Ocean Observing Co-Design
by The Global Ocean Observing System

Meeting report: GOOS Ocean Observing Co-Design programme meeting 2026

Morning session

The morning session opened with a series of presentations from the Exemplars, each offering a different lens on collaboration. While initially framed as an exchange of experiences, the discussion quickly evolved into a deeper reflection on synergies amongst the various Exemplars and how to integrate these

Identified actions:

- Continue to identify priority pilot areas where we can increase Exemplar collaboration and facilitate integrated observing approaches .
- Facilitate cross-Exemplar collaboration through existing initiatives, contacts and workshops, particularly where systems intersect.
- Develop and publish regional-global implementation pathways that link observing activities to societal applications and decision-making needs, existing examples include Boundary Current workshop, and future Tropical Cyclone paper/blueprint.
- Consider developing a concise, quantified account of what co-design requires in practice — including estimated time, staffing, and cost for early-stage stakeholder engagement — to strengthen the investment case for funders and institutional partners.
- Compile a shortlist of shared phenomena (marine heatwaves, boundary currents, tropical cyclones, carbon) that appear across multiple Exemplars, to serve as the basis for prioritising cross-Exemplar coordination in the next programme phase.

Cross-Exemplar Collaboration Session

The session focused on the future direction of the Ocean Observing Co-Design Programme and its potential to advance ocean observing systems. Emma emphasized the need to identify shared regional themes and leverage collaboration opportunities across Exemplars.

The session aimed to identify one to two priority areas where regional collaboration across Exemplars could add value, focusing on shared geographies, observing challenges, and user communities. Rather than remaining at the level of general discussion, the agenda structure - organized around four targeted presentations - enabled a progressive deepening of the

conversation: from conceptual integration → regional implementation → funding-linked collaboration → large-scale coordination.

Across the session, the discussion moved from examples of collaboration toward a shared recognition that the Programme has reached a point where informal alignment is no longer sufficient. Delivering fit-for-purpose, co-designed observing systems will require more deliberate coordination, clearer prioritization, and stronger programme-level support. Current collaboration is informal and not scalable without structural support

Coastal–Shelf–Deep Sea Continuum (CSDC) – Co-design as integrator

The first presentation introduced the concept of the Coastal–Shelf–Deep Sea Continuum (CSDC) as a structural integrator across Exemplars, highlighting that many observing challenges cannot be addressed within isolated system boundaries. Co-design was framed as a mechanism to connect systems across this continuum, maximizing information use and supporting sustainable development goals.

The discussion emphasized that fragmentation in observing systems often reflects institutional and disciplinary divisions rather than the interconnected nature of ocean processes. Participants noted that many societal applications - particularly in coastal zones—require understanding interactions across the full continuum, from open ocean dynamics to nearshore processes. While the continuum offers a strong conceptual basis for collaboration, it does not yet translate into operational coordination across Exemplars. Users, particularly in operational and disaster risk contexts, require integrated information streams across the full value chain, including observations, modelling, forecasting, and service delivery.

There was recognition that adopting this approach would require:

- Alignment across different observational scales and communities
- Better integration between physical, biogeochemical, and ecosystem components
- Potential collaboration with regional observing structures (e.g. Regional Ocean Observing Systems in Europe) and a focus on specific applications to improve forecasting

Boundary Currents – Agulhas Current Implementation Plan

The second presentation grounded the discussion in a concrete regional case, focusing on the Boundary Currents Exemplar and the Agulhas Current system. The Exemplar provided an update on progress since the on-site workshop (September 2024, report available here), including stakeholder engagement, gap analysis, and proposal development under the Flanders-UNESCO Science Trust Fund (FUST).

The implementation plan highlighted observing technologies deployed over the past 2–3 years - such as gliders, floats, and surface vehicles - which have provided new insights into ocean dynamics and boundary current variability. The team is working toward expanding

these observations, with a focus on societal applications including food security, fisheries, and shipping.

The discussion emphasized the importance of securing additional funding - both internationally and from local government departments - to sustain and expand the observing system. Participants also explored ways to strengthen the link between ocean observations and decision-making, noting that long-term stakeholder engagement and clear demonstration of value are essential for sustained support.

This discussion highlighted the important role of regional stakeholders, such as fisheries and maritime operations, and the need to align observing efforts with specific regional needs and applications. It also underscored the potential for regional implementation plans to serve as entry points for cross-exemplar collaboration, helping to connect activities and strengthen coordination across initiatives.

The exemplar emphasized that boundary current systems:

- Naturally connect multiple domains (open ocean, shelf, coastal impacts)
- Provide a strong case for linking science, services, and decision-making

At the same time, participants noted that while regional initiatives are progressing within individual Exemplars, there is no clear mechanism to connect them with parallel efforts across other Exemplars, nor dedicated capacity to support such coordination. This reinforced the need to move toward more regionally coordinated approaches rather than parallel exemplar-driven implementation.

Carbon Exemplar – Horizon Europe Project

In the third presentation, the Carbon Exemplar provided an update on a successful Horizon Europe proposal (Project JOHN – Joint Operations for monitoring antHropogenic and Natural GHG emissions and sinks), which aims to design a cost-effective, user-oriented greenhouse gas (GHG) observing system by building on existing assets and complementing them with emerging technologies. The project will contribute to governance and finance work packages and demonstrate proposed governance and funding mechanisms through the North Atlantic Carbon Observatory, building on earlier stakeholder engagement involving public institutions, industry, and financial actors. Stakeholders emphasized the need to better understand how investments contribute to the observing system as a whole, informing the project's focus on investment roadmaps.

The discussion also highlighted complementarity with ongoing work under the Global Greenhouse Gas Watch (G3W). Participants noted that fully optimized observing system designs may be difficult to implement immediately due to current asset availability and resource constraints, suggesting a more pragmatic approach that builds on existing systems and incremental improvements. Reanalysis products were identified as useful tools for identifying observation gaps and system errors.

Overall, the discussion emphasized the importance of embedding co-design within funded initiatives, aligning with policy frameworks related to climate governance and carbon accounting, and engaging a broader set of stakeholders, including private and financing actors.

North Pacific Ocean & Marginal Seas (NPOMS)

The fourth presentation expanded the discussion to the North Pacific Ocean & Marginal Seas (NPOMS) context, highlighting linkages between ocean observations and tropical cyclone forecasting. While several countries are already investing heavily in observations, the Exemplar's added value lies in strengthening coordination between research and operational centres, particularly through existing World Meteorological Organization structures and regional partnerships.

Participants noted that multinational observing systems require alignment across countries and institutions, making regional coordination platforms and international collaboration essential. However, effective collaboration depends on existing governance structures, bilateral relationships, and sustained coordination capacity.

Examples include ongoing collaboration between the United States and Korea Institute of Ocean Science and Technology (KIOST) to support joint activities within the Exemplar. Planned activities for 2026 include Early Career Ocean Professionals (ECOP) exchanges, coordinated field activities during tropical cyclone campaigns, and a partnership coordination workshop hosted under the GOOS Co-Design and SynObs programmes at the Japan Meteorological Agency. Upcoming SynObs workshop will also explore cross-exemplar collaboration, particularly where tropical cyclones intersect with marine heatwaves and boundary currents in the NPOMS region.

The discussion also explored developing a targeted blueprint or action-oriented guidance based on insights from the Tropical Cyclones Exemplar to support uptake within World Meteorological Organization (WMO) frameworks. Such an output could translate co-design lessons into practical recommendations for operational forecasting communities and National Meteorological and Hydrological Services, including identifying observing gaps, strengthening integration between ocean observations and forecasting systems, and highlighting priority investments.

Overall, the discussion reinforced that regional collaboration is essential but not self-organizing. Advancing co-designed observing systems will require facilitation, institutional coordination, and stronger engagement with operational users, while building on existing initiatives rather than relying solely on new funding.

Funding pathways

The funding discussion led by Emma focused on identifying pathways to support Exemplar implementation, drawing on lessons from recent proposals and ongoing initiatives. While

some progress has been made through mechanisms such as Horizon Europe and FUST-supported proposals, participants noted that funding opportunities remain limited and uneven across Exemplars.

A key challenge highlighted was the mismatch between funding structures and the needs of co-design, particularly as early-stage activities - such as stakeholder engagement and co-definition of needs - are rarely funded. As a result, these activities often rely on limited internal resources, constraining the ability of Exemplars to scale their work.

Participants emphasized the need for a pragmatic approach to funding, building on existing initiatives and aligning proposals with clear societal applications and operational outcomes. The discussion also underscored the importance of better articulating impact and aligning with funder priorities, while improving coordination across Exemplars to identify shared opportunities and avoid duplication.

Afternoon Session

The afternoon session brought together representatives from the Ocean Decade, GOOS, GOOS Regional Alliances, GOOS Expert Panels, and WMO. The session generated a notably positive response from the Programme partners, with representatives expressing strong interest in building on the Programme's work and integrating co-design more broadly within their own frameworks. There was a clear sense that the Decade, the GRAs, and other institutional partners came away with a much deeper understanding of what co-design means in practice and with a genuine desire to be part of taking it forward. The session started with a presentation of the Co-Design Vision Paper (Draft V1), the afternoon session focused on how lessons from implementation can be translated into institutional pathways, in alignment with partner mandates.

Identified actions:

- Develop concise value briefs or case studies for each Exemplar, highlighting societal benefits and relevance for partners and Member States.
- Prepare a differentiated GRA engagement strategy for example for a GRA Forum — including tailored value messaging for well-resourced versus capacity-constrained GRAs — and pursue targeted collaboration with specific GRAs where alignment with Exemplar activities is strongest. Including connection between GRAs and relevant WMO frameworks, operational forecasting communities and NMHS, to support regional uptake of co-design recommendations across oceanographic and meteorological communities.
- Explore development of an action-oriented “blueprint” from the Tropical Cyclones and/or other Exemplars to support uptake within WMO frameworks.

- Building on the discussions at OSM26 engage with the Ocean Decade Coordination Unit (DCU) for the 2027 Ocean Decade Conference (Rio, April 2027) preparation; follow up with Alison Clausen (DCU) to contribute co-design framing to the observations priority are on thea and to promote the Vision Paper through the Ocean Decade Alliance and Foundations Dialogue, with the goal of securing seed funding for early-stage co-design activities.
- Ensure that Exemplar insights on marine heatwaves, boundary currents, and carbon are submitted as input to the OOPC/GCOS 2027 urgent implementation plan gap analysis within the next 12 months.
- Develop an initial mapping of blue economy and private sector stakeholders relevant to each Exemplar, drawing on the IMOS industry engagement model as a reference, as a first step toward structured non-scientific user engagement.
- Continue to actively seek funding opportunities for improving coordination across Exemplars.

Presentation of the Co-Design Vision and Key Lessons from Implementation

The afternoon session opened with the presentation of the Co-Design Vision Paper, which summarizes lessons from the Programme's implementation and outlines pathways to strengthen the role of co-design in ocean observing systems.

David Legler, Programme Co-Chair, introduced the presentation by highlighting the Programme's goal of leveraging ocean knowledge to address societal needs, emphasizing the role of co-design, co-production, and effective dissemination of information. He outlined the Programme's implementation approach, which includes engaging users, developing regional pilot activities, and advancing solutions through Exemplars focused on areas such as climate hazards and operational services.

Bernadette Sloyan Programme Co-Chair and Emma Heslop, GOOS programme Specialist, then presented key learnings emerging Vision Paper. These included the importance of targeting specific user groups, mapping the ocean information value chain, and assessing the maturity of that chain within each application area. The discussion also highlighted the value of regional pilots linked to global frameworks and the need to build trust and legitimacy with stakeholders. A recurring challenge identified was time-commitment to engage with new stakeholders and the lack of funding for early-stage stakeholder engagement, suggesting the need to explore alternative funding models.

The presentation concluded by encouraging participants to consider how these lessons could be leveraged to further embed co-design approaches within ocean observing systems. For further details, Draft of the Vision Paper is available here.

Positioning Co-Design within the Ocean Decade and UN Ocean Conference 2027

The discussion with Alison Clausen explored how co-design could contribute to the broader objectives of the Ocean Decade. Co-design was recognized as a transformational approach that can strengthen the effectiveness of Decade Actions by ensuring that observing systems respond directly to societal needs.

Alison highlighted the United Nations Ocean Conference in 2027 as a key strategic opportunity to position co-design within the global ocean agenda. The Conference was framed not only as a visibility platform, but as a moment to shape narratives, influence priorities, and align stakeholders around actionable commitments.

Alison expressed strong enthusiasm for the Programme's achievements, noting the progress made since its early discussions and emphasising that the Decade would actively support efforts to promote and share the work more broadly. Alison specifically highlighted interest in the tools developed to evaluate co-design as an area the Decade currently lacks, and confirmed the Decade's commitment to helping embed co-design lessons into the preparations for 2027 Ocean Decade Conference.

Participants discussed the possibility of contributing to the development of an ocean observing session, using examples from the Exemplars to demonstrate how co-design improves the alignment between observations, decision-making needs, and operational services. Early engagement in the planning of the Conference was considered important to ensure that co-design perspectives are reflected in the framing of sessions, key messages, and case studies.

The Decade was positioned as a potential scaling platform, but one that requires clearer entry points and stronger narrative alignment, for which further engagement will be required.

Integrating Co-Design within GOOS Structures

From the GOOS perspective, the discussion emphasized the importance of embedding co-design within the existing architecture of GOOS. Participants noted that co-design plays an important role in linking observations to user needs and societal outcomes, but that it is not yet systematically integrated across GOOS components.

There was broad agreement that co-design should move beyond being treated as a parallel activity and instead be integrated within core GOOS processes, including expert panel activities, observing system design discussions, and regional implementation efforts.

Expert Panel representatives contributed a technical perspective, highlighting the challenges of translating stakeholder-driven requirements into scientific methodologies and observing system design frameworks. This revealed an ongoing gap between user-driven approaches and scientific system design processes, pointing to the need for mechanisms that better bridge these domains.

Expert panel representatives expressed enthusiasm and embraced co-design as a transformative philosophy rather than a mere methodology. They committed to its systematic integration into future observing system designs, ensuring that scientific priorities remain directly responsive to evolving user requirements.

Regional pathways for implementation: the role of GOOS regional alliances

The discussion then focused on the role of the GOOS Regional Alliances (GRAs), with contributions from the GRA Co-Chairs, Alvaro and Gabrielle. GRAs were highlighted as important regional enablers of co-design, linking global frameworks with national implementation and stakeholder engagement. While GRAs are well positioned to support coordination and outreach, they noted that capacity and resource limitations currently constrain their ability to fully support these activities.

Participants discussed how GRAs could serve as a mechanism to anchor Exemplar activities within regional contexts, leveraging their networks and knowledge of regional systems to connect with relevant user communities. Given the Programme's limited regional capacity, collaboration with GRAs was seen as a way to accelerate the uptake of co-design practices.

A potential action discussed was for the Programme to present at the GRA Forum, or alternatively to pursue targeted engagement with specific GRAs where alignment is strongest. It was also noted that the relevance of different Exemplars may vary across regional structures; in some cases engagement may be more effective through GRAs, while in others it may align better with WMO regional frameworks.

Gabrielle also noted that these discussions should be considered within the context of the ongoing GOOS reform process, and welcomed the idea of bringing the topic both to the GRA Forum and to the GOOS Steering Committee.

Gabrielle confirmed that GRAs would actively bring the co-design discussion into the GOOS reform conversation, welcoming it as part of the broader discussion on the value and role of GRAs at both the GRA Forum and the GOOS Steering Committee meeting.

From user needs to observing systems

A related discussion emphasized the importance of identifying requirements before designing observing systems. Participants highlighted that understanding the phenomena, processes, and user needs - including their spatial and temporal characteristics - should precede decisions about observing infrastructure.

Examples from the Tropical Cyclones and Boundary Currents Exemplars illustrated how mapping user needs and observational requirements can guide system design. In many cases, conversations with users are not framed directly around EOVs, but rather around essential ocean features and processes that need to be better understood and represented in models. This approach helps ensure that observing strategies respond to the specific characteristics of the phenomena being addressed.

WMO Perspectives and Engagement with Operational Forecasting Systems

Interventions from Champika Gallage mentioned the importance of strengthening the link between ocean observations and operational forecasting systems, particularly in the context of hazard monitoring and early warning services. The discussion emphasized that ocean observing initiatives must increasingly demonstrate their operational relevance for National Meteorological and Hydrological Services (NMHS) and forecasting centres, which rely on timely and reliable data for decision-making.

Questions raised during the discussion highlighted the need to better articulate how observing system improvements translate into operational forecasting benefits, including for tropical cyclones and other ocean-driven hazards. Champika encouraged the Programme to frame its work in ways that clearly connect observing investments with improvements in forecast skill, warning systems, and services delivered to society.

The exchange also reinforced the value of working through existing WMO coordination mechanisms and regional frameworks, which provide established pathways to connect ocean observing initiatives with operational meteorological communities. Strengthening collaboration with NMHS and operational centres was therefore identified as an important step to ensure that co-design activities lead to fit-for-purpose information products that directly support forecasting and early warning systems.

As a follow-up, participants noted the opportunity to further explore how insights from the Exemplars, particularly those focused on high-impact hazards such as tropical cyclones, could inform WMO processes, potentially through practical guidance or case studies demonstrating the contribution of ocean observations to forecasting and risk reduction.

Summary of session

The afternoon session marked a significant turning point in the institutional understanding and collective ownership of Co-Design. Partners now have a much deeper grasp of what Co-Design means in practice and are eager to embed these lessons within their own frameworks.

Partners recognized the Co-Design Vision Paper as a valuable cornerstone that provides a clear roadmap for future implementation. Alison Clausen (Ocean Decade Coordination Unit) confirmed the Decade's commitment to taking forward the recommendations of the paper and integrating Co-Design into the preparations for the 2027 Ocean Decade Conference in Rio, positioning it as a priority topic for the global ocean agenda. This strategic alignment includes promoting the programme through the Ocean Decade Alliance and Foundations Dialogue to secure seed funding for early-stage stakeholder engagement activities.