MEETING REPORT

The Global Ocean Observing System

Tenth Session of the GOOS Steering Committee Part 2 of 2 (GOOS SC-10-2)

29 NOVEMBER - 1 DECEMBER 2021

ONLINE

unesco Intergovernmental Oceanographic Commission

WORLD METEOROLOGICAL ORGANIZATION

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International Science Council

JANUARY 2022
REPORT NO.: GOOS-270

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Note: The GOOS SC Decisions are highlighted in green boxes.

1. Opening

Toste Tanhua, co-chair of the GOOS Steering Committee, opened the GOOS SC meeting on Tuesday 30 November. These sessions are Part 2 of the Tenth GOOS Steering Committee meeting. Part 1 took place in April 2021.

Toste Tanhua described how the SC would run (Day 1, Day 2, Day 3 *in camera*), the items which would be discussed and their relation to the GOOS Strategy Implementation.

Presentation: GOOS SC-10 part 2 Short Introduction

2. Regional Workshop Outcome

GOOS Co-Chairs, Toste Tanhua and Anya Waite, briefed the SC with a summary of discussions from the GOOS Regional Policy Workshop which preceded the SC meeting on 29 November, and presented the SC with a draft zero decision from the workshop.

Members of GOOS SC agreed on the importance of constituting a task team or working group to revise GOOS Regional Policy, looking at the GOOS Regional Alliance (GRA) role within GOOS. Several suggestions were made, which have been reflected in the decision:

- Important to define the link between GRAs and GOOS contacts at the national level, specifically the GOOS National Focal Points (NFPs). The Report from Neville Smith (*Report of study on Support Provided to Global and Regional Ocean Observing Systems*) made reference to both regional and national coordination structures.
- Consider improving the linkage between GOOS Observation Coordination Group (OCG) and the GRAs
- Consider how to link more efficiently with the WMO Regional Associations, and other relevant organizations, e.g. to UNEP
- Take into account the users of GRAs when revising their role
- Make the linkage between the regional and the basin scale more explicit
- Adopt a more top-down approach through which GOOS can review and outline what are the needs of GOOS with respect to GRAs, as an initial task.

Members of GOOS SC discussed the link between a proposed GOOS Regional Policy Task Team and GOOS Governance Task Team. The consensus was to include the GOOS Regional Policy work as a subtask or working group under the Governance Task Team. In this manner its work can run parallel, it can maintain a broader membership and regional focus, and also be embedded within the wider GOOS Governance work.

Decision 1: GOOS Regional Policy

To constitute a GOOS Regional Policy subtask or working group under the GOOS Governance Task Team, to:

a) Review the GOOS Regional Policy 2013, highlighting gaps, weaknesses and where it is inconsistent
b) Evolve a vision for the GRAs role in the GOOS
c) Identify the commitment required from GOOS to support a thriving GRA ecosystem
d) Define possible attributes for different levels of ambition / capacity of GRAs
e) Explore mechanisms to engage WMO and UNEP in the process of GRAs and link up to those regional structures
f) Establish links to GOOS National Focal Points
g) Review role in connection to the users of ocean information
h) Develop a proposal for an updated GOOS Regional Policy 2022, in-line with the Global Ocean Observing System 2030 Strategy and current societal needs for ocean information

The GOOS Regional Policy subtask or working group should include members of the Governance Task Team, GOOS Steering Committee, GRA leadership and regional projects.

The outcomes, recommendations and a draft GOOS Regional Policy 2022 should be ready to present to the GOOS SC for approval in 2022, following preview by the GOOS Sponsors, WMO, IOC, UNEP and ISC.

If the proposal is mature enough it can be put to the IOC Executive Council in June 2022, this would require the proposal for the draft GOOS Regional Policy 2022 to be ready in April 2022.

The GOOS Regional Workshop Background Paper and Report can provide an initial base for discussion.

3. Short Items of a Strategic nature

Emma Heslop introduced this second part of the session, where several short items of a strategic and cross-GOOS nature were covered.

2.1 Global Ocean Observing Report Card - a cross-GOOS Plan

First Session: Mathieu Belbeoch
Second Session: Mathieu Belbeoch
Document: Ocean Observing System Report Card 2021
Presentation: Ocean Observing System Report Card

OceanOPS presented a plan on how to evolve the Ocean Observing System Report Card, currently focused on reporting across the 12 OCG global ocean observing networks, to a cross-GOOS Ocean Observing System Report Card.

Discussion:
The GOOS SC congratulated OceanOPS on delivering a useful and professional product of great value to GOOS and beyond. GOOS SC welcomed plans to evolve the Global Ocean Observing Report Card, highlighted its value in reaching stakeholders, and recognised the need to support it with additional resources.

Many on the SC commented that the Ocean Observing System Report Card should not be reinvented as it currently successfully fulfills its role of informing on the status of the ocean observing system (e.g. from the WMO perspective). The proposed plan and timeline to broaden the Report Card to be cross-GOOS was generally accepted, the main points of which are referenced in the PPT and the decision (below). The SC provided some input and ideas for the future work.

The SC highlighted the importance of:

- Gradually moving from a platform-based to an EOV-based view of the global ocean observing system
- Ensuring that the Report Card leads with presenting the societal relevance of GOOS work and the benefits of sustaining a global ocean observing system
- Considering distribution of the Report Card and how to reach the intended audience
- Tracking the impact of the Report Card, is it reaching its intended audience, do they read it, reference it, use it

The SC suggested the following as ideas for the future:

- Moving from a static to a more dynamic format, perhaps more like a dashboard, but different from the existing comprehensive OceanOPS dashboard
- Reporting on ocean indicators, the framework for which is being developed in the Ocean Indicators Task Team (see 2.4)
- Giving visibility to national efforts, GOOS NFPs could be relevant for this purpose.
- Reflecting the regional dimension
- Sending the Report Card survey to Foundations and other stakeholders to explore relevance

The report card is used increasingly as a reference, and this role should also be considered in the planning. For example, the network's status and activities as reflected in the Report Card have been a valuable input for GCOS Status Report and there are other areas of intersection with the GCOS Implementation Plan. OOPC can support as it leads the interface with GCOS for GOOS.

Decision 2: Cross-GOOS Report Card

The GOOS SC commended the work of OceanOPS and the Observation Coordination Group in developing and maintaining the Ocean Observing System Report Card, from 2018 onwards, as a key GOOS publication.

To develop the Ocean Observing Report Card to be a cross-GOOS publication, following the proposal outlined by the Observations Coordination Group/OceanOPS, namely:

- GOOS Panels to nominate editorial contacts, in addition from the BCG and BioEco Panel, a technical contact will also be required (this can be the same person if preferred) to support system status reporting
- Initiate work on 'status' reporting for BioEco networks in 2022, for inclusion in 2023
- The audience (funders and contributors to the GOOS) and format generally remain the same with:
    - expansion of status reporting to encompass BioEco networks (most ready first)
    - expansion of the integrated system delivery 'stories' to represent the 3 GOOS delivery areas, maybe in 3 sections
    - Evolution of an EOV focus for assessments and visualisations of the observing system
    - Important to maintain the article features that highlight specific 'hot topic' areas of delivery, to show what users gain from an integrated multi-platform system, and the thank you for national contributions/support section
- Aim to have a cross-GOOS Report Card by 2024

In order to meet this goal OceanOPS will need additional support for editorial, technical, design, print and web elements. Current budget is around 50K$ per annum, it might be anticipated that this could double for an expanded and cross-GOOS publication. GOOS will need to look at the financing of this work, one locus would be in the context of the GOOS Implementation Plan budgets.

2.2 WMO Data Policy and GBON

First Session: Jon Turton
Second Session: David Legler
Document: Suggestions for the GOOS Steering Committee on an initial GOOS contribution to the WMO Global Basic Observing Network (GBON)
Document: GOOS News
Presentation: WMO Data Policy and GBON

Discussion:

Jon Turton introduced this item. GOOS SC asked for some clarifications about the scope of WMO Data Policy and GBON and discussed some ideas to complement the draft Decision, as presented in the background document and PPT.

It was highlighted that the proposal reflected in the draft Decision took into account the level of readiness of the networks, as GBON implies a commitment to deliver data, generally only mature observing networks are able to comply with this commitment.

It was further stressed that GBON approval by WMO Congress is the result of a very lengthy discussion, hence it is advisable to start with those networks and variables that are vital to WMO services and are at sufficient level of maturity. Contributors to GBON should be well-established systems so that it is possible to fulfill the commitment. For example, the Argo network is the most utilized source of in situ ocean data for weather forecast applications right now and has a well established data flow.

It was emphasised that this initial recommendation is the starting point and that other variables should and would be added in the future. GBON currently covers weather and climate, not the full suite of Earth system monitoring and prediction efforts. After COP26, it seems likely that WMO will consider new climate applications such as global carbon monitoring. Ocean CO_2 data is not yet fully operationalised, but there is capacity to provide useful information in delayed mode and this for example could be one variable that may be included in GBON in the future. The SC noted the need to consider data from measurements available only in delayed-mode for climate applications (e.g. ocean carbon).

The SC discussed the challenges and benefits of obtaining national commitments to GBON, and it was recommended that WMO and GOOS jointly advocate to member states to secure these commitments. GOOS was recommended to take this request to the WMO Executive Council, members who sit on both in GOOS SC and WMO EC is a potential route, and the WMO-IOC Joint Collaborative Board was also indicated as an additional potential vehicle for this.

It was recommended that:

- salinity (surface and subsurface) be added to the core GBON variables
- an additional bullet point be added to the draft Decision to set up a process in communication with WMO on identifying upcoming variables and networks that can contribute to GBON, e.g. using the feasibility vs. impact criteria developed for the GOOS EOV process.

Decision 3: WMO Global Basic Observing Network

The proposal for GOOS to request WMO to include a marine element in the Global Basic Observing Network (GBON) was generally accepted as an important request to make. WMO clarified that for GBON there is an obligation to exchange data in real-time, which means only

mature networks would presently be able to deliver against this obligation. The Steering Committee noted this would be a starting point for a marine component in the WMO GBON, and that a pathway for the inclusion of other EOVs and networks should be developed.

1. The GOOS Steering Committee concurred with the prioritization of Sea Surface Temperature, surface air pressure, and upper ocean temperature and salinity as initial priority EOVs for the ocean elements of the WMO Global Basic Observing Network (GBON)
2. GOOS to request the Standing Committee on Earth Observing Systems and Monitoring Networks (SC-ON) to request the WMO Executive Council, to include the indicated observing networks (see note below) be included in the Global Basic Observing Network (GBON).
3. GOOS to develop a pathway, with WMO, to bring in additional EOVs and GOOS networks into the GBON, as they reach sufficient levels of maturity, including for delayed mode climate data such as surface ocean CO2.

It is suggested that the following observations are considered as initial GOOS contributions to GBON. This does not preclude other GOOS observations and/or networks becoming part of GBON in the future.

Initial suggested GOOS contributions to GBON:

- Air pressure and SST measurements from drifting buoys. For both of these variables the global drifter array (and Arctic/Antarctic buoy programmes) provide the majority of the data over the ocean. Presently only 60% of drifters carry pressure sensors and tangible benefits would be realized if this proportion was increased;
- Surface meteorological observations from Voluntary Observing Ships (VOS). This would encompass both automated and manual observations from VOS from both Members Exclusive Economic Zones (EEZs) and over the High Seas;
- Upper ocean temperature and salinity data from the global array of Argo floats. In virtually all cases the temperature data are distributed alongside salinity profiles, where both are used to give the ocean density structure that drives the ocean thermohaline circulation;
- Surface meteorological observations and, where available, upper ocean temperature (and salinity) data from moored data buoys. Many of these are moored in Members Territorial Waters or EEZs, together with the global Tropical Moored Buoy Array (TMA) that has components in the Pacific, Atlantic and Indian Oceans. Increase of air pressure sensors on the TMA elements is also recommended, only a few currently have this capacity.

2.3 EEZ Report

First Session: Emma Heslop

Second Session: Emma Heslop
Document: Final Draft Expert Meeting report on the Ocean Observations in Areas under National Jurisdiction Workshop
Presentation: GOOS SC-10-2 Ocean Observations in Areas under National Jurisdiction (OONJ) – Preview of Report Findings

Discussion:
Emma Heslop introduced this item. The SC noted a natural link between the WMO & GBON discussion and the issue of ocean observing in States EEZs. WMO highlighted that GBON covers EEZs as well, with language that speaks to Member States to facilitate other Member States in undertaking observations. While the wording is not very strong, it could be useful to get traction.

Allowing observations in EEZs should be in the interest of nations because there is no climate mitigation and disaster prevention without that, however the report makes clear that communication with member states on the value of ocean observing. It was suggested that GOOS/IOC play a stronger role in lobbying, e.g. during Fourth Session of the Intergovernmental conference on an international legally binding instrument IGC4 for BBNJ in 2022. There was also a note that communication should be undertaken with coastal states perspectives in mind.

It was recommended that GOOS works closer with GRAs as regional coordination could help promote the need for change in this regard.

Decision 4: Ocean Observing in EEZs

No single solution from the Ocean Observations in Areas Under National Jurisdiction Experts Workshop will be sufficient to solve all the issues that networks face. The need to resolve these issues for the sustained operational ocean observing system under GOOS is driven by the clear challenges faced by society related to climate change and adaptation, and the development of sustainable ocean management. Seven solution spaces were identified, working on a selection of these will support implementation of a truly Global Ocean Observing System.

GOOS Core Office to work with IOC, WMO and DOALOS to carefully select those areas where they will place effort to support ocean observations in coastal States EEZs.

GOOS to ask these organisations to work together and commit to making progress in this politically difficult but societally vital area.

2.4 Ocean Indicators Task Team

First Session: Sabrina Speich
Second Session: Sabrina Speich
Presentation: Towards an International Ocean Indicator Framework

Discussion:
Sabrina Speich introduced this item. The GOOS SC welcomed this initiative.

The GOOS SC mentioned other frameworks currently in place and stressed the importance of producing something authoritative and useful and not duplicating efforts. The IOC's State of the Ocean Report initiative was mentioned (IOC EC June 2022) together with the Copernicus Ocean Status Report or the World Ocean Assessment. The GOOS SC recommended that the initiative be expanded to better accommodate stakeholders needs as it currently appears to be science-driven. GOOS SC members also mentioned that at the local level there are many indicators in place, that it is also important to consider the blue economy, and that environmental information should be framed in such a way that it could be useful for conventions related to biodiversity/marine ecosystems.

It was clarified that the intention of the Ocean Indicators Task Team is to include policy and economic aspects in the discussion. The Task Team will be supported by the G7 Future Seas and Oceans Initiative (FSOI) group and the European EuroSea project.

2.5 Reflections on COP-26 / Carbon Observatory

First Session: Toste Tanhua
Second Session: Anya Waite
Presentation:

Discussion:
Toste Tanhua introduced this item for the first session and Anya Waite for the second session.

The GOOS SC agreed that GOOS activity at COP-26 was well received and resulted in a step change in the awareness of GOOS and understanding of the oceans' role in climate change and the critical need for ocean observations. This was accomplished through a simple narrative, tailored to the ministers and ministries of nations represented in the negotiations.

GOOS SC appreciated the idea of an Ocean Carbon Observatory, which focuses on the deliverables and high quality regular estimations that would be obtained. However, not all of the SC were comfortable with GOOS proposing a regional North Atlantic demonstration. The potential of the blue carbon was discussed briefly in this context. While blue carbon is part of the concept and discussions, it would ultimately only be a small percentage of the total storage.

It was recommended that a GOOS communications strategy for COP be developed for the future and shared with the SC. More work is required to ensure the ocean is included adequately in the final COP documents in the future. Closer work with IOC and WMO is needed to pursue the idea of ocean carbon monitoring and tracking.

2.6 Proposal to become a GOOS project SMART cable

First Session: Bruce Howe
Second Session: Jose Barros
Document: JTF SMART Cables Request for Affiliation as a GOOS Project
Presentation: SMART Subsea Cables: GOOS Project

This item was introduced by Bruce Howe in the first session and Jose Barros in the second. In the second session there was no time for discussion, the summary below is thus from the first session.

GOOS SC raised the importance of this kind of system for the Tsunami Warning Systems and a discussion with the Tsunami Unit within IOC was encouraged.

Endorsement from GOOS is considered to be very useful to support this initiative. Further developments like upper column moorings or the possibility of using the installations as docking stations for AUB were also discussed, however at this stage it is important to keep the project simple so that it is palatable for the Telecom industry.

GOOS SC supported the draft Decision as shared by GOOS Secretariat.

Decision 5: SMART Subsea Cables

GOOS Projects are aimed at filling identified gaps in the system. They may be Development Projects with a broad scope covering requirements, observations, and data systems universally relevant to GOOS, with a geographic or thematic focus; or Pilot Projects focused on specific areas or systems to improve readiness for sustained observations.

GOOS welcomed the progress in development of SMART Subsea Cables as a component of the sustained ocean observing system, and is supportive of the proposal for SMART Subsea Cables to become a GOOS project. Projects are time bound.

GOOS requests SMART Subsea Cables to provide a clear project development timeline for the next 5-years, with deliverables to GOOS that are aligned with the 2030 Strategic Objectives, and report back to GOOS SC-11 in 2022 with this timeline and updated project proposal for endorsement as a GOOS Project.

4. Ocean Decade Programme

Presentations were given by each of the programmes *Ocean Observing Co-Design*, *CoastPredict*, *Observing Together* to update the committee on work to date, the development of programme structures and governance, and to outline key challenges for each programme and some of the challenges that are common across the three programmes.

Across the three GOOS Ocean Decade programmes the key points and specific requests for the Steering Committee were:

- *All programmes value the increased visibility and catalysing discussions / strategising across government, science, NGOs and industry that is being achieved by the Ocean Decade.*
- *GOOS should advance its communication to diverse communities, focusing on policy makers and research institutions of the Member States.*
- *GOOS should ensure that 3 GOOS Decade Programmes are integrated (good effort thus far!).*
- *GOOS should clarify how the Ocean Decade Programmes will be implemented within the GOOS structure.*
- *There is concern from the three Programmes that there is a lack of implementation resources for the Programmes, in contrast to the resourced Ocean Decade office.*

The Decade Coordination Unit (DCU) was represented in both sessions and updates on the Decade (presentation) was provided by Vladimir Ryabinin and Julien Barbiere [Session 1] and Alison Clausen [Session 2]. This input highlighted the level of activity already underway as part of the Decade and priorities for the coming year.

In the first session Vladimir Ryabinin highlighted the need for consolidation of initiatives within the Ocean Decade. He reflected that a priority for GOOS should be to work with strong users, this is already successful connections to the meteorological community, however there is an opportunity for greater connection to biodiversity communities, and to strengthen delivery across climate, economy (including meteorology), and intangible value, such as capacity development. GOOS should aim for greater connection to the mainstream design of ocean management; ocean management is related to conventions, such as those on biodiversity, climate, and the work of organisations such as the High Level Panel for a Sustainable Ocean Economy. IOC could do more to help GOOS in creating these connections.

The new Decade Advisory Board will meet in early 2022. Recent innovations in the Decade include having sponsored calls, the first from AXA Research Fund and Meer Wissen Institute, also the Global Stakeholder Forum, which can be a platform to share news and connect with potential sponsors. The DCU is growing, with many positions through secondment. Support is also developing with Decade Coordination Units, 2 such units are close to going ahead; climate and coastal resilience, co-design, ocean prediction, NE Pacific. Resource mobilisation will have greater focus from the DCU this year and priorities will include further engagement of member states to drive funding, and engagement with the philanthropic and private sectors, including two meetings in 2022 (Rabat, Morocco and Monaco). The Ocean Decade Alliance was highlighted as an emerging group of engaged funding actors including member states and the intention is to broaden the group to engage more private sector and philanthropic foundations. Understanding the resource needs of Decade Programmes is important to all this work, and the Ocean Decade Office would like to work more closely with GOOS on the messaging around its Programmes. Other key events for engagement and outreach will be One Ocean, Brest, France

and the UN Ocean Conference, Portugal. Julian and Alison highlighted 3 opportunities where the DCU and GOOS could work together more closely in the coming months:

- GOOS ambition in the observing community - lead a community of practice, establish a decade coordination office for observing to elevate GOOS role as the global coordinating body for ocean observations and infrastructure through the Decade
- Joint analysis and action in relation to philanthropic funding resource mobilisation
- Work together on messaging and engagement of potential funders to put forward investable activities - through development of joint messaging and packaging of products for coordination and programme resource needs

Documents:

- *CoastPredict: Revolutionising Global Coastal Ocean observing and forecasting*
- *Observing Together: Meeting stakeholder needs and making every observation count*
- *Ocean Observing Co-Design: Transforming our ocean observing system assessment and design process*
- *The Global Ocean Observing System at the heart of The Decade of Ocean Science for Sustainable Development 2021-2030*

Presentations: Ocean Observing Co-Design, CoastPredict, Observing Together, Ocean Decade

Discussion

GOOS Role in the Ocean Decade

A major topic was the role of GOOS as a whole in the Ocean Decade. GOOS has developed 3 major Programmes that are aimed to be transformative, however at a more fundamental level Global Ocean Observing System and core GOOS work are a vital infrastructure that will be key to implementing the Ocean Decade. Should GOOS have a more core role in the Ocean Decade as ‘core infrastructure’?

There has been a proliferation of actions, structures and reporting under the Decade; GOOS work is already complex and it would not be viable or useful to have the many actions in GOOS apply to be considered as Decade actions, and yet they will be the underpinning of the Decade. Need something that would identify the core role of GOOS across the Ocean Decade.

The Ocean Decade has set up new structures around coordination and there was strong recognition from DCU, IOC and SC members that GOOS was the right place to build the Decade ocean observing coordination. However, placing the whole of GOOS in the Ocean Decade was not considered a viable route, as the Ocean Decade has a time limit and is aimed at being transformational. GOOS should take the opportunity presented by the Decade to transform but will exist beyond the Ocean Decade.

The proposal to develop a GOOS led Ocean Observing Decade Coordination Office was discussed. This role is consistent with the core of what GOOS is/does, i.e. the coordination of global ocean observing initiatives, into frameworks and structures, so that many contributions add up to a coherent whole.

GOOS SC confirmed interest in developing the idea for a GOOS led DCO for ocean observing programmes, projects and actions within the Ocean Decade, however at the same time it was

noted that this could not be accomplished without additional support. Although taking on this new global role with no immediate additional support is a risk, the alignment with GOOS core role is such that this is a risk GOOS should be prepared to take, in anticipation that support for such a DCO structure would be forthcoming.

The DCU expressed interested in developing this discussion around how it can support GOOS as the coordination framework for programmes and projects, to build the capacity of GOOS to act as a hub for co-design and to identify priorities - work that is doing today, but that it could develop further within the Ocean Decade, and through this also increase its value by developing connections to additional/other stakeholders, such as biodiversity, ocean management, and for climate change adaptation and resilience. As GOOS builds its internal structure, it could start to strengthen these external links.

The DCU welcomed a discussion with the GOOS leadership to scope and develop the ideas as to what this DCC would look like. What is the extra lift that is required for the Ocean Decade beyond the coordination that GOOS currently undertakes? What would an ocean observing collaboration centre look like and what would its priorities be?

The DCU noted that the scope and resource needs of the DCO and DCC coordination hubs are becoming more clear and that the DCU could support GOOS in refining the concept and needs of a DCO. The DCU would also support GOOS in seeking the resource needed, through resource mobilization activities. It noted that in-kind or personnel secondment seems to be an attractive means of resourcing for donors, for example resource mobilisation could initiate with in-kind resourcing through private-sector secondments.

Concern was expressed that developing a GOOS led DCO will put pressure on existing resources in the short-term, however there was consensus that GOOS should approach this strategically and examine in more detail what this role might look like.

It was suggested that GOOS engage swiftly with the DCU to discuss in more detail what additional lift is needed to establish GOOS and support as the coordinating body for ocean observations and as a critical infrastructure that will underpin the Ocean Decade. Consideration should be given collectively to assess the balance of effort in GOOS core work and the Ocean Decade Programmes, particular emphasis must be on resourcing and how the DCU can provide support with regard to resourcing the Programmes. It was suggested to establish a collaborative approach between GOOS and the DCU to work on joint messaging around areas of investment for philanthropy and to analyse and take action for engagement of potential donors.

The IOC noted the bigger picture, that national governance mechanisms around the ocean are weak, not many states have ocean departments/ministers. We need more momentum to make a difference. Stronger IOC, stronger Ocean Decade, stronger GOOS and future for sustainable ocean management.

Biodiversity

There was some agreement that GOOS should identify strong users in biodiversity, and that the conventions were strongly interested in developing capacity, and that measures of success within the Ocean Decade should be linked to concepts such as how many nations are reporting on EOVs.

Observing Together

Observing Together was asked how projects can join the Programme. One particular project for ocean and ice observations from IAATO ships in Southern Ocean waters was noted as a potential to join the Programme. It was suggested that a representative for the project Observing Together project meeting, in addition GOOS SC members were invited to join the Observing Together Advisory Group.

Ocean Observing Co-Design

BioEco Panel note that interaction with Ocean Observing Co-Design would be welcome, marine heat waves were identified as a potential exemplar locus for interaction. Marine heat waves were noted as a good 'exemplar' for co-design of an effective observing system.

In addition, the ideas of developing some exemplar work around a carbon observing system (noted in session around COP-26) were dicussed. It was agreed that ocean carbon is ripe for an Ocean Observing Co-Design exemplar, however the SC commented that this carbon observatory observing system should be enlarged to encompass a wider region, i.e. including more regions than the NE Atlantic, to develop an ocean carbon observatory that reaches the interest of more stakeholders, nations and communities. It was noted that Ocean Observing Co-Design already has a carbon exemplar, and so this was noted as an area which can be discussed and potentially implemented starting 2022.

WMO noted their interest in the Ocean Observing Co-Design Programme and noted that the concepts being developed under this Programme are of interest to WMO with respect to the Rolling Review of Requirements process, and that WMO could learn from engagement in this programme. The opportunity for the WMO to play a role in the Ocean Observing Co-Design programme was noted as an opportunity that would offer mutual benefit.

WMO suggested that work with intermediary providers in some exemplar areas is important, this matches how the Ocean Observing Co-Design Programme envisioned the work in exemplar areas, i.e. to engage with major intermediaries where they exist.

Coast Predict

The need to focus on the EOVs that are important to coastal issues we noted; many developing states have more immediate needs associated with phenomena such as waves and wave related issues.

WMO noted that there was some potential overlap in the ambition of Oceast Predict and work within WMO, for example within the global data forecast and prediction system work. With limited resources it was suggested that a discussion between WMO and CoastPredict to work on connections and look at potential efficiencies. CoastPredict noted that strong coordination with WMO was an intention of the Programme. There is potential to work together towards enhanced observing and forecasting, and real integration in the coastal areas to develop fit-for-purpose systems that really respond to stakeholders. The CoastPredict outcomes and principles and structure could be a good place to start such a discussion. Further discussion between the WMO and the CoastPredict programme was requested.

A post GOOS-SC meeting of the three Ocean Decade Programmes to consolidate input from the Steering Committee was also recommended.

Decision 6: GOOS in the Ocean Decade

GOOS thanks the Ocean Decade Team for the increased visibility and for catalyzing discussions/strategizing across government, science, NGOs and industry. In the context of the Ocean Decade GOOS should:

- *advance its communication to diverse communities, focusing on policy makers and research institutions of the Member States.*
- *ensure that Decade programmes are integrated (this work is already underway).*
- *clarify how the Decade programmes will be implemented within the GOOS structure and implementation.*

There is currently a lack of implementation resources for the GOOS Programmes and projects. Although projects are perhaps an easier route for investment, it will be Programmes that will place the projects into a framework for societal impact, to benefit multiple users. Programmes/projects need to receive implementation support and resources to coordinate planning.

GOOS and the Decade Coordination Unit (DCU) to work on raising the profile of the GOOS Programmes, as vital and fundable entities within the Ocean Decade.

GOOS and the DCU to work together in the area of philanthropic fundraising for GOOS Programmes.

GOOS Co-Chairs, IOC Executive Secretary and the Ocean Decade Coordination Office leadership should convene and discuss GOOS role as a whole in the Decade, with a focus on several key issues:

- The role, scope and priorities for a GOOS led Ocean Observing Decade Coordination Office (DCO) or other coordination structure. What does this fulfill for the Decade and the observing community, beyond what GOOS does today? Can this also be transformational for GOOS? Define the scope, extra/expanded work, what are the support/resource needs for a DCO? And how GOOS and DCU work together on funding such a DCO?
- How would the Ocean Decade describe GOOS 'role, for example as vital or critical infrastructure? It is important to have a clear articulation of this that both GOOS and the Ocean Decade can reference

Ocean Observing Co-Design

- BioEco Panel interest in collaborating, perhaps around marine heatwaves
- WMO interest in this Programme
- interest in marine heatwaves and ‘carbon station’ system exemplars

CoastPredict

- to connect with WMO and look at potential to work together for greater efficiency and to discuss areas of intersection in terms of coastal forecasting

Observing Together

- To communicate regarding potential for projects to join the programme and invite representative of the IATTO Ships in the Southern Ocean project

Convene a post GOOS-SC meeting of the three Ocean Decade Programmes to consolidate input from the Steering Committee.

5. GOOS Task Team Progress and Priorities

Emma Heslop presented on progress of the GOOS Task Teams and actions set during the last Steering Committee meetings (SC-9 amd SC-10), noting where priority has been placed, and where there has been less progress and why. Several suggestions to the Steering Committee were discussed.

Presentation: GOOS SC-10-2 Task Team Progress and Priorities

Discussion notes

GOOS Structure Task Team: this should be considered as a subtask or working group under the Governance Task Team, as with the GOOS Regional Policy subtask/working group, see Decision 1.

Partnerships Task Team: it was recognised that there are other priorities for dedicated secretariat resources at the moment, however could this be considered as a biannual review with Steering Committee members to map partnerships and connections and leverage existing connections for stronger engagement. A focus could be put on key connections between partners and the Steering Committee members to leverage existing relationships for greater engagement.

Evaluation and review framework: This has been to some extent superseded by the Ocean Observing Co-Design Programme. The work envisioned here will form part of the Ocean Observing Co-Design Programme Workshop, in April 2022. *G7 FSOI has offered to provide scientific and technical support to the eval framework work given that it relates to G7 priorities for authoritative guidance on priority gaps and requirements. In discussion how this work merging into CoDesign relates to G7 FSOI mandate/goals.*

Implementation Plan Task Team: it was suggested that this completes as a task team at the next SC, with work continuing through quarterly GOOS Exec meetings to work on IP actions, funding, progress, issues, and reporting to SC across GOOS. The Ocean Decade programmes should be connected through the GOOS Implementation Plan and regular GOOS Executive meetings.

Future reporting on Implementation: it was suggested that future implementation Reporting (e.g. this reporting on Task Team and Actions) to the GOOS SC should look at achievements against the Implementation Plan, as a more useful way to report look at implementation by strategic objective and against the strategy as a whole. This would give greater scope to the Advisory role of the Steering Committee for the GOOS core team, to advise about improvement in a few specific areas per year and how improvements could be achieved. There was a positive response to the suggestion to use the Implementation Plan as a way of reporting out.

OOPC asked for input from the Steering Committee and other panels about progressing observing system review through synthesis of recent reviews. G7 suggested that funding could be aligned if there are clear recommendations. It was suggested that this may potentially be achieved through the Ocean Observing Co-Design Workshop in 2022. However, there was some reservation about including the review synthesis work as part of the Ocean Observing Co-Design Workshop as the audiences and focus of the Workshop will be different. If recommendations are too general they may not be actionable. There was also a suggestion that the review synthesis may be linked to the cross-panel indicator paper. GOOS partners and Steering Committee to participate in the Ocean Observing Co-Design workshop planning.

One idea from SC-10 that had not yet been actioned was the suggestion to add representatives from developing nations, SIDS to all GOOS teams, building on positive experience in OCG. This is something that GOOS should work at, starting at the component/panel level. There was a positive response to the suggestion to include representatives from LDCS and SIDS in all of the GOOS task teams. That would mean looking outside of core GOOS SC to other committees within the larger ecosystem

Decision 7: GOOS Task Teams

The Implementation Plan Task Team will complete at next SC in April 2022, by proving a clear pathway forward using the Implementation Plan and tools for:

- Management of GOOS Actions
- Annual reporting to the GOOS SC
- A base for funding activity

Ocean Observing Co-Design to consider how/if the development of synthesised recommendations for ocean observing priorities can be integrated into the planned Ocean Observing Co-Design Workshop.

The GOOS Structure Task Team, to be formed as a subtask or working group under the GOOS Governance Task Team.

A special session on partnerships could be held with the Steering Committee to consider the existing map of partnerships, with a focus on identifying key partners, the connection or focal points within the SC. Ideally then to develop some sort of visualisation of partnerships from this meeting.

6. How we work in 2022

Emma Heslop shared a presentation developed by Albert Fischer on *How we work in 2022*. This highlighted changed ways of working due to COVID-driven global restrictions and noted the opportunity presented by travel budget savings to reallocate funding to resource consultants and engage expertise from specialist agencies. The return to physical in-person meetings or hybrid options must be considered, to define priority scenarios for travel.

Some key questions were:

- How could we improve online work? Can interactive sessions be made more fulfilling and useful to enable people to fulfill missions?
- How might we transition to more hybrid working given ongoing travel restrictions?
- With reduced funds going to travel what should priorities be for travel? Should a focus be put on partnership building, for example regions where in-person engagement is particularly necessary?
- Suggestion: single steering committee meeting session with smaller topical meetings every 2 months?

Discussion

There was a recognition of the importance of in-person meetings in some cases, however that priorities need to be evaluated to optimise budgets, for both travel and carbon. There can still be value in physical meetings e.g. at the start of establishing a team or when particular engagement and interaction is needed. In-person interaction may be of particular importance for missions to engage with implementation teams and in some cultures. Some recent success with hybrid events was reported from the BGC Panel.

GOOS should continue to evolve its understanding of best practices for online meetings.

Decision 8: GOOS SC and Meetings

The SC generally supported the following ‘ways of working’ for 2022:

- The next SC (April 2022) will be an online event. This will be a single SC-11 meeting, with additional short topical SC sessions around key major items approximately every 2 months.
- GOOS will operate in the future with a reduced travel budget (reduced by 50% or more as compared with 2019 levels). This means that GOOS elements will need to consider how best to prioritise travel to have most impact

7. In camera session

In Camera Day of GOOS SC-10, December 2:

Summary:

Revisited the Vision and Mission: “[provide]…essential information needed for sustainable development”, and “..lead and create partnerships” for the observation community.

Re. Ocean Carbon Observatory: While there was support for the strong focus on a step change in ocean carbon observations, several voices were heard that cautioned on a too solitary focus on carbon. The strength of GOOS is an integrated system. Ocean observations for climate (carbon, heat) and for weather long-range forecasts were voiced as being “sellers” of ocean obs. It was clarified that the communications nevertheless needed to be extremely focused and targeted; i.e., policy messaging would in some instances need to be significantly narrower than the actual strategic focus of GOOS.

Re. Operations: Strong message that GOOS system is overloaded, and that while “it works”, the number of activities is too high and needs to be focused on the most relevant actions.

Re. Resourcing: Several voices of concern with respect to the insufficient resourcing for GOOS, in particular the central Paris office. Suggestions for better communication and advocacy to remedy the situation (e.g., for the Carbon Observatory, above, to bring attention to GOOS). Discussion as to how GOOS might name its relevance for the Blue Economy.

Re. Partnerships: Several voices for stronger connection to WMO – stronger mandate to impose action to members. Also links to access additional funding (SOFF etc) and regional / national structures by more closely aligning with met services. Go quasi-operational (i.e. don’t leave the science community behind).

For SIDS, there are some routes for additional funding from climate funds, SOFF etc.

Several voices asked us to talk to member states (of IOC and WMO) rather than only ask the IOC for additional funding. Suggestion to have a side event during the IOC Executive Council this summer, raising the concern for GOOS and asking for additional support. Energize the IOC member states! Start with the major nations to have a focused strategy on ocean obs. We need to be tactical.

Better alignment and communication with end-users were voiced by several SC members as priority.

Several SC members voiced governance as a key element to elevate GOOS.
We also heard support for continued work with POGO and GEO to not dilute the message and the funding. A strategic path to work better together with one voice.

ANNEXES

List of Participants

A full list of participants can be found on the meeting website.