Ocean Observing Co-Design

by The Global Ocean Observing System

Progress Report:

Co-Design Programme Achievements and Updates 2025

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Ocean Observing Co-Design

by The Global Ocean Observing System

Document to provide a narrative report to WMO on progress made under the Co-Design Programme, which receives WMO support under a UN2UN Agreement, and the background for the Ocean Observing Co-Design Meeting at Ocean Science Meeting 2026

Table of Contents

01 Introduction

This Progress Report provides an overview of the Ocean Observing Co-Design Programme's activities and achievements in 2025. During the reporting period, the Programme advanced its implementation, internal coordination, and engagement across regional and thematic areas. Notable progress was made in consolidating governance arrangements, enhancing visibility through strategic communications, and deepening collaboration with World Meteorological Organization (WMO) structures, Intergovernmental Oceanographic Commission of UNESCO (IOC) Regional Bodies, and Ocean Decade Coordination Units. The continued development of the Exemplars, the growth of regional pilot activities, and increased alignment with global partners reflect the Programme's expanding contribution to improving the delivery of ocean information at regional and global scales.

Key Achievements

In 2025, the Programme strengthened its strategic planning processes, advanced pilot activities in several regions, and increased its presence across international scientific and policy fora. Key achievements include:

- The successful Co-Design Strategy and Planning Meeting in Miami, which endorsed the 2025–2026 Work Plan.
- Approval of the joint Co-Design and SynObs sessions (oral and poster) for Ocean Science Meeting 2026.
- Creation and delivery of a Co-Design in Ocean Observing Lessons learned and vision for the future publication/paper.
- Launch of a 2025 Caribbean Glider Mission in collaboration with IOCARIBE, supported by a transboundary cooperation agreement between Barbados, Trinidad and Tobago, and Guyana - supporting the Tropical Cyclones Exemplar and increasing regional knowledge.
- Leadership of discussions on ocean carbon observation at the One Ocean Science Conference and secured Horizon Europe funding to advance governance and finance mechanisms, and engagement with non-science/UN users for ocean carbon observing data.
- Strengthened Marine Heatwaves governance, with the consolidation of leadership and the Steering Committee, alongside the selection and planning of pilot activities within the Marine Heatwaves Exemplar.
- Publication of the Boundary Currents Workshop Report, documenting outcomes from the 2024 Agulhas–Benguela co-design workshop.
- Initiated the development of two FUST funding proposals.

02 Progress against an 2025 - 2026 overview

A significant milestone in early 2025 was the Planning and Strategy Co-Design meeting, which brought together the Co-Design Management team, Exemplars and collaborators and resulted in the adoption of the Programme's Work Plan for 2025–2026. The report and the work plan provided a structured and trackable framework to guide activities across 2025, with an outlook toward 2026. The Work Plan documented each planned action, including its level of priority, expected outcome, timeline for implementation, and designated responsible lead (See Work Plan 2025-2026 and meeting report). This structure enabled clearer monitoring of progress and improved alignment across the Programme.

Across the year, the Programme has achieved the majority of its planned activities (See Work Plan 2025-2026), with a small number experiencing delays due to external factors or the need to re-prioritise efforts as circumstances evolved. The Management Team will revisit and update the Work Plan early in 2026, at an Ocean Observing Co-Design Programme meeting at Ocean Sciences 2026, ensuring continuity, responsiveness, and strategic coherence. As a living guidance document, the Work Plan remains essential to navigating priorities and coordinating efforts across Exemplars and programme components.

This report summarises key areas of programme-wide progress identified as priorities during the 2025 Strategy and Planning Meeting in Miami. These thematic areas represent foundational elements that support implementation across the Programme and its Exemplars and reinforce coherence, integration, and collective impact throughout the Co-Design Programme. Progress is reported in the following areas: Programme governance, funding, development of the Co-Design paper, Communication and Outreach, and Co-Design Exemplars progress.

Programme Governance

In 2025, the Programme further strengthened its governance arrangements to improve coordination, operational clarity, and long-term sustainability. The governance framework clearly distinguishes strategic and operational functions and defines reporting lines across Exemplars, enhancing coherence, accountability, and collaboration with partner organizations. The governance schematic (Figure 1) has been published on the Co-Design website to support transparency and broader community understanding of the Programme's organizational arrangements.

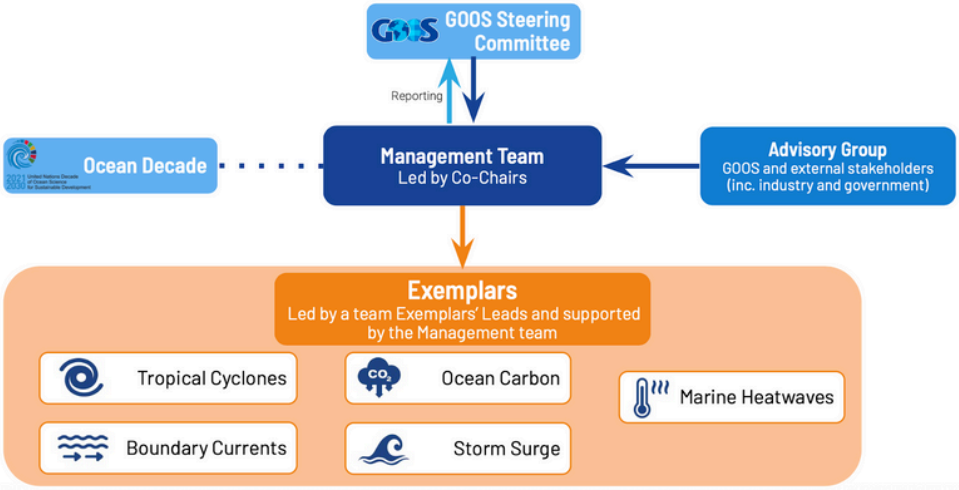


Figure 1. Ocean Observing Co-Design Governance structure. An extensive explanation of the structure is available on our website.

The Programme also recognized the importance of establishing an Advisory Group. Rather than constituting this group immediately, efforts in 2025 focused on clarifying the roles, responsibilities, and expected functions of an Advisory Group, acknowledging that these considerations strongly shape its composition and effectiveness. This foundational work will inform the formal establishment of the Advisory Group in a subsequent phase.

Funding

In 2025, the Programme advanced several efforts to strengthen its funding base. A key step was the development of a pitch deck for the Tropical Cyclones Exemplar, produced with support from the Decade Strategic Communications Group to ensure it was ready for outreach to potential funders, particularly in industry.

The Programme also published its Co-Design Profile on Ocean Matcher, enabling visibility to a broad range of funders who can directly contact the Programme based on areas of interest. In addition, the call for FUST (Flanders UNESCO Science Trust Fund) proposals resulted in two potential concepts that are being checked for initial funder interest and will be further developed into proposals in early 2026. Looking ahead, the Programme will explore opportunities within existing partnerships to prepare a proposal for European funding, particularly targeting calls aligned with Ocean Decade priorities.

Materials: Tropical Cyclone Pitch Deck

The Programme would like to acknowledge the World Meteorological Organization for its substantial support throughout the year. WMO's contributions and continued confidence in the value of the Co-Design approach have been instrumental in enabling the Programme to advance its work and deliver progress for the broader community, particularly through fostering connections and supporting coordination of the programme.

Co-Design Paper - vision for policy makers, GOOS & the Ocean Decade

After four years of work, the Programme has developed a mid-Decade Co-Design paper to document lessons learned from implementing co-design projects and to articulate a vision for policymakers, GOOS, and the Ocean Decade. Prepared with input from across the Exemplars and the Co-Design Programme, this paper documents ten key lessons that can be applied by projects across GOOS. Advancing the ocean observing system and strengthening the practice of co-design across the ocean observing community are core aims of the Programme.

This paper is a step in that direction (preliminary paper), bringing together community learning, highlighting persistent barriers to change, and outlining what policymakers, GOOS, the Programme, and the Ocean Decade can do to further support the implementation of co-design practices.

Communications and Outreach

Communications activities expanded throughout 2025, increasing the Programme's visibility across the global ocean observing community. Exemplar leads and members of the Management Team represented Co-Design at several key international meetings, including GCFI, the European Space Agency (ESA) MHW workshop, the WMO G3W meetings, and the Canadian Science Policy Conference. A non-exhaustive timeline summarizing these appearances is provided in Figure 2.

These engagements strengthened connections with user communities, policymakers, early career professionals, and operational centres. The publication of One Ocean Conference reflections on the GOOS website provided accessible insights into emerging themes and reinforced the Programme's role within wider Ocean Decade efforts.

Communications materials, such as the Co-Design slide deck, were updated in alignment with GOOS brand guidelines, and are being integrated across exemplar and Programme-level presentations. The Co-Design diagram was refreshed to show the conceptual framework for Exemplar development (Figure 3). Collaboration with the Ocean Decade Strategic Communications Group resulted in a pitch deck for the Tropical Cyclones Exemplar, available to support resource mobilization and stakeholder engagement.

2025 Co-Design & Exemplars: Event Appearances & Presentations

Figure 2. Timeline providing an overview of engagements where the Co-Design Programme and its Exemplars participated throughout 2025. This is a non-exhaustive list.

Looking ahead, the Programme's jointly submitted session with Synergistic Observing Network for Ocean Prediction (SynObs) was approved for Ocean Science Meeting 2026. The high number of abstracts received demonstrates the growing recognition of co-design as a key approach in shaping future ocean observing systems.

Materials:

- Co-Design Programme video
- Update Programme Slide Deck
- Co-Design Reflections from Nice 2-pager and Co-Design Reflections from Nice Highlights
- AAORIA Forum Co-Design Poster

03 Co-Design Exemplars: Projects maturing

The Co-Design diagram illustrated in Figure 3 provides a structured way to track and assess the development of the Exemplars. For the purposes of this report, progress for each Exemplar is presented according to the phased approach outlined below.

Phase I (Engagement & Design) focuses on identifying user needs and establishing value-chain linkages. Phase II (Pilot Activity) allows proposed observing approaches to be tested and refined in pilot settings. Phase III (Implementation) involves integrating successful practices into broader observing systems.

These phases are supported by continuous Programme-level processes, including standards development, stakeholder feedback mechanisms monitoring tools, and the expansion of international co-design capacity. Together, they ensure that Exemplar activities remain coherent and aligned with Programme-wide objectives.

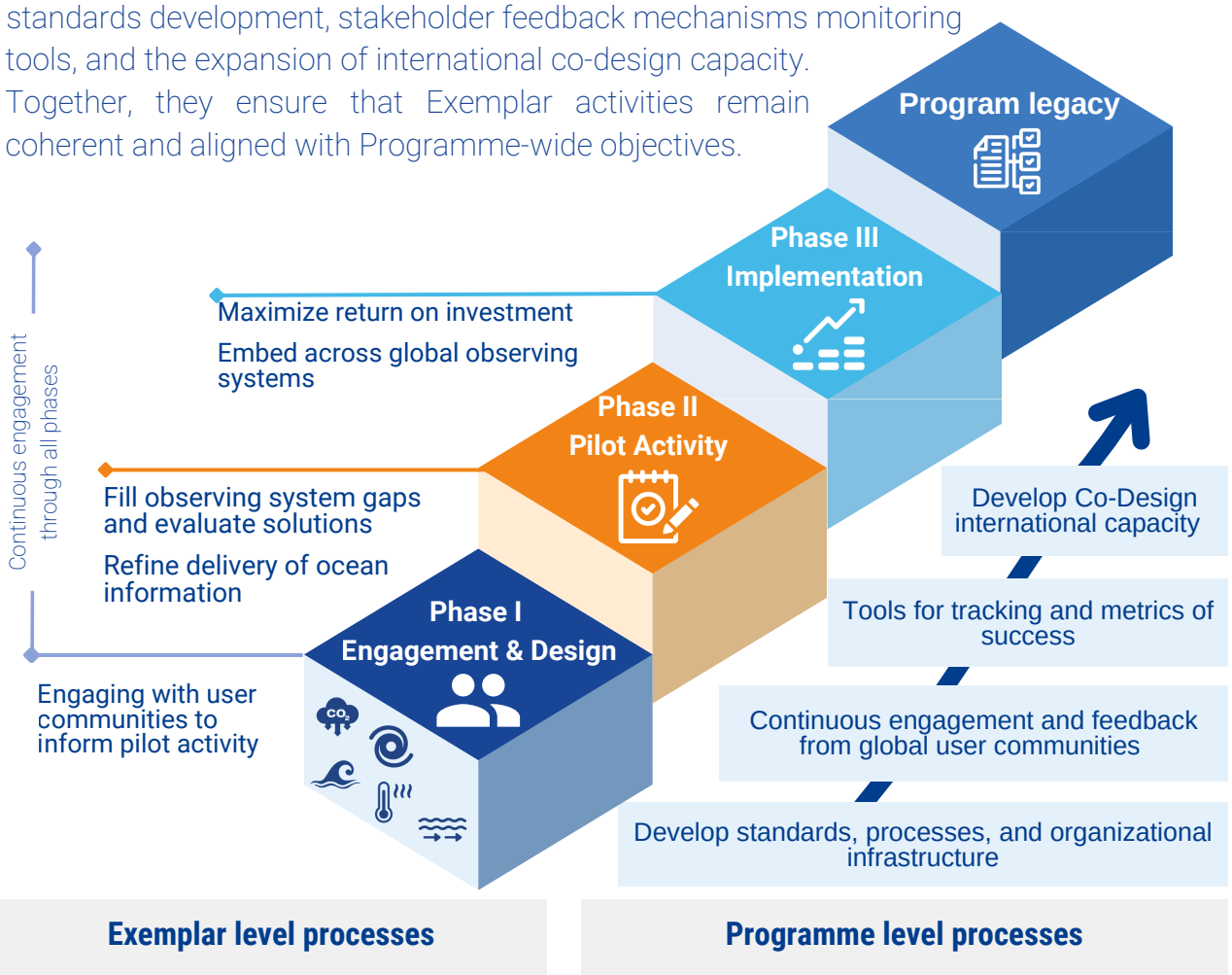


Figure 3: GOOS Ocean Observing Co-Design approach: The figure illustrates the phased pathway followed by the Co-Design Exemplars - from Engagement & Design (Phase I), where user needs and priorities are defined; through Pilot Activity (Phase II), where solutions are tested and refined; to Implementation (Phase III), where successful practices are scaled and embedded in broader observing systems. Alongside (dark blue arrow), the programme-level processes advance continuously with stakeholder engagement, strengthening standards, tools, infrastructure, and developing international co-design capacity.

Beyond serving as a reporting structure, the phased framework also provides a lens to assess the relative maturity of each Exemplar. Over the course of 2025, Exemplars have progressed at different speeds across the three phases, reflecting differences in scope, regional readiness, existing infrastructure, and stakeholder maturity. Figure 4 provides a high-level overview of Exemplar maturity across the three phases of the Co-Design framework. It offers an indicative snapshot of where each Exemplar is currently positioned, based on progress achieved during 2025. Importantly, this overview should be read as relative rather than comparative, reflecting the specific characteristics of each observing system, including differences in scope, regional readiness, existing capacities, and stakeholder landscapes.

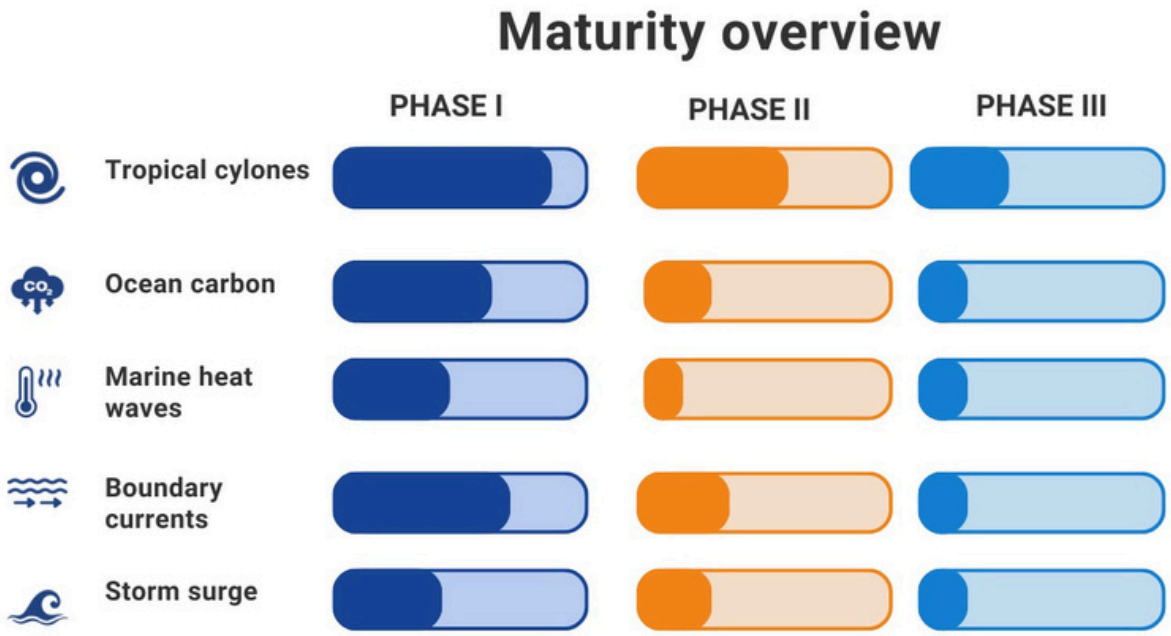


Figure 4 - Relative Progress of Exemplars Across Co-Design Phases: All Exemplars have demonstrated progress over the past year, either by advancing into subsequent phases or by deepening and consolidating activities within their current phase. Further detail on the specific achievements, challenges, and next steps for each Exemplar is provided in the corresponding Exemplar reporting sections that follow.

Several Exemplars advanced from early engagement and design activities toward pilot implementation, while others consolidated foundational work, strengthened governance arrangements, or expanded partnerships in preparation for pilot activities. This progression highlights both individual Exemplar maturation and the growing coherence of the Exemplar portfolio as a whole.

The following sections summarize progress across each Exemplar, including updates from multiple pilot regions where applicable, and outline proposed priorities for the coming year.

Tropical Cyclones Exemplar

The Tropical Cyclones (TC) Exemplar aims to enhance the accuracy, reliability, and utility of tropical cyclone forecasts through fit-for-purpose, co-designed ocean observing systems. It focuses on developing regionally distributed pilot studies that build collaborative capacity, expand the coverage and cross-border delivery of ocean data to forecasting centers and scientists, and strengthen connectivity among stakeholders across the value chain. Through this approach, the Exemplar seeks to deliver actionable insights that support improved predictions, disaster preparedness, risk management, and resilience in cyclone-prone regions.

This Exemplar continues to be one of the most advanced components of the Co-Design Programme. In 2025, the Exemplar strengthened engagement with WMO Regional Associations and national forecasting centres, expanded pilot activity across multiple basins, and progressed knowledge transfer between regions. These developments reinforce the Exemplar's aim to improve the use of ocean information in operational modelling and prediction through coordinated, user-oriented observing activities.

Phase I - Engagement and Design

Throughout 2025, the Exemplar deepened collaboration with WMO structures across the Caribbean, Pacific Islands, Bay of Bengal, and North Pacific, contributing to improved alignment between ocean observing efforts and forecasting needs. The Steering Committee convened to review progress and discuss region-specific challenges, supporting an adaptive, iterative approach to engagement. These exchanges helped refine regional priorities, confirm key actors along the value chain, and ensure that planned pilot activities respond to operational requirements in each basin.

Phase II - Pilot Activity

Tropical Americas and Caribbean (TAC):

Pilot activity advanced significantly in the Caribbean. The Exemplar contributed to the second Ocean Panel session during the 47th WMO Hurricane Committee Meeting and supported the successful implementation of the 2025 Caribbean Glider Mission with IOC sub-commission for Caribbean and Latin Americas (IOCARIBE) and the Caribbean Institute for Meteorology and Hydrology (CIMH). This mission benefited from strengthened coordination between Barbados, Trinidad and Tobago, and Guyana - marking an important step toward transboundary observing missions and collaboration. It is the first glider mission to monitor the southern hemisphere contribution to the Caribbean Throughflow and the Amazon River Plume inflow.

Outreach associated with the mission, including engagements with local media and high-school students, contributed to capacity development and increased awareness of the importance of ocean observations for early warning and disaster preparedness. Live interactive webinar broadcasts were conducted immediately after launch and again immediately after recovery with representatives of IOCARIBE member states to raise awareness of the developing capabilities and impact. Representatives of the Caribbean Development Bank attended both webinars in person. Two videos for broader outreach have already been produced (linked below). Follow-on presentations were made at the Caribbean and Gulf Fisheries Institute annual meeting and at the IOCARIBE regional meeting.

Overall, these activities position the TAC region within Phase II (Pilot Activity) of the Co-Design framework, with early elements supporting a transition toward implementation or Phase III. Coordination is anchored through established engagement with WMO structures like the Hurricane Committee of the region, and the IOC sub-commission IOCARIBE, providing a clear interface for both operational and intergovernmental alignment.

2025 Caribbean Glider Mission with IOCARIBE-GOOS and the Caribbean Institute for Meteorology and Hydrology (CIMH) - Deployment day in Barbados, Photo credit: Shanice King

Next steps:

- Plans are in place for local capacity development over the winter in preparation for additional glider deployments during the 2026 Atlantic hurricane season. Two CIMH offshore technology staff will attend glider camp at Rutgers and participate in the 2026 hurricane glider deployment. The first glider will serve as a scout for the international team scheduled to survey the region aboard the Schmidt Foundation Research Vessel Falkor scheduled for August of 2026. IOCARIBE has asked for a glider implementation plan to be developed for the Caribbean.

North Pacific Ocean and Marginal Seas (NPOMS):

In early 2025, the Exemplar participated in the WMO RA II RBON workshop, a key regional WMO event for observing system recommendations. The Exemplar presented its work and contributed to discussions on increasing ocean observing thresholds for relevant ocean variables. Collaboration with NOAA, KIOST, and regional partners continued through the U.S. – Korea Joint Project Agreement (JPA), and the Exemplar joined the scientific organizing committee of the 2026 SynObs International Workshop.

Next steps:

- A one day meeting is being planned on the side of the Synobs International Workshop. This meeting will be co-led by KIOST with an emphasis on expanding partnerships and collaboration opportunities, and will facilitate the direct contact and further planning on how to improve the forecasting capacities in the region. The Exemplar also awaits a decision from the JPA for a modest funding proposal to facilitate a bilateral ECOP exchange in this region. The exemplar will also place a proposal in the matchmaker portal of Ocean Matcher and submit a request for support under the Ocean Decade Development Facility for mobility support.
- Subject to the availability of targeted funding, the Exemplar aims to build on and align existing regional efforts to support improvements in tropical cyclone forecasting across relevant centres.

Bay of Bengal & Southwest Indian Ocean (SWIO) - Indian Ocean

The Exemplar contributed to the Data Buoy Cooperation Panel's Capacity Building Workshop for the Indian Ocean, presenting recommendations for strengthening regional observing capacity. Lessons from the 2024 Agulhas Current workshop (Boundary Currents Exemplar) were shared to support knowledge transfer and demonstrate practical links between boundary current dynamics and cyclone-related processes.

Next steps:

- Tropical Cyclone Ditwa presents new challenges as a deadly rapidly developing storm that circled the island of Sri Lanka and then made landfall in India, staying close to shore the entire time. India has significant ocean observing and modeling capacity. Collaborations through OceanPredict are being pursued to share knowledge for glider deployments and path planning as a next step.
- Working with the IOC Sub-commission and Ocean Decade regional coordination centre is also being explored.

Pacific Islands:

Engagement with the GOOS Regional Alliance PI-GOOS helped identify areas for collaboration and regional support. Discussions focused on transferring lessons learned from the Caribbean pilot and exploring the integration of satellite-derived information to address data gaps in remote areas. PI-GOOS also facilitated connections with the WMO RA-V Tropical Cyclone Committee Association, supporting a more coordinated regional approach. PI-GOOS invited the Exemplar to co-deliver a presentation to this committee; feedback was requested and recommendations were presented and included in the meeting report.

Next steps:

- Bolster PI-GOOS leadership of this pilot and contribute to a funding proposal led by the WMO Representative for the South-West Pacific.

Phase III - Implementation

The Exemplar continues to facilitate cross-regional learning, using insights from established pilots to inform activities in newer regions. The strengthened regional relationships with WMO structures and TC centres has contributed to increased visibility of ocean information needs within meteorological coordination processes. These developments mark early progress toward implementation-stage activities, particularly through strategic replication of successful approaches and alignment with operational priorities across multiple basins.

The TC Exemplar will work towards a paper or summary in 2026, that will highlight the common and specific needs in each region, although not a single blueprint for ocean observing needs this will highlight the different observing needs and opportunities, and where value chain gaps also need work, by region to enhance regional and global forecasting and our common understanding of what needs to be done.

In parallel, inputs from the Exemplar are being considered in the design of several WMO Regional Basic Observing Networks (RBONs), further strengthening the link between Co-Design activities and operational observing frameworks.

Additional materials:
RBON RA II Workshop Report & Tropical cyclones presentation at RBON RA II
Barbados Glider Mission Launch, Glider Mission Recovery
Glider story video and Growing a Caribbean glider feet video
WMO RA-V Workshop Report
Tropical Cyclone Exemplar Steering Team - Presentation
Tropical Cyclone - DBCP presentation

Ocean Carbon Exemplar

The Ocean Carbon Exemplar works toward establishing an integrated, policy-relevant ocean carbon observing system. Its efforts focus on co-designing observations with users, strengthening connections between scientific and policy communities, and addressing key gaps in governance, financing, and sustained data delivery.

Phase I - Engagement and Design

In 2025, the Carbon Exemplar led high-level discussions on ocean carbon systems at the One Ocean Science Conference and UNOC 2025. These engagements emphasized the need to align observation strategies with climate policy frameworks, including Paris Agree-

ment reporting requirements and emerging carbon management practices. The Exemplar also maintained active links with the GOOS Biogeochamistry Panel and the broader pCO_2 research community.

UNOC3 - From Science to Solutions: Advancing the Ocean Carbon System for Climate Action

Phase II - Pilot Activity

North Atlantic Ocean:

Building on collaborations established over the past two years, the Exemplar joined a regional consortium composed of leading scientific and operational institutions. This consortium successfully submitted a Horizon Europe proposal focused on governance, financing, and observing-system implementation in the North Atlantic. Within this proposal, the Exemplar contributes to integrating ocean, land and atmospheric domains and to advancing governance mechanisms that support cost-effective, sustainable and resilient environmental observing systems. These activities reflect the multidimensional nature of carbon cycling and the need for cross-sector approaches. In particular, the Exemplar's role focuses on strengthening governance and finance mechanisms as well as enhancing user engagement along the carbon value chain.

Next steps:

- The Exemplar's activities in 2026 will implement the actions outlined in the approved Horizon Europe project, with a focus on assessing the current state of the observing system, including existing governance structures and financial mechanisms.

Phase III - Implementation

The Exemplar contributed to WMO G3W discussions and maintained regular interactions with the GOOS BCG Panel. These activities support the integration of carbon observations into broader global climate monitoring frameworks and reflect the Exemplar's role in bridging observational and policy domains.

Additional documents: From Science to Solutions Carbon Exemplar

Marine Heat Waves Exemplar

The Marine Heatwaves (MHW) Exemplar aims to improve understanding, monitoring, and prediction of MHW events and their impacts, with a strong emphasis on stakeholder engagement and co-designed solutions. In 2025, the Exemplar restructured its leadership, advanced governance arrangements, and identified priority pilot regions.

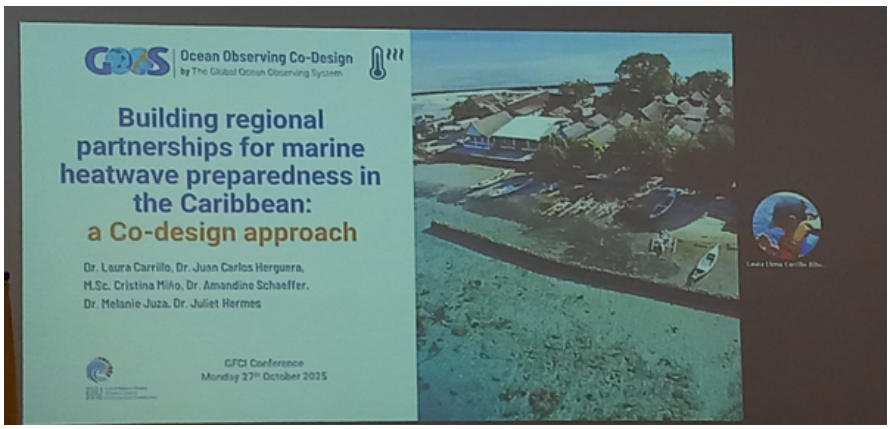
Phase I - Engagement and Design

The Exemplar underwent a revitalization process in 2025, resulting in a four-member leadership team representing diverse regions and areas of expertise. The Steering Committee was re-engaged, and selection criteria for pilot activities were confirmed, leading to the identification of the Caribbean and the Australian Coast as priority pilot regions. Given existing activity, the Agulhas Current and Northwest Pacific regions were also identified as areas where the Exemplar can provide targeted support. These developments positioned the Exemplar for a more structured transition into pilot implementation.

Phase II - Pilot Activity

Caribbean Seas:

Foundational engagement took place through discussions with stakeholders in Belize and through participation at the GCFI Conference under the IOCARIBE invitation. The region's MHW dynamics intersect with other challenges, such as hurricanes and Sargassum influxes, highlighting the need for integrated observing and forecasting approaches. These insights informed ongoing scoping of the region's user needs.



Virtual attendance and presentation of the MHW Exemplar during the GCFI Conference co-organized by IOCARIBE-GOOS

Next steps:

- Engagement with key stakeholders in the region is envisioned in support with IOCARIBE- GOOS (GOOS Regional Alliance) and other regional actors.
- The exemplar is seeking for funding to support engagement on site and will be developing a FUST proposal with IOC data colleagues (IODE/OBIS) to support funding for observations and forecasting testing in Mexico/Belize and integrated co-designed services to give species information, leveraging the OBIS metadata.

Australian Coast:

Engagement with regional partners and operational services progressed steadily. While baseline MHW systems exist, the Exemplar is working to identify areas where Co-Design can strengthen the alignment between observing practices and user needs. An exhaustive review of existing initiatives is underway and a stakeholder survey is planned, drawing on methodologies tested in other exemplars, including Boundary Currents.

Next steps:

- Review and reflection on existing stakeholder oriented initiatives in the region, identify observations and products that are already used, existing gaps and stakeholder wish lists, and provide recommendations. Include lessons learnt from the 2025 Harmful Algal Bloom in South Australia.

Phase III - Implementation

The Exemplar contributed recommendations to a European Space Agency session on MHW observations. Additionally, the exemplar is also part of the scientific organising committee supporting preparations for the 2026 SynObs Workshop. These activities provide opportunities to mainstream MHW considerations within broader Earth observation and forecasting initiatives.

The Exemplar is also actively exploring funding opportunities to support the implementation of planned activities. In this context, a proposal under the Ocean Decade Development Facility is being considered to support mobility for participation in the SynObs International Workshop in Mutsu in August 2026, as well as to secure resources to convene an Exemplar meeting alongside the event. In parallel, the development of a proposal under the FUST forms part of ongoing efforts to mobilize resources to enable Exemplar activities within the pilot regions.

Supporting Materials:
MHW Exemplar Slide Deck
ESA Session in MHW Slide
MHW Fust concept note - presentation

Boundary Currents Exemplar

The Boundary Currents Exemplar focuses on strengthening the understanding, monitoring, and forecasting of major ocean boundary currents, which are central to climate regulation, regional weather, and food security. Through a Co-Design approach, the Exemplar works to integrate climate, biogeochemical, and fisheries needs into sustained observing frameworks, engaging scientific institutions, operational centres, industry, governments, and communities. Its activities support improved climate forecasting, informed ecosystem management, and the development of long-term monitoring strategies that are jointly designed with users and aligned with regional priorities.

Phase I - Engagement and Design

During 2025, the Boundary Currents Exemplar strengthened its engagement with the broader ocean community through the leadership team's involvement in the organisation and leading of the G20 Ocean20 Social Engagement Group. This series of events provided opportunities to interact with a wider range of stakeholders within Southern Africa involved with Blue Economy initiatives in particular, and to contribute to discussions on collaboration, partnerships, and the development of inclusive and sustainable ocean observing systems. These engagements supported the refinement of user needs, reinforced connections across the value chain in the region and globally.

The Agulhas Current Observing System Design Workshop report was also finalised with recommendations on next steps to be taken to design, fund and eventually implement a sustained ocean observing system within the pilot region of the Agulhas Current.

Phase II - Pilot Activity

Agulhas Current:

Several smaller "pilots within pilots" projects such as the African Coelacanth Ecosystem Programme (ACEP) funded project which looks at the impacts of the Agulhas Current on thriving inshore ecosystems such as that found within Algoa Bay, is yielding impressive results after six intensive surveys, including the type of instruments best suited to monitoring such a powerful western boundary current effectively. Two Slocum G3 Gliders were also deployed and their efficiency at operations in the coastal regions inshore of the Agulhas Current was determined, along with the training and development of glider pilots within South Africa. All of these initiatives build up the capacity needed in terms of infrastructure and skills for the eventual implementation of a Boundary Current Pilot system.

Next steps:

- Cross reference between the Agulhas Current design report, mini "pilot within pilot" projects and lessons learnt from historical expeditions, mooring and autonomous instrument deployments, what operations were successful, and which were not, and how to move forwards with an observing and monitoring plan that is robust and realistic.
- Further engagement with user groups and stakeholders over updated design plans, either through dedicated workshops or one-on-one meetings. This is also a good place to determine co-funding opportunities.
- Write-up into White Papers and Operational plans the Design process for adoption at higher government levels and for funding awareness opportunities.

Benguela Current:

This was highlighted during the Agulhas Current Design workshop as needing to connect with the Agulhas Current through projects and collaborations. Two projects are being undertaken within the Cape Cauldron region of the Agulhas Retroflection - QUICCHE and WHIRLS - which offer opportunities to link these two systems and understand what long-term monitoring needs to continue. But closer concerted efforts are most likely needed with existing South African government led monitoring programmes such as DFFE (Department of Forestry, Fisheries and the Environment).

Next steps:

- Engage with existing monitoring projects and short term projects on collaborations linking the Agulhas Current system and Benguela Current systems.
- Engage with published literature, reports and outputs from the Benguela Current Commission and similar to understand gaps and needs within the system.
- Potentially set up additional stakeholder workshops similar to that that was undertaken for the Agulhas System.

Phase III - Implementation

The Boundary Currents Exemplar is also part of the Scientific Organizing committee supporting preparations for the 2026 SynObs International Workshop. Additionally, the Exemplar has started the preparation of a FUST proposal to finance part of the recommendations from the Workshop Report.

Supporting Materials:
Agulhas Current Workshop Report

Storm Surge Exemplar

The Exemplar focuses on improving the prediction and understanding of coastal storm surge events to help minimise impacts on vulnerable communities and natural resources. Through a Co-Design approach, the Exemplar aims to enhance real-time coastal forecasting by strengthening operational systems that provide timely information on coastal conditions and hazards. In parallel, it works to advance multi-hazard risk assessment by improving understanding of interactions between storm surge, waves, pollution, and other coastal hazards, and by assessing their combined impacts on communities and ecosystems. Together, these efforts support the development of user-oriented tools and services that enhance resilience and inform coastal management and preparedness.

Phase I - Engagement and Design

Engagement activities for the Storm Surge Exemplar were closely linked to interactions undertaken through the CoastPredict programme, where several initial consultations with stakeholders in some regions were facilitated. While much of the early outreach has occurred through Coast-Predict, the Exemplar leads have maintained a clear focus on applying Co-Design principles and intend to expand stakeholder and user engagement through future activities supported more directly by the Co-Design Programme.

BioEco Exemplar

During 2025, the Management Team reviewed the status of the Marine Life Exemplar and concluded that the structure supported through the Marine Life 2030 programme did not align fully with the requirements for a Co-Design Exemplar. The Co-Design Programme focuses on applications where global cooperation and alignment can enhance impact, and where learning on observing needs, observing chain gaps, and user needs for information and services can be explored regionally and applied with adjustments globally. The Marine Life 2030 Programme is focused on specific projects. While co-design approaches are being applied within those activities and the connection between the two Programmes will continue, the collaboration under a formal Exemplar project was brought to a close.

Following this decision, work was initiated in 2025 to renew and redefine a biological and ecosystem-focused Exemplar within the Co-Design portfolio. Engagement with the GOOS BioEco Panel helped identify practical opportunities to reframe the biological observing focus in a way that better aligns with the Co-Design approach. As part of this renewal process, a first proposal has been developed to establish the AniBOS network as a new BioEco Exemplar.

The proposed Exemplar would focus on delivering real-time data services on the distribution of protected species to support mitigation of vessel strikes and inform dynamic fishing closures; improving the identification of ecological hotspots for conservation planning; and demonstrating integrated, multidisciplinary data-delivery systems. Preparatory arrangements are currently underway to consolidate this renewed BioEco Exemplar within the Programme's portfolio.

We thank you for your ongoing support of our programme

unesco
Intergovernmental Oceanographic Commission

WORLD METEOROLOGICAL ORGANIZATION

UN environment programme

International Science Council

Acknowledgements

Co-Design Management team and Exemplar teams

CSIRO

NOAA

DMI

UCAR

RUTGERS–NEW BRUNSWICK
Center for Ocean Observing Leadership
School of Environmental and Biological Sciences

NORCE

SOCIB Balearic Islands Coastal Observing and Forecasting System

OCEAN FRONTIER INSTITUTE | Led by DALHOUSIE UNIVERSITY

NRF National Research Foundation | SAEON South African Environmental Observation Network

science, technology & innovation
Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA

UNSW SYDNEY

ECOSUR

cmcc

Ocean Observing Co-Design

by The Global Ocean Observing System

Co-designing fit-for-purpose ocean observing systems with a global team from 19 countries and 35 institutions

2021 2030 United Nations Decade of Ocean Science for Sustainable Development