situ* networks and emerging 'global' networks, and has 8 key foci for its cross-network activity:

1. Improving the fit-for-purpose of the observing system against numerous requirements and the needs of OCGs sponsors and stakeholders;
2. Encouraging technical development of existing observing networks and engaging emerging networks and communities of practice that are the key to addressing new requirements and needs;
3. Developing metrics and targets to assess and report observing system performance and progress over time, towards meeting user needs;
4. Advancing exchange of international data and metadata and system-wide monitoring capabilities through OceanOPS;
5. Encouraging system-wide integration and quality standards through development of community best practices and standards;
6. Improving integration of data and information through data management standards and integration pilot projects;
7. Working towards increasing the ability of states with less developed observing capability to both take and use the needed observations;
8. Encouraging environmental stewardship.

This annual meeting serves for OCG members and Networks to discuss advances, identify next steps across the OCG foci, identify and engage potential new OCG observing networks, and advance the global ocean observing system.

The OCG-13 meeting covered advances across all the OCG foci areas, and had a particular focus on strengthening communications between OCG networks, WMO, GOOS Expert Panels (OOPC, BGC and BioEco), improvement of connection across requirement processes and evaluation of observing against these requirements; and fostering closer coordination with UN Decade activities relevant to OCG. The key takeaways are noted below, with more details on the topics in the next section.

- Observing requirement development and feedback is a distributed effort within GOOS with some key activities led by the WMO. The roles and responsibilities of each organization are somewhat fluid. There are near-term opportunities, particularly in WMO, for GOOS and OCG networks to more strongly engage and/or lead requirements development and evaluation. OCG will coordinate activities and engagement with WMO and others.

[1] New OCG Terms of Reference

- Several OCG observing networks have made progress in recovering from COVID-induced impacts; however, a few networks (e.g. long-term deep-water moorings, GO-SHIP) continue to be significantly impacted. There continues to be a slow decline in resourcing of several OCG networks, potentially jeopardizing a range of research, products, and services. With heightened interest in biogeochemistry-related observations, there is an increasing need for OCG to improve coordination of related sensor use, calibration, etc. Lastly, the OCG noted continued challenges by multiple OCG networks on access to, and operations within, EEZs.
- Following updates from multiple new potential OCG networks (e.g. cabled observations, Uncrewed systems, marine debris, ship-based time series), the OCG will provide feedback to these networks and continue to advance the concept and process for becoming an OCG network.
- The OCG will continue to encourage and coordinate (e.g. through additional ECOP participation, workshops, etc) OCG network engagement in UN Decade related activities, and potential opportunities to address OCG foci.
- The OceanOPS team continues to provide key capabilities and services to OCG networks and GOOS stakeholders.
- An OCG Data Strategy to move OCG towards higher levels of compliance of FAIR principles, and integration across the OCG observing networks' data system is nearly ready for review by OCG networks, followed by wider public distribution.
- OCG/GOOS and NOAA are partnering to initiate GOOS / MTS Industry Dialogues starting later in 2022 to facilitate dialogue between government, science and industry across the value chain.

Prior to the OCG-13 meeting, during the week of May 23 - 26th, 2022 three virtual workshops were held addressing various cross-network topics. The workshops covered:

- **Data and Metadata:** Present results of the OCG Data Flow Mapping effort, and describe the preliminary recommendations towards the development of an OCG data implementation plan.
- **Boundary Currents**: Foster continued cross-network collaborations for the sampling of Boundary Current systems, encourage the inclusion of altered mission parameters or sample techniques of ocean observing instrumentation to obtain more observations within Boundary Currents, determine a working group / task team on a Boundary Current for a pilot study, and working to engage stakeholders to design a fit-for-purpose integrated ocean observing network.
- **Ocean Observations Indian Ocean**: Share information and communication on optimizing the Indian Ocean implementation plan for OCG networks, develop synergies within the Indian Ocean observing networks and partners, monitor stock of platforms, capture support requests for operations and discuss opportunities and need to fill observation gaps in the Indian Ocean.

Report

Note that this is an interactive document with links to recordings, presentations, and background and working documents. Click the blue underlined hyperlinks to reach those resources. The Report covers the discussions and follows the OCG-13 Meeting Agenda (here), the actions arising from these discussions are noted in the text and compiled in the Actions Table.
The meeting was held daily (31st of May - 3rd of June, 2022). Each substantive agenda item below captures a short summary, the main points of discussion and action items of each session. The opening session included orientation to the GoTo meeting tool and tips on meeting etiquette in the online format.

Please refer to the action table (TBD) for the compiled list and additional information on the actions, including teams, identified priorities, and responsibilities.

1. Opening

David Legler, OCG Chairperson, opened the online OCG-13 meeting on Tuesday May 31st. David Legler gave a presentation setting aims of the meeting and reflection on intersessional work and highlights; actions with updates on the following: Standards and Best Practices, Capacity Development, Some highlights and successes, IODE Data Strategy, Data mapping, Report Card, and OCG-13 Workshops. Looking forward to 2022 activities, increasing connections beyond OCG, identifying linkages of network UN Decade activities and OCG, refinement of metrics.

2. Understanding requirements processes and connections to OCG networks

Prior to the OCG meeting a pre-recorded presentation on the general RRR process was circulated for review (presented by Erik Andersson). This session provided a read out on the Ocean perspective of the WMO rolling review of requirements (RRR) process and the Ocean perspective and a readout from OOPC/CLIVAR and IOCCP Panel on how networks are involved in developing requirements, the process, what happens with the requirements and the outcomes, what are your priority requirements for the next 3 years, and how are networks using the rolling review of requirements. Recent developments/activities and potential connections and impacts on OCG requirements and connections to networks will be provided in advance of time.

The discussion addressed the process of the Rolling Review of Requirements particularly on the Ocean and their process of determining the impacts of observations on predictions and models and requirements created based around their impacts. Review process includes many entities but no large engagement with Networks directly at this point. OOPC (Sabrina

Speich) Reviews EOV and ECV requirements for specific topic areas and highlighted the need for tools to separate phenomena. Biological ECVs/EOVs standardization just started in the GCOS Implementation Plan. IOCCP (Maciej Telszewski) pointed out the need for a GOOS-wide strategy on carbon biogeochemistry data management since an integrated data management structure is missing. IOCCP also mentioned their work on a global ocean oxygen database and atlas. OCG has a role to play and needs to be identified.

Other materials: The Global Ocean Observing System: Oceans of Data for Earth System Predictions

Resulting action

Understanding requirements processes and connections to OCG networks

- Liaise with WMO/Dominique Berod to receive future WMO actions and for GOOS/OCG/OOPC/networks to review reports and highlight priorities including v3 of the OOIS report with exec summary and WMO Statement of Guidance.
- Organize a call with OCG, OOPC and Co-Design co-chairs to identify specific followup actions and ways to better engage in WMO RRR process.
- GOOS (OCG/OOPC/ETOOFS) to engage with WMO in planning the next observing impact assessment workshop to highlight GOOS approaches to assessing adequacy of ocean observations (for the Application Areas).

3. Networks Reports Part 1

Update from across the networks providing highlights from previous year, challenges, and looking forward to the goals, opportunities, report out against the network attributes. Network updates provided by DBCP, OceanGliders, GLOSS, AniBOS, HF Radar.

The discussion addressed specific suggestions and asks from OCG networks and how OCG can assist in providing guidance. Highlights of achievements for each network are listed below:

DBCP

- **Achievements:** DBCP Launch of 2022-2027 Strategy; Anti-vandalism videos in 11 languages; New Executive Board structured around the strategy; Drifting buoy metadata full synchronization with OSCAR/WIGOS; SIO and AOML formally endorsed as Data Acquisition Centres under Marine Climate Data System; Dialogues with commercial sector; DBCP funded wave buoy pilot about to announced
- **Concerns:** Severe drop in Global Tropical Moored Buoy Array, particularly RAMA (only 3 out of 29 operational); Ongoing uneven distribution of drifter deployments - gaps in South Atlantic, Indian Ocean

OceanGliders

- **Achievements:** Publication of Ocean Gliders best practices document in progress; Publication of community Standards Operational Practices that will be distributed; OG1.0 almost validated; Creation of a GitHub page to manage the SOPs and OG1.0; Development of a set of maps, produced routinely, to better monitors the networks; set of indicators and steering team renewal and updated governance rules
- **Concerns:** Clearer target for the program, inconsistent sharing of scientific results and building of the OceanGlider community; Evolve toward a more unified data management system and IOOS GDAC

GLOSS

- **Achievements:** Manual on Sea-level Measurements and Interpretation, Volume V: now available in 4 languages; Quality control of in situ sea level observations: A review and progress towards automated quality control, Volume 1 published; Updated access to GLOSS data; Renewed emphasis on metadata; GESLA is now a GLOSS project
- **Concerns:** highlighted the need for in-person meeting; Capacity Building; Need of central funding

AniBos

- **Achievements:** Updated MEOP-CTD database published; Metadata integrated in OceanOPS – metadata & data visibility; Standardized data framework published; Best practice on animal handling and metadata naming convention developed; Data available through ERDDAP; > 200 loggers deployed in the last year (Indian Ocean and Southern Ocean); Oxygen sensor tested successfully in the Southern Ocean (PI: C. Guinet, CNRS)
- **Concerns:** Spatial coverage has decreased globally since 2021 – COVID19; Sustained observations rely on research funding; Improved procedures for oxygen and chlorophyll data needed; Lack manpower to start integration of biological data

HF Radar

- **Achievements:** Governance structure has been proposed; Updated map of HFR network; Updated list of publications; New release of the Copernicus Marine Service delayed-mode product dedicated to in-situ observations of water velocity with historical data reporting; Data Gap filling and Wave Working Groups launched; Contacts with OceanOPS established; Increasing number of systems connected to the European HFR Node (+7); Ongoing activities for identifying the stakeholders, their needs/problems/requirements, and the capability of HFR data/products; Ongoing work on describing good practices on stakeholder commitment; Ongoing work to build a competence matrix; 2 community papers have been submitted in MONGOOS
- **Concerns:** Aging infrastructure, Wind turbine interference

4. Networks Reports Part 2

Network updates provided by OceanSITES, GO-SHIP, SOT, Argo, below are highlights from the items that the networks notes, asked of OCG and were discussed by the OCG in plenary.

The discussion addressed specific suggestions and asks from OCG networks and how OCG can assist in providing guidance. Highlights of achievements for each network are listed below:

OceanSITES

- **Achievements:** Updated Executive Committee and Data management Team; Best practices GOOS endorsed; Data discovery and visualization through new webtook by NOAA PMEL; Improved access to OceanSITES deployment information; Intensified Dialogue with DOOS, general public, Ship based Marine Ecological Time Series (METS) network
- **Concerns:** Transition from “centralized data management system dream” to a FAIR distributed data-base; Minimize Latency in updating sites/metadata through potential new strategy; Establish and maintain connection with many PIs, with nations (e.g. China, Africa, South America, Pacific Rim) and specific regional groups (Polar Regions)

GO-SHIP

- **Achievements:** Additional representatives from Italy and China; 8 GO-SHIP cruises completed in 2021; 5 GO-SHIP decadal full cruises; 3 GO-SHIP high frequency cruises; 2 GO-SHIP cruises underway right now [1 GO-SHIP decadal full cruise (P02), 1 GO-SHIP high frequency cruise (Med01)]; Data Management Team kick off meeting; Bio-GO-SHIP Data working group; Euro-GO-SHIP initiative submitted; GO-SHIP Evolve project endorsed by Ocean Decade; Updated Best Practices for nutrients; Updated Best Practices for DOC endorsed at Ocean best practices
- **Concerns:** Ongoing pandemic-related impacts: logistics, personnel availability, covid cases; Some reference sections have no national commitment; Diplomatic clearance issues to perform Marine Scientific Research in EEZs; Management and tracking of add-on projects and new variables including validation samples for BGC Argo

SOT

- **Achievements:**
    - **SOT:** Active participation in SOT-11 and PMO-6 virtual meetings; Start of SOT TT work to expand independent class observations; Feedback to ISO on “Shipborne Meteorological Instruments” standard document; Ongoing cooperation with Maersk; 50 AWS installed on Maersk vessels by end of 2022; Start of project to share data from Maersk onboard systems

    - **ASAP:** ASAP independent panel within SOT since SOT-11; 4609 successful ASAP launches with data submission to the GTS in the year 2021
    - **SOOP:** Finalized OceanOps metadata scheme for SOOP-XBT; SOOP-pCO2: 422 data sets submitted to SOCATv2022; >50 publications using XBT data, >55 using surface pCO2; Best Practices documentation for SOOP-XBT activities finalized and available in the Ocean Best Practices Repository.
- **Concerns:** Problem with Indian ban of Iridium telecommunication; jcomm.info offline; OceanExpert very problematic; Missing functionalities and support, no operational lists for PMOs, NFPs etc; Travel and safety restrictions due to the COVID-19 pandemic continue to impact the ability to conduct cruises; Maintained relationships and awareness of SOOP with ship partners; Secretariat resources and support; Ocean Decade organization and funding; WMO functional connections.

Argo

- **Achievements:** Blue Observer charter; Ocean basin operation and planning meeting; Group lead identify for each bassin; Atlantic - regular meeting, Indian Ocean - First meeting May 2022 ; Pacific Ocean - to be planned; Successful Argo implementation for TPOS; Data Management - RT timeliness on GTS/GDACs (99%<24h, 91% <6h, 53%< 3h), DMQC (88% achieved for T/S) and progressing on the 6 BGC variables; Sensor manufacturer expansion
- **Concerns:** Global coverage is decreasing slightly and has holes (WIO) 19% of array is greylisted due to sensor failures; Slowly recovering from Covid; OneArgo extensions are only slowly progressing - largely a capacity building stage; Extensions (regional and multi-disciplinary) are not properly funded (with a few national exceptions) despite a relative high technology readiness; National programs sacrificing core to build capacity in Deep/BGC; One Argo cannot be achieved without substantial extra funding; 10 countries sustain 95% of the array; Very limited number of sensor manufacturers impacts deliveries and costs

Resulting action

Networks Report Part 1 and Part 2

- Create a shared calendar of OCG network meetings that can be updated by Network representatives.
- OCG Exec assess Emerging networks transition from pilot to mature status.
- Approach John Cortinas (IO-Caribe vice chair) and Emily Smith (Sea level) to address funding needs for GLOSS technicians (potentially approach GRAs). [GLOSS]
- OCG to continue to support GOOS in working on EEZ issues (e.g. actions pending for the IOC Executive Council; followup on the EEZ Report).
- Prepare GOOS feature story around the best practices that are now available, how endorsement works and people developing these. [Juliet]
- Continue to receive updates on Iridium issues through WMO with India (Iridium

issue) [SOT]. [Mathieu]
- Encourage Network responsiveness on OceanOPS requests including metadata and implementation targets to ensure and support evaluation performance.
- Scope tasks for an expert group (network volunteers) to characterize BGC sensor challenges and potential solutions (e.g., convergence of best practices) and address several common issues across the networks. [Lead - IOCCP, Brad (gliders), Susan (Argo), Oceansites, DBCP, Saildrone]

5. Coordination of other activities/Ocean Decade

General updates were provided in advance of the meeting. This session focused on coordination across networks on Ocean Decade and other activities and discuss what the Decade and other Actions (One Argo, Ocean Observing Co-Design, CoastPredict, Boundary Currents) need from global networks and how can and does OCG support these initiatives. Goal is to create an understanding of activities and connections and identify how OCG can help.

- **Argo UN Decade Forum** update presented by Mariana RochaDeSouza and Susan Wijffels, highlighted that the event was useful to start learning about other related activities around the Ocean Decade. A lot of potential future collaborations were developed during the meeting and it raised awareness of the status of the observing networks.
- The **Ocean Observing Co-Design** programme (Sabrina Speich) aimed to redesign the ocean observing system hosted a workshop (here) from June 7-9th, on exemplars or “user areas” (e.g., Marine heatwaves, Boundary Currents, Tropical Cyclones). This workshop reviewed lessons learned, breakout sessions to advance exemplar projects and determine next steps to advance and support exemplar areas.
- **Coast Predict** (Nadia Pinardl) has 3 focus areas: core-predict on time, core-flame, core-core interface infrastructure. It has 4 endorsed core projects on various topics (see slide 4), international advisory board, and a Decade collaborative centre on coastal resilience in a changing climate.
- The **Boundary Currents** (Tammy Morris) group has hosted 2 workshops last year with interesting robust conversation. Outcomes included to identify a pilot region to develop an integrated fit-for-purpose observing system. Another workshop was hosted in May 2022 around adaptation of strategies & missions to better acquire data boundary current systems. The group is also involved in the co-design workshop and raised key questions around the suggested pilot region Agulhas Current; prioritize ocean observations or modeling goals to fill in gaps; stakeholder engagement and funding availability.

Other materials: Argo UN Decade Forum Slides

Resulting action

Coordination of other activities/Ocean Decade

- Keep networks informed of UN Decade activities e.g., Ocean Observing Co-Design etc.
- IOC Secretariat to seek dedicated ECOPs to analyze dependencies of Ocean Decade programmes/projects to GOOS OCG networks and liaise with/coordinate observing networks in the UN Decade through e.g., a survey. [Ann]
- Arrange a meeting to explore future actions and aspirations (coastal networks, DCC involvement) and how it fits into GRA's and OCG.
- Send information on the webinar series to distribute and help identify POCs/speakers.

6. OceanOPS

Mathieu Belbéoch presented the OceanOPS WorkPlan, Financial Report and requests for review of the 2022 Report Card. This session discussed the work in the frame of the OceanOPS 5 year strategy. (*Presentation link*).

The discussion focused around funding and the difficulty to secure sustained funding from various bodies:

- **Metadata**:
    - **Real-Time** Quality controlled procedures are applied; All individual observations are made available on the GTS of WMO with proper timeliness; All individual observations are made available on the Internet with proper interoperable services (API, ERRDAP e.g.), citable, discoverable.
    - **Delayed mode**: Raw data are archived for future reprocessing; A percentage of individual data are processed with additional quality controls; All individual observations made available on the WWW with proper interoperable services, citable, discoverable.
    - Metadata: Metadata made available to OceanOPS according to its standard; Metadata are transmitted machine2machine; Networks serve additional metadata beyond OceanOPS
- **OceanOPS report card**: Highlighted progress of the report card; Focus on BioEco and BGC with intentions to move towards cross-GOOS report card; interactive map and re-defined network status criteria.
- **Financial Report**: Total expenditure is stable and positive balance at the end of the year. WMO supported the OceanOPS manager position and infrastructure costs.

- **Budget**: Expected overall budget same level as 2021 and expectancy of positive balance which allows for other activities to be undertaken. Potential challenges in 2023 as EU projects will be exhausted.
- **Staff**: 4 recruitments achieved at WMO (metadata expert, Manager, Network Focal Point, IT engineer).
- Projects: Odyssey; EuroSea Regional monitoring, EuroArgo RISE, TRUSTED 2, GROOM2.
- **Considerations**: OceanOPS has little margin if some financial contributions are delayed or missing; Decrease of national contributions are fortunately compensated by the WMO support; New and emerging networks should contribute to OceanOPS encouraging the development of specific support services.

Other materials: Draft 2022 Report Card PDF

Resulting action

OceanOPS

- Draft an engagement and funding support strategy to enlist increased stakeholder support of core OceanOPS operations. [Emanuela]
- Seek feedback from Networks on balance of proposed OceanOPS efforts across the five goals in the OceanOPS Strategic Plan; and suggestions of areas of new work.
- Continue to work with emerging networks (i.e., AniBOS, HF radars) on ingestion of metadata into OceanOPS web system and update Report Card network status. HF radar and other networks to invite OceanOPS to their network meetings.

7. Data Management

Kevin O'Brien presented the results of the pre-OCG-13 Data and Metadata Workshop, the OCG network data mapping exercise and analysis, and other activities (i.e., roundtable). Note connections and developments at IODE, Open Access GTS update, WIS update. Plan for OCG in relation to data management moving forward (*Presentation link*).

This session presented the overall OCG data vision, goals and recommendations. An overview of the OCG data mapping effort was provided and the draft recommendations that were the result of the data flow mapping were discussed. These recommendations, coupled with input from the OCG networks, will lead to the development of a Data strategy designed to move OCG toward higher levels of compliance of FAIR principles across the global network data systems. This OCG Data strategy will also be developed to support optimal integration with IODE, WMO and the UN Ocean Decade digital ecosystem.

OCG Data and Metadata Vision:

- Provide frictionless data flow to uniform 'end points' for inclusion into a federated OCG data network that supports both real time and delayed mode
- Liaise and collaborate with the international data community to ensure the OCG federated network boundary is seamless for global stakeholders
- Continue evolving towards greater efficiency in data flow across the OCG networks

Other materials: OCG data flow mapping and draft data recommendations (to be put online)

Resulting action

Data Management

- Distribute draft OCG Data trategy to OCG stakeholders after feedback from networks and communicate externally (e.g., webinars, overview powerpoint, brief IODE, WMO, Decade Coordination Group Data). [Winter 2022]
- Initiate planning with OCG networks for developing an implementation plan .
- Develop and provide tutorials illustrating on how to access OCG data through the federated data structure [Provide examples of accessing OCG data using open science data platforms and tools].
- Ensure network data/metadata contact list is up to date.
- Roundtables: BioEco data/metadata roundtable (including METS RCN).
- Develop, from the networks, a list of data products and data integrators that will appear in the data flow diagrams.
- Subgroup for biological observations to help define standards.

8. Capacity Development

Zulfikar Begg presented on the Capacity Development task teams actions, opportunity for the capacity development to share recent activities and plans for 2022. Address working towards increasing the ability of states with less developed observing capabilities to both take and use the needed observations (*Presentation link*).

This session gave an overview of the CD Teams goals and webinars that have been hosted by the team. Going forward more webinars will be organized, focussed training sessions to address specific needs and work will continue to address gaps in the ocean observation systems in developing countries. It was highlighted that resources are limited funding opportunities, relying on individual networks and encouraging cross network initiatives.

Other materials: Fifth Data Buoy Cooperation Panel Pacific Islands Training Workshop on Ocean Observations and Data Applications (DBCP-PI-5), Virtual Session

Resulting action

Capacity Development

- Seek feedback at the next OCG meeting on successes of instrument funding programs (WMO, DBCP, SOT).
- Monitor and seek support through the WMO systematic observations funding facility for SIDS to establish potential capacity building activities in SIDS.
- Coordinate with Sidney Thurston on Ocean Webinar series hosted within WMO on Earth Systems Observations and the Ocean influences.

9. New networks and multidisciplinary expansion of existing networks

This session explored new expanding networks and created connections to OCG and OCG networks and how OCG reports and connects to other initiatives. Bruce Howe (Smart Cables), Ruth Gwynneth Patterson (Uncrewed Surface Vehicles), Artur Palacz (IMDOS), and Heather Benway (Ship-based Marine Ecological Time-Series) presented on how close these different initiatives are to meeting the OCG Network Requirements and highlight any 'asks' of OCG/OCeanOPS.

- **Smart cables**
  - Endorsed as a UN Decade program and endorsed by the Moore foundation.
  - Main Bottom temperature, pressure and seismic acceleration.
  - Systems of various stages include demonstration projects [CAM2, Wet Demo, Medusa].
  - Future projects include systems in New Caledonia, Indonesia, Koete, Chatham Islands, Antarctica, Arctic.
  - SmartCables is planning to be online in 2025 and is preparing pilot regions currently.
- **Uncrewed surface vehicles**
  - USV are already in use for observing various phenomena and observe many EOV and ECVs.
  - Project based but best practices are established and data delivery is being improved and partially already implemented.
  - OASIS envisages a USV network for GOOS that will fill gaps in space, time, disciplines and complement existing GOOS infrastructure.
  - A new project, "Uncrewed Surface Vehicle (USV) network for GOOS", linked to OASIS, will be submitted for endorsement from the UN Ocean Decade.
  - OASIS is currently undertaking a study that includes commercial USV manufacturers, operators and researchers, and will describe a USV Community of Practice. We welcome advice and participation.
- **Integrated Marine Debris Observing System (IMDOS)**
  - Marine (Plastics) Debris as a new Essential Ocean Variable

    - Objectives include: Augmenting and harmonizing ocean sampling with marine debris survey protocols; Coordinated observing network for surface floating plastics, integrated within GOOS structures; Matching *in situ* capacity with satellite product development needs; Supporting data synthesis efforts & informing stakeholders
    - Guidelines for harmonizing ocean surface microplastic monitoring methods are already available.
- **Ship-based Marine Ecological Time-Series (METS)**
    - Coastal and open ocean time series data already available capturing physical, biogeochemical and biological variables.
    - Network already fulfilling many of the OCG requirements.
    - Hosted a Methods workshop and networks has established 33 sites in 17 countries. Continues to work on articles, vision papers and data workshops.
    - METS-RCN Goals include: Devise FAIR METS data practices; Broaden METS data users and applications; Build community capacity for METS data analysis.

Other materials:

- Frontiers paper: Ocean Time Series Observations of Changing Marine Ecosystems: An Era of Integration, Synthesis, and Societal Applications
- Recording of webinar on METS, controlled vocabularies, and intelligent mapping
- METS RCN

Resulting action

New networks and multidisciplinary expansion of existing networks

- Emerging Network Engagement - OCG Exec will review the materials and schedule a dialogue with the networks to discuss/identify the next steps of OCG interaction. The OCG-Exec will report on these discussions at an upcoming Roundtable meeting in early 2023. [November 2022]
- The OCG will support GOOS as required with actions. Several followup actions are planned in response to this Workshop. The OCG will look for opportunities, with GOOS and WMO, for the OCG network and other connected communities to be part of these planned follow up actions.

10. Private sector industry engagement

Emma Heslop gave a readout of the MTS/GOOS Industry dialogues readout and private and industry engagement and highlighted what OCG's responsibilities are and how OCG is uniquely positioned in the new technology space (*Presentation link*).

The discussion focused around additional support for GOOS through both in-kind and funding support, prioritization of tasks and actions, communication of benefits, and inclusion of partner organizations.

- Created GOOS / MTS Industry Dialogues to facilitate dialogue between government, science and industry across the value chain.
- Background paper to be released outlining a view of the ocean observing system as a marketplace to better foster dialogues.
- Tabletop Exercise Format: large panel - 20 experts from 3 areas – 3-4 key questions, 2 page primer before session, expert discussion and audience interaction.
- Output will be recommendations that GOOS, government, science and industry can act on.
- Sessions to start in September 2022.

Resulting action

Private sector industry engagement

- Continue updating the networks on the dialogues / ensure that questions addressed are relevant to network work.

11. Best practices and standards of best practices

Juliet Hermes provided a status update on recent developments and activities on OBPS, assessment of OBPS purpose for networks, and elevate importance of OBPS to the ocean observing community and beyond. To discuss potential funding constraints and how OCG can help (*Presentation link*).

Achievements

- Remain on OBPS steering group which allows for improved communication over OCG BP and enhanced collaborations. OBPS workshops are always well attended and an opportunity for focused discussion.
- Ocean Practices for the Ocean Decade, endorsed program.
- 'Endorsed' search field on OBPS will go live very soon.
- Part of a TT focused on BP for under resourced countries, hosting a workshop in Mozambique in June and working with OASIS co-leading a TT on BP
- 5 BP on OBPS are GOOS endorsed, another 2 about to be added, 2 published in Frontiers (1 to be submitted).

Next steps

- Reminder to panels to propose BPs for endorsement and ensure process is kept active; Webinar as part of OCG CD series and meeting with the Pacific community, engage further with GRAs.

Resulting action

Best practices and standards of best practices

- OCG will request feedback from the networks on experience on the endorsement process at a roundtable.
- Identify major obstacles to create a best practices via survey [best practice survey] and report back to the OCG Networks for discussion/action.
- Reach out to the OCG networks to share photos of best practices in action and any best practices stories.

12. Report Outs

EuroSea Report outs and recommendations from 2 of the pre-OCG-13 Workshops, time to also reflect if the format of pre-meeting workshops is effective.

EuroSea

- Improving and Integrating European Ocean Observing and Forecasting Systems for sustainable use of the Oceans.
- EuroSea WP3: Oversee key aspects of integration of European observation for its optimal use in the European Ocean Observing System (EOOS) and in the GOOS but addressing national interests.
- EuroSea workshop on Network Governance to compare governance and only minor overlaps across areas. National Requirements often determine governance structure.
- Second workshop around Observational network KPIs: Various levels of KPIs that differ e.g., Network internal, OCG wide, Observing system, Obs. Data and metadata, Legacy and commercial sector KPIs.

OceanOPS Workshop

- Workshop to discuss difficulty of Indian Ocean deployment opportunities across networks.
- Meeting objective was to share and communicate information; foster cross network cooperation; optimize deployments in the Indian Ocean; Enhance coordination between CLIVAR Indian Ocean Regional Panel and Indian Ocean Resource Forum.
- Deployment opportunities shown in the meeting agenda broken up by country in the Indian Ocean.
- **Next steps**
    - Built upon Atlantic coordination experience leading to a 3 months charter and basin optimization (North/South).
    - Preparatory work by OceanOPS team on status, requirements, and deployment opportunities.
    - Informal but structured, Request to publish a quarterly summary on status and (ship) opportunities.
    - TBC through regular roundtables to drive attention and information sharing.

- Facilitate and enable cross networks operations.
- Coordinate for key cruises (GO-SHIP/TMA).
- Develop and optimize regional cooperations with a cross network perspective.

13. Summarise Actions

Emma Heslop and David Legler presented finalized action items, decisions and recommendations coming out of the OCG-13 meeting.

- Updating 5-slide presentation on OCG and executive summary.
- OCG-14: OCG recognizes the need to shift the timing of the OCG annual meeting to reduce overlaps with GOOS Steering Committee (May) and IOC Assembly meetings (June), Indonesia, South Africa, South America
    - It was suggested that the OCG should hold its meeting in conjunction with an observing network meeting. In 2023 SOT has invited OCG to join (Australia). Other suggestions for OCG meeting locations include Paris and/or Fiji.
    - There was a strong preference for a hybrid meeting, to encourage in-person interactions.
- Throughout OCG-13, several topics were suggested for upcoming Roundtable discussions:
    - Metadata and data expert group for biological observations
    - Diversity and inclusion
    - A readout of the way forward, following OOIS; for the WMO connections/functional connections including RRR
    - Collaborations across UN Decade actions and OCG networks
    - OCG intersections and collaborations with BioEco observational communities/networks

Annex: List of participants

OCG-13 Agenda (here)

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