14th GOOS Steering Committee meeting (SC-14) | 19-21 February 2025 (Paris)
**Background paper**

**Session:**

6b System implementation and applications

**Agenda item:**

6.4 Results from GOOS Decade Programmes that can support GOOS evolvement (5min) - Ann-Christine Zinkann and Emma Heslop, CoDesign and CoastPredict

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**Introduction/Background**

Including links to relevant documents, mandates etc.

**Ocean Observing Co-Design**

The Ocean Observing Co-Design Programme aims to develop a fit-for-purpose ocean observing system through co-design with end-users. The programme operates under GOOS and the UN Ocean Decade framework, aligning with global priorities in ocean observation, forecasting, and stakeholder-driven system design. The Co-Design Programme includes 6 Exemplars or use cases: Tropical Cyclones, Ocean Carbon, Marine Heatwaves, Marine Life, Boundary Currents and Storm Surge. The Programme also works on developing some best practices for co-design processes across Exemplar projects, including the relevant connections and discussion points needed in co-design of services, especially between observing, modelling and user communities.

Key references:
- Executive summary of Co-Design Progress report 2024
- Exemplar explainer

**CoastPredict**

CoastPredict will expand GOOS into the coast. The Programme is advancing plans for a relocatable integrated coastal ocean observing system with a cloud-based infrastructure for data and knowledge sharing and cloud-based computing space to overcome the need for local HPC capacity. The GlobalCoast Network is a network of 130 PIlot Sites with local partners, where the integrated system will be demonstrated. The Network was formally established with the signing of an MOU (open to initial signatories until June 2025).

Key references:
- GlobalCoast Network
- GlobalCoast Network MOU with Attachment I - list of members to date (updated 12-02-2025)

Both Coastpredict and Ocean Observing Co-Design aim to transform GOOS - SC-9 Part 1 -

paper. It is important that GOOS identifies pathways to integrate the transformational work of these projects, including learning, processes, and structures.

**Current status**

**Ocean Observing Co-Design**

The Co-Design Programme has progressed significantly in 2024 by strengthening direct connections with observing system implementers and users, ensuring that stakeholder needs are integrated into the development of fit-for-purpose observing systems.

- **Programme Growth & Team Expansion:** A new co-chair, an expert in modelling linkages and a support officer joined the programme enhancing the team's capacity to accelerate implementation.
- **Integration with GOOS Components:** Strengthened connection with GOOS components such as OCG, OOPC and BGC ensure the programme's co-design work is connected to and aligned with other work in GOOS.
- **WMO:**The programme is actively creating new pathways for collaboration with WMO funding support and establishing connectivity to regional bodies of the WMO.
- **Transformational Elements:** reshaping engagement strategies with positive feedback from stakeholders, and positioning co-design as a core mechanism for improving ocean observing governance and delivery. New connections with partners, focused around delivery. Programme is advancing the Exemplars as a pathway for enhancing or adding to the existing observing system, for specific purposes/services. These structural changes are expanding opportunities for long-term impact.
- **Exemplar Development**: The exemplars are moving according to the implementation plan (See Fig 1), that includes three phases described as follows; Phase 1 defines aims, identifies and engages with the value chain and key stakeholders, and assembles a global team; Phase 2 plans pilots, selects locations, engages key partners and users, connects along value chain (e.g. modelling), and develops design assessment and implementation plans. Phase 3 assesses value, scales knowledge globally and evaluates the contribution of the Exemplar to the core co-design process knowledge and practice. The Exemplar maturity varies based on the existing observing system, the challenge to overcome and the community in the specific use area, the summary of the state of the exemplar in such phases (P) is found in Table 1.
    - Tropical Cyclones - Completing P1 and moving P2: Stakeholder engagement has resulted in stronger collaboration with regional forecasting centers to integrate ocean data into forecasting systems. Connections with WMO bodies have enabled exemplar leads to participate in key WMO events, further embedding ocean observing in forecasting frameworks.
    - Boundary Currents - Completing P1 and moving P2: The Agulhas Current (pilot area) Co-Design Workshop in South Africa focused on designing observing

systems with intermediate users fostered regional connections, laying the groundwork for future collaborations. Stakeholder co-design discussions included fisheries, weather services, and air sea search and rescue, data and modellers, as well as scientists working with the government.
- Marine Carbon - Progressing in P1 and seeking funds for P2: Engagement in the North Atlantic region has led to partnerships for developing a funding proposal under the Horizon Europe call, strengthening co-design efforts in ocean carbon observation.
- Marine Heatwaves - Restarting P1: With a new leadership team in place and a revitalized Steering Committee, the focus is now in re-engaging key stakeholders.
- Storm Surge - Aligning to P1: The exemplar is now aligning their progress to the co-design implementation plan and aims to start the engagement in areas where there has been work through the CoastPredict programme.

The Exemplars have developed strong connections with global experts through this co-design work, such that the exemplars are advancing webs of activity, with co-design for output towards service delivery and enhancing observations/systems as a focus. The link to GOOS and the access to connections, is perceived as vital by all Exemplars. Connections at the global level are the first to have been made: WMO, BGC Panel, CLIVAR, WCRP, OOPC, and modelling work. As pilots are developed the programme needs to facilitate better regional connections to GRAs and GOOS NFP, with WMO this appears to be proceeding through appropriate WMO RAs and RBON meetings. Greater connection with appropriate satellite groups is also needed.

A comprehensive recap of 2024 achievements and the state of Exemplar projects can be found in the Progress Report: Co-Design Achievements and Updates 2024 or the Executive summary of Co-Design Progress report 2024.

**CoastPredict**
**GlobalCoast Network**
An MoU has been established with 26 signatories to date (as of 13 February 2025).
The first Assembly of the Network took place in Lecce, Italy on 5-6 February 2025, with the election of GlobalCoast Network co-chairs (Giovanni Coppini, CMCC and Aletta Yñiguez, University of the Philippines) and approval of CMCC as host of the GlobalCoast secretariat.
The Network and MoU establish the principles of collaboration among the Pilot Sites globally, for exchange of information and set of requirements for observing and services in the coastal area for coastal resilience. In the longer-term the GlobalCoast Network may serve as a coastal collaborative structure for GOOS.

**Fundraising**
3 regional proposals are being developed for the Adaptation Fund. Other funding opportunities are being anticipated e.g. upcoming HORIZON calls

**GlobalCoast Cloud**
In collaboration with EGI (European Grid Infrastructure) FoundationI a prototype is being developed for a regional cloud infrastructure

**Evolution of governance structure**
To respond to the evolution of the Programme and the establishment of the GlobalCoast Network the governance structure of the Programme was updated (accepted by an Extraordinary Assembly on 4 November 2024) to include the GlobalCoast Network within the formal governance structure. This integration of the Network formalises it within the structure of the Programme and initiates a structure for the Network which may evolve as a coastal component within GOOS.

**Public-private partnership**
Flagship accelerator project with Fugro as private partner is in discussion, to demonstrate services and that the GlobalCoast structure is developed with both public and private sector use of the data resources (advanced model output, new and existing open data sources) for services delivery, a first in the GOOS context.

## Work/Project plan

Including Deliverables (e.g. Activities/Actions/ KPIs) and Budget / Resource needs
➔ 2025
➔ 2026-2027

**2025**

**Ocean Observing Co-Design**

- Re-establish a governance structure and make it available (Mar 2025) defining roles reconstituting an advisory group for broader advocacy (Sep 2025).
- Develop a planning template for exemplars to best identify opportunities for funding and support by (Mar 2025)
- Identify criteria for assessing the exemplars process by (Sep 25).
- Expand regional engagement, aligning exemplars with GRA and WMO regional representations (ongoing).
- Update the website and populate new material on learnings and best practices during all the year (Jun 2025).
- Identify funding opportunities (new areas such as philanthropic, industry, climate adaptation) to tackle specific needs of the exemplars (Second part of 2025)
- Submit three proposals via the Ocean Decade platform for funding matchmaking (Jun 2025)

- Place a call for a BioEco space exemplar (Jun 2025)
- Host a Co-Design meeting (Second part of 2025 -depending on funding)
- Work on observing - modelling connections with Co-Design approach (depending on obtaining the NSF funding - ongoing)
- Secure funding for science officer beyond 2025

**CoastPredict**

- Establishment of 2 GlobalCoast Working Groups:
  - WG 1- Met-Ocean WG to support GlobalCoast collaboration with Met-Offices: TOR: meet 1-2 times per year; Members: Secretariat will call for volunteers; Chairs to be selected from members.
  - WG 2- Best practices for user engagement: TOR: meet 1-2 times per year; Members: Secretariat will call for volunteers; Chairs to be selected from members

- Delivery of 3 regional proposals to Adaptation Fund with UNESCO as Multilateral Implementing Entity - the first regional proposals are from Caribbean (coordination with IOCARIBE) / South East Asia Seas (coordination with IOC-WESTPAC) / Pacific Islands (coordination with SPC) (underway)

- First COMPASS (Coastal Observing and Modeling for Prediction and Assessment to Support resilient Systems) Training Course in the Philippines (COMPASS-Philippines) (Feb. 24-Mar 8, 2025)

- Regional Cloud Infrastructure demonstration with EGI Foundation - (underway)

- Start of Flagship accelerator project demonstration with Fugro private partnership (Oct. 2025)

- Reopening of GlobalCoast survey to expand network of Pilot Sites (Sept. 2025)

- Fundraising/proposals to other funding platforms (ongoing)

- Stronger connection to the Decade Collaborative Center for Coastal Resilience Partner Alliance Network to implement training and funding opportunities

- Formalizing the contribution of the next generation, through the preparation of a CoastPredict ECOP Project that will be submitted for UN Ocean Decade endorsement (Aug. 2025 Call for Decade Actions)

**2026 - 2027**
**Co-Design**

- Produce the first design recommendations - what this will look like - such that it is understandable and implementable.
- Scale up proven co-design methodologies from our Exemplars into global blueprints.
- Enhance evaluation mechanisms for exemplar impact and value assessment.
- Secure additional funding for pilot site implementation.
- Strengthen the integration of co-design across existing ocean observing networks through GOOS.

**CoastPredict**

- Implementation at Pilot Sites as part of regional projects
- Proposal of further regional projects for funding
- Flagship accelerator project demonstration with Fugro private partnership
- GlobalCoast Network Assembly as part of CoastPredict Assembly (annually)

**Resource needs Co-Design:**

- Programme officer (2026+) - programme and exemplars
- GOOS comms - website and communications on co-design processes.
- Paris HQ support continued, vital for connections and alignment, transformation from GOOS, management of programme to achieving aims.
- If NSF funding not secured we will need to find support for the Co-Design meeting
- Exemplar implementation:
    - Existing: mix of support from alignment with regional/national ongoing work, Ocean Decade Collaboration Centres, new funding support (EU Projects, other)
    - Seeking: additional from Ocean Decade (matchmaker), industry (exposure DCO work, and Decade strategic communications, regional and or global climate/other funds

**Expected outcomes for GOOS**

**Ocean Observing Co-Design**

- Test the system against exemplars for actionable data supporting digital ocean simulation and stakeholder access.

- Rapid and dynamic observing systems that adapt to evolving needs, technologies, and spatial scales.
- Synthesize diverse stakeholder needs into open, inclusive assessment frameworks.
- Reports and diagnostics to prioritize system gaps.
- Co-design observing and forecasting systems to enhance model utility and forecasting capabilities.
- Engage sponsors to maximize returns and sustain essential elements.
- Incorporate new components into the global framework seamlessly.
- Use advanced technologies and targeted projects to address observing gaps.
- Implementation of tools and processes for global, regional, and national decisions.
- Build capacity for designing, implementing, and evolving the observing system.
- Strengthen system maturity through partnerships and co-design processes.

**CoastPredict**

- GlobalCoast Network / MoU has established a coastal network - future integration into GOOS
- Pilot Sites implementation will demonstrate a fit-for-purpose integrated coastal observing and predicting system

## Considerations for the GOOS Steering Committee

**Ocean Observing Co-Design**

Integrating the learning, processes and structures within GOOS including:

- Learning from best practices and process development, considering
  - Communications
  - Role in GOOS 2.0
- Considering how Co-Design enhances our understanding of an Ocean GBON, RRR and regional/other enhancement for services. As services become established, is this a part of Ocean GBON and RRR type processes? Co-Design is used for incubation and to establish needs and value.
- SC recommends connection with GRAs and NFPs in pilot areas, integration of effort - this is happening, but a little ad hoc. What will be an appropriate fora to discuss pilots and roles.

**CoastPredict**

- Connection to GRAs to be developed maintaining considerations of the Global Coastal Ocean aspects
- Explore connections between GLOSS and GlobalCoast

## Proposed decisions/recommendations

- Recommends to find pathways to connect Co-Design and CoastPredict Programmes to the GOOS Regional Associations and NFPs in pilot areas.
- Sets an action for a specific SC session in 2026 to have a deeper look at consolidated learning from this process (and perhaps the Decade work in general) and discuss the integration pathways for Co-Design and CoastPredict elements, so as to influence the output from these programmes
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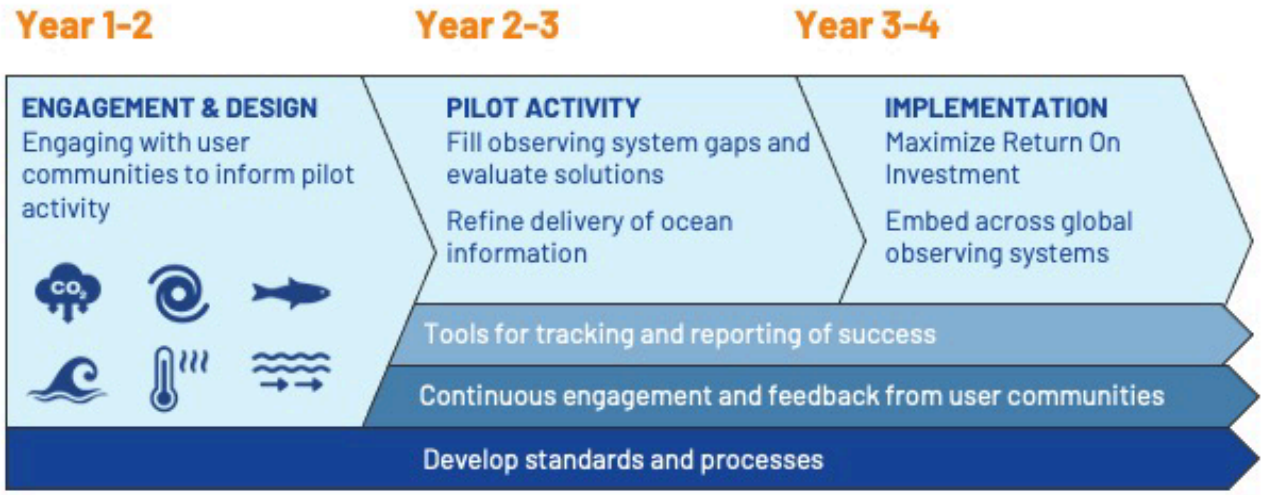
## Additional Information

Figure 1. Implementation plan for Exemplars



## Tabla 1. Summary of the progress of the Co-Design Exemplars

| Exemplar | Phase 1 Engagement and Design | Phase 2 Pilot Activity | Phase 3 Implementation |
|---|---|---|---|
| **Tropical Cyclones** | Completed in TAC<br>Ongoing in NPOMS, SWIO, Bay of Bengal, PI | Ongoing (TAC, NPOMS, SWIO)<br>Starting (Bay of Bengal and PI) | Knowledge transfer between TAC and NPOMS and SWOI |
| **Boundary Currents** | Partially completed (Agulhas Current) | Ongoing: Agulhas Current (Interest to expand to Benguela Current) | Not yet |
| **Marine Heat Waves** | Revival ongoing but community is ready and needs direction | Identified potential Pilot areas | Not yet |
| **Storm Surge** | Unknown | Unknown | Unknown |
| **Marine Life** | MBON (Unknown) | Unknown | Unknown |
| **Marine Carbon** | Partially completed | Identified: NACO | Not yet |

### Pilot areas:

TAC : Tropical Americas and Caribbean
NPOMS: North Pacific Ocean and Marginal Seas
SWIO: South West Indian Ocean
PI: Pacific Islands