GOOS SC-10 Part 2: Workshop on GOOS Regional Structures
Background Information

Prepared by Emma Heslop, Denis Chang Seng, Albert Fischer and Alejandro Aldana, with Annex 1 as developed by Maria Hood

Workshop Aims

This special GOOS SC session will focus on the GOOS regional approach. The first GRA was created in 1994 and the most recent addition was in 2014. GRAs are coalitions of nations and/or institutions that share GOOS principles and goals, but are mostly concerned with local priorities and organized around ocean basins or coastal environments.

Today there are 13 designated GRAs. They are heterogeneous in structure and governance and range in type from large national systems, such as IOOS and IMOS, to regional consortia that coordinate across data flow and networks, such as EuroGOOS, to regional bodies that focus on coordination to respond to scientific questions of regional importance. There are also a few emerging regional groups that are not designated as GRA's, but regularly participate and gain from the GRA Forum discussions, such as SOOS and the Arctic Council.

GRAs by concept are especially important for incorporating both coastal and open ocean observations, and for engaging with the users of operational services and the beneficiaries of marine ecosystem health. All GRAs are focused to deliver on the provision of ocean observing information. Several GRAs had evolved to meet a wide range of societal challenges related to both the coastal and open ocean observations. Some GRAs are active and are embracing new networks consistent with the expanded vision and mission of GOOS and increased delivering in terms of operational modeling capacities within GRAs. Despite this, several regions remain sparsely observed and the GRA structure and activities have not been a driving force for global capacity development towards filling these gaps. In addition, the last 5 years has seen the development of regional ocean observing coordination through projects such as TPOS2020 and AtlantOS, that seek to coordinate across perceived 'gaps' in the current GRA structure. In the case of AtlantOS to take a basin scale approach for the Atlantic, and for TPOS2020 to revive and update the Tropical Pacific Observing System for the benefit of the intermediate data users that use the TPOS ocean data in services. Coordination, collaboration and engagement between these regional projects and GRA activities have also not been optimal in order to deliver maximum regional benefits.

The OceanObs'19 paper by Moltmann et al. (2019) and the published paper in Frontiers in Marine Sciences (2019) - on this link outlines some clear benefits in the GRA structure, as well as barriers and challenges which predominantly include resources and partnerships.

At the GOOS SC-10 part 1 we considered the Study on Support Provided to Global and Regional Ocean Observing Systems, by Neville Smith (link). Section 3.22 page 34 summarises the findings for the regional dimension and makes a Recommendation 3: Regional networks should be recognized as part of the (GOOS) support structure when and where they offered advantage and value for implementing the six pillars of the support strategy.

Under Strategic Objective 2 of the 2030 Strategy GOOS and as recommended in the Study on Support Provided to Global and Regional Ocean Observing Systems, by Neville Smith (Recommendation 2), there is work underway to rejuvenate the GOOS National Focal Points role in GOOS. This will be an ongoing focus within GOOS and so should be considered within the regional discussions.

This Workshop is convened with the GOOS SC, the leadership of the GRAs and the regional Projects to discuss the evolution of the GOOS GRA concept, to consider what works, what does not, what and how should we evolve this regional concept to contribute more to the GOOS and to those involved at the regional level.

A key discussion point is - could we gain from a more flexible and adaptable approach to what constitutes a GRA and the GRA framework?

Background on GRAs

1. Development of the GOOS Regional Alliances

The first GOOS Regional Alliances (GRAs) were formed in 1994 and 1996, and were guided by the GOOS Regional Policy 2006 (IOC-WMO-UNEP/I-GOOS-VI/3 Annex VII).

The GOOS Regional Council was created by the GRAs at the 2nd GOOS Regional Forum (Nadi, Fiji, 2004) and is not a subsidiary body of IOC. Its creation was noted by I-GOOS-VIII (Paris, 13 – 16 June, 2007). The Regional GOOS Implementation Decisions of the I-GOOS-VIII, decision 8 stated: I-GOOS recognized the formation by the GRAs of the GOOS Regional Council (GRC), and accepted the Terms of Reference as amended.

The “Strengthening and Streamlining for GOOS” (IOC Resolution XXVI-8, 2011) recommended creating the GOOS Steering Committee with effect from 1 January 2012, and reinforcing cooperation with the IOC Regional Subsidiary Bodies, and with other relevant bodies including the GOOS Regional Alliances, as a means for coordination and implementation of GOOS. The Terms of Reference for the GOOS Steering Committee (Annex to Resolution XXVI-8), states that the chairs of appropriate coordinating and implementing bodies, both within and outside IOC, will be invited to participate in an ex-officio capacity. Such bodies would include the GOOS Regional Council.

The Regional Policy of 2006 grew outdated after the reform of GOOS structures by the XXVI Session of the IOC Assembly in 2011, and was replaced by the GOOS Regional Policy 2013 (IOC/INF-1308). The GOOS Regional Policy 2013, incorporated new aspects of the GOOS Steering Committee, the Framework for Ocean Observing (IOC/INF-1284, 2011), IOC Resolution XXVI-8, and the terms of reference of the GOOS Regional Council (GRC). In the GOOS Regional Policy 2013, the role of the GRAs, their qualifications, and their approval by IOC governing bodies were noted, including the responsibilities of GRAs in GOOS.

In summary, all GRAs should:

- Uphold GOOS Principles (1998, GOOS-41) and implement a Framework for Ocean Observing (IOC/INF-1284 rev.)

- Serve as a platform for coordination and facilitation of observing requirements, observing networks, data streams, and assessment of regional capacity
- Promote/manage programmes on developing regional capacity
- Encourage the development of Regional and National Ocean Observing Systems

The method of creation of a GRA was noted:

- A GRA is formed via recommendation or by agreement by IOC Regional Subsidiary Bodies, and/or between participating countries, and/or national organizations, and/or international bodies
- Proposals to be recognised as a GRA must be approved by the Assembly or the Executive Council of the IOC. Recommendation for recognition will be received through the GOOS Steering Committee (GOOS SC) or from IOC Regional Subsidiary Bodies in consultation with the GOOS SC

The role of the GOOS Regional Council to provide a unified voice for global communication and exchange of information between GRAs and the GOOS Steering Committee was clearly defined, as well as the relationship of the GRC with other IOC bodies.

Today there are 13 designated GRAs. They are heterogeneous in structure and governance and range in type from large national systems, such as IOOS and IMOS, to regional consortia that coordinate across data flow and networks, such as EuroGOOS, to regional bodies that focus on coordination to respond to scientific questions of regional importance. All GRAs are focused to deliver on the provision of ocean observing information. Several GRAs had evolved to meet a wide range of societal challenges related to both the coastal and open ocean observations. Some GRAs are active and are embracing new networks consistent with the expanded vision and mission of GOOS and increased delivery in terms of operational modeling capacities within GRAs. GRAs promote shared strategies, infrastructure development, data standardization, open access, and capacity building. In particular, GRAs have contributed to a global inventory of ocean observing assets and have developed an inventory of operational ocean modeling activities to promote a value chain approach to ocean observing. They are especially important for incorporating both coastal and open ocean observations, and for engaging with the users of operational services and the beneficiaries of marine ecosystem health.

2. Ninth GOOS Regional Alliances Forum 2019

The 9th GOOS Regional Alliances Forum (GRF-IX) in 2019 (link), raised questions regarding regional governance, the role of the GRAs, and their needs.

The GRF-IX:

- Explored the potential for new partnerships between GRAs and other programs relevant to GOOS, with an emphasis on capacity development in: 1) Global Ocean Acidification Observing Network (GOA-ON); 2) Regional ocean observing initiatives; 3) Large Marine Ecosystems (LMEs); 4) Modelling and Forecasting.
- Identified a need to explore stronger engagement of national programs (such as those emerging in Canada and South Africa) in the GOOS regional observing enterprise, as well as stronger interlinkages between GRAs.

- Looked at improving implementation at national level. In particular, what activities of 'GOOS' are most important in developing national investment in sustained ocean observations and how governance helps national implementation?
- Indicated that countries are looking at observing system development options and how this relates to different risks and impacts. It was important for GOOS and GRAs to listen, and understand the country's needs to better deliver the intended societal benefits.
- It was considered important to raise awareness and understanding regarding the larger issues about the global ocean observing system, and this would facilitate discussion and engagement with partners and agencies.
- Highlighted that significant capability exists in some regions that are not currently engaged with GRA structures, better understanding impediments and barriers will be important.

As GOOS key activities include providing data standards and global context for data sharing, GRAs believe there are values and benefits to countries to see themselves as part of the regional and global context.

A survey conducted prior to GRF-IX identified three tiers of expectations:

Expectation from GOOS Structure: 60-65% of GRAs expect improved coordination, tighter connections and interactions between the GOOS structures (GOOS panels, OCG, working groups GRAs and JCOMMOPS) as well as improved feedback/interactions with Member States. They also expect support and advice from GOOS; as well as that the socio-economic aspects of GRA contributions be better reflected.

Expectations from other GRAs: This includes having the opportunity to share best practices, knowledge, data & experiences, strengthen cooperation and coordination to enhance capacity for efficient use of resources and assets, & consolidate relationships between GRAs to enhance collaborative activities, observations and research projects.

Expectations from the GRA Forum: 70-75% of GRAs would like to have the opportunity to understand the status of different GRAs and discuss how GRAs can align in delivering GOOS, to learn on other GRAs success, best practices and challenges, to share knowledge and experiences. They expect the Forum to help to ensure effective coordination among GRAs, as well as in identifying common interest for project collaboration with other GRAs. It helps to strengthen collaboration with JCOMM (WMO IOC Joint Collaborative Board), IOC and WMO.

Questions raised at GRA-IX included:

- Whether we can build a GRA if there are no existing strong national programmes? And if evaluation should happen first at a national level?
- Whether GRAs should be active in all areas of responsibility? There are implications for the performance and evaluation of GRAs.
- And are there other regional actors that take on parts of this, or pull into the value chain further?

There were different views on how to improve governance by adopting fit-for purpose organizational and coordination structures, however a 'soft-light' touch/approach on governance was recommended, with a key focus on improving communication and

enhancing the value chain. With a charge to GRAs to explore opportunities of collaborating at national level through bilateral and multilateral agreements.

2. OceanObs'19 Moltmann et al. Paper

In "*A Global Ocean Observing System (GOOS), Delivered Through Enhanced Collaboration Across Regions, Communities, and New Technologies*" paper, Moltmann et al. (2019) identified that the GOOS Regional Alliances (GRA) role and values are to; identify, enable, and develop sustained GOOS ocean monitoring and services to meet regional and national priorities, aligning the global goals of GOOS with the need for services and products satisfying local requirements.

Moltmann et al (2019) noted two key challenges and impediments related to GOOS and GRAs in delivering a Global Ocean Observing System (GOOS) through enhanced collaboration across regions, communities, and new technologies, in particular in embracing new observations and data "*The Need for New Observations and Biological and Coastal Data to Meet Expanded Requirements for GOOS*."

1. ***Global coordination of additional networks:*** It was emphasized that the expanded requirements, new EOVs for biogeochemistry (e.g., oxygen), and biology/ecosystems (e.g., zooplankton biomass and diversity, fish distribution, of GOOS in 2019 will not be met by a system designed in the 1990s. Thus, Global coordination of these additional networks presents a challenge. Some GRAs currently lack capacity and expertise to develop these new networks.
2. ***Heterogeneity and funding:*** The paper identifies that due to significant heterogeneity in the GRA governance, funding of GRAs continues to be a key barrier and impediment. In particular, Moltmann et al. (2019) argued that several GRAs are founded on governance agreements that do not easily allow the addition of new partners.

The scarcity of funding to support multinational ocean observing efforts and genuine capacity development within nations is also a serious challenge. As an example, the MESCAT cross GRA pilot project seemingly failed to attract an appropriate funding mechanism until very recently, eventually its activities were partly injected into another European project (EuroSea).

3. Findings from the - Report of study on Support Provided to Global and Regional Ocean Observing Systems

In 2019 GOOS commissioned a report by consultant Neville Smith on the support structures for sustained ocean observing systems, including support for the GOOS core team components, link to report. The recommendations considered regional engagement and referenced the Moltmann et al. (2019) paper.

From the Report by Neville Smith:
We found strong support among the correspondents for retaining regional support structures, but the feedback also echoed the conclusions of the Moltmann et al (2019) which concluded the role of GOOS Regional Alliances remains an outstanding issue. Given both

IOOS and IMOS were in effect national alliances, only EuroGOOS can be put forward as a strong and successful model for regional collaboration and coordination of support, despite significant efforts elsewhere.

We conclude regional networks should be recognized as an element of the architecture when and where it is clear they provide advantage and value in terms of the six pillars (objectives) of the support structure[1] (see Report section 2.2 and Figure 4). There were two clear cases where such advantage and value might prevail:

1. The first was in situations where the region (or basin) brings unique phenomenological considerations into play, directly influencing design, requirements, and optimal solution (Figure 7a). TPOS 2020, IndOOS and SOOS were three such examples. TPOS 2020 was a stakeholder intervention whose objectives were to redesign and reset the TPOS. It cut across domains (physical, climate and biogeochemistry) and covered the end-to-end system (observation, data management, and modelling and prediction), including full consideration of user requirements and their implications for the system. TPOS 2020 worked in the same space as the domain Panels and provided support aligned with all six pillars. The project was now evolving to the implementation phase, thus intersecting more directly with the activities of the Ocean Coordination Group.

2. The second situation, and the one most referred to in consultation, was where a regional network was acting at and effective at the user/societal interface, enhancing engagement and uptake (Figure 7b). They were often based on geopolitical considerations; EuroGOOS and PI-GOOS were two such examples. Their value was at the edges/interfaces of the 'cloud of support', but they may not necessarily be strong across all the pillars and aspects of the support structure. Some also render advantage through capacity building and training actions. The GRAs were typically of this type, but as Moltmann et al (2019) noted, questions remain around the advantage and value of individual GRAs.

Recommendation 3 *Regional networks should be recognized as part of the support structure when and where they offered advantage and value for implementing the six pillars of the support strategy.*

[1] The six pillars (primary objectives) for support identified in the report are; (i) planning and design, (ii) coordination, (iii) tracking progress, impact, (iv) standards best practice, (v), resourcing, (vi) engagement, communication.

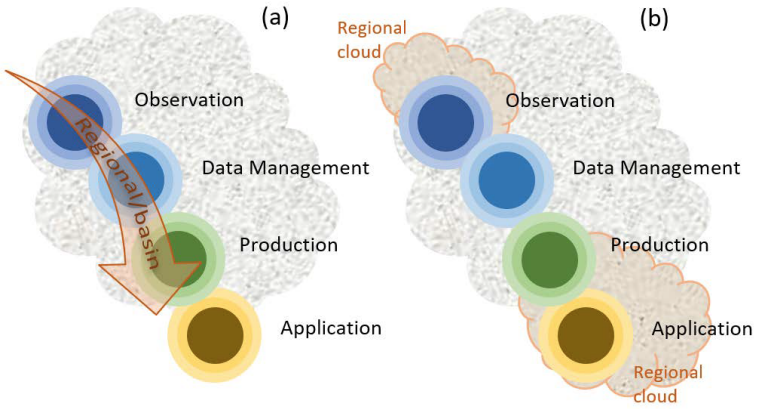

Figure 7. Two examples of regional support. (a) the support cuts across the system and focuses on a basin for scientific reasons; (b) regional networks formed for geopolitical reasons with strong interfaces to users.

5. Summary of issues

There are a range of issues to consider in evolving towards a thriving and integrated ecosystem for GOOS regional coordination

Issues for the Workshop to consider:

- The last GOOS Regional Policy was created in 2013, since then the Global Ocean Observing 2030 Strategy has been released, and ocean observing is evolving to encompass more biological, ecological and human impact observations, and greater connection down the value chain to ensure the integrated system is achieving the required societal impacts
- There are several new regional groups that are not designated as GRA's, but regularly participate and gain from the GRA Forum discussions, such as SOOS and the Arctic Council
- Projects such as TPOS 2020 and AtlantOS have evolved to take on coordination for gaps in the regional system / structure
- The GRA entrance system has proved to be overly rigid, with no exit strategy for underperforming regions
- GRAs are heterogeneous and so there is no policy or assessment that can cover all types
- This heterogeneity and the partnership ecosystems are seen as an inhibitors to the funding of GRAs
- Questions remain around the advantage and value of individual GRAs
- The relationship of GRAs to the strengthening GOOS National Focal Points/ Committees is not clear. Could the European Ocean Observing System (EOOS) Operations Committee be a good example, where GOOS National Focal Points are members of the committee with other observing infrastructure elements.

6. A vision for a thriving regional coordination ecosystem

The vision for a future **or a thriving regional coordination ecosystem** could include a less rigid entry/exit system, enabling GRAs to be accepted by GOOS based on meeting criteria and committing to GOOS principles, with an ability to exit if they are not ultimately successful in their mandate.

It would include a recognition that although decisions regarding funding are generally made at a national level, and several high functioning GRAs are national systems, that regional coordination brings many benefits to these national investments through alignment, sharing, and working on common integrated system elements.

Non exclusivity by geography, but clarity on scope. Where a plurality of alliances could exist in a region, however, each adds a demonstrated value to the regional system, that they collaborate, and potentially merge where this leads to greater efficiency and is a natural evolution.

The GRAs play an important role in enhancing regional relevance of the observing system, through connecting down the value chain (2030 Strategy), and providing a connection to regional governance structures, for example in weather, environment or ocean-focused, as users and funders.

A new GOOS Regional Policy might include:

a. greater flexibility in entry and exit of GRAs
b. attributes of a GRA
c. clear expression of the value to GOOS and its stakeholders of the GRA
d. appropriate support from GOOS
e. ability to deal with under performance

7. Draft request of the GOOS Steering Committee

To constitute a Task Team including members of GOOS SC, GRA leadership and regional projects, amongst others, and using the background paper, the feedback and results of this workshop and input of the Task Team members to:

a) review the GOOS Regional policy 2013, highlighting gaps, weaknesses and where it is inconsistent
b) evolve a vision for the GRA role in the GOOS
c) identify the commitment required from GOOS to support a thriving GRA ecosystem
d) develop proposal for an updated GOOS Regional Policy 2023, in-line with the Global Ocean Observing System 2030 Strategy and current societal needs for ocean information
e) Present this to the GOOS SC for approval in 2022

In 2020 GOOS requested Maria Hood to undertake a synthesis of the Benefits, Responsibilities, and Principles of being a GOOS Regional Alliance and Procedures for Endorsement for the current GRA policy. This is a useful resource for such a GRA TT in defining a revised Policy (see Annex 1 below).

Annex 1: Benefits, Responsibilities, and Principles of being a GOOS Regional Alliance and Procedures for Endorsement

Version 1 DRAFT_October2020 - Author Maria Hood

1. BACKGROUND

This document has been developed to stimulate discussion and agreement on the benefits, responsibilities, and principles of being a GOOS Regional Alliance and procedures for endorsement based on the GOOS Regional Policy 2013. This summary is intended to provide text for use on the GOOS web site, with reference to the 2013 policy for details. Unless otherwise stated, the source for information used in this summary is the GOOS Regional Policy 2013, IOC/INF-1308.

2. WHAT IS A GOOS REGIONAL ALLIANCE?

(Source: adapted from text on existing GOOS web)

GRAs are coalitions of nations and/or institutions that share GOOS principles and goals but concentrate their efforts on local priorities and are organized around regional seas or coastal environments.

Thirteen GRAs from different regions around the globe emphasize regional priorities, differing by need, resources and culture. Some GRAs emphasize data sharing or regional capacity development, while others are building extensive observation systems with dedicated marine service goals, such as oil spill response capabilities or hurricane / typhoon forecasting.

Initially, nearly all marine observation systems were justified by nations for national purposes. The major task of developing GOOS has been to unify national observation systems into an integrated, interoperable global system in a way that allows national needs to drive and benefit from the added value of participating in a global system. As a measure of GOOS success, many nations now collaborate through GRAs to build regional observation programmes that are major contributions to the global system.

3. BENEFITS OF GRAs

Because of regional heterogeneity, GRAs can adopt the most appropriate organizational structures for their alliance, and the relationship between GRAs and GOOS remains flexible.

- GRAs allow nations and regions to focus their efforts on their own priorities, and are thus important partners for the global system for identifying and filling gaps in the observing system and in data products and services delivery.

- GRAs benefit from and contribute to global observing system coordination through the GOOS expert panels, where global priorities and work plans may be applied to national and regional concerns.
- GRAs offer a mechanism to participate in and influence the development of the global system, and play a leading role in the development of coastal observations and their linkages to the open-ocean and climate systems. GRAs offer a platform to accelerate the integration and expansion of observations and modelling from global to local scales.
- GRAs benefit from cooperation and information sharing through a regular forum with other GRAs.

4. PRINCIPLES OF GRAs

GRAs should:

- adhere to core GOOS principles, follow the Framework for Ocean Observing, and contribute to the GOOS 2030 Strategy
- serve as coordination mechanisms to identify regional requirements for societal benefit, to coordinate and implement transboundary networks, to facilitate real-time / delayed mode / and archived data streams and their integration with the global system, to encourage and facilitate timely, free, and unrestricted assess to data, to facilitate the development of regional models and data products, and to monitor and evaluate the performance of the system in delivering fit-for-purpose data and information products.
- Promote and develop regional capacity
- Encourage the development of national and regional ocean observing systems by promoting the visibility, value, and recognition of the services provided by ocean observing systems, advancing scientific and technical developments, identifying gaps at the national and regional levels, and encouraging and coordinating participation in international initiatives.

5. RESPONSIBILITIES OF GRAs

To ensure that there is a single forum where regional GOOS activities can be considered in their entirety, all recognized GRAs are expected to:

- designate one or more representatives to the GOOS Regional Council
- participate in the bi-annual GOOS Regional Forum,
- provide at a minimum an annual report of activities,
- be responsive to GOOS Implementation Plans,
- participate in activities agreed to by the GOOS Regional Council, and
- maintain current management information with the GOOS Project Office for communication and outreach purposes.

6. PROCEDURE FOR ENDORSEMENT OF GRAs

Proposals to be a recognized as a GRA must be approved by the IOC Assembly or the Executive Council. Recommendation for recognition will be received through the GOOS Steering Committee or from IOC Regional Subsidiary Bodies in consultation with the GOOS SC. GRA proposals may be developed between national organizations in participating countries or through existing regional monitoring networks, fisheries bodies, or regional seas conventions, for example.

To be recognized as a GRA, proposals must include the following:

- Evidence that a management structure is in place that can deliver an integrated and sustained system by linking, enhancing and supplementing existing infrastructure and expertise in the region, and

- Provision of an acceptable plan that has been endorsed by stakeholders (data providers and users) from the region and describes the procedures by which the observing system will be established, developed, and sustained. This must include procedures for quality assurance, conformance to internationally accepted standards and protocols for measurements, data management, and communications.