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Item 3.2 of the Provisional Agenda

**REPORT OF THE EXECUTIVE SECRETARY ON THE WORK ACCOMPLISHED  
SINCE THE THIRTY-SECOND SESSION OF THE ASSEMBLY (June 2023–May 2025)**

Addendum

This Addendum is a part of the IOC Executive Secretary report and provides a more detailed update on the work accomplished over the period June 2023 to May 2025. It is presented by IOC Functions. The work on Ocean Decade has a dedicated agenda item of the Assembly, but it is also briefly reported in this document. The work of Regional Subsidiary Bodies is mostly reported under Function E (on the Decade) and under Function F (on capacity development).

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## **FUNCTION A: OCEAN RESEARCH**

*Foster ocean research to strengthen knowledge of ocean and coastal processes and human impact upon them*

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### **World Climate Research Programme**

1. The World Climate Research Programme (WCRP) underpins the work of the Intergovernmental Panel on Climate Change (IPCC), which in turn supports decision-making by the UN Framework Convention on Climate Change (UNFCCC). IOC's co-sponsoring of WCRP, therefore, represents an example of climate change science in action, through a value-chain approach, going from research to decision-making. As part of its co-sponsorship, IOC supported the WCRP Open Science Conference (OSC) 'Advancing climate science for a sustainable future' in October 2023 in Kigali, Rwanda and in 2025 hosted the annual meeting of the joint WCRP scientific committee in Paris from 12–16 May. In line with the finalisation of an updated science and implementation plan, the co-sponsors, IOC, WMO and ISC are currently updating their co-sponsorship agreement.

### **Ocean carbon sources and sinks**

2. Through decision EC-LI/4.2, the IOC convened experts in ocean carbon research and systematic observations under the umbrella of the Integrated Ocean Carbon Research (IOC-R) programme (<https://imber.info/science/regional-programmes-working-groups/ioc-r/>). This initiative federates: the IOC; the International Ocean Carbon Coordinating Project (IOCCP); the Surface Ocean-Lower Atmosphere Study (SOLAS); the Integrated Marine Biosphere Research Project (IMBeR); the Climate and Ocean Variability, Predictability and Change (CLIVAR) project of the WCRP; and the Global Carbon Project (GCP). The goal of this initiative is to design an integrated research and observation agenda in the next decade in support of relevant efforts by the G7, GOOS, the UNFCCC and its Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Ocean Decade. Since the delivery of the first Summary of Ocean Carbon Research and Vision of Coordinated Ocean Carbon Research and Observations for the Next Decade, published as IOC Technical Series, [158](#), new science and observation technologies have been developed, important to provide guidance to national and international research efforts and funders. A new publication 'Integrated Ocean Carbon Research—a vision primed for implementation' was released in June 2025 at the United Nation Ocean Conference. The report reinforces the commitment to understanding the ocean as a changing sink for human-produced CO<sub>2</sub> and its climate change mitigation capacity, as well as the vulnerability of ocean ecosystems to increasing CO<sub>2</sub> levels. By integrating the latest scientific findings and observational data, it aims to provide a more robust and actionable foundation for addressing the challenges of ocean carbon research and contributing to the UN Decade's objectives. The program Integrated Ocean Carbon Research was also highlighted together with other ocean carbon efforts supported by IOC (OARS and GO-BC) at the 2024 Ocean Decade Conference in Barcelona in a Satellite event on 12 April 2024.

3. The Global Ocean Acidification Observing Network (GOA-ON) now has more than 1,500 members, from 116 countries (2015 comparative: 150 scientists, 31 countries) and is constantly growing. 20% of the members are from SIDS. Currently 23 SIDS and 26 African countries are represented in the network, reflecting IOC's engagement in projects in the Pacific Islands, Caribbean, the Mediterranean and East Africa. GOA-ON continues to host a webinar series providing a platform for presenting scientific findings and new developments to researchers from around the world. In order to ensure continuing engagement of the OA community throughout the year, IOC supported the organization of a third and fourth edition of GOA-ON Ocean Acidification week in 2023 and 2024, respectively. The latest edition of OA Week featured 19 sessions, including community discussions on a range of topics from communication to technology, research updates from the Regional Hubs, and the GOA-ON early career network ICONEC. Within GOA-ON, IOC co-chairs the biological working group, which met for the third time in person 26-28 February 2025 in Helsingør, Denmark. This meeting, supported by IOC, was organized to advance action to achieve GOAL 2 of GOA-ON - Improve our understanding of ecosystem response to OA. Specifically, the meeting

provided guidance to a new IOC/Velux Fonden project which will also fund a postdoc, guided by the working group to focus on developing and comparing approaches linking chemical and biological changes to evaluate the strength of OA signal, and assessing the impact of ocean acidification on marine biodiversity. The working group is also planning a series of workshops to assess capabilities and interest in ocean acidification impact studies.

4. Since 2021, IOC, together with GOA-ON, co-chairs the Ocean Decade Programme “Ocean Acidification Research for Sustainability” (OARS). The programme is structured around seven transformative outcomes and aims at providing systematic evidence of the impacts of ocean acidification on the sustainability of marine ecosystems, enhance research capacity, increase observations of ocean chemistry changes, improve communication to policymakers and communities by providing the information needed to mitigate and adapt to ocean acidification and to facilitate the development and evaluation of strategies to offset future impacts. Over the reporting period IOC co-coordinated the preparation of seven Outcomes’ white papers, outlining the implementation strategy for OARS. These papers were published as IOC Technical Series, [185](#) in April 2024. Different working groups, supported by IOC, have formed to implement the OARS outcomes, focusing on co-designing and co-locating ocean acidification measurements with aquaculture stakeholders, and ocean acidification quality assessments. In addition, IOC supports the alignment of metadata and data requirements for inorganic carbon data by different databases worldwide to increase the interoperability across and the utilization for ocean acidification products. This initiative is integrated in the IOC data infrastructure.

5. Together with partners from GOA-ON and OARS, IOC co-organized one of the discussion tables during the Earth Information Day World Café, focusing on ocean acidification and deoxygenation as well as four events during UNFCCC COP28. The events helped to increase awareness of the impacts of ocean acidification on ocean and human health and to engage with new partners to advance the mission of OARS.

6. IOC co-sponsors the Blue Carbon Initiative (BCI) with Conservation International and IUCN. The 15th annual meeting of the Scientific Working Group of the BCI was organized and held on 3–6 October 2023 in Singapore. A total of 105 people from 20 countries attended the meeting throughout the week (74% participants from the region and 52% women). In July 2023, the BCI released an update of the [Guidelines for Blue Carbon and Nationally Determined Contributions](#). The 2024 meeting of the BCI was held on 2–6 September 2024 in Cape Town, South Africa and the next meeting is scheduled for 9-14 September 2025 in Sri Lanka.

7. Together with Australia, IOC co-hosts the secretariat for the coordination of the International Partnership for Blue Carbon (IPBC). Partner and stakeholder engagement activities over the last couple of years have resulted in the growth of the partnership, which now has over sixty Partners, of which 18 are Member States. Key knowledge sharing activities were performed during 2023, including the organisation of [a knowledge exchange session on blue carbon in NDCs](#) and the dissemination of policy guidance ([Actionable blue carbon ecosystems for climate mitigation and adaptation](#); [Coastal Blue Carbon Ecosystems in International Frameworks and Conventions. Overview Report](#) updated to September 2023; [IPBC Inventory of Global Blue Carbon Actors](#)). Collaboration among the IPBC Coordinator Team, IPBC Partners and the secretariat of the High Level Panel for a Sustainable Ocean Economy resulted in the co-branding of the [Ocean Panel Blue Carbon Handbook](#), released in June 2023. On 1-4 October 2024, the sixth IPBC Dialogue was held in Cairns, Australia, co-hosted by Australia and Fiji, with the support from the IOC. Around 100 participants from over 20 countries attended the Dialogue. The objectives of the 2024 IPBC Dialogue were to convene IPBC Partners to connect, share information and exchange on activities and plans and to create opportunities for exchange with regional and local invited guests.

8. A key outcome of the last Dialogue in 2023 was the establishment of a High-Level Ambition Group (HILAG). The HILAG was initially conceived as an initiative of France and Conservation International at the One Ocean Summit in Brest in 2022 and is now an integral part of the IPBC jointly coordinated by France, the French Development Agency (AFD) and IOC. In 2024, on behalf

of the HILAG, the IOC led the development of a Blue Carbon Finance Toolbox guidance document, which offers an overview of financial mechanisms and strategies to support the conservation, restoration and sustainable management of blue carbon ecosystems. The Blue Carbon Finance Toolbox has benefitted from the review of all IPBC Partners and will be officially launched at the third United Nations Ocean Conference in Nice, France in June 2025.

9. IOC is also part of the Steering Committee of the newly established Global Decade for Blue Carbon (endorsed as a program under the Ocean Decade), which aims at connecting global blue carbon experts, deepening understanding of the ocean-climate relationship to mitigate the impacts of climate change, acknowledging broader ecosystem roles to address climate responses while supporting both people and biodiversity, producing innovative outcomes across estuarine, coastal, and open ocean environment, promoting nature-based solutions and effectively communicating and delivering outputs to policymakers and communities. GO-BC convened a scientific session (and townhall meeting) at the European Geosciences Union general assembly in Vienna, Austria at the end of April 2024 and was highlighted at the IOC side event addressing ocean carbon at the Ocean Decade conference in 2024. Furthermore GO-BC was presented to Member States at a side event during the 57<sup>th</sup> Session of the IOC Executive Council in June 2024.

10. In 2023, IOC was among the recipients of a grant from the European Climate, Infrastructure and Environment Executive Agency (CINEA) for a 48-month project on “Carbon sequestration in BLUe EcoSystems” (C-BLUES) led by the Norwegian Institute for Water Research (NIVA). IOC is responsible for the deliverable of two summaries for policymakers on gaps in ambitions and potentials for conservation and restoration of blue carbon ecosystems and on the climate-biodiversity nexus. The project has started in April 2024 and will end in early 2028.

11. Several blue carbon events were organized at UNFCCC COP28 (30 November 2023–13 December 2024, Dubai, UAE) raising the profile of blue carbon for climate action. Marine and coastal nature-based solutions were widely recognised in the global stocktake outcome for their vital role for effective and sustainable climate action. Eight countries (Australia, Costa Rica, Fiji, France, Papua New Guinea, Seychelles, the United Kingdom and the United States of America) showcased their efforts in progressively integrating blue carbon into national climate action during an official side event on ‘[Blue Carbon Coastal Wetlands in Climate Action: Taking Stock of Nature-based Solutions in Practice](#)’, co-organised by the [International Partnership for Blue Carbon \(IPBC\)](#), the Ocean and Climate Platform and the Pew Charitable Trusts. At COP28, Japan announced they joined the IPBC as the latest Partner, bringing the total number of countries in this global effort to 18. IOC, France, the French Development Agency (AFD) with support from the IPBC and Australia also co-organised a side event in the French Pavilion where Australia, Costa Rica, France and Monaco presented their national commitments to blue carbon as part of their membership of the HILAG. At UNFCCC COP29 in Baku, Azerbaijan (11-22 November 2024), the IPBC, Rare, Conservation International and the Pew Trusts co-organised an official side event focusing on innovative financial mechanisms to protect, restore and sustainably manage coastal blue carbon ecosystems, including blue carbon credits.

### **Climate change impacts on ocean and coastal ecosystems**

12. IOC continues to co-sponsor with IMO and WHO, GESAMP Working Group 41 on Ocean Interventions for Climate Change Mitigations (formerly Geo-engineering in the Marine Environment), which provides for a continued interagency focus on the challenges and possibilities in marine geo-engineering (also referred to as ‘carbon dioxide removal and negative emissions techniques’). In its current phase, GESAMP WG 41 is focusing on wider societal implications of different marine geo-engineering approaches for the marine environment. This will include the development of an assessment framework that covers social, political, economic, ecological, ethical and other societal dimensions. The WG also contributes to the work of the UNFCCC related to ‘negative emissions’ (carbon removal and other similar techniques), as part of the mitigation element of the Convention’s programme of work. GESAMP WG 41 met in Copenhagen, Denmark, on 9–12 May 2023 and again 18–20 November 2024, hosted by IMO and the IOC Science and Communication Centre on Harmful



Algae Blooms at University of Copenhagen. The 2024 meeting focussed on drafting a Scientific Summary for Policymakers to be published ahead of the UN Ocean Conference. The Summary will aim to provide a concise overview of ocean intervention approaches, mainly marine carbon dioxide removal, their maturity and potential impacts as well as governance.

13. IOC is also cosponsoring with IAEA, UNEP, WMO and IMO, GESAMP Working Group 45 on Climate Change and Greenhouse Gas Related Impacts on Contaminants in the Ocean. The WG 45 combines the efforts of a multidisciplinary group of experts to critically review existing research on the effects of climate change (ocean physics and chemistry) on the speciation, toxicity, bioaccumulation, mobilization, and transport of pollutants in the ocean and coastal ecosystems identifying knowledge gaps (as published in *Nature/ Communications Earth & Environment*, October 2024); to document the central role and global importance of climate change on the coastal and marine ecosystems' functions and services, and to make recommendations for future research directions on the effect of climate changes in the speciation, cycling, toxicity, transport, mobility, and bioavailability of diverse pollutants, including trace elements, radionuclides, organic pollutants, and nutrients.

14. De-oxygenation has been recognised by the IPCC as a problem exemplifying the effects of climate change-induced ocean warming, and is also recognised as being related to eutrophication along coastal areas. IOC leads scientific and capacity development efforts related to deoxygenation, for the benefit of its Member States, through its working group on Global Ocean Oxygen Network (GO<sub>2</sub>NE). The GO<sub>2</sub>NE series of regular webinars (37 webinars in total in April 2025) continues to be a success with on average 100 participants attending each webinar. Since November 2020 scientists and other stakeholders from more than 90 countries have joined the network.

15. Deoxygenation remains overlooked at many discussions addressing the impacts of climate on the ocean during UNFCCC events. To counter this, UNESCO-IOC, together with the [Global Ocean Oxygen Network](#), the Ocean Decade programme [Global Ocean Oxygen Decade](#), and other partners organized an event at the Ocean Pavilion entitled '[Climate Change, Deoxygenation and Biodiversity in the High Seas and Deep Sea: Interactions and Policy Opportunities](#)' to showcase the importance of ocean oxygen observations.

16. The "Global Ocean Oxygen Decade" (GOOD) Ocean Decade endorsed programme is focused on raising global awareness about ocean deoxygenation and providing knowledge for action. This includes developing mitigation and adaptation measures through local, regional and global efforts, intensified monitoring, transdisciplinary research, bi-directional knowledge transfer among stakeholders and scientists, innovative outreach and ocean education and literacy. Under the Decade programme, IOC convened experts in September 2024 to discuss the potential of reoxygenation approaches to stop further deoxygenation. The outcomes of this workshop are being prepared for publication in EOS.

17. In order to improve data availability and quality, GO<sub>2</sub>NE continues to contribute to the planning of an ocean oxygen data portal: the GO<sub>2</sub>DAT (Global Ocean Oxygen Database and Atlas). Further development of the database and alignment with the IOC data architecture is included in planning by the Go2NE steering group and will be facilitated through a project funded by NORAD focusing on developing oxygen observing capacity in Africa.

18. A summer school coordinated under the auspices of GOOD and GO<sub>2</sub>NE and including OARS with the support of IOC took place in November 2023 in Chile. The Chile summer school provided a great opportunity for 33 young researchers from 17 countries to meet more than 15 world experts in their respective fields. The days were filled with presentations on different aspects of ocean acidification and deoxygenation as well as practical sessions on modelling, laboratory experiments, shipboard measurements and analysis, communication training (mostly scientific) and an introduction to ethics in science. Planning for the next edition in November 2025, in Malaysia is well underway and it is expected that 40 students from 20 countries will attend.

19. The annual GO<sub>2</sub>NE meeting took place just before the 2024 Ocean Decade Conference in Barcelona (8–9 April 2024). Together with the experts involved in GO<sub>2</sub>NE and partners IOC also organized a satellite event, highlighting new approaches to combat eutrophication and hypoxia). In 2025 the group met 7-8 June 2025, in Villefranche-sur-Mer, France. In total the group finalized two scientific publications over the reporting period, one focusing on the impact of mCDR on ocean oxygen, and one addressing biological indicators of low-oxygen stress in marine water-breathing animals.



## **FUNCTION B: OBSERVING SYSTEM/DATA MANAGEMENT**

*Maintain, strengthen and integrate global ocean observing, data and information systems*

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20. The Global Ocean Observing System (GOOS) continues to deliver and coordinate essential ocean variable and observation system coordination and delivery according to the GOOS 2030 Strategy for a range of application areas. GOOS provides coordination, integration and advocacy on global ocean observing in combination with advancing stakeholder engagement, and the resilience and responsiveness of the global system. The GOOS Steering Committee steers GOOS to support a robust system driven by the needs of Member States and other relevant stakeholders that is aligned for strategic effectiveness as well as to support discussions on funding mechanisms for GOOS. Current resource requirements do not enable GOOS to move at the pace needed and demanded by Member States and society.

21. Currently GOOS coordinates more than 8,700 ocean observing platforms across 13 global ocean observing networks, operated by 83 Member States (9 in Africa, 9 SIDS). Over 120,000 ocean observations are delivered to operational forecasting systems every day, as tracked through OceanOPS (GOOS IOC-WMO Operational Centre). The number of sustained biological and ecological observing programmes coordinated and tracked has risen to 638 across 71 Member States with 7 in Africa and 14 SIDS.

22. GOOS have submitted the EOVS paper “GOOS Essential Ocean Variables: the backbone of a sustained and evolving global ocean observing system” to the Marine Policy journal, which defines the governance of the process to adopt new EOVS. Members of GOOS have been involved in the UNFCCC expert process to develop indicators for the Global Goal on Adaptation and a task team is developing an outline for a methodological framework for building standardized ocean indicators, and developed criteria for indicator development. GOOS panels have been working on a Biodiversity Plan and a Carbon and GHG plan, which are at different stages of development and aim at improving the observational capacity and the delivery of scientific evidence to support implementation of key policies and agreements such as the Kunming-Montreal Global Biodiversity Framework (GBF) or the Paris Agreement.

23. The Observations Coordination Group recognised Uncrewed Surface Vehicles as a new emerging network at its recent meeting in April 2025. There are now 13 networks and 4 emerging networks in GOOS. The OCG also approved the introduction of service level agreements by OceanOPS to help support GOOS networks.

24. The Ocean Coordination group Data Task Team is reviewing the mandatory metadata required for all GOOS networks and is defining the minimum metadata required for a WIGOS ID. The result will be the development of a minimum metadata “passport” with a unique identifier for data use and tracking for all GOOS platforms. The passport will include controlled metadata for the following categories: identification, affiliations, hardware, operations, data, status, and latest update.

25. GOOS/IOC office has worked closely with WMO to deliver the first Statement of Guidance for Ocean Applications as part of the Rolling Review of Requirements process. This is a significant step forward in expressing the observational needs across operational ocean forecasting systems for a range of application areas. The Rolling Review of Requirements (RRR) is a systematic and transparent process within the WMO Integrated Global Observing System (WIGOS) framework that supports the design and evolution of WIGOS by compiling information on service (user) requirements for observations across various WMO Earth System Application Categories. These are then brought together into a summary called a Statement of Guidance (SoG) document. Since 2023, the RRR process has included an Ocean category.

26. GOOS has undertaken a rebranding exercise and now has a new logo. Correspondingly, In development is a GOOS communication toolkit and messaging guide that will be released in 2025. This work has been guided by interviews with key stakeholders and the results of a social listening

experiment, the results of which were also presented to the SC. The goal of the communications toolkit is to enhance not just the visibility of GOOS but provide tools for the community to advocate for GOOS. Also in production is the Ocean Observing System Report Card 2025. As an update from earlier years the approach this year includes making the report card more interactive and engaging, such as by evolving web content for users to dive deeper into the content.

### **GOOS Regional Alliances and National Focal Points**

27. The GOOS Regional Alliances (GRAs) and National Focal Points (NFPs) serve as the key contact points for ocean observing system needs at regional and national levels respectively. Emphasis has been on building engagement and support with the 14 GRAs and 81 GOOS NFPs, the former through two online meetings and the latter through a second annual GOOS NFP Forum and a survey.

28. The GRAs play a key role in delivering the benefits of GOOS's strategy, structure, and programmes at a regional, national and finally global level. In November 2024, the GOOS Regional Council convened a meeting with 26 participants representing 13 out of 14 GRAs, three partner programmes and the GOOS Office. The meeting included a review of progress on actions from previous GRA forums. Five GRAs shared the updates on their achievements, challenges, opportunities and future plans. The GRAs are also working to further strengthen the connections with NFPs and with other GRAs. Another GRA Council online meeting was organized on 16 April 2025, with 23 participants from 13 GRAs, ArORA task team, and GOOS Office. Six GRAs shared their updates, and the uptakes from GOOS SC-14 on GRAs, enhanced GRA reporting, application areas for collaboration among GRAs were highlighted.

29. The 2nd National Focal Point online Forum was organized on 24 October 2024, with 42 participants from 32 countries, including 32 NFPs (or their representatives) attending. The forum focused on two major themes: 1) enhancing national coordination and support; 2) strengthening the links between NFPs with GRAs. In response to the [IOC Circular Letter 3024](#), five Member States newly designated their GOOS NFPs (Malta, Peru, Qatar, Senegal, Tunisia), nine updated their GOOS NFPs (China, Kenya, Kuwait, Myanmar, Netherlands, Nigeria, Singapore, Saudi Arabia, UK), and six (Canada, Columbia, Egypt, Romania, Sweden, USA) confirmed no change, making the [NFP List](#) up-to-date. A comprehensive NFP survey was launched on 2 December 2024, with responses received from 43 Member States, highlighting understanding communication and support needs between GOOS Office and NFPs (Part I), the national coordination (Part II) and priorities (Part III) for ocean observation, NFP evolving roles and actions (Part IV) and Advisory Group (Part V). In addition, following the GOOS SC-14 decision, a task team has been established to develop a proposal for NFP implementation guidelines.

### **IOC Data Architecture**

30. In September 2024 an IODE/GOOS Data Workshop took place where a significant step forward was made in uniting IOC data elements towards a cutting-edge IOC Data Architecture (*IOC Assembly agenda item 3.4.3*). The goal was to enhance coordination and discuss an integrated and scalable IOC digital architecture that would improve data sharing, management and accessibility, across ocean systems, and enhance the IOC's support to key United Nations mandates.

31. The workshop outlined an approach forward to optimise connections between existing data elements and clarified some elements of support that will be needed to strengthen delivery of ocean data for operational services. As a first step, the Workshop participants agreed to set up a working group to develop a proposal for the IOC Data Architecture [IOC/A-33/3.4.3.Doc\(1\)](#).

### **The IODE/GOOS Ocean Best Practices System (OBPS)**

32. The IODE-GOOS Ocean Best Practices System (<http://www.oceanbestpractices.org>) (OBPS) is a fundamental element for system integration, efficiency, and interoperability. The OBPS

plays a vital role in supporting IOC sections and contributing to the UN Decade of Ocean Science for Sustainable Development and the Sustainable Development Goals (SDGs). By providing a permanent, curated archive of methodologies, standards, and practices, OBPS enables IOC sections to make their documents discoverable, and shareable, while fostering a collaborative space for communities to collectively advance our methodological heritage. It enables the refinement of methodologies, ensures global dissemination, and promotes collaboration within the IOC community and beyond.

33. In 2019, the OBPS became a UNESCO/IOC Project, supported by GOOS and the International Oceanographic Data and Information Exchange (IODE). It was designated as a joint GOOS-IODE Project. To secure its long-term sustainability and ensure relevance to all IOC mandates, it is proposed to expand the scope of OBPS beyond GOOS and IODE. This strategic shift will amplify OBPS's visibility, impact, and value for all IOC Sections. The benefits of evolving from a GOOS-IODE project-based initiative are to become a more sustained and structured system, enabling long-term support for best practices across a growing number of communities. Expanding its reach across the full ocean value chain, the IOC OBPS will engage a broader spectrum of stakeholders, ensuring greater impact. With increased funding, it will gain more stability, making it an even more valuable resource for the IOC community and fostering regional champions, and strengthening the global network of ocean best practices. This proposal, including a work plan and budget, to evolve OBPS from a GOOS-IODE Project to a cross-IOC Ocean Best Practice System was approved at the GOOS 14th Steering Committee and IODE-28 meetings in 2025, with the final decision to be made at the 33<sup>rd</sup> IOC Assembly [[IOC/A-33/3.4.4.Doc\(1\)](#)].

#### **Joint WMO-IOC Collaborative Board**

34. The Joint WMO-IOC Collaborative Board met in person in September 2024 and identified priority areas for its work using a multi-criteria analysis. These priority work areas are: (i) defining the Global Basic Observing Network (GBON) for oceans; (ii) improving data management and interoperability; (iii) strengthening coastal and maritime resilience; and (iv) enhancing capacity development through joint training and collaboration. Progress has been accomplished within each work area.

35. The subgroup on GBON has prepared the Terms of Reference and selected its membership. The subgroup on data management and interoperability have developed Terms of Reference that were subsequently endorsed by the IODE-28 session. For the priority area on coastal and maritime resilience, experts from IOC and WMO contributed to the report "*Meteotsunamis: definition, detection and alerting services investigation*" (IOC Technical Series 200, 2025). The JCB highlighted the need to include oceanographic information and the IOC in the work of the UN Early Warning for All Initiative. The GOOS Steering Committee has since formed a task team to develop a proposal on how GOOS can exchange with the EW4ALL initiative. In the capacity development focus area the IOC and WMO coordination includes the Global Campus Initiative and the Ocean Teacher Global Academy. IOC members formally joined the WMO Executive Council Capacity Development Panel as the JCB representative. An update of the work is provided in [[IOC/A-33/4.6.Doc\(1\)](#)].

#### **OceanOPS – the GOOS Operations Centre**

36. OceanOPS aims to become the international hub and centre of excellence that provides vital services in monitoring, coordinating, and integrating data and metadata, across an expanding network of global oceanographic and marine meteorological observing communities. Supporting GOOS, its global and emerging networks, OceanOPS is hosted by France, within Ifremer (Institut Français de Recherche pour l'Exploitation de la Mer), Brest. OceanOPS has implemented its ambitious five-year Strategic Plan ([GOOS-250 Report](#)) with excellent progress across the goals, under resources constraints as reported at last OCG session [[Report](#)].

37. Monitoring (Goal 1): OceanOPS successfully monitors in real time 80% of GOOS OCG Network platforms -its website ocean-ops.org is an achievement- and reports as needed to

Networks, GOOS, IOC and WMO—its ReportCard is an achievement, gradually expanding across GOOS disciplines with a shared production with GOOS HQ. EO/ECV perspective on GOOS capabilities remains to be developed to contribute to gap analysis work.

38. Metadata (Goal 2): OceanOPS has harmonized metadata content for observing platforms through the concept of "GOOS passport", with unique WIGOS identifiers and controlled vocabulary, and routinely delivers them to WMO/OSCAR through its API. Connection to ODIS being worked out. Progress remains to be made on 20% of the platforms, mainly on some fixed points. Monitoring of GRAs and BioEco would be needed for a full view on Member States contribution to GOOS.

39. Operations (Goal 3): OceanOPS delivers tools to support implementers in their day-to-day operations including alerts/notification (per IOC Res XLI-4), basin-based coordination meetings enabling opportunities and optimization. OceanOPS chartered a sailing yacht during COVID with USA, EU and Canada to deploy 100 profiling floats.

40. New networks (Goal 4): OceanOPS has supported the development of the emerging OceanGliders and AniBOS networks, and developed a regional node in the Mediterranean Sea through cooperation with Monaco Explorations. It has developed several cooperation with racing community (e.g. Vendée Globe, OceanRace) generating operational and outreach value. OceanOPS has initialized a major expansion of the ship-based components of the GOOS, through partnership with the shipping industry as recommended in UN decade Challenge 7 whitepaper: [www.ocean-ops.org/unoc](http://www.ocean-ops.org/unoc).

41. Infrastructure (Goal 5): OceanOPS is now firmly established in France, with increased support from Ifremer, WMO and IOC/GOOS. Budget management has been consolidated but slightly decreasing resources from Networks triggered a restructuring plan, which triggered consequently a 5-month outage when migrating the Information System. OceanOPS services to Networks is now organized with a Service Level Agreement Framework but only half of GOOS OCG networks, gradually expanding, provide financial support to OceanOPS.

42. OceanOPS stakeholders will develop a new Strategic Plan in 2025/26 in support of the GOOS towards 2030. Member States are invited to feedback on past/future services, and further support this critical piece of the GOOS infrastructure. OceanOPS is a core partner in Europe through its participation in two major projects: ARMIT and TRICUSO, preparing a future collective digital ecosystem (monitoring, data, metadata) and supporting further emerging network such as SOCONET (surface ocean carbon observations).

### **Global Ocean Observing System (GOOS) Reform**

43. Consultations and in-person meetings have taken place, led by the secretariat, to deliver the proposal for GOOS reform (agenda item 4.5.1 at this session), according to the mandates set out in Decision EC-57/4.1 and document [IOC/EC-57/4.1.Doc\(1\)](http://www.ioc-goos.org/EC-57/4.1.Doc(1)).

44. As identified under agenda item 4.5.1, a workshop took place at the 14th meeting of the GOOS Steering Committee in February 2025. The aim of this session was to have interactive open discussions about the future direction of GOOS (2030 and beyond) and identify key areas of change to accomplish this goal. Key questions were discussed to elucidate the concept and unique value proposition for the future GOOS that will answer the questions and needs of society of tomorrow.

45. This workshop outlined critical areas for GOOS's development, including strengthening its positioning, refining its messaging, optimizing organizational efficiency, and engaging key stakeholders including member states. By addressing these aspects, GOOS can enhance its impact, increase its visibility, and secure a sustainable future of global ocean observations.



## GOOS and Ocean Decade

46. The UN Decade of Ocean Science for Sustainable Development (2021–2030) has significantly bolstered the efforts of the Intergovernmental Oceanographic Commission's Global Ocean Observing System (GOOS) by providing strategic direction, fostering partnerships, and mobilizing resources. Through the endorsement of key GOOS-led programs such as *Observing Together*, *CoastPredict*, and *Ocean Observing Co-Design*, the Ocean Decade has facilitated the expansion and integration of ocean observation networks, enhancing the collection of physical, biogeochemical, and biological data critical for addressing global challenges like climate change and marine biodiversity loss. The collaborative framework of the Ocean Decade has enabled GOOS to identify and address observational gaps, particularly in underrepresented regions, by promoting co-designed initiatives that align with the objectives of the [Decade Challenge 7 White Paper](#).

47. The Ocean Decades Digital Ecosystem strategy is also strategically aligned with GOOS's Cross-Network Data Implementation Strategy, cooperatively aiming to improve the integration of data, metadata, and access services across global in situ networks, promoting FAIR (Findable, Accessible, Interoperable, and Reusable) data principles. This strategy supports the federation of distributed data nodes, enhancing discovery and access, and underpins the growth of the digital ocean ecosystem, facilitating applications like digital twins and AI/ML tools. The Ocean Decade's Challenge 8 White Paper provides a framework for advancing a globally connected, digitally enabled, and user-driven ocean data ecosystem that strengthens the value chain from ocean observations to societal benefit, directly supporting GOOS's efforts to improve data interoperability, accessibility, and integration across observing networks.

## The IODE Network

48. The IODE network now includes 102 ocean data centres: 61 are National Oceanographic Data Centres (NODCs) (of which 12 are IODE accredited) and 45 Associated Data Units (ADUs) 42 are IODE accredited). Seventeen (17) of the data centres are in Africa, 9 in Latin America/Caribbean and 8 in the WESTPAC region. Five (5) are in SIDS.). There are 90 IODE national coordinators for data management and 45 IODE national coordinators for marine information management.

## IODC collaboration in the UN Ocean Decade

49. The IOC Project Office for IODE, Ostend (Belgium) continues to host the Decade Coordination Office for Data Sharing (DCO Ocean Data Sharing) which entered a second phase of activity in February 2025. Together with the central Decade Coordination Unit, the DCO mobilized funding for a period of 24 months from ENGIE Foundation for the further development and continuation of the DCO beyond the first phase which ended in June 2024. The DCO Ocean Data Sharing acts as sub-unit of the DCU to coordinate data and information activity across Decade Actions falling within its scope and to lead the associated ocean data sharing community of practice in the Decade; to contribute to the implementation of the Decade's Data & Information Strategy and to further the progress towards Challenge 8 of the Decade "Creating a Digital Representation of the Ocean"; and to undertake capacity development and resource mobilisation activities within the Decade for data management and sharing. The DCO has developed a website (<https://oceandatasharing-dco.org>) with resources to assist Decade Actions including a Data Resources Toolkit and a virtual Data Helpdesk. The DCO has also surveyed over 92 Decade Actions on data management and sharing needs. As a result, the DCO is working closely with the IODE team and the IODE community to update manuals and guides on data management planning and data attribution (data citation).

50. The DCO Ocean Data Sharing contributed to the third International Ocean Data Conference (IODC-3) held in Santa Marta, Colombia, 10–11 March 2025 through: leading the session on Working towards a federated Global Ocean Data Ecosystem ongoing initiatives, partnerships and ambitions towards the Ocean Decade Vision 2030 outcomes; presenting with the DCU, DCO Ocean Observing and Decade Collaborative Centre for Ocean Prediction on the Decade Digital Ocean

Ecosystem; and both presenting and chairing a breakout during the Ocean Data Information System session. The DCO Ocean Data Sharing also participated in the 28th session of the IODE Committee (Santa Marta, Colombia, 12–14 March 2025) and will participate in the new IODE Inter-sessional Working Group on Advancing Ocean Data Sharing for Sustainable Development in areas within national jurisdiction (IWG-DSNJ). The DCO Ocean Data Sharing is planning to participate in the 2025 UN Ocean Conference in Nice with a number of sessions submitted and the physical data sharing helpdesk to be operated after the successful operation at the previous edition of the conference.

51. The IODE Secretariat is working closely with the DCO Ocean Data Sharing and other IOC programmes and Decade coordinating bodies in the definition of the IOC Data Architecture. The IOC Data Architecture will link key IOC data into a holistic ecosystem and for the Decade Digital Ecosystem it provides a focal point for sharing of data through the IOC/IODE Ocean Data and Information System (ODIS). The Ocean Biodiversity Information System (OBIS) and International Coastal Atlas Network (ICAN) are also in collaboration with DCO Ocean Data Sharing on capacity development activities for Decade Actions.

52. IODE continued to support the GOOS BioEco panel (BioEco portal), GOOS/IODE Ocean Best Practices System (OBPS), GOSR, StoR, HAB (HAEDAT, Toxin DB, HAIS, GHSR), GO<sub>2</sub>DAT and SDG Indicator 14.3.1 (OA portal); as well as more broadly the implementation of the *IOC Capacity Development Strategy* through its OceanTeacher Global Academy (OTGA) (see also below and under Function F). Cooperation has also been enhanced with the regional sub-commissions with the co-design and implementation of activities that respond to the regions' work plans.

53. IODE, through OceanTeacher Global Academy (OTGA) Programme Component, have continued to successfully support the training needs of UN Ocean Decade, developing and delivering trainings to address its 10 Challenges. These courses have been developed by OTGA Regional and Specialized Training Centres and affiliated partners, which include the Decade Coordination Unit, Decade Collaborative Centres, Early Career Ocean Professionals (ECOPs) Programme, and many Decade actions. Examples are the Sustainable Coastal Growth and Resilience blended training (2025), Co-design for the Ocean Decade online training (from 2024), and Ocean Data Analysis with R Programming for Early Career Ocean Professionals (2023–2024). In 2024, OTGA has also implemented a competency framework to better monitor the results and impact of its training courses in relation to the Challenges.

54. IODE, through the Ocean Biodiversity Information System (OBIS) successfully implemented two Decade actions: Pacific Islands marine Bioinvasion Alert Network (PacMAN) and eDNA expeditions in World Heritage marine sites (eDNA expeditions). Both projects were funded under the UNESCO-Flanders Trust funds. The PacMAN project primarily focused on Fiji, and has built local capacity in science to detect marine invasive species using molecular technologies. The project developed an early-warning decision support tool, a custom bioinformatics pipeline, and an end-to-end system for monitoring, sampling, and analyzing marine invasive species. It also provided training for local researchers. The UNESCO eDNA Expeditions project was jointly implemented by OBIS and the World Heritage Marine Programme, and has showcased the transformative power of environmental DNA (eDNA) for marine biodiversity monitoring in 21 World Heritage marine sites across 19 countries. The project engaged over 250 participants—including students—in citizen science, resulting in the identification of approximately 4,400 marine species, including those 120 threatened species on the IUCN Red List. The data is openly accessible via OBIS and an interactive dashboard, contributing to global awareness and decision-making.

### **IODE strategic developments 2023–2025**

55. After the decision by IODE-XXVII (March 2023) to restructure the IODE into three programme components (OBIS, ODIS and OTGA) and 10 programme activities (most under ODIS), efforts during the past inter-sessional focused on strengthening the programme components (PCs) and streamlining the programme activities. Detailed reporting on the PCs is provided below.

56. IODE implemented its first NODC health check revealing the need for remedial action to assist NODCs. IODE continued to seek and implement cooperation with other IOC programmes through OBIS, ODIS and OTGA demonstrating the importance of the IOC value chain. To further develop such cooperation strategically, an IOC IODE-GOOS Data Workshop was held in September 2024. This resulted in a proposal for an IOC Data Architecture that will be discussed at the Assembly.

57. The IODE Committee met for its 28th Session in Santa Marta, Colombia, 12–14 March 2025. It focused on the following key issues: (i) contribution of the IODE programme to the implementation of the IOC medium-term strategy (2022–2029); (ii) status of the IODE network and NODC health status; (iii) progress of the IODE programme components and programme activities; (iv) progress with joint activities with IOC programmes and other organizations; (v) outcome of the 3rd International Ocean Data Conference; (vi) progress of cooperation of IODE with the UN Ocean Decade; (vii) Advancing Ocean Data Sharing for Sustainable Development in areas within national jurisdiction; (viii) Development of the IOC Data Architecture; (ix) Renewal of the MOU between the Flanders Marine Institute and IOC regarding the IOC Project Office for IODE (2027–2031) and (x) work plan and budget for 2025–2026.

58. The third edition of the International Ocean Data Conference (IODC-3) was held on 10 and 11 March 2025. It gathered leading experts in marine biodiversity data, oceanography, information technology, and data science, as well as experts in ecosystem management, marine spatial planning, and even emerging topics of geodata management and marine governance in the Antarctic continent. The conference underscored the importance of strengthening data infrastructure, improving accessibility, and fostering collaboration to ensure inclusive and equitable participation in the global digital ocean ecosystem. The conference stressed the need for inclusive data collection approaches, incorporating local knowledge and regionally driven initiatives. Community-driven projects and mobile-based tools demonstrated how grassroots engagement can contribute to marine data repositories, enhancing global datasets while addressing local environmental and socioeconomic needs. Strengthening policy frameworks, improving regional monitoring, and fostering collaboration between scientific and local communities were identified as key priorities. Capacity-development efforts remain fundamental to ensuring equitable access to ocean data. Regional collaborations, such as those within Latin America and the Caribbean, aim to enhance data-sharing and accessibility across diverse stakeholder groups. Training programmes, mentorship initiatives, and the development of best practices support long-term sustainability in marine data management. Beyond technological advancements, IODC-3 recognized the indispensable role of people in ocean data collection, curation, and application. Volunteer networks, citizen science initiatives, and workforce training are crucial in sustaining high-quality marine biodiversity information. Ensuring sustainable funding and institutional support for these efforts is essential to maintaining the long-term integrity of ocean data systems. The conference reaffirmed the urgency of building a unified and inclusive digital ocean ecosystem where scientific, cultural, historical, and local knowledge converge. Achieving this vision requires sustained efforts in data harmonization, policy alignment, and international cooperation. By strengthening these foundations, the ocean science community moves closer to a future where ocean knowledge is accessible, actionable, and impactful for all.

### **The Ocean Biodiversity Information System (OBIS)**

59. The IODE/Ocean Biodiversity Information System (OBIS) continues its role as the world's leading open-access platform for marine biodiversity data. As of 9 April 2025, OBIS holds an impressive 135 million species observations from 5,575 datasets, covering approximately 194,000 marine species. This remarkable growth underlines OBIS's continued success in mobilising biodiversity data and supporting the global science-policy interface for ocean conservation.

60. To enhance strategic coherence and strengthen operations, the IODE Steering Group for OBIS (SG-OBIS) adopted a new priority strategy at its twelfth session in March 2024 in the Republic of Korea. This strategy introduced a restructured management framework and established three new coordination groups: the OBIS Data Coordination Group (DCG), the OBIS Products Coordination



Group (PCG), and the OBIS Nodes Coordination Group (NCG). The DCG is focused on data standards, long-term archiving, and integration with the IOC data architecture, including the implementation of biodiversity Essential Ocean Variables (EOVs). The PCG is tasked with enhancing access to FAIR data products and is developing a Products Catalogue and a JupyterHub for testing and innovation. Meanwhile, the NCG facilitates communication across OBIS Nodes to coordinate priorities and address shared challenges.

61. Supporting these structural changes, OBIS has employed a part-time consultant, enabled through increased regular programme funding from UNESCO. SG-OBIS also agreed to convene biennial OBIS All-Hands meetings to engage the broader community of practice, although in 2025 this will be replaced by coordination meetings held back-to-back with the Living Data 2025 Conference in Bogotá, Colombia. The sixth session of the OBIS Executive Committee (EC-OBIS-6) in October 2024 advanced planning for the coordination groups, drafted the 2025 work plan and budget, and discussed a long-term vision for OBIS, including enhanced visibility through a new website and outreach materials.

62. OBIS's role in international biodiversity policy frameworks has grown significantly. The Convention on Biological Diversity (CBD) recognised OBIS in COP15 (2022) and reaffirmed this in COP16 (2024) as part of the marine component of the emerging Global Biodiversity Observing System (GBIOS), alongside GOOS and ODIS. OBIS was specifically mentioned as contributing to indicators for Goal D and Targets 20 and 21 of the Kunming-Montreal Global Biodiversity Framework, relating to access to and capacity to use biodiversity data. OBIS is now tasked with developing robust indicators and user guidance to support national reporting under the CBD.

63. To strengthen collaboration with other global biodiversity initiatives, OBIS formally launched a joint marine strategy and action plan with the Global Biodiversity Information Facility (GBIF) in May 2024. A joint OBIS-GBIF Implementation Committee now meets monthly, and OBIS will co-organise the Living Data 2025 conference with GBIF, GEO BON, and TDWG. The IODE Committee welcomed this partnership, noting its potential to enhance the reach, quality, and policy relevance of marine biodiversity data.

64. Despite its achievements, OBIS continues to face challenges, particularly around staffing and financial sustainability. While the OBIS Secretariat has grown to nine staff members—including project and consultant appointments—key roles remain unfilled, including the Technical and Scientific Coordinator post. Although a regular UNESCO P-3 programme position was created for this role, the recruitment process has been put on hold, prompting concerns from the IODE Committee. Temporary solutions have been arranged to maintain continuity, including salary coverage for the OBIS Data Manager until the end of 2025.

65. In summary, OBIS has made substantial progress in data mobilisation, coordination, and its strategic positioning within global biodiversity and ocean governance frameworks. With a clearer structure, enhanced collaboration, and a growing data infrastructure, OBIS is well-placed to support the monitoring needs of international frameworks like the Global Biodiversity Framework, while continuing to serve scientists, policymakers, and conservation practitioners worldwide. Sustained funding and staffing support will be critical to ensure the long-term impact and success of OBIS as it enters a new phase of development.

### **The Ocean Data and Information System (ODIS) and Ocean InfoHub (OIH)**

66. The ODIS Catalogue of Sources (ODISCat) (<http://catalogue.odis.org>) is an online browsable and searchable catalogue of existing ocean related web-based sources/systems of data and information as well as products and services. The content of the catalogue has continuously been growing and now contains 3,146 entries of on-line content sources covering 16 content types. ODISCat and ODIS have always been closely linked, but now they are integrated. The ODISCat record is now the source for the institutional partners' links to ODIS, enabling an automated indexing of metadata records in partner catalogues.

67. The Ocean Data and Information System (ODIS) is a federation of independent data systems coordinated by the International Oceanographic Data and Information Exchange (IODE) of UNESCO-IOC. This federation includes continental-scale data systems as well as those of small organisations. ODIS partners use web architectural approaches to share metadata describing their holdings, services, and other capacities. While ODIS has initially focussed on 'partners associated with IOC' this has been expanded, considering the partnership established under the UN Decade of Ocean Science for Sustainable Development. As such ODIS will become a key contribution to the data chapter of the Ocean Decade implementation plan. The documentation for the ODIS-architecture is openly available online <https://book.oceaninfohub.org/index.html>

68. The Ocean InfoHub Project (2020–June 2024) successfully supported the initial development of the Ocean Data and Information System (ODIS), which provides the interoperability layer and supporting technology to allow existing and emerging ocean data and information systems, from any stakeholder, to interoperate with one another. Although OIH first worked with global IOC partners and three pilot regions (Africa, Latin America and the Caribbean Region, and the Pacific Small Island Developing States), OIH and ODIS gradually expanded over time so that now ODIS is engaging with over 120 organisations at some level, to enable them to expose their metadata and to join the growing ODIS network. OIH/ODIS has supported the three pilot regions in the specific ways they wanted to link to ODIS:

- INVEMAR has a regional node, which links ODIS to datasets from 12 countries in the LAC region as well as regional partners that include CLME+ Training and Capacity Development Portal, The Sargassum Information Hub and the Caribbean Marine Atlas
- IOCAFRICA has developed three thematic portals that link to ODIS,
- The Pacific has linked its two existing regional portals to ODIS.

69. Globally, ODIS currently links 55 data sources from 45 partner organisations from around the world. A Global Search portal has been developed as a demonstration of ODIS (<https://oceaninfohub.org>). The portal currently (February 2025) contains over 130,000 content items in seven content categories: (i) Experts (27,000); (ii) Institutions (13,000); (iii) Documents (42,000); (iv) Training (1,500); (v) Vessels (113); (vi) Projects (3,600); and (vii) Datasets (48,000). The Ocean InfoHub Project and ODIS have succeeded in creating a self-sustaining network of partners, but there remains much work to do to widen the collaboration to other regions and nations, build capacity and digital equity in regions with low resourcing, and continually upgrade the capabilities of the network. ODIS offers a long-term solution for any organisation, including NODCs and ADUs and new partners to keep ownership and complete control over their data holdings, while choosing which (meta)data to share with a growing global ocean digital ecosystem.

70. Other UN agencies, global data systems, and initiatives in other domains and sectors have expressed an interest in adopting the ODIS technology. Interoperability solutions are being discussed with the Group on Earth Observations Biodiversity Observation Network (GEO BON), the Helmholtz Metadata Collaboration (HMC), the Earth Science Information Partners (ESIP), and the Polar Data Discovery Enhancement Research (POLDER) project). OIH/ODIS is also a case study in the ongoing WorldFAIR project representing the ocean domain in a constellation of 11 case studies.

## **FUNCTION C: EARLY WARNING AND SERVICES**

*Develop early warning systems and preparedness to mitigate the risks of tsunamis and ocean-related hazards*

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**Function C centres around four main programmatic components: (i) the global Tsunami Warning System; which includes close cooperation with the Global Sea Level Observing System (GLOSS); (ii) Operational Ocean Forecast Systems services under the Joint WMO-IOC Collaborative Board; and (iii) the Harmful Algal Bloom Programme and activities on non-indigenous species.**  
**Tsunami Warning Systems**

71. The Tsunami programme kept its strong capacity development focus in all ocean basins with active support by Member States. A relevant cooperation fact for this biennium is the renewal (2023–2027) of the Partnership Agreement with the Agency for Meteorology, Climatology, and Geophysics of Indonesia hosting the Indian Ocean Tsunami Information Centre (IOTIC), with the Coastal Zone Management Unit (CZMU) of Barbados to host the Caribbean Tsunami Information Centre (CTIC) 2024–2029 and with the Bureau of Meteorology (Bureau) of Australia, hosting the Indian Ocean Tsunami Warning and Mitigation (IOTWMS) Office in Perth, Australia 2023–2027. On operational aspects the programme published the UNESCO-IOC Technical Series, [183](#), *Monitoring and Warning for Tsunamis Generated by Volcanoes*. On community preparedness the Tsunami Ready Recognition Programme also continued to expand, with over 100 communities now recognized in 30 Member States.

72. As a follow up to the recommendation of the 57th Session of the IOC Executive Council towards addressing tsunamis generated by non-seismic sources, the UNESCO-IOC Tsunami Resilience Section organised 2 global webinars on Tsunamis generated by Volcanoes in April 2025 to provide an overview of UNESCO-IOC Technical Series 183, review procedures and best practices for hazard assessment and early warning of tsunamis generated by volcanoes and initiate partnerships between the tsunami and volcano research, monitoring and early warning communities. Close to 270 participants joined for these webinars.

73. The main elements of the Tsunami Programme focus on: (i) secretariat support to the four regional Intergovernmental Coordination Groups (ICGs) and respective technical working groups and task teams under the four regional Tsunami Warning and Mitigation Systems in the Caribbean (CARIBE-EWS), Indian Ocean (IOTWMS), Pacific (PTWS) and North-Eastern Atlantic, Mediterranean and Connected Seas (NEAMTWS), as well as the Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG) which addresses inter-ICG and cross-cutting coordination and harmonization; (ii) preparedness and awareness courses and workshops; and (iii) enabling research and policy development. The 17th meeting of the TOWS-WG was held on February 2024 (Cf. [IOC/TOWS-WG-XVII/3](#)) and the 18<sup>th</sup> meeting was held in February 2025.

74. 26 December 2024 coincided with two Decades since the deadly Indian Ocean (Aceh) Tsunami which was commemorated through multiple activities. The most important activity was the 2<sup>nd</sup> UNESCO-IOC Global Tsunami Symposium on ‘Two decades after the 2004 Indian Ocean Tsunami: Reflections and the way forward’ that was held in Banda Aceh, Indonesia during 11-14 November 2024. Hosted by the Republic of Indonesia through its Agency of Meteorology, Climatology, and Geophysics (BMKG) in collaboration with the UNESCO-IOC Tsunami Resilience Section and IUGG Joint Tsunami Commission, the symposium brought together around 702 participants from 37 countries in addition to 171 online participants. Leading tsunami warning specialists, disaster managers, scientists, engineers, disaster risk reduction practitioners, and policymakers from around the world discussed the status of tsunami warning systems and the latest advances in tsunami science and engineering to help globally enhance tsunami disaster preparedness and mitigation. The symposium included seven key thematic sessions, which focused on lessons learned, identifying knowledge gaps and challenges, and offering concrete recommendations to align regional efforts with global commitments while enhancing coordination. The symposium also served as a global platform to review the contributions of each regional tsunami

warning and mitigation system towards achieving the objectives of the UN Ocean Decade Tsunami Programme (ODTP) under the “Safe Ocean” outcome of the UN Decade of Ocean Science for Sustainable Development by 2030. The Banda Aceh Statement for global tsunami warning and mitigation thus focused on building sustainability for the next decade through transformation and innovation ([IOC/BRO/2025/1](#)). UNESCO and its partners called on States and civil society to drastically step up their investments and efforts to strengthen Tsunami Early Warning Systems and achieve 100% of Tsunami Ready Communities across the world by 2030.

75. The 5th Meeting of the Ocean Decade Tsunami Programme Scientific Committee (ODTP-SC), was held in Paris on 16–17 January 2025. It focused on aligning the UNESCO-IOC Tsunami Programme with the ODTP Research, Development, and Implementation Plan. Key discussions included the review of the 2024 White Paper on Community Resilience and the need for stronger collaboration to integrate Tsunami Early Warning Systems (TEWS) into people-centred Multi-Hazard Early Warning Systems (MHEWS). The Committee commended progress in monitoring ODTP-endorsed actions. A major outcome was the discussion of the Tsunami Ready Coalition (TRC) Implementation Plan, aimed at achieving 100% tsunami preparedness for at-risk coastal communities by 2030, with endorsement planned at the 33 IOC Assembly. Additional progress include: (i) the development of a global Methodological Protocol for estimating potential number of Tsunami Ready communities in the Caribbean with the potential of implementation of methodology in all ocean basins; and (ii) the ODTP-RDI Performance Monitoring and Tracking Tool to support implementation. Looking ahead, the ODTP-SC plans to participate in key global events in 2025, including the EW4ALL Global Stakeholder Forum, the Global Platform for Disaster Risk Reduction, 2-6 June 2025, reinforcing its commitment to advancing tsunami preparedness and disaster risk reduction worldwide. The 18th session of the Working Group on Tsunamis and Other Hazards related to Sea Level Warning and Mitigation Systems (TOWS-WG) and its Task Team on Disaster Management Preparedness and Tsunami Watch Operations were organised at HQ, Paris 20-25 February 2025. The third Tsunami Information Centres (TICs) meeting was organised on the 26 February 2025.

76. The (hybrid) Seventeenth Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS XVII) took place in Managua, Nicaragua during 6-9 May 2024 with the participation of 83 experts (28 in-person, 55 virtual) from 15 ICG/CARIBE-EWS Members States (8 in-person, 7 virtual), including 27 Observers. ICG/CARIBE-EWS XVII decided to establish a Steering Committee not only to make a move towards harmonization of global ICG governance structures but also to ensure provision of strategic guidance to its work programme and serve as an efficient instrument of results-based management, especially in providing an oversight in the execution of its decisions and recommendations. Acknowledging the UNESCO recommendations on reducing UNESCO’s carbon footprint to meet its set target of reducing its emissions by 31 per cent by 2030, in line with the goals of the Paris Agreement, ICG/CARIBE-EWS XVII decided to consider conducting its future sessions from 2026 onwards in-person only every second year, and online every other.

77. The fourteenth session of the ICG/IOTWMS was hosted by the Republic of Indonesia through its Agency for Meteorology, Climatology and Geophysics (BMKG) in Baten during 17–19 November 2024. The session was conducted in hybrid mode and was attended by 77 delegates from 19 Indian Ocean Member States. The ICG acknowledged with appreciation the contribution and continued support of the Government of Australia for the IOTWMS Secretariat and the support of the Government of the Republic of Indonesia for hosting the Indian Ocean Tsunami Information Centre (IOTIC). The Session decided to continue the existing 4 Working Groups and establish 3 new Task Teams on (i) Indian Ocean Wave 25 Exercise (IOWave25), (ii) New/Emerging Technologies for Observations and Forecasting, and (iii) Medium Term Strategy. Mr E Pattabhi Rama Rao (India) was elected Chair, and Dr Yuelong Miao (Australia) and Dr Harkuti Pertiw Rahayu (Indonesia) were elected Vice-Chairs. The ICG/IOTWMS Steering Group held its 18th intersessional meeting at Hyderabad, India in February 2024. Its 19<sup>th</sup> Steering Group meeting is scheduled to be held in Jakarta during 17–19 June 2025. Several meetings of the Working Groups and Task teams have been held to progress and refine the work programmes.



78. The 2024 Capacity Assessment of Tsunami Preparedness in the Indian Ocean (IOC Technical Series, 193) received inputs from 22 Member States and provided an update of the status of tsunami preparedness, identifies specific gaps and prioritised capacity development requirements at both the regional and national levels with an overarching view of strengthening the end-to-end tsunami warning and mitigation system in the Indian Ocean. The survey results indicated that significant progress in tsunami warning systems has been achieved since 2004. More specifically, between 2018 and 2024, there has been significant progress in downstream community awareness and preparedness initiatives while the upstream warning and detection system has plateaued. Considerable growth has been measured in the areas of standard operating procedures for community evacuation, and tsunami exercises conducted in cities and schools. Countries have also reported an increase in tsunami information boards and signage reflecting greater community awareness and preparedness. This progress is largely attributed to the adoption and growth of the UNESCO-IOC Tsunami Ready Recognition Programme.

79. As part of the ongoing efforts to improve disaster risk reduction through early warning systems, and in line with existing mandates, UNESCO-IOC, with the support of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), is conducting a comprehensive reassessment of tsunami preparedness capacity for the Pacific Tsunami Warning and Mitigation System (PTWS) in 2025. This assessment was launched through a dedicated survey, as announced with the IOC Circular Letter, [3027](#) and aligns with the United Nations Secretary-General's Early Warnings for All (EW4All) initiative and with the goals of the United Nations Decade of Ocean Science for Sustainable Development 2021–2030, UNESCO-IOC Tsunami Programme, UNESCO-IOC Tsunami Ready Recognition Programme, 2030 Agenda for Sustainable Development, and the Sendai Framework on Disaster Risk Reduction (DRR). A preliminary compilation of the survey results, to which 39 ICG/PTWS Member States (85%) out of 46 responded, has been presented at the 31st session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXXI, Beijing, China, 7–11 April 2025). An Evaluation Workshop was organized in Manila, Philippines, 14–16 May 2025, kindly hosted by the Philippine Institute of Volcanology and Seismology (PHIVOLCS), in which these initial results of the survey were reviewed and analysed in detail by 12 Experts from 10 Member States supported by the ESCAP Technical Consultants for the Technical Report and Policy Report and the Secretariat. 8 Observers attended the Workshop. The analysis resulted in the identification of gaps, suggestions for improvements in the survey design for a possible future similar survey, and recommendations for each pillar of the tsunami resilience as presented through the survey. Progress in the PTWS-TPCA, including the outcomes of this Workshop will be presented to the 33rd Assembly of the IOC (25 June–3 July 2025) through the presentation of the ICG/PTWS Chair. The Technical and Policy Reports as derived from this initiative will be distributed to ICG/PTWS Member States in October 2025, upon review of the ICG/PTWS Steering Committee in September 2025.

80. In the NEAMTWS region the Eighteenth Session of the ICG for the Tsunami Early Warning and Mitigation System in the NEAMS was held at Headquarters, Paris, France on 6–8 February 2024. The hybrid session was attended by 68 participants from 15 Member States and by 4 observers including a representative of EU DG ECHO, DG DEFIS and the chairperson of ICG/CARIBE EWS and PTWS. This was the first in-person meeting of the ICG/NEAMTWS since 2019 due to the COVID-19 pandemic and other unforeseen reasons from regional conflicts. New ICG/NEAMTWS Chairperson and vice Chairpersons were elected for the period 2024–2025. A new Task Team on Non-Seismic Tsunamis was also established. The 19th session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS) was held in Paris from the 27th to the 29th of November 2024. It saw the strong participation, with 67 attendees, including 5 online. Representatives from 17 Member States took part, including Tunisia and Algeria after a long absence. Additionally, two international organizations — DG ECHO and the Joint Research Center (JRC) of the European Commission — were present. The meeting appreciated the launch of the new IOC CoastWAVE EC DG ECHO funded Project Phase II (CoastWAVE 2.0) titled 'Scaling-Up and Strengthening the Resilience of Coastal Communities in the North-Eastern Atlantic and Mediterranean Regions to the Impact of Tsunamis and Other Sea Level-Related Coastal

Hazards', which began on 1 July 2024. The session welcomed the progress on the SMART Cables initiatives in particular the Atlantic Smart CAM and the planned deployment of two Ocean Bottom Pressure Sensors by the National Institute of Geophysics and Volcanology (INGV) of Italy in the Ionian Sea in 2025. A new Task Team on Governance was established to provide advice on restructuring and reorganization. Additionally, the meeting agreed to conduct the next NEAMWave exercise in March 2026 (NEAMWave26), aligning with CoastWAVE 2.0 project exercises at the local level.

81. The Kandili Observatory and Earthquake Research Institute (KOERI) Türkiye hosted the ICG/NEAMTWS Steering Committee meeting in Istanbul, Türkiye, 15–16 May 2025. The meeting discussed on the new NEAMTWS Operational User Guide and the need to consider non-seismic tsunamis, the implementation of tsunami Threat Levels in NEAM, Probabilistic Tsunami Forecast implementation, the new Ocean Decade Tsunami Programme related actions, as well as the planning for next NEAMWave exercise in March 2026.

82. The Secretariat organized an online scientific meeting on February 18, 2025, to help better understand the Santorini seismic activity, which prompted residents and tourists to evacuate the island.

83. Several other intersessional working group and CoastWAVE project (EU DG ECHO funded) related meetings have been organized by the Secretariat for the ICG/NEAMTWS including: Joint meeting of Task Team on Operations and Task Team on Documentation, October 2023; side event on Building Coastal Resilience to Sea Level related hazards at COP28, Dubai, 5 December 2023 co-organized with the National Institute of Oceanography and Fisheries (NIOF), Egypt and other international partners. Several other workshops and trainings have also been carried out in the CoastWAVE project countries on tsunami Standard Operating Procedures, the development and validation of tsunami evacuation maps and the Tsunami Ready Recognition Programme in 2023.

84. From 18 to 20 March 2025, 20 leading experts from several member states gathered in Paris at the invitation of UNESCO-IOC to examine the seismic, volcanic and landslide-related tsunami sources that threaten the North-Eastern Atlantic and Mediterranean (NEAM) region. The meeting was organized under the IOC CoastWAVE2.0 project, funded by the European Commission Directorate-General for European Civil Protection and Humanitarian Aid Operations (EC DG-ECHO). Participants placed special focus on two high-risk zones: the Hellenic Arc and the Azores-Gibraltar Fracture Zone, both historically responsible for generating the region's largest tsunamis.

85. A satellite event on "Coastal Cities and Communities Joining Tsunami Ready" was also recently organized at the 2024 Ocean Conference in Barcelona on 11 April 2024, convening 13 experts and key community stakeholders from the Northeastern Atlantic and Mediterranean, Caribbean, Pacific, and the Indian Ocean regions to share experiences and insights on enhancing community resilience and call for other countries and communities to join the initiative to address Ocean Decade challenge 6 on Increase Communities Resilience to Ocean hazards.

86. In the Pacific Ocean, the 30th Session of Intergovernmental Coordinating Group for the Pacific Tsunami Warning System (ICG/PTWS-XXX) was organized in Nuku'alofa, Tonga on 11–15 September 2021 (81 participants, 25 Member States). At this session, the ICG/PTWS established a Working Group-2 (WG2) Tsunami Detection, Warning and Dissemination Task Team on Tsunami Generated by Volcanoes (TGV), a WG2 Task Team on Forecasting from Ocean Observations (TT-FOO), and a Working Group-3 Disaster Risk Management and Preparedness (WG3) Task Team on Tsunami Ready.

87. The Eleventh Meeting of the ICG/PTWS Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region (ICG/PTWS-WG/SCS-XI) took place in Guanzhou China on 25–26 September 2023 (13 participants, 4 Member States).

88. The Ninth Meeting of the ICG/PTWS Pacific Island Countries and Territories Regional Working Group on Tsunami Warning and Mitigation System—Task Team Seismic Data Sharing in the Southwest Pacific was conducted on December 2023 following the meeting of the 8th Meeting of the Oceania Regional Seismic Network (ORSNET).

89. An online ICG/PTWS Steering Committee meeting took place in March 2024, and two ICG/PTWS Officers Meeting were organized in December 2023 and April 2024, respectively.

90. The seventh Meeting of the Regional Working Group for Central America of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS) was held in Managua, Nicaragua, on 10 May 2024 and provided important opportunity to review the draft ICG/CARIBE-EWS-XVII Recommendations from the perspectives of the ICG/PTWS work program in the Central America.

91. The Sixth Meeting of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS/WG-SEP-VI) took place in Valparaíso, Chile during 16–17 August 2024 with the participation of experts from Chile, Colombia, Ecuador, and Peru. The meeting presented an opportunity to evaluate the progress made in its Member States in tsunami resilience

92. The 12th Meeting of the PTWS-WG-SCS, organized during 7–8 November 2024 in Jakarta, Indonesia, under the hosting of the Badan Meteorologi, Klimatologi, dan Geofisika (BMKG), Indonesia a provided a timely opportunity to review of Action Items from the ICG/PTWS-XXX in September 2023 and the progress made since then, also taking into considerations of the ICG/PTWS Steering Committee Meeting that took place in September 2024 in Honolulu, USA. 13 participants (including 1 virtual participant) from five of the nine Member States of the WG-SCS, namely from China, Indonesia, Malaysia, Philippines, Vietnam attended the meeting.

93. The Thirty-first Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXXI) took place in Beijing, China, during 8–11 April. A total of 24 Member States participated at the ICG/PTWS XXXI (20 in-person, 4 virtual), supported with a total of 38 delegates (24 in person, 14 virtual). 11 in-person and 21 virtual participations attend as Observer, reaching the total number of 94 participants (55 in-person, 39 virtual. Argentina attended the session as Observer. The ICG/PTWS-XXXI noted with satisfaction active participation of Argentina in the PacWave24 as the Coordinator of the NAVAREA VI for the purposes of testing tsunami maritime safety product dissemination; encouraged Argentina to actively participate in the future PacWave exercises with respect to its Search and Rescue (SAR) and NAVAREA VI coordination responsibilities, and invited WG1 and the Secretariat to consider organizing a scientific workshop with the aim of assessing tsunamigenic potential of the Scotia Arc in its impact to PTWS Area of Service. The ICG/PTWS-XXXI accepted with appreciation the kind offer of Ecuador to host the 32nd Session of the ICG/PTWS in 2027 in Ecuador, and noted with appreciation the intention of Costa Rica to host the 33rd Session of the ICG/PTWS in 2029 in Costa Rica, to be confirmed at the 32nd Session of the ICG/PTWS in 2027. ICG/PTWS-XXXI recommended the provisional approval of the Tsunami Ready Equivalency Guidance, which will allow Member States to report progress and achievements in achieving the twelve indicators of the UNESCO-IOC Tsunami Read Recognition Programme without necessarily implementing the programme itself.

94. The Eighteenth Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS XVIII) took place online during 5-7 and 9 May 2025, as no ICG/MEMBER States was available to host an in-person ICG. The session was attended by 57 representatives of 13 ICG/CARIBE-EWS Member States, with an additional 22 Observers. Argentina and Uruguay attended the session as Observers. ICG/CARIBE-EWS-XVIII appreciated that the U.S. National Weather Service through its Tsunami Warning Centres and International Tsunami Information Centre is committed to continue to provide timely and effective tsunami services for the protection of life, livelihoods and economic prosperity in the U.S. and the Pacific and the Caribbean and Adjacent Regions. ICG/CARIBE-EWS



XVIII recommended that the Central America Tsunami Advisory Center (CATAC), established at the Instituto Nicaragüense de Estudios Territoriales (INETER) in Managua, Nicaragua, continues full functionality in an interim manner to be able to support the National Tsunami Warning Centers (NTWCs), Tsunami Warning Focal Points (TWFPs), and emergency management authorities of Central America in addressing those challenges. It further recommended that the Steering Committee of the ICG/CARIBE-EWS to work with CATAC and Member States towards the consideration of CATAC as a TSP at its XIX session in 2026, and consideration of CATAC as a TSP in its XIX Session in 2026 to enable the IOC Executive Council to consider the final admission of CATAC as TSP in June 2026. ICG/CARIBE-EWS XVIII noted with appreciation the consideration expressed by Barbados at ICG/CARIBE EWS XVII to host the ICG/CARIBE-EWS XIX in 2026, and the consideration expressed by Curaçao at ICG/CARIBE EWS XVIII to host ICG/CARIBE EWS XIX in 2026 and requested the Secretariat to issue an IOC Circular Letter to invite ICG/CARIBE-EWS Member States to host the ICG/CARIBE-EWS XIX in 2026 and to officially inform their availability by 30 September 2025, in case no official confirmation from the Governments of Barbados or Curaçao is communicated to the IOC Secretariat by 15 June 2025. Reconfirming its decision to consider conducting its future sessions from 2026 onwards in-person only every second year, and online every other, ICG/CARIBE-EWS XVIII decided to conduct ICG/CARIBE-EWS XIX virtually if no official communication by any ICG/CARIBE-EWS Member State is communicated to the Secretariat by 30 September 2025.

95. As per standard practices in the Caribbean, Indian Ocean and Pacific Ocean Member States were invited through Circular Letters to nominate experts to the Working Groups and Task Teams of both ICGs, with the principal aim of better facilitation of Technical Secretarial support to them by the IOC Tsunami Resilience Section.

### **Tsunami Preparedness Exercises**

96. Tsunami exercises and drills help to increase tsunami preparedness and awareness of coastal communities. Regular exercises are essential to maintain operational readiness of response agencies and exercises test communications, review agency standard operating procedures, and promote emergency preparedness.

97. The [CARIBE WAVE 2024](#) regional Exercise for the Caribbean and adjacent regions was conducted on 21 March 2024. Two hypothetical scenarios were simulated for CARIBE WAVE 23, a tsunami generated by a magnitude Mw 8.7 earthquake located in the Puerto Rico Trench, and a tsunami generated by a magnitude Mw 8.47 earthquake located in the North Panama Deformed Belt. It was up for each of the 48 Member States and Territories to choose between the two scenarios and decide the level of participation and activity for their country. Almost 700.000 people registered in the [TsunamiZone](#), including citizens, experts and government officials participating across 32 Caribbean countries and 16 territories. Most participants from across the region were from K-12 schools, local/federal/national government agencies and preparedness organizations. This annual exercise has been improving and validating tsunami readiness since 2011.

98. [Exercise Indian Ocean Wave 2023 \(IOWave23\)](#) was conducted during 4–25 October 2023 with participation of 20 Member States. While all involved National Tsunami Warning Centres (NTWCs) and Disaster Management Organisations (DMOs), it was encouraging also to see exercising down to community level in 8 Member States, including specific testing of the UNESCO-IOC Tsunami Ready indicators in at least 7 Member States. Around a total of 45,000 people participated in evacuation drills, including all genders, children, elderly, and people with disabilities. TSP-Australia was commended for their new products for tsunamis generated by non-seismic sources (such as for the scenario of a tsunami generated by a Herard Island volcano), which were tested for the first time. The webinar on ‘Lessons Learnt during Exercise Indian Ocean Wave 23’ was held during 12–13 December 2023.

99. In the NEAM region, NEAMWave23 exercise was conducted on 6–7 November 2023. Exercises were conducted for the first time within NEAMWave23 at the local community level in

Cyprus, Egypt, France, Greece, Italy, Malta, Morocco, Portugal, Spain and Türkiye. NEAMWave23 simulated two exercise scenarios. The Emergency Response Coordination Centre (ERCC) of the European Commissions of Civil Protection Mechanism also supported the exercise playing the role of providing International Assistance to countries that requested assistance.

100. The ICG/NEAMTWS plans to conduct the next NEAMWave exercise, NEAMWave26, in March 2026, incorporating additional exercise scenarios to encourage greater participation from Member States.

101. The fourteenth annual Regional Tsunami Exercise of the ICG/CARIBE-EWS, CARIBE WAVE 25, was conducted on the 20th of March 2025 at 1500 UTC, with the involvement of around half a million participants from 44 Member States and Territories.

102. Exercise Pacific Wave 2024 (PacWave24), as the eleventh such exercise in the Pacific, was conducted in the months of September through November 2024 to support International Disaster Risk Reduction Day (13 October) and World Tsunami Awareness Day (5 November). PacWave 24 also provided a first-time opportunity to test the dissemination of special tsunami maritime safety products to NAVAREA coordinators. The operationalization of this functionality for NAVAREAs VI, X, XI, XII, XIII, XIV, XV, and XVI is expected to take place in 2025/Q4.

### **Significant Tsunami Events**

103. In the Pacific, on 1 January 2024 at 07:10 UTC an earthquake with Mw 7.5 occurred 42 km NE of Anamizu, western part of Japan, at a depth of 10 km. Tsunami messages were issued by the PTWC, starting with a first message 11 minutes after the earthquake origin time indicating the possibility of hazardous tsunami waves from this earthquake within 300 km of the epicentre along the coasts of Japan. Following this, less than 1 metre tsunami observations at various sea-level stations were reported by the PTWC, whereas Japan Meteorological Agency (JMA) reported greater than 1.2 metres wave heights at Wajimako sea-level station. While this event was located very closely to the presumed epicentre of the 26 November 1614 Mw 7.7 earthquake which is associated with 100-1000 casualties from both earthquake and tsunami, no tsunami related casualties were reported. Additionally, there appears to be a coastal landslide triggered by the earthquake but their possible contribution to the observed tsunami requires further scientific investigation. According to the central government, tsunami waves swept across some 190 hectares of land in three municipalities. Chief Cabinet Secretary Yoshimasa Hayashi said at a press conference that breakwaters were damaged at least in seven beaches hit by tsunami waves. A Team of Kyoto University's Disaster Prevention Research Institute estimated tsunami at least 4.7 metres high hit the Misakimachijike district of Suzu, which is close to the tip of the Noto Peninsula. Almost all homes in that district were damaged, some totally. But while a tsunami as high as 5.1 metres reached the Akasaki and Shishizu districts of Shika on the west coast of the Noto Peninsula, the damage was limited because seawater only flowed within a very narrow band. According to an on-site survey conducted by the Japan Meteorological Agency, the maximum run-up height was preliminary measured to be 5.8 metres in Joetsu, Niigata Prefecture.

104. In the Pacific, on 2 April 2024 at 23:58 UTC, an earthquake of magnitude 7.4 occurred in the Taiwan Province of China at a depth of 35 km. This is an inland event at less than 2 km from the nearest coast. PTWC issued tsunami information messages, starting with a first message 11 minutes after the earthquake origin time indicating that hazardous tsunami waves are possible for coasts located within 300 km of the earthquake epicentre. Tsunami waves were observed at Taiwan, China coasts near the earthquake epicentre and Okinawa Islands, Japan. The largest tsunami was observed at Hualien, Taiwan, China 10 minutes after the earthquake with 1 metre wave height. 30 centimetres wave heights observed at Okinawa Islands, Japan. In NEAM, a small tsunami of few centimetres was recorded locally following the 6.2 M earthquake along the coast of the Sea of Marmara, Türkiye.

## **Tsunami Ready Recognition Programme**

105. Within the ICG/CARIBE-EWS, Christ Church West (Barbados) and St. George (St. Vincent and the Grenadines) were recognized as Tsunami Ready in 2023 and St. James Central (Barbados), Cahuita (Costa Rica), Portsmouth (Dominica) and Laborie (Saint Lucia) were recognized as Tsunami Ready in 2025, reaching a total of 23 communities from 14 Member States (of which 10 are SIDS).

106. Within the ICG/PTWS, a total of 23 communities from 8 Member States (of which 5 are SIDS) are now recognized as Tsunami Ready under UNESCO-IOC Tsunami Ready Recognition Program.

107. In the Indian Ocean, the programme continues to gain momentum with 48 communities (26 in India and 22 in Indonesia) receiving Tsunami Ready recognition from UNESCO-IOC. In addition, up to a further 100 communities are in the process to become Tsunami Ready recognized in India and Indonesia. Several other countries such as Madagascar, Maldives, Seychelles and Sri Lanka have also expressed interest in implementing TRRP. The ICG/IOTWMS Working Group 3 on Tsunami Ready Implementation met online (24 August 2023), in-person in Hyderabad, India (7 February 2024), and online (21 August 2024). Indian Ocean Member States have been requested through Circular Letter, [2978](#) (18 December 2023) to establish a National Tsunami Ready Focal Point for the ICG/IOTWMS. To date, nominations have been received from 19 Member States.

108. In the Pacific, Fiji, Republic of Marshall Islands (RMI), Federated States of Micronesia (FSM) and Palau developed in 2023 capacities for tsunami hazard assessment with support from USAID, ITIC. Sila and Navuevu communities in Fiji are officially recognized Tsunami Ready in 2023 and work is in progress towards Tsunami Ready Recognition of seven communities in Solomon Islands. Chuuk and Pohnpei communities of the FMI have been recognized as Tsunami Ready in April 2024 and expression of interests for Kosrae and Yap communities were received in March 2024. Under the guidance of Tonga 2021 DRM Act, the establishment of the National Tsunami Ready Board (NTRB) was submitted to the Minister and Cabinet for endorsement via the National Disaster Risk Management Committee in April 2024. A National Stakeholder Workshop on UNESCO/IOC Tsunami Ready Programme will be held in Vanuatu on 20th May 2024.

109. In NEAM, 6 communities have been awarded Tsunami Ready recognition from UNESCO-IOC. Other communities, from Malta, Cyprus and Morocco are close to completing Tsunami Ready. Several other communities are also progressing in implementing Tsunami Ready. Under the new CoastWave 2.0 project, 9 new communities in seven countries initiated the process to start implementing Tsunami Ready.

110. In the NEAM region, a new two-years DG-ECHO funded CoastWAVE Project–Phase II ([CoastWAVE 2.0](#)) project targeting eight countries was approved in December 2023. The new project officially started on 1 July 2024 on ‘Scaling-Up and Strengthening the Resilience of Coastal Communities in the North-Eastern Atlantic and Mediterranean Regions to the Impact of Tsunamis and Other Sea Level-Related Coastal Hazards’. The new project aims to build collective and common capacities in tsunami hazard assessment and evacuation mapping using probabilistic and or deterministic approaches. It will track changes in the level of tsunami awareness and risk perceptions. The project will install additional tsunami detection, monitoring, and alerting systems. It will scale up UNESCO-IOC Tsunami Ready Recognized communities in existing and new countries, as well as synergies actions, where possible within existing coastal resilient initiatives (e.g. Making Cities Resilient 2030, Ocean Decade Challenge 6 on increase resilience to ocean hazards). A key outcome is to engage and create dialogues with multi-stakeholders and users involved in coastal resilience in a multi-hazard/risk context with the aim to create shared prevention and resilient preparedness for ocean related hazards to reduce their impact through better understanding and integration of tools, strategies and policies.

## Targeted capacity development and technical assistance

111. In the Indian Ocean, several key capacity development initiatives were undertaken by the IOTWMS Secretariat and the Indian Ocean Tsunami Information centre (IOTIC) including (i) 3 Subregional training workshops on standard operating procedures for National Tsunami Warning Centres and Disaster Management Organisations in July and August 2023, (ii) 3 national Tsunami Ready trainings in Timor Leste (July 2023), Seychelles (November 2023), and Maldives (August 2024), (iii) Sub-regional training workshop on inundation mapping and evacuation planning in Muscat, Oman during 21–25 April 2024 and d) Regional Training Workshop on Tsunami Evacuation Maps, Plans, and Procedures (TEMPP) and UNESCO-IOC Tsunami Ready Recognition Programme (Hyderabad, April 2025). The TEMPP workshop had 35 participants from 17 countries and 14 trainers from UNESCO-IOC, India and Indonesia.

112. The UNESCAP-funded project ‘Strengthening Tsunami Warning in the North-West Indian Ocean through regional Cooperation – Phase 2c’ was implemented during November 2023 to April 2025. The project involved India, Iran and Pakistan with Oman and United Arab Emirates participating on a self-funded basis. Phase 2c focused on capacity building through the development of tsunami inundation and evacuation maps for pilot communities of the North-West Indian Ocean Member States. The Phase 3 proposal (under preparation) focuses on implementation of the UNESCO-IOC Tsunami Ready Recognition Programme and has synergies with the United Nations initiative of ‘Early Warning for All’ by 2027. The ICG/IOTWMS together with UNESCAP and India co-organised a webinar on [‘Resilient Coasts: Enhancing Disaster Preparedness Through Regional Collaboration in Asia and the Pacific’](#), which was held as a side-event to the 81<sup>st</sup> Session of UNESCAP (Bangkok, 25 April 2025). The webinar highlighted the regional coordination efforts aimed at strengthening coastal urban disaster risk resilience in the North-West Indian Ocean and the significance of tsunami preparedness as a foundation for broader multi-hazard coastal disaster preparedness. The 8th Joint IOC ICG/PTWS–IUGG Joint Tsunami Commission (JTC) Technical Workshop on Understanding and Lessons Learned from Tsunami Generated by the Hunga Tonga – Hunga Ha’apai Volcano Eruption on 15 January 2022 took place on 11 September 2023 in the fringes of ICG/PTWS-XXX.

113. A Tides Training Course was jointly organized and funded by the International Hydrographic Organization (IHO), the International Maritime Organization (IMO), the Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC) and NOAA during 13–17 November in 2023, Costa Rica. Efforts are in place to organize a similar course in 2025/Q4 targeting the English-speaking countries of the Caribbean and its Adjacent Regions, with the aim of conducting future training in English and Spanish in alternating years.

114. PTWC Procedures and PTWS Products for Hunga Tonga – Hunga Ha’apai (HTH) Volcanic Tsunami Hazard Response were published (IOC Technical Series, 188) in 2024. Noting that the HTHH event in 2022 which generated a tsunami causing widespread damage locally, regionally and throughout the Pacific was an unprecedented event not only for the PTWC but also for all Tsunami Warning Centres whose warning procedures and products were designed for earthquake-generated tsunamis, accounting for almost 90% of past tsunami events worldwide, these procedures and products will allow the PTWC and its stakeholders to improve their response capabilities to address the possibility of future tsunamis originating from volcanic eruptions or associated processes at the HTHH.

115. In March 2024, Tonga Meteorological Service, Geohazards Management Unit of Natural Resources Division and the National Disaster Risk Management Office (NDRMO) reviewed, aligned and updated their tsunami warning and response SOP involving over 20 government officials.

116. A Tsunami Evacuation Workshop was organized in San José, Costa Rica, 22–25 April 2024 bringing together some key actors from Latin American countries with a Pacific coast to exchange advances associated with tsunami evacuation in areas such as technology, modelling, communication, warning systems, community organization, associations/partnerships, and training



needs at different levels. Around 30 experts from 12 Member States in Central and South America representing their functions in the national tsunami warning systems and disaster/emergency operations. The workshop, organized by the Florida International University Extreme Events Institute (FIU-EEI) Disaster Risk Reduction and Resilience program and the United States Development Agency's Bureau of Humanitarian Affairs (USAID/BHA), in close coordination with the National Tsunami Monitoring System of Costa Rica (SINAMOT) and Tsunami Resilience Section of IOC-UNESCO (IOC/TSR), emphasized areas with greater development and challenges that remain, focusing on the promotion of cooperation between the participating countries.

117. An Expert Meeting on Tsunami Sources, Hazards, Risk and Uncertainties Associated with Vanuatu, San Cristobal and New Britain Subduction Zones was organized (in a hybrid mode) in Port Vila, Vanuatu, on 14–17 May 2024, bringing 18 Experts and 8 observers from 10 Member States together to quantify earthquake sources that can generate dangerous tsunamis and to directly support community hazard assessments and evacuation planning that are part of the implementation of the Tsunami Ready Recognition Programme in the Pacific Island countries and territories. The report of this Expert Meeting ([IOC-WR-315](#)) has been published in January 2025. The report highlighted a number of recommendations for further scientific work to improve the knowledge of tsunami threats in the region. These include the need for a full probabilistic treatment of all potential tsunami sources and impacts in the region, more geodetic observations to constrain relative plate rates and slip deficit accumulation, and more paleotsunami studies to assess past tsunami occurrences. There is also a need to improve the sustainability and the spatial coverage of the instrument networks in the region and to encourage full and open sharing of data and scientific results.

118. An online training for seismic and tsunami warning operators in the South China Sea region on theories, applications and operations of tsunami numerical models has been conducted in Zhenjiang, China on 22 May 2024.

119. Vanuatu Tsunami Warning and Response SOP was finalized in May 2024 along with the establishment of a workplan to review and update Vanuatu National Tsunami Response Plan.

120. An expert meeting organized by the UNESCO-IOC Tsunami Resilience Section and hosted by the Sistema Nacional de Monitoreo de Tsunamis (SINAMOT) of Costa Rica in Heredia, Costa Rica, 3-5 December 2025, brought together 18 in-person and 7 remote experts from Costa Rica, Italy, Norway, and USA<sup>1</sup> to discuss the source properties of earthquakes in the Northwest Caribbean and non-seismic sources of tsunamis for the Caribbean and Adjacent Regions. As a result of intense discussions in a laboratory type of setting, source parameters for volcanic and earthquake origin tsunamis in the respective regions were identified and preliminary modelling results were cross-examined during the joint session on the last day of the Expert Meeting. The report of this Expert Meeting will be published in 2025/Q3.

121. The 9th IOC-IUGG Joint Tsunami Commission Workshop was organized on 7 April 2025 in Beijing, China. The Workshop, titled "60th Anniversary of the ICG/PTWS – Past and Future", to guide 5-year research and development strategy for detection, monitoring and forecasting. 12 in-person and 6 virtual presenters contributed to the scientific presentations of the workshop, to which 60 in-person and 30 virtual participants attended. The workshop outcomes underlined the need for interaction between forecast users and forecast creators (Emergency Managers – Tsunami Service Providers), challenges with forecasting uncertainties and conservative approaches, challenges of equity in tsunami resilience across all Member States, forecast challenges for local events, and the need for direct ocean observations to forecast non-earthquake sources.

122. As part of the CoastWAVE 2.0 project activities in the NEAM region, a regional Tsunami Ready training workshop was held on 14–15 January 2025 to support countries in implementing the Tsunami Ready programme.

## World Tsunami Awareness Day (WTAD)

123. As part of World Tsunami Awareness Day 2023 observation a national one-day workshop was convened in Barbados on 9 March 2024 which targeted community-level stakeholders. Jointly convened by the United Nations Office for Disaster Risk Reduction (UNDRR) Regional Office for the Americas and the Caribbean, the UNESCO-IOC CTIC, and the Department of Emergency Management (Barbados). This workshop was attended by over 40 participants from the District Emergency Organisations (DEOs) and focused on reviewing the implementation and progress towards achieving a well-functioning and resourced community volunteer programme which supports the national emergency management programme. The workshop also built capacity through a review of the history of the UNESCO-IOC Tsunami Ready Programme, its indicators and the application process. Workshop participants also benefited from lessons learnt shared from the DEOs with experience in implementing the Tsunami Ready programme

124. To commemorate the World Tsunami Awareness Day 2023 in the Indian Ocean, the [webinar on Fighting Inequality for a Resilient Future](#) was jointly organised by IOTIC, ICG/IOTWMS Working Groups 1 and 3, and BMKG (Indonesia). Experts from the Indian Ocean region shared their experiences on: (i) How to create accessible tsunami early warning for all; (ii) Research, development, and implementation plan for the Ocean Decade Tsunami Programme; (iii) Early warning for remote populations from Maldives; and (iv) Early warning for people with disabilities from Indonesia. The event attracted over 100 participants with many from the Indian Ocean region.

125. For the WTAD 2023 Campaign in the NEAM region, the main contribution was that several countries carried out exercise at the local level for the first time within the NEAMWave23 exercise, 5–7 November 2023. Several schools participated in the exercise. The Secretariat/NEAMTIC prepared three brochures on *Tsunami What to Do*, *Tsunami Fact Sheet*, and *Tsunami Ready Recognition Programme*, which were disseminated to Member States. Educational activities were organised in the Town Hall of Samos (Greece) with general presentations on earthquakes and tsunamis including self-protection measures. In Chipiona (Spain), a Tsunami Walk exercise, and several awareness activities for students were organized. Italy conducted tsunami risk perception studies in coastal regions (peninsular and main islands) and in the Stromboli volcano area. The National Institute for Earth Physics (Romania) focused on educational projects and activities related to earthquake and tsunami which were highlighted in the publication of an article at the 16th annual International Conference of Education, Research and Innovation (ICERI) conference.

126. In November 2023, Fiji and Tonga World Tsunami Day and IDRR 2023 event coincided with the official visit of the UNDRR SRSG Ms Mami Mizutaki. She joined targeted school's tsunami drill Exercises. Approximately, 8,000 people participated including students, teachers, first responders. These events were also viewed live on Facebook engaging around 5,000 online viewers.

127. In Fiji, the WTAD23 programme included the official recognition of the first two UNESCO-IOC Tsunami Ready Communities and tsunami drills exercise at Sila and Navuevu community in collaboration with the Nadroga/Navosa Province EOC team and first responders.

128. WTAD 2024 was of special importance because it coincided with the 20<sup>th</sup> anniversary of the 2004 Indian Ocean Tsunami. The United Nations Office for Disaster Risk Reduction (UNDRR), and IOC joined together on a number of awareness raising activities on tsunami risk. Through the Tsunami Ready programme, UNESCO-IOC continued to support the #GetToHighGround initiative, which offers a chance to accelerate action on early warning systems for tsunamis and encourages partners to raise awareness of tsunami risk by organising a drill, fun run or walk of their tsunami evacuation route to #GetToHighGround. Among several other inovative initiatives UNDRR and IOC co-organised:

- [WTAD webpage](#), featuring a video, good practices and key information for 2024;
- [#GetToHighGround Campaign Activation toolkit](#);

- World Tsunami Awareness Day 2024 Video [playlist](#);
- Games, activities and resources for children and youth in multiple languages in the [International Day for Disaster Risk Reduction 2024 Activation Toolkit](#);
- Joint UNDRR and UNESCO exhibition entitled [Tsunami: Sea Change for Resilience](#);
- [Tsunami Eyewitness and Survivors project](#) by UNESCO-IOC shares inspiring stories and experiences of tsunami survivors and eyewitness and is closely linked to the Tsunami: Sea Change for Resilience exhibition;
- [Tsunami United Initiative](#) designed to engage and educate the next generation about tsunami hazards, awareness, and preparedness.

### **Harmful Algal Blooms and non-indigenous species research and monitoring**

129. The Harmful Algal Bloom Programme continued to provide its longstanding systematic and demand driven training with certification to member state institutions on HAB species monitoring including inter-calibration of phytoplankton identification. Two intercalibration exercises, six international training courses and several regional and in-country courses were implemented.

130. A Memorandum of Understanding was signed April 2024 between UNESCO-IOC and FAO on the co-sponsorship of the Intergovernmental Panel on Harmful Algal Blooms (IOC-FAO IPHAB) and formalises close ongoing cooperation on e.g. early warning systems for HAB's and on global data compilation and sharing. IPHAB comprises: 16 different sub-groups; 7 IPHAB Task Teams; 4 Regional HAB networks and groups; 3 Expert Working Groups; 1 Steering Committee; and 1 Project group. The programme is implemented via the IOC Science and Communication Centre on HAB, at the University of Copenhagen (Denmark). IPHAB held its first session under the new MoU 18-20 March 2025 (see IOC-FAO/IPHAB-XVII/3s).

131. In 2023 FAO, IOC and the IAEA published '*Joint technical guidance for the implementation of early warning systems for harmful algal blooms*' as FAO Fisheries and Aquaculture Technical Paper No. [690](#).

132. A preparatory project on 'Early Warning Systems for HAB' was concluded in 2023 in Namibia and Morocco with stakeholder workshops and identification of needs to upgrade existing HAB monitoring programmes to actual early warning systems. The second phase with pilot testing was initiated April 2024 and is ongoing throughout 2025.

133. The scientific steering committee of the research programme GlobalHAB, co-sponsored by IOC with SCOR, met on 24–25 September 2024 in California USA to develop a decadal plan for GlobalHAB. This was presented to IPHAB in March 2025 and will be presented to SCOR in September 2025. Joint efforts by GlobalHAB include:

- A white paper by GlobalHAB and GESAMP: '*Sargassum white paper: addressing the influxes of the holopelagic Sargassum spp. in the equatorial and subtropical Atlantic: recent scientific insights in their dynamics*', as IOC Manuals and Guides no [96](#), published in June 2024.
- A white paper on '*Fish-killing marine algal blooms: causative organisms, ichthyotoxic mechanisms, impacts and mitigation*' published as IOC Manuals and Guides no. [93](#). This paper provides the state of knowledge and scientific gaps with a focus on developing strategies for mitigating the impacts of HAB related fish kills.
- A Workshop at the PICES Annual Conference 2023 on Solutions to Control HABs in Marine and Euarine Waters. The focus of this workshop was on HAB control efforts related to the organisms themselves (either killing them or removing cells) and/or toxins from the water. Participants discussed technical, environmental compliance and public perception challenges and explored solutions to control of HABs. The outcome of the workshop was a summary of the worldwide approaches in HAB control.



- A workshop was held in conjunction with the 20th International Conference on Harmful Algae in Hiroshima, Japan, 3–5 November 2023. The in-person workshop involved 22 participants and included a session at the conference on how to integrate the qPCR method into HAB monitoring. The workshop provided the basis of a peer-reviewed white paper on how to integrate the qPCR method into HAB monitoring.
- A Harmful Algal Bloom Solutions (HAB-S) Programme was endorsed as a UN Decade of Ocean Science for Sustainable Development programme in early 2024. Lead agencies are UNESCO-IOC and the FAO. The HAB Solutions Programme conduct initiatives to advance collaborative global initiatives for preventing, controlling, and observing HABs, mitigating HAB impacts, making HAB data equitable and accessible for all, and increasing HAB literacy.

134. The compilation of data continued at all levels for the IPHAB-IODE Harmful Algae Information System with HAEDAT and OBIS databases as providers of high-quality information on HAB events, status and trends of HAB occurrence, and for a new toxin database linked to the IOC UNESCO Taxonomic Reference List via WoRMS. Close collaboration with ICES, through ICES-IOC Working Group on HAB Dynamics, and PICES continued in compiling and sharing global data on HAB events in the IODE Harmful Algae Event Database (HAEDAT). The biofouling of submerged anthropogenic surfaces and factors that contribute to the spread of non-indigenous species (NIS) have both received substantial attention from researchers, regulators and the private sector focused on understanding their economic, social and environmental consequences. IOC-UNESCO is partner in the GEF-UNDP-IMO GloFouling Partnerships project, a joint global initiative between the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) and the International Maritime Organization (IMO), with the Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC) as a partner. The IOC was tasked to take the lead on non-shipping pathways of biofouling and as part of this work IOC sponsored GESAMP Working Group 44 on Biofouling Management and Non-Indigenous Species (NIS). The WG was established in 2020 with 15 subject matter experts from around the world and completed its terms of reference end 2024. GESAMP WG 44 published a 150-page report with 10 peer-reviewers report entitled “Marine Biofouling: Non-Indigenous Species and Management Across Sectors” August 2024.

135. The IOC led on the development of three reports collating best management practices dealing with biofouling in specific sectors: Volume 1: *Biofouling prevention and management in the marine aquaculture industry: best practices in biofouling management*, was published 2022; Volume 2: *Biofouling prevention and management in the offshore oil and gas industry* was published 2024; and Volume 3: *Biofouling prevention and management in offshore renewable energy infrastructure and construction* was also published 2024.

136. The IOC finalized the implementation of a project aimed at furthering the scientific knowledge and capacity basis in the Canary Current Large Marine Ecosystem (CCLME) by focusing on invasive alien species and their connection with other ocean stressors. The project was funded by the Spanish Agency for International Development Cooperation (AECID) and implemented in partnership with the Spanish Institute of Oceanography (IEO-CSIC). Deliverables include a CCLME Alien Species Database, made available in a reviewed and upgraded CCLME Eco-GIS Viewer (<http://www.ideo-cclme.ieo.es>), as well as a regional training portal for the CCLME (<http://cclme.training.ieo.es>). Two virtual workshops were held to facilitate the scientific discussions during the reported period.

## FUNCTION D: ASSESSMENT & INFORMATION FOR POLICY

*Support assessment and information to improve the science-policy interface*

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### Sustainable Development Goals (SDG)

137. In the context of the 2030 Agenda for Sustainable Development, several targets of SDG 14 are directly relevant to the work of IOC, particularly in the areas of marine pollution, ocean acidification, ecosystem-based management, as well as marine research capacity and transfer of marine technology. UNESCO-IOC is identified as the UN custodian by the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs) for SDG indicators 14.3.1 (ocean acidification) and 14.a.1 (scientific knowledge and ocean research capacity). IOC has recently provided reporting on these indicators for inclusion in the UN Secretary General's Progress Report towards the SDGs in 2025.

138. Concern over the impacts of altered nutrient inputs, N, P and Si, to coastal waters led the UN to include an 'Index for Coastal Eutrophication Potential' (ICEP) as indicator for SDG Indicator 14.1.1 on eutrophication: *By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution*. UN Environment is the custodian agency for Indicator 14.1.1, and UNESCO-IOC is responsible to develop ICEP as the indicator. To implement ICEP, it is required to develop a component on a dissolved silica model and evaluate the effectiveness of ICEP in predicting coastal impacts at the global scale. To promote and increase the understanding of the potential of ICEP as indicator, the IOC in 2019 produced an animation for YouTube: <https://youtu.be/qW2nV2bsyCs>. The detailed plan of work was elaborated by the IOC N-CIRP Group of Experts in 2017. The work required funding for two postdoctoral scholars and an expert workshop to validate models. Identifying funding proved a hard challenge but was solved late 2021 as a combination of funds from UNEP via a UN agreement as well as Norwegian (NORAD) funding. Currently the ICEP model is being validated and final delivery to UNEP is expected end 2025 for subsequent application and implementation for SDG 14.1.1. reporting.

139. The IOC continued to provide active support to Member States in developing capacity to act towards, and to report on, SDG Indicator 14.3.1. As the custodian agency for the indicator, IOC has facilitated the development of the methodology associated with the indicator, providing guidance to scientists and countries on how to carry out measurements following the best practices established by the ocean acidification (OA) community. Since the launch of the SDG 14.3.1 data portal in December 2019, an increasing number of ocean acidification observations have been reported to IOC and are included in the annual 14.3.1 assessment (308 stations in 35 countries reported in 2022, 765 stations in 44 countries reported in 2025). There are, however, still strong inequalities in the distribution of these global ocean acidification observations: gaps in observations and data remain in many areas, especially in coastal Asia and Africa and the open waters of the South Atlantic, Pacific and Indian Ocean as well as the Southern Ocean. In the absence of data on ocean acidification permitting predictions of future scenarios and impacts, these regions remain particularly vulnerable. The latest results from the IOC SDG 14.3.1 reporting will be published on the UN Department of Economic and Social Affairs (DESA) website in July 2025, as well as in the UN Secretary General's Progress Report. In order to further advance SDG 14.3.1 related measurements and data reporting, IOC is working with experts to improve methodology and data collection. This includes engaging experts from the GOA-ON IOC convened expert working groups consisting of data managers and representatives of global ocean carbon data products and databases, including EMODNET, ICOS, GLODAP, NCEI, and SOCAT, as well as several National Oceanographic Data Centres (NODCs) to develop an automated exchange of data towards the SDG 14.3.1 Indicator from other databases already hosting and collecting relevant datasets. These expert working groups are contributing to the automated and regular exchange of relevant datasets through the implementation of a federated data system, in close collaboration with IODE and ODIS. Additionally, IOC is working with GOA-ON to develop a data visualisation tool for the SDG 14.3.1 data on the GOA-ON Data Explorer. This SDG App will highlight the data providers, national agencies, and give access to the datasets submitted towards the indicator.

140. The IOC was invited to contribute output from its SDG 14.3.1. reporting to the WMO Statement on the state of the Global Climate published in April 2024.

141. The Ocean Teacher Global Academy (OTGA) online curriculum on ocean acidification is now undergoing translation to French, to facilitate broader application. The OTGA Ocean Acidification course will next be used in training in Africa as part of IOC capacity development efforts in the region, bolstered by NORAD funding. The course is expected to be available as an open self-paced course in 2025. IOC further works with partners to align and further advance ocean acidification capacity development activities and participates in a new effort to define an ocean acidification capacity development strategy with indicators of success, such as number of countries contributing to SDG 14.3.1. The product is expected to be available end of 2025.

### **UN World Ocean Assessment (WOA)**

142. The IOC continues to provide scientific and technical support to the World Ocean Assessment process established under the UNGA. A third cycle of assessment (2021–2025) was initiated under the UN Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects. In accordance with the programme of work for the third cycle, one of the outputs of the third cycle will be the production of one or more assessments of the marine environment, including socioeconomic aspects. In addition, the Regular Process will provide support for other ocean-related intergovernmental processes which may include a series of policy briefs for policymakers tailored to each process.

143. On 12–13 December 2023, UNESCO-IOC and UN DOALOS organized a joint Symposium at UNESCO, aimed at strengthening the ocean science-policy interface at national, regional and global levels. The Symposium covered the following oceanic regions of the Regular Process: the North Pacific; the South Pacific, the Indian Ocean (including the Arabian Sea and the Bay of Bengal); the Red Sea and the Gulf of Aden, and the Regional Organization for the Protection of the Marine Environment (ROPME)/Regional Commission for Fisheries (RECOFI) area; the North Atlantic, the Baltic Sea, the Mediterranean Sea, and the Black Sea; and the South Atlantic (between the African and American coasts) and the wider Caribbean. To further advance the strengthening of the science-policy interface to support integrated action for the conservation and sustainable use of the oceans and marine resources, the Symposium focused on the following elements: (i) Overview of global ocean governance and importance of the science-policy interface with theories and practice; (ii) Background on the Regular Process/World Ocean Assessment and presentation on the process of nomination to the Pool of Experts and opportunities for contributing to the third World Ocean Assessment; (iii) Regional deep dives on capacity-building needs (including in the science-policy interface) and lessons learned in all regions; (iv) the importance of science communication and Ocean Literacy as a key element of the science-policy interface; and (v) Ocean Decade: support of the World Ocean Assessments (WOAs) on the Ocean Decade's mission to generate and use knowledge for the transformational action needed to achieve a healthy, safe and resilient ocean for sustainable development by 2030 and beyond.

144. A joint side event was organised with DOALOS during the 2024 Ocean Decade Conference (Barcelona, 10–12 April 2024) to further articulate the science/policy interface and identify cooperation amongst Decade actions and the Regular Process structural elements.

145. The IOC was invited by DOALOS to review the draft chapters of the World Ocean Assessment-III in May 2025.

### **The IOC State of the Ocean Report (StOR)**

146. At its 53<sup>rd</sup> session in February 2021, the IOC Executive Council considered the proposal to prepare a periodic 'IOC State of the Ocean Report (StOR)' as a response to the previously mentioned increased demand for the key information on the state of the ocean (see [IOC/INF-1393](#)). Following the 53<sup>rd</sup> session of the Executive Council, the IOC Secretariat invited Member States to express their

views on the spatial and temporal scope of the report, focus areas, and style of presentation (cf. IOC Circular Letter, [2843](#)). In parallel the IOC Secretariat convened an informal expert consultation on the StOR to further discuss its main features. The results of the Member States and expert consultation are synthesized in the [IOC/INF-1393 Rev.](#) The IOC Assembly at its 31<sup>st</sup> session in June 2021 endorsed the production of a Pilot StOR, which was presented to the IOC Executive Council at the 55<sup>th</sup> session in 2022. Following the presentation of *State of the Ocean Report 2022 – Pilot edition* to the IOC Executive Council in June 2022, the related concept note went through a 1.5 year review process. Further guidance by Member States was received at the 32<sup>nd</sup> session of the IOC Assembly (IOC/A-32/Dec.4.2). The StOR Advisory Board played a central role of the StOR Advisory Board in the scoping, reviewing and editing of the report since the IOC Assembly session in June 2023. The StOR Advisory Board consists of representatives from nine countries. The Secretariat with the support of the Advisory Board updated the concept note based on comments received during the IOC Assembly. The results of the consultations were presented in IOC Circular Letter, [2963](#), which included an updated StOR concept note and a template for contributions. As requested by the Assembly, the IOC Secretariat conducted two online workshops allowing Member States to provide additional comments. Member States welcomed the concept note and the publication in 2024 (as IOC Technical Series, 189). Planning for the 2026 StOR, initially, with the establishment of the StOR Advisory Board, following a call through IOC Circular Letter [3032](#) issued in March 2025. The StOR Advisory Board will meet to further planning for the report on the sidelines of the Assembly.

### **General Bathymetric Chart of the Oceans (GEBCO)**

147. GEBCO, initially established in 1903, is transitioning from a "project" to a sustained "programme" and is increasingly recognized as a fundamental component for achieving global ocean-related goals. The source highlights a "continuing and growing interest in the health and status of the oceans by many governments, international and philanthropic organizations and by the public more generally." This heightened awareness is driven by high-profile initiatives such as the UN's 2030 Agenda for Sustainable Development Goals, The Paris Agreement, the Sendai Framework for Disaster Risk Reduction, the UN Decade of Ocean Science for Sustainable Development (2021–2030), and the new UN High Seas treaty (BBNJ). These initiatives have "all highlighted the lack of comprehensive global bathymetric coverage, which is recognized as a fundamental element to achieve the goals of these initiatives." Despite this increased focus, significant gaps remain. As of June 2024, "GEBCO has 26.1% coverage of directly measured gridded bathymetric data of the world's oceans," meaning "almost three quarters of our oceans we lack fundamental knowledge, critical for the sustainable development of our oceans and therefore of our planet."

148. The GEBCO Guiding Committee (GGC) has taken significant steps to modernize the programme's strategic direction and governance. A pivotal development was the approval of "the first GEBCO Strategy 2023–2030, which will provide guidance for GEBCO's Sub-Committees." Concurrently, the GGC approved "the GEBCO Governance Review report as a blueprint of the current, complex and organically grown organization of GEBCO, identifying key areas for improvement." An implementation plan for both the Strategy and Governance Review is under development, with a detailed SWOT analysis conducted at GGC41 in Fiji (November 2025) and a project team tasked with refining the plan.

149. Leadership continuity and change are also noted, with Marzia Rovere completing her GGC term in 2024 and Evert Flier confirmed for a second five-year term as a GGC Member and a second three-year term as Chair of the GGC. The GGC also held its 41<sup>st</sup> meeting in Fiji, marking the first time in a Pacific Island State, which facilitated "great amount of interaction between the GEBCO community and representatives of the Pacific Island States."

150. The Sub-Committee on Undersea Feature Names (SCUFN) continues its critical role in standardizing undersea feature names for GEBCO products and international nautical charts. In 2023, SCUFN reviewed 334 proposals, accepting 263, but faced challenges with "strong statements from representatives of Coastal States asserting their naming rights within disputed Exclusive Economic Zones (EEZ) and Extended Continental Shelves (ECS)," particularly in the South China



Sea. This led to a decision "that all decisions would be made solely based on the existing Rules of Procedure and Guidelines, despite their inherent uncertainties."

151. To address these complexities and modernize the process, the "SCUFN Naming 2030 Sub-Group was established to help modernize the naming process." This initiative aims to develop "a new designator model incorporating Geographic Feature Unique Identifiers and enabling multilingual naming attributes for a single feature." A significant procedural change in March 2024 involved the adoption of a new article (2.11) introducing "a cap on the number of proposals considered at each plenary meeting, limiting them to 250 in total and 25 per country," and maintaining the suspension of "the submission of proposals for undersea features in the South China Sea."

152. The Technical Sub-Committee on Ocean Mapping (TSCOM) is engaged in several key technical projects to improve GEBCO's data products and infrastructure. Notable work includes:

- **Generic Sensor Format:** A project to "promote the value of preserving and sharing processed swath data in a generic sensor format data to the archive(s)."
- **Discrete Global Grids:** After a feasibility study, work is ongoing to convert the GEBCO TID grid into the H3 system, with "Differences were in the expected range confirming the potential of the H3 gridding system."
- **Global Bathymetric Coverage Metadata Service:** A detailed project plan is in place for developing this service, aiming to "improve the overall workflow and quality of the bathymetric pipeline to the DCDB in general and the GEBCO grid in particular."
- **Deep Argo Groundings:** For the first time, "depth values derived from deep Argo groundings have been used in the GEBCO 2024 digital grid," indicating progress in utilizing novel data sources for grid calibration.
- **GEBCO Grid Publication Reference:** A study will be conducted "to see if the GEBCO grid product specification can be part of S-100 and in particular within the S-300 series reserved for IOC-related products."
- **Cookbook:** The "Cookbook is an official IHO publication and has proven to be difficult to maintain due to a lack of authors." An interim chair has been appointed to conduct a survey on its future.

153. The Sub-Committee on Regional Undersea Mapping (SCRUM) plays a crucial role in fostering collaboration with regional mapping initiatives and integrating their efforts into the GEBCO Grid. SCRUM actively participates in IHO and IOC meetings, leading to GEBCO/Seabed 2030 and Crowdsourced Bathymetry (CSB) presentations at "15 of the 16 Regional Hydrographic Commission (RHC) meetings." They have also worked to identify and appoint Seabed 2030/CSB coordinators for RHCs, with "coordinators now confirmed for 15 out of 16 RHCs." Future plans include "strengthen[ing] communication and provide additional support to these coordinators, with the goal of expanding engagement and participation in future RHC meetings." SCRUM also contributes to the review of the GEBCO Grid and enhances cross-subcommittee collaboration.

154. The newly formed Sub-Committee on Education and Training (SCET) is focused on expanding its membership and building global capacity in ocean mapping education. Key initiatives include "developing an inventory of the various International and national groups undertaking seabed mapping capability-building programmes and performing a gap analysis." A high priority for SCET is "Developing a governance structure and cooperation ToR between SCET and the Nippon Foundation–GEBCO Training Programme at the University of New Hampshire (UNH)."

155. The long-running Nippon Foundation–GEBCO Training Programme at UNH is now in its 20th year, having trained "120 alumni from 50 Coastal States." The program has "returned to pre-COVID in person classes and labs."

156. The IHO DCDB, hosted by NOAA (USA), serves as a "prominent repository of digital oceanic bathymetry" for IHO Member States and the ocean science community. It actively "encourages data contributions from the bathymetric community" and has expanded its focus to include shallower coastal areas to support "coastal zone management and the mitigation of seaborne disasters." The DCDB is the preferred raw data store for the Seabed 2030 Project.

157. Now in its 8th year, the Seabed 2030 Project is a "flagship programme of the UN Ocean Decade" and is at the forefront of the global effort to map the ocean floor. Key achievements and developments include:

- **Data Coverage:** The GEBCO\_2024 grid was released, with "mapping coverage stood at 26.1% with some 4.34 million km<sup>2</sup> of new data added between 2023 and 2024. This equates to an area a little more than the size of the European Union." Significant regional compilations like IBCAO v5.0 (Arctic) and IBCSO 2.0 (Southern Ocean) have been integrated.
- **Systems and Tools:** Improvements in metadata handling, refinement of the GEBCO Grid viewer and hosting, development of a Web Map Service (WMS), and the creation of new web applications are noted.
- **Technology Innovation:** Engagement in uncrewed vessel trials (DriX) and PhD projects focusing on "super-resolution algorithms as a means to accurately predict seafloor topography at particularly high resolutions."
- **Mapping Activities:** Continued operation of a "Trusted Node for Crowdsourced Bathymetry (CSB)," with ongoing activities and close relationships with organizations like the International Seakeepers Society. There have also been "generous contributions of Satellited Derived Bathymetry (SDB) compilations."
- **Partnerships and Outreach:** Seabed 2030 continues to expand its reach, with "74 MOUs in place," including a complex signing with the Nordic Hydrographic Commission. The project has seen a "continued rise in global media coverage, enhanced collaboration with strategic partners, and a notable expansion of the project's presence across multiple digital platforms including a very successful podcast series." The "SB2030 Wind in the Sails activity delivered a compendium of 12 Use Cases for ocean mapping," designed for senior decision makers.

## Reducing nutrient enrichment

158. Under the leadership of FAO the IOC, together ADB, CAF, EBRD, GWP, UNIDO, UNEP and the UK Centre for Ecology and Hydrology, engaged in a new proposal for a GEF project: Clean and Healthy Ocean Integrated Program (CHO-IP). The CHO-IP is expected to start summer 2025. IOC's project components will be focused improving the evidence base and raising awareness to more effectively address nutrient pollution and marine hypoxia.

159. A new partnership with the Nippon Foundation and UNEP allowed for the development of a decadal implementation plan for "*A global ocean free from the harmful impacts of pollution by 2050*". The plan was pre-launched at the Economist Impact's World Ocean Summit and Expo, Tokyo, Japan, March 2025.

**160.** IOC UNESCO continued to co-sponsor, with UNEP, GESAMP Working Group 40 on Plastics and micro-plastics in the ocean. WG40 is set to review and further development risk assessment methods for marine litter and microplastics and identify data needs; to assess the effects of marine litter and macro-plastics—e.g. human wellbeing, biodiversity and animal welfare, food security, direct and indirect cost to different sector, risk perception and communication; to assess the effects of nano and micro-plastics—e.g. chemical contaminants, biodiversity, human health, risk perception and communication; to assess the effects of transfer of biota—e.g. human welfare, biodiversity, direct and indirect costs, pathogens, risk perception and communication; and to carry out initial risk assessment (based on ToRs 1-4). However, due to lack of funding the WG has not been able to progress on its ToRs in 2024–2025.

## **FUNCTION E: SUSTAINABLE MANAGEMENT & GOVERNANCE**

*Enhance ocean governance through a shared knowledge base and improved regional cooperation*

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### **UN Ocean Conference, 2025**

161. The 2025 UN Ocean Conference (UNOC) on SDG 14 was co-chaired by France and Costa Rica and took place in Nice (France) from 9 to 13 June 2025. It was preceded by three special events, namely: (i) the One Ocean Science Congress hosted by France (ii) Blue Economy Finance Forum to be hosted by Monaco; and (iii) the Ocean Rise and Coastal Resilience Coalition Summit hosted by the city of Nice. The IOC is participating in the inter-agency group supporting the conference and led the preparation of concept papers relevant to its mandate for the interactive policy dialogues (Ocean Action Panels) that structured the core programme of the conference. The IOC Executive Secretary was a panellist for the Ocean Action Panel focusing on Science, Research Capacity and Education. In January and February 2025, the Secretariat attended the UNOC prep-com in New York, organised a side event with France and Costa Rica on the role of Ocean science for SDG14, and also organised two online information sessions to guide Member States in preparing for Nice, ensuring science-informed participation, including key messages from the IOC perspective to be included in the formal UNOC Declaration.

162. The Nice Action Plan/UNOC Declaration offers entry points for IOC to:

- (i) Provide the Scientific Foundation by assessing ocean health through the Global Ocean Observing System (GOOS), OBIS and the State of the Ocean Report, by facilitating access to up-to-date, reliable data to guide policy decisions, and by Identifying knowledge gaps where information is missing and advocates for further research and observation is needed;
- (ii) Operationalizing Commitment by developing open-access ocean data platforms, supporting capacity-building and education to empower all states to contribute to and use ocean knowledge and foster international collaboration in marine science and policy.
- (iii) Driving Implementation through the Ocean Decade as a key vehicle for turning the Nice 2025 Declaration into action, by coordinating a portfolio of initiatives — “Ocean Decade Actions”— that directly respond to the priorities set in the Declaration, and providing a framework for stakeholders (governments, research institutions, businesses, and civil society) to align their efforts with global goals.
- (iv) By measuring Success and Accountability as the IOC can assists in developing indicators and metrics to track progress toward goals outlined in the Declaration.

163. Over two dozen events were organised or co-organised by the IOC to showcase the deployment of scientific solutions towards ocean sustainability. A high-level meeting of Ocean Decade Alliance took place as well as the now regular Ocean Decade Forum which brought over 300 participants together, showcasing the impacts of Decade actions. Several partnerships with the private sector and philanthropic organisations were launched focusing on eDNA monitoring, ocean observation, marine pollution, ocean literacy, Decade funding tools, Marine Spatial Planning/SOP, and seabed mapping.

### **UN Partnerships and contribution to BBNJ, CBD and UNFCCC**

164. The fourth International Conference on Small Island Developing States (SIDS4) was held from 27 to 30 May 2024 in St John's, Antigua and Barbuda, under the overarching theme of ‘Charting the course toward resilient prosperity.’ The Conference sought to assess the ability of SIDS to achieve sustainable development, including the 2030 Agenda and the Sustainable Development Goals. It resulted in an intergovernmentally agreed, focused, forward-looking, and action-oriented political outcome document. The IOC Executive Secretary led the UNESCO-IOC Delegation at the conference, and took part in one the interactive dialogue entitled *Leveraging data and digital technologies and building effective*



*institutions for a resilient future in small island developing States*. The IOC organised five side events focusing on the Ocean Decade and SIDS, Ocean Literacy, regional collaboration in ocean science, disaster risk reduction and preparedness.

165. Following the adoption of the International Legally Binding Instrument (ILBI) on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction (BBNJ) in March 2023, IOC has supported a number of side events organized by UN DOALOS (acting Secretariat) in order to promote the ratification of the Agreement as well as specific science and capacity development issues relevant to the Commission's mandate. In March 2024, the IOC Executive Secretary attended the Blue Leaders' Summit organized by the Belgium Government in the context of their EU presidency. This event was therefore organised with the objective of increasing momentum towards BBNJ ratification and implementation. The event provided an opportunity to present IOC's work relevant to BBNJ and network with other ocean professionals, engage in high-level roundtable discussions involving government, NGO, youth and scientific representatives. The Event, which gathered about 120 participants, was closed by Prince Albert II and the Prime Minister of Belgium, Alexander De Croo. The IOC Executive Secretary was invited to deliver a keynote talk on the Ocean Decade and its contribution to the advancement of the BBNJ agreement.

166. Given that IOC possesses recognized technical expertise in several areas of relevance to the BBNJ agreement, further discussion will be required with Member States and the future Secretariat of the Treaty (undefined at this stage) to identify and develop further collaborative approach so that the IOC can contribute scientific and technical inputs in the operationalization and implementation of the Agreement, in accordance with its mandate.

167. In April 2025, IOC took part in the 1st meeting of the Preparatory Commission (PrepCom) established by the UNGA to facilitate progress on the operational components of the BBNJ Agreement such as: the rules of procedure of the future COP, rules of procedure and modalities of operation of the subsidiary bodies; arrangements for the Secretariat, including the selection of its seat; funding of the Secretariat, COP, and subsidiary bodies; arrangements with the Global Environment Facility and provisions of funding; and operationalization of the Clearing-House Mechanism (CHM). On the later point, IOC together with Maldives and Norway UN Missions organised a dedicated side event on the IOC contribution to the BBNJ Clearing House Mechanism, focusing on the IOC expertise in designing, operating, and connecting networks of data and information systems that assist the global community in discovering, understanding, and managing life in our oceans. The Second meeting of the Prepcom will take place from 18-29 August and will consider the establishment of a working group to facilitate the design of the BBNJ CHM.

168. The Kunming-Montreal Global Biodiversity Framework (KMGBF), adopted at COP15, identified 23 action-oriented global targets to curb biodiversity loss and restore ecosystem by 2050. Several of the KMGBF targets rely on the provision and access to measurable data, making sustained ocean observations and accessible data vital for informed decision-making. IOC as a whole, the Ocean Biodiversity Information System (OBIS) of the International Ocean Data Exchange (IODE) and the Global Ocean Observing System (GOOS, co-sponsored with the World Meteorological Organisation, the UN Environment Program and the International Science Council) in particular, therefore play a pivotal role in supporting several GBF targets and indicators by providing coordinated marine biological and ecosystem observations, structured around a set of Essential Ocean Variables (EOVs) and ocean data products in association. Furthermore, OBIS was added to the list of tools designed to help countries monitor biodiversity and track progress in ocean, species, and ecosystem protection.

169. The Parties to the CBD agreed on a new process for identifying **Ecologically or Biologically Significant marine Areas (EBSAs)**. They also adopted mechanisms to add new EBSAs and revise existing ones, ensuring that information on these areas is catalogued in a way that supports planning and management using the best available science and knowledge OBIS maps and biodiversity

indices have been used as a primary source of information to support the EBSA process and with the introduction of the new process could continue providing an essential source of information.

170. The IOC Secretariat actively engaged in the 16th Conference of the Parties (COP16) of the Convention on Biological Diversity (Cali, Colombia, 21 October–1 November 2024) and the additional agenda finalisation meeting 25–27 February 2025 (Rome, Italy). Through CBD COP Decision 16/31; the Conference of the Parties welcomed the guidance<sup>1</sup> on the monitoring framework provided by the Ad Hoc Technical Expert Group on Indicators for the KMGBF. This guidance informs how Parties should monitor and report their progress towards the KMGBF goals and targets. Importantly, this guidance directly references a Global Biodiversity Observing System (GBIOS). The guidance, and the COP16 discussions it informed, explicitly acknowledge that IOC already provides the ocean component of this GBIOS through its existing systems: GOOS, OBIS, and ODIS.

171. The planning, monitoring, reporting, and review mechanisms adopted at COP16 further rely on data and information streams that the IOC provides. National reports, which are the primary source for the global review, require Parties to use headline indicators, including providing data (either national or from relevant global sources). The global report will draw upon analyses of indicator usage and relevant national, regional, and international scientific and technical assessments. IOC's data systems, reports (such as the State of the Ocean Report and Global Ocean Science Report), and contributions to global assessments are crucial inputs for this process. The establishment of an Ad Hoc Scientific and Technical Advisory Group for the global report that will advise on indicator use and draw on these sources underscores the need for robust data and scientific input from bodies like IOC.

172. The context of COP16 highlights the need for strengthening national monitoring systems, enhancing international cooperation, and addressing capacity gaps. IOC, through its GOOS and OBIS national and regional networks, is already positioned to support countries in these areas, for example, in developing national marine biodiversity monitoring systems. Leveraging the framework of the UN Decade of Ocean Science for Sustainable Development should be seen as a way to solicit actions that contribute to filling ocean science and knowledge gaps for GBF implementation and support Parties through guidance (e.g., on integrating ocean issues into NBSAPs) and tailored capacity development products.

173. IOC was present at various UNFCCC COP28 side events and discussion panels, participated in a large coalition of partners committed to making the ocean more central to climate negotiations and informing delegates about the potential of the ocean to support climate action (reported against the various functional elements involved). At COP 28, the outcome of the first global stocktake ([Decision 1/CMA.5](#), paragraph 180), welcomed the outcomes of the 2023 [ocean dialogue](#) and encouraged further strengthening of ocean-based action, as appropriate. The Global Goal on Adaptation (GGA, Paris Agreement Article 7.1) aims to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change. The Glasgow–Sharm el-Sheikh work programme on the global goal on adaptation set in place a process to elucidate the framing for the GGA. At COP 28, Decision [2/CMA.5](#), Parties adopted the UAE Framework for Global Climate Resilience, as part of the UAE Consensus and also established a two-year UAE – Belém work programme, on the development of indicators for measuring progress achieved towards the targets outlined in the framework. The IOC is supporting this work through technical work, including the technical expert group. The IOC also contributes to the UNFCCC Ocean and Climate Dialogue established since 2020 and delivered key interventions on at the 2024 and 2025 Ocean Climate Dialogue meetings to highlight the contribution of ocean science and observation to these processes.

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<sup>1</sup> <https://www.cbd.int/doc/c/85eb/18f4/797b0b3e3accf4f07746e773/cop-16-inf-04-en.pdf>

## Marine Spatial Planning

174. For almost 20 years IOC has been the leading international organization promoting marine spatial planning (MSP). Within the context of the '*Joint Roadmap to accelerate Marine/Maritime Spatial Planning processes worldwide*' ([MSProadmap](#)), updated in 2022, IOC has implemented the [MSPglobal Initiative](#), co-funded by the European Commission. The second phase of MSPglobal started in July 2023 and will run until December 2024. The project has contributed to develop guidance on MSP and related topics, strengthen capacities and increase awareness among governmental authorities and stakeholders about the importance of MSP.

175. One of the objectives of the MSProadmap and the MSPglobal Initiative is the promotion of transboundary MSP, i.e., to improve the dialogue on MSP among Member States that share the same sea-basin so they can develop marine spatial plans coherent across borders, taking into consideration transboundary issues. Currently, the initiative is focusing on two pilot projects: [West and Central Africa](#) and [Western Pacific](#). The activities in the beneficiary countries include also national trainings, workshops and the implementation of the new MSPglobal Rapid Assessment Methodology (RAM). The RAM has as its final goal the co-development of an Action Plan to guide the beneficiary country in a clear pathway to advance its MSP process.

176. MSPglobal is also developing further knowledge, tools and a new multilingual online training on OceanTeacher Global Academy to support Member States. The new tools are related to topics such as engagement of indigenous peoples and local communities, spatial data infrastructure, ocean observation, marine protection and restoration, climate change, etc. All tools are planned to be co-developed through participatory processes, engaging experts from around the world.

177. Also, within the context of the MSProadmap, the Government of Sweden has provided additional support to the IOC Secretariat since 2018. The funds have been used to organize meetings, workshops and trainings, as well as develop technical reports on MSP and sustainable blue economy. In November 2023, IOC and its Sub-Commission IOCAFRICA led the organization of the [2<sup>nd</sup> Regional MSPforum for Africa](#). An Organizing Committee was established with the African Union and UNEP Regional Seas, allowing to pull in additional human and financial resources from different initiatives in Africa. The event was attended by 74 people from 24 countries.

178. From June 2023 to mid-April 2024, MSPglobal activities involved 867 participants from 100 countries (32 Africa, 12 SIDS). These included mainly the 2<sup>nd</sup> MSPforum for Africa, trainings for representatives of national authorities and global workshops to co-develop MSP tools with experts from all continents and oceans.

179. The MSPglobal website remains the IOC's knowledge platform on MSP [www.mspglobal2030.org](http://www.mspglobal2030.org). The website is a multilingual repository (English, Spanish, French and Arabic) where all IOC products on MSP can be found, as well as an assessment about '[MSP around the world](#)'. Country profiles will be updated soon with the information to be shared by Member States when answering the 2024 IOC survey on the status of MSP, which is including for the first time an MSP typology criteria to help the IOC to assess whether there are commonalities, differences and/or trends in the adoption of MSP worldwide. The results of this survey will be also used to develop an assessment of global capacity needs on MSP that will inform specific tailored capacity development activities by IOC and other interested institutions.

180. UNESCO-IOC and the European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE) are planning to jointly organize the [6<sup>th</sup> International MSPforum](#) in October 2024, in Bali (Indonesia), together with national and local authorities.

181. Within the context of the 5<sup>th</sup> Phase of the GEF IW:LEARN project (International Waters Learning Exchange and Resource Network: Strengthening transboundary water management of the GEF International Waters portfolio), IOC will lead regional capacity building activities on MSP for the GEF portfolio of LME projects. In addition, IOC will assist GRID Arendal in the development of a

practical approach to integrate MSP into the GEF Transboundary Diagnostic Analysis and Strategic Action Program (TDA-SAP) methodology.

182. The 2024 International Water Conference resumed after six years, in its 10th edition, hosted by the Government of Uruguay, in Punta del Este, under the theme: "Transformative actions and impacts for the water and ocean SDGs: The GEF IW response to the global challenge", to reunite the IW portfolio and celebrate 30 years of the GEF IW focal area. The Conference organised by IW:Learn brought together more than 300 participants, including GEF IW project managers, institutional stakeholders from beneficiary countries, non-governmental and civil society organizations, transboundary and regional management institutions, UN agencies, Development Banks and Intergovernmental Organisations, and the private sector. Collectively they represent approximately 100 active GEF IW projects, from 80 countries and various GEF Agencies which aim to facilitate cross-sectoral and portfolio-wide learning & experience sharing.

183. There is an increasing number of countries committed to sustainably manage the ocean area under their jurisdictions, such as members of the High-Level Panel for a Sustainable Ocean Economy (Ocean Panel), which aims to do that through Sustainable Ocean Plans (SOP). SOP is an umbrella policy to integrates sectors and concepts, and that has 9 key attributes: place-based; ecosystem-based; knowledge-based; inclusive; integrative; iterative; endorsed; financed; and capacitated. Thus, SOP includes approaches such as Marine Spatial Planning (MSP), Integrated Coastal Zone Management (ICZM), Marine Protected Areas (MPAs), sectoral policies, etc. IOC is a member of the global coalition [Ocean Action 2030](#), which was established to support the Ocean Panel in the development and implementation of Sustainable Ocean Plans (SOP). IOC experience on MSP has inspired and provided inputs to establish a new Ocean Decade Programme on Sustainable Ocean Planning, which was launched during a satellite event of the 2024 Ocean Decade Conference in Barcelona (Spain). This Decade Programme has been co-designed through a participatory process with key users and UNESCO-IOC partners. It aims to provide a resource and technical platform for all countries, not only member of the panel. An interim advisory committee led by IOC was established; it is composed of partners from different institutions engaged in the topic. This new programme will use the Ocean Decade ecosystem (e.g., other Decade Actions, calls for actions, task forces, communities of practice, etc.) to develop capacity and leverage actions at all levels. In parallel, the IOC Assembly at its 32<sup>nd</sup> session initiated the development on an IOC-wide Strategy on Sustainable Ocean Planning and Management, which will be discussed under agenda item 4.7 of the IOC Assembly at its 33<sup>rd</sup> session.

184. Over the period June 2023 to May 2024, IOC participated in several national, regional and international events of initiatives related to MSP, such as those of the Ocean Panel, DOALOS, OECD and the G20 Environment and Climate Sustainability Working Group under the presidency of Brazil.

### **United Nations Decade of Ocean Science for Sustainable Development (2021–2030)**

185. The period from June 2023 to May 2025 was a period of intense activity on numerous fronts. Building on past efforts, significant achievements were realized in terms of engagement and visibility, building of a strong and diverse portfolio of Decade Actions, and operationalization and growth of the central and decentralized architecture for the governance and coordination of the Decade. The 2024 Ocean Decade Conference was the focal point of activity during this period and was a watershed moment for the future of the Ocean Decade.

186. Four additional Calls for Decade Actions were launched during this period. As of May 2025, the Calls for Decade Actions have resulted in the endorsement of 59 programmes, 535 projects and 109 contributions.

187. Eleven decentralized coordination structures (Decade Collaborative Centres and Decade Coordination Offices) have been established and have an essential role to play in supporting the Decade Coordination Unit to coordinate Decade Actions, catalyse new initiatives, build stakeholder engagement, mobilize resources and communicate on the Decade. Several of these structures,

including those led by IOC in Africa and the Tropical Americas and Caribbean Region and covering ocean observations, require additional resources to become fully operational and further efforts are required to fully optimize the impact and collaboration of the existing network of structures.

188. Forty (40) National Decade Committees have been created and are implementing diverse initiatives to catalyse national interest and resources for the Decade, as well as provide a platform for the discussion of national priorities aligned to the Decade. The rate of establishment of new National Decade Committees has slowed in this period and additional efforts are required to support the creation and impact of new National Decade Committees. Notable gaps exist in the global coverage of NDCs, particularly in SIDS and LDCs.

189. IOC is leading 24 Decade programmes and projects across a range of themes and is substantively involved in several others. It is also hosting Decade Coordination Offices across several themes and geographies including ocean observations, data sharing, ocean literacy and in Africa, Western Pacific, and the Tropical Americas and Caribbean region. There is a significant potential for the IOC contribution to the Decade to reinforce IOC's core programmatic work and human resources. However, additional resources are required to ensure full operationalization of IOC-led Decade Actions and coordination structures.

190. Despite the significant level of activity in this period, notable geographic gaps persist in the portfolio of Decade Actions in terms of leadership of Decade Actions by partners in Least Developed Countries and Small Island Developing States. In addition to the targeted support to partners identified through Call for Decade Actions No. 06/2023 further concerted and targeted efforts have continued to increase engagement in SIDS and Africa. The Africa Ocean Decade Taskforce met in January 2024 and oversaw development of an Africa-wide programme for sustainable ocean management as a central contribution to the implementation of the Africa Ocean Decade Roadmap. The Tropical Americas and Caribbean Taskforce was established in November 2023 and held its first in-person meeting in June 2024. This meeting resulted in the development of a regional roadmap for the Ocean Decade that was launched in December 2024. The Pacific Islands Ocean Decade Roadmap was developed under the leadership of the Pacific Islands region Decade Collaborative Centre (DCC) and was launched at the 2024 Ocean Decade Conference.

191. During this period, two in-person and several online meetings of the Decade Advisory Board were held. The first two-year term of the initial cohort of the expert members of the Decade Advisory Board came to an end in December 2023. Following an open nomination process that resulted in over 300 applications, expert membership of the Decade Advisory Board was renewed in January 2024. The Board discussed recommendations related to the endorsement of Decade programmes from Calls for Decade Actions and discussed a range of strategic issues related to measuring progress of the Decade, resource mobilisation, the role of indigenous and local knowledge in the Decade, and the means of increasing engagement of Small Island Developing States and Least Developed Countries. The most recent annual in-person meeting focused on the results of the Ocean Decade mid-term evaluation, including discussion of proposed revisions to the Terms of Reference for the Board to increase its strategic focus and oversight. The draft revised Terms of Reference are provided as [IOC/A-33/4.8.Doc\(3\)](#).

192. The Ocean Decade Capacity Development Facility was formally launched in December 2023 and will build on and complement IOC's programmatic activities in capacity development. Aligned with the IOC Capacity Development Strategy (2023–2030), this Facility, which is being established with funding from the Government of Flanders (Kingdom of Belgium), is a mechanism to match priority capacity development needs in the Ocean Decade with existing or new capacity development initiatives.

193. A Data Strategy Implementation Group continued to operate to support development and operationalization of the data, information, and knowledge strategy for the Decade. The Corporate Data Group continues to develop actions to facilitate sharing of data between private sector and the scientific community. The Strategic Communications Group has been renewed and comprises 25



communications experts who provide advice to the Decade Coordination Unit on communications tools and approaches. The Ocean Decade Expert Roster has been established to create a pool of experts to assist the IOC Secretariat with the identification of strategic targets for Ocean Decade Challenges, in the review of Decade programme submissions, and in regular review processes of the Decade.

194. Hosted by Spain, the 2024 Ocean Decade Conference (Barcelona, 10–12 April 2024) convened over 1,500 in-person participants and over three thousand online participants. Held as the culmination of a full 'Ocean Decade Week' the Conference discussed the outcomes of the year-long Vision 2030 process that aimed to identify priorities for the implementation of each of the Ocean Decade Challenges. Structured around four thematic sessions, the Conference discussed the 10 Vision 2030 White Papers that were prepared by expert working groups, and the Vision 2030 Outcomes Report. Over 120 satellite events were held throughout the week to complement the main Conference programme. The core outcomes of the Conference were synthesized in The Barcelona Statement, which sets out priorities for science and knowledge, ocean science infrastructure, and cross-cutting recommendations that will be critical to achieving the vision of the Ocean Decade by 2030. The priorities identified in The *Barcelona Statement* will guide the work of the Ocean Decade in coming years and will be translated to regional and national contexts.

195. In addition to the 2024, Ocean Decade Conference, there were intensive stakeholder engagement and outreach efforts during this period. In-person or hybrid events focusing on different aspects of the Ocean Decade were held at or in the sidelines of the SDG Summit (New York, September 2023) and UNFCCC COP28 (Dubai, December 2023), the United Nations Fourth International SIDS Conference (Antigua and Barbuda, May 2024), the 'Immersed in Change' High Level Event (Costa Rica, June 2024), and the Convention on Biological Diversity COP16 (Colombia, November 2024).

196. The Ocean Decade Alliance has grown during this period and now numbers 11 Patrons and 20 institutional members. Alliance members have been engaged in high-level events and in raising visibility of the Ocean Decade amongst their constituencies. An in-person meeting of the Alliance was held in the sidelines of the 2024 Ocean Decade Conference and identified future joint priorities for Alliance members related to seabed mapping, ocean data sharing, and sustainable ocean planning, with cross-cutting themes of support to engagement of SIDS and ocean literacy.

197. There have been significant efforts to engage philanthropic Foundations during this period. Two in-person meetings of the Foundations Dialogue were held during this period in June 2023 hosted by the Prince Albert II of Monaco Foundation and in September 2024 hosted by the Boticario Foundation. The Rio Action Statement which emerged from the latest meeting highlights four areas of action including tools to generate new support for Decade Actions, collaboration on strategic communication activities, and development of guidance and tools to support decision making on investments in ocean science.

198. Mobilization of resources remains a key challenge for the Decade and was an important focus of discussions at the 2024 Ocean Decade Conference. To maintain the current momentum and level of activity, additional financial or in-kind resources are urgently required to allow the full resourcing and operation of the Decade Coordination Unit, decentralized coordination structures and Decade Actions.

199. Year 2025 marks the mid-term of implementation of the Ocean Decade. As foreseen in the Implementation Plan, a mid-term evaluation of the Ocean Decade has been carried out focusing on measures to improve the delivery and impact of the Decade. A summary of the evaluation and the management response to the evaluation findings and recommendations are contained in [IOC/33/4.8.Doc\(2\)](#). Key actions will focus on strengthened coordination and engagement of UN agencies, tailored and targeted resource mobilisation, increased coordination across Decade Actions, enhanced monitoring and evaluation, and tangible measures to leverage the impact of the Decade to support future evolution and sustainability of IOC programmatic work.

200. A Call for Expressions of Interest for Member States to host the 2027 Ocean Decade Conference was launched in November 2024 via Circular Letter [3013](#). Bids from shortlisted Member States were received in April 2024 and the host country will be announced during the 33rd Session of the IOC Assembly. The 2027 Ocean Decade Conference will be a crucial moment to take stock of achievements since the 2024 event, refine priorities for the remaining years of the Decade, and lay the foundations of the post-Decade legacy.

### **IOC Sub-Commission for Africa and the Adjacent Island States (IOCAFRICA)**

201. Significant progress was achieved by the IOCAFRICA Sub-Commission over the intersessional period, despite operating with limited staff capacity. Progress was particularly notable in enhancing the Africa Ocean Data and Information, facilitating regional coordination for the Ocean Decade through the SEAWARD Africa programme, improving ocean observation and monitoring systems through GOOS-Africa collaboration, expanding early warning and hazard preparedness, advancing capacity development initiatives for institutions and professionals across Member States, supporting Early Career Ocean Professionals (ECOPs) to engage in training, research, and international collaboration, promoting initiatives on ocean science and climate change, strengthening ocean literacy through targeted outreach and education, and advancing cross-sectoral partnerships to promote ocean sustainability and the blue economy in Africa, and promoting science-policy integration through high-level dialogues.

202. IOCAFRICA held its Eighth Session at the Pride Inn Paradise Hotel in Mombasa, Kenya, from 7 to 9 May 2025. The Session brought together 67 participants representing 13 IOCAFRICA Member States and 16 regional and international organizations, including two High Commissions and the Ministry of Foreign Affairs of Norway. The following areas were discussed intensively:

- **Ocean Data and Information:** Enhanced Africa Ocean Data and Information.
- **Ocean Decade Coordination:** Facilitated regional coordination for the Ocean Decade through the SEAWARD Africa programme, leading to "enhanced regional and global visibility." The establishment and operationalization of the Decade Coordination Office (DCO) for Africa, hosted within IOCAFRICA, was strongly supported.
- **Ocean Observation:** Improved ocean observation and monitoring systems through GOOS-Africa collaboration. The establishment of the GOOS-Africa Secretariat at CURAT in Côte d'Ivoire was welcomed as a "concrete step towards strengthening institutional capacity and operational coordination."
- **Early Warning & Hazard Preparedness:** Expanded early warning and hazard preparedness initiatives.
- **Capacity Development:** Advanced capacity development initiatives for institutions and professionals, including support for Early Career Ocean Professionals (ECOPs).
- **Ocean Science & Climate Change:** Promoted initiatives on ocean science and climate change.
- **Ocean Literacy:** Strengthened ocean literacy through targeted outreach and education.
- **Partnerships & Blue Economy:** Advanced cross-sectoral partnerships to promote ocean sustainability and the blue economy, and promoted science-policy integration.

203. As host of the Ocean Decade Coordination Office for the region, the IOCAFRICA Secretariat facilitates regional coordination of Decade Actions through a new Science and Knowledge for a Sustainable and Resilient Ocean Economy in Africa (SEAWARD programme), improving ocean observation and monitoring systems through GOOS-Africa collaboration, expanding early warning and hazard preparedness, advancing capacity development initiatives for institutions and professionals across Member States, supporting Early Career Ocean Professionals (ECOPs) to engage in training, research, and international collaboration, promoting initiatives on ocean science and climate change, strengthening ocean literacy through targeted outreach and education, and advancing cross-sectoral partnerships to promote ocean sustainability and the blue economy in

Africa, and promoting science-policy integration through high-level dialogues. The Sub-Commission reported five new National Decade Committees, bringing the total number of active NDCs in the region to eight. The Africa Ocean Decade Task Force, comprising 14 experts and representatives of 6 organizations was established and commenced its assignment of supporting the development of regional Ocean Decade Actions in 2023. The 'Science and Knowledge for a Resilient and Sustainable Ocean Economy in Africa (SEAWARD Africa)' developed by the Decade Task Force is built on four pillars: (i) sustainable management of marine resources; (ii) climate change and marine biodiversity; (iii) tackling ocean pollution for enhanced human health; and (iv) extreme events and disaster risk reduction. The envisioned enablers for these pillars are capacity development, technology and innovation, knowledge generation and dissemination, Ocean Literacy, and financing mechanisms and instruments. Ocean observations including data and information will be the foundation of the programme. The Programme will catalyse Decade actions in Africa and will be used as a resource mobilization tool for the various actions in Africa. The Taskforce organized a successful satellite event on the margins of the 2024 Ocean Decade Conference in Barcelona (Spain). The satellite event brought together partners with the aim of collaborating in the implementation of the new Africa Programme (SEAWARD Africa).

204. At the Marine Regional Forum held in Dar es Salaam (Tanzania) in November 2023, IOCAFRICA in collaboration with the GIZ, co-chaired a session, 'From Science to Policy and Society: Co-designing a sustainable blue economic development in the framework of the Ocean Decade.' The session provided a space for dialogue and learning on the importance of working across the science-policy-society interface for sustainable blue economic development. The session identified the potential roles, challenges and synergies of researchers, policy- and decision-makers as well as social actors, such as indigenous peoples and local communities, in advancing sustainable ocean development. Challenges and opportunities to increase the use of ocean science in the Western Indian Ocean region to contribute to the Sustainable Development Goals, the Africa Roadmap for the Ocean Decade, and the Global Biodiversity Framework were also highlighted. The potential role of the UN Decade of Ocean Science for Sustainable Development as a framework to increase the generation and use of co-designed ocean science for sustainable blue economic development was presented.

205. Progress has been made in relation to the objectives of UNESCO Africa Flagship Programme 5 that are led by UNESCO-IOC and in terms of increased engagement of African stakeholders in the Ocean Decade. In terms of the first objective of Flagship Programme 5, related to harnessing science to inform management of natural resources & development of sustainable ocean economy, ocean and coastal observations have been enhanced and strengthened for example through regional oceanographic expeditions with participation of more than 50 experts from the region, installation of tide gauges at selected locations in the framework of GLOSS and ODINAFRICA, a survey of status of ocean observations along the African coastal and development of a proposal for a comprehensive African Ocean Observing System.

### **IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE)**

206. Since the IOCARIBE IGM XVII meeting, the Board agreed that, in the context of co-design of the Ocean Decade, the Sub-commission should conduct a review and revision of the IOCARIBE governance arrangements for technical programs, as well as the establishment of new working groups, as appropriate. The Board of Officers guided a comprehensive review of the Sub-Commission's portfolio, with an emphasis on prioritization. The new working groups aim to augment the severely limited technical capacity of the Sub-commission and to accelerate the use and application of ocean science across the region, ensuring participation by Member States, partners and communities.

207. During the June 2023 - May 2025 period, the following governance and coordination activities were completed, led by the IOCARIBE Board and implemented by the Sub-commission and its many partners. The Sargassum Working Group, a key partnership with GeoBluePlanet has now established six (6) Task Teams on: An observing system for Sargassum; Remote sensing

advancement; Modelling advancement; A Regional Sargassum Forum; The Sargassum Information HUB; and Community-led decision support tools. Other governance and technical arrangements for IOCARIBE-GOOS are ongoing, with the establishment of a Technical Advisory Group, with experts who have already been engaged in the development of observing systems. During May 2024, the Sub-commission is inviting Member States to join the IOCARIBE-GOOS Steering Group.

208. The Harmful Algal Blooms (HAB) working group has been consistent in delivering good science and knowledge. However, the Sub-commission advised that there was a necessity for the expansion of the group to include users and key sectors with specific interest in their work, such as tourism and fisheries. A regional meeting held in October 2023 resulted in some expansion of the Group, with key tourism and fisheries sectors requesting information.

209. With respect to governance for capacity development, the Board agreed to the establishment of a new governance arrangement – a regional working group on capacity development to reduce fragmentation of training, avoid duplication of activities, and ensure that trained persons have expertise to participate fully in the work of IOC-UNESCO. Within this group, a Task Team on Ocean Literacy is being established following the launch of the Program “Ocean Literacy Caribbean – The Ocean and Me” at the SIDS4 Conference in May 2024.

210. Procaribe+ is the new Caribbean large marine ecosystem (LME) project that was approved for implementation by the GEF. Through this LME process, a regional Ocean Coordination Mechanism (OCM) has now been established, with 9 IGOs, including UNESCO-IOC joining the OCM. So far, 19 Member States have also joined the OCM with several more expressing their interest.

211. According to the IGM XVII recommendation, IOCARIBE convened an open-ended working group to finalize the IOCARIBE Medium-Term Strategic Science Plan 2023–2030. Member States were given the opportunity to comment, and the final document was shared in March 2024. The Science Plan aligns the IOCARIBE programmes with the Ocean Decade Challenges and provides a roadmap for maximum benefits to be derived from the Ocean Decade for the region.

212. To address the regional need to streamline data and information flow for decision making, IOCARIBE will participate in the Marine Data Infrastructure Working Group of the OCM, focused on building an adequate framework, through appropriate training and technical advice to Member States on open data, as well as FAIR and CARE principles.

213. Progress on Ocean Decade governance has been rapid: The Head of the DCO is now in place. Interns are also invited to join the DCO, to participate in the work of the Ocean Decade. After a comprehensive and transparent process, the TAC Ocean Decade Task Force was established, with Terms of Reference and a multi-stakeholder constituency comprising 15 representatives of academia, the private sector, civil society, communities and ECOP, and 9 representatives of regional organizations. The Ocean Decade Roadmap for the TAC region is now published, facilitating the regional implementation of the Ocean Decade up to 2030.

214. Joint governance teams of IOCARIBE and the ICG CARIBE-EWS are implementing the Decade-endorsed project Integrating Coastal Hazards Early Warning Systems (iCHEWS) seeks to incorporate a multi-hazard approach into the mature Tsunamis Early Warning System. This project, collaborating with the IOCARIBE-GOOS group and CoastPredict has designated seven (7) pilot sites in the region to implement observing, forecasting and prediction, and will strengthen the joint governance arrangements.

215. The 18th Session of the IOCARIBE Sub-Commission was held in Brasilia, April 23-25, 2025. Fourteen key recommendations were agreed, with new foci on blue carbon and ocean acidification. New partnerships were also approved, with the International Atomic Energy Agency (IAEA), the Georgia Aquarium, USA; the All-Atlantic Ocean Research and Innovation Alliance (AAORIA) and the Fishing Vessel Observing Network (FVON).

## **IOC Sub-Commission for the Western Pacific (WESTPAC)**

216. Since the 14<sup>th</sup> Intergovernmental Session of the Sub-Commission (April 2023, Jakarta, Indonesia) and the last Assembly of IOC (June 2023, Paris), WESTPAC continues to foster ocean science-policy-society interface, advance ocean knowledge and cooperation, and co-design and co-implement with its Member States a diverse array of programmes and activities, including those for the UN Ocean Decade, addressing ocean management and sustainability challenges.

217. Meanwhile, the Sub-Commission has been taking the lead in the region, motivating and engaging experts, institutions, and countries in the Ocean Decade. In pursuance of the IOC Executive Council Resolution EC-55.1, the WESTPAC Office started to assume a new function in June 2022 as a Decade Coordination Office for the region.

218. In addition to providing technical and strategic support to Member States, the Sub-Commission develops, coordinates, mobilizes, and implements the Ocean Decade related Actions and activities, including the [2nd UN Ocean Decade Conference for the Western Pacific & 11th WESTPAC International Marine Science Conference](#) (22–25 April 2024, Bangkok).

219. Under the banner, 'We commit to accelerating ocean science solutions for sustainable development!', the resolute voice of 1,200 participants resonated throughout [the 2nd UN Ocean Decade Conference for the Western Pacific & 11th WESTPAC International Marine Science Conference](#), held in Bangkok from April 22 to 25, 2024.

220. This significant gathering, orchestrated by the IOC Sub-Commission for the Western Pacific (WESTPAC) and hosted by the Government of Thailand, brought together a diverse array of ocean stakeholders from over 40 countries. Together, they presented the latest ocean knowledge, examined the progress of the Ocean Decade Actions over the past three years, outlined future priorities, forged partnerships, and catalysed concrete actions for transformative ocean-based solutions to sustainability challenges in the region.

221. The remarkable turnout set a new benchmark in the history of the Sub-Commission. Unfolded with a prestigious opening attended by the Deputy Prime Minister of Thailand, the Conference featured [25 Scientific Sessions](#) dedicated to sharing and disseminating the latest knowledge about ocean priority issues in the region, [13 Decade Action Workshops](#) to examine development progress and formulate action plans for endorsed Decade programmes and projects (Decade Actions), and [12 Decade Action Incubators](#) established to transform ideas into concrete Decade Actions.

222. Additionally, a Special Forum on the South China Sea, held in collaboration with UNEP/GEF SCS SAP project, reviewed the project scientific findings and their applications to local management in the South China Sea and Gulf of Thailand. [A Townhall discussion](#) centred on the outcomes of the Barcelona Conference and the Decade Vision 2030, offering insights and actional recommendations to tackle ocean priority issues in the region towards sustainable development. [Several side events](#) were arranged on the sidelines of the Conference, showcasing the latest development in ocean science and technology, such as marine ecological ranching and the ocean satellite GOCI-II.

223. [The Outstanding Scientist Awards 2024](#), presented on 23 April, honoured five ocean scientists for their science achievement, and great contribution to international ocean science development and cooperation in the region. In a bid to ignite youth enthusiasm for ocean science and cooperation, the Conference spotlighted [6 Best Young Scientist Oral and 2 Poster Presentations](#) meticulously selected from a pool of 300 applications.

224. The Conference culminated in the [issuance of the Early Career and Mid-Career Ocean Professionals Statement \(ECOPs and MCOPs\), and the Bangkok Declaration](#). These collective commitments from all participants aimed at accelerating the development of ocean science solutions, empowering diverse stakeholders as co-architects of ocean stewardship, nurturing ocean leaders through widespread literacy and education, harnessing technical and technological innovations,



supporting early career ocean professionals, and advancing international ocean science development and cooperation in the region for a sustainable ocean.

225. While mobilizing actions from various stakeholders in the region, the IOC Sub-Commission for the Western Pacific (WESTPAC) has also been stepping up efforts to implement its initiated Decade Actions. Positive progress since June 2023 could be demonstrated by:

- UN 21: Accelerating marine spatial planning in the Western Pacific, with [the Group of MSP Experts formed and its first meeting](#) organized on 14–15 November 2023, marking the beginning of the implementation of the UN Ocean Decade Action 21: [Accelerating MSP in the Western Pacific and adjacent areas](#);
- Kick-off the UN Ocean Decade Action – [UN22: ‘Stem the Tide of Asia’s Riverine Plastic Emission into the Ocean’](#), with its international workshop held on 20–22 November 2023, hosted by the East China Normal University (ECNU), a leading institution in plastic research and also the host of the [Regional Training and Research Center on Marine Plastic Debris](#).
- The implementation of UN 23: Accelerating transformations in capacity development-Regional Network of Training and Research Centers (RTRCs) on Marine Science, with the 6<sup>th</sup> Regional Training and Research Center established at the City University of Hong Kong, focusing on [Coastal Contaminant Monitoring and Marine Innovative Technologies \(RTRC-Coastal COMMIT\)](#).
- The implementation of UN 24: [the 2<sup>nd</sup> Cooperative Study of Kuroshio and its Adjacent regions](#), which is underpinned by [more than 10 projects](#) covering various scientific, ecological, social and economic aspects of the Kuroshio, with [its fourth meeting of International Steering Committee](#) held on 4–6 December 2023, Qingdao (China), hosted by the Laoshan Laboratory.

226. Moreover, to harness the potential of environmental DNA for marine biodiversity conservation, On 27–29 November 2023, the IOC Sub-Commission for the Western Pacific (WESTPAC) in partnership with the Marine and Coastal Resources Research and Development Institute (Thailand) and the Nanjing University (China), organized a training workshop at the Phuket Marine Biological Centre (Thailand) to introduce about the Environmental DNA (eDNA) method, and explore how it could be used for researching and monitoring marine biodiversity in coastal habitats.

### **IOC Regional Committee for the Central Indian Ocean (IOCINDIO)**

227. The IOC Assembly at its Thirty-second Session (UNESCO, Paris, 21–30 June 2023) adopted Resolution A-32/1, by which it elevated the former IOC Regional Committee for the central Indian Ocean (IOCINDIO) to an IOC Sub-Commission and requested the Executive Secretary to issue, within four (4) months following the adoption of the present Resolution, a Circular Letter inviting Member States to submit a Letter of Adhesion to the IOCINDIO Sub-Commission. Subsequently, the Executive Secretary issued the IOC Circular Letter, [2956](#), dated 24 August 2023 which invited Member States to submit a letter of adhesion to the newly adopted IOC Sub-Commission for the central Indian Ocean (IOCINDIO). A total of 13 (Thirteen) Letters of Adhesion have been received by the IOC Executive Secretary from competent national focal points of IOC Member States, namely Bangladesh, France, India, Indonesia, Islamic Republic of Iran, Kuwait, Mauritius, Oman, Russian Federation, Saudi Arabia, Sri Lanka, United Arab Emirates, and the United States of America – hence establishing IOCINDIO as a sub-commission.

228. [The first intergovernmental session of IOCINDIO Sub-Commission](#) (announced through [IOC Circular Letter 3028](#)) was organized in-person at the Emirate of Ras Al Khaimah, UAE during 21-23 May 2025. During the session nominated delegations from member states and partner member states/organizations’ representatives participated. The deliberations led to preparation of the workplan for the next biennium, which will be presented by the IOCINDIO technical secretary Dr. Nimit Kumar, at the Thirty-third session of the IOC Assembly ([A-33](#)) at Paris in June 2025. The

discussions during the intergovernmental session were supported by IOCINDIO Workshop-1 on Strengthening Ocean Sustainability ([IO-SOS 2025](#)) organized at the same venue during 19-20 May 2025. At the end of the session, the first of the IOCINDIO sub-commission officers were elected **and thereby completing the process of formal launch of the sub-commission**. **Dr. Saif AlGhais** representing UAE has been elected as the first Chair of IOCINDIO sub-commission while **Dr. Maryam Ghaemi** (Islamic Republic of Iran) and **Dr. Balakrishnan Nair TM** (India) were elected as the vice-chairs

229. IOCINDIO co-organized with the Decade Collaborative Centre for the Indian Ocean Region (DCC-IOR) and the Indian National Centre for Ocean Information Services (INCOIS) of India, the Indian Ocean Regional Decade Conference 2024: Bridging Billions to Barcelona' as an Official Prelude to the Ocean Decade Conference-2024', INCOIS, Hyderabad, 1–3 February 2024. IOCINDIO supported, contributed, and participated in the Conference and organized a dedicated Session on the IOCINDIO.

230. IOCINDIO contributed to the UN Decade 2024 Conference in Barcelona and organized a dedicated Satellite Events: 'Enhancing coastal resilience in the Indian Ocean Key contributions of ocean and climate sciences to institutional capacity development as a vital solution to coastal vulnerability and climate change' on the 9 April 2024. The hybrid event was well attended with about 100 participants (50 online and 50 in presence). IOCINDIO also contributed to the onsite event organised by India during the UN Decade 2024 Conference, on 10 April, providing the report on the Indian Ocean Regional Decade Conference 2024: Bridging Billions to Barcelona' as an Official Prelude to the 2024 Ocean Decade Conference. It is worth noting that all three IOCINDIO Officers together with several senior scientists, managers and ECOPs participated actively in the 2024 Ocean Decade Conference.

231. IOCINDIO reinforced cooperation with the IIOE-2 and co-organised the Second Indian Ocean Expedition (IIOE-2) meeting on Future Road Map for International Indian Ocean Expedition in Hyderabad on 28–30 November 2023. Seventeen (17) participants from seven countries (India, UK, USA, South Africa, France, Australia, Kuwait) participated in and contributed to the meeting which helped to align the IIOE-2 with the UN Decade and reinforced cooperation with the IOCINDIO Member States. IOCINDIO also co-organised the International Indian Ocean Science Conference 2024 in Lombok (Indonesia), with a dedicated session on IOCINDIO.

232. IOCINDIO, in collaboration with the Environmental Protection and Development Authority of the United Arab Emirates, co-organized the 6<sup>th</sup> International Conference on Global Warming: 'The Critical Role of Oceans', under the auspices of the Supreme Council and Ruler of Ras Al-Khaimah as a parallel event of the COP28 hosted by the United Arab Emirates in Ras Al Khaima on 4–7 December 2023. The IOC Executive Secretary participated in the Conference with a keynote address on the important role of the IOC in term of capacity development through international cooperation to support for ocean observations which are vital for understanding climate systems on the earth. The IOCINDIO Technical Secretary led a dedicated session on IOCINDIO and presented the progress on the work of IOCINDIO including the status of membership of the newly adopted Sub-Commission. The Conference brought together international multidisciplinary, multi-ethnic, and multi-generational experts, scientists, conservationists, policymakers in the fields of oceanography, ecosystem restoration, climate science, ocean and environmental policy and governance from around the world. The participation of a non-scientific public, the youth and schools' kids ensured a wide public awareness in inclusive manner. Along with keynote and panels discussions, the conference through interactive, dynamic and innovative workshops explored and presented latest research and innovations solutions to help reduce greenhouse gas emissions and promote climate resilience. The Conference also offered networking opportunities, exhibitions, and poster sessions promoting collaboration and knowledge-sharing. A full day immersion was organized in Dubai on 6 December at the COP28 venue in Dubai to share knowledge on the current Ocean-related patterns, trends, and innovations in climate change mitigation, and resilience.

## **FUNCTION F: CAPACITY DEVELOPMENT**

*Develop the institutional capacity in all of the functions above, as a cross-cutting function*

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233. In June 2023, the IOC Assembly, through Decision A-32/4.3, adopted the *IOC Capacity Development Strategy 2023–2030* ([IOC/INF-1433](#)) and its Outreach and Communications Plan.

234. Shortly after the adoption of the IOC CD Strategy, the CD Secretariat, highlighting the need for close collaboration with the regional subsidiary bodies in implementing the new strategy, co-organized with IOCARIBE Secretariat in November 2023 a regional capacity development webinar series to reach out to the regional stakeholder groups in identifying the capacity development priorities and existing expertise and resources in the region.

235. The fifth meeting of the IOC Group of Experts on Capacity Development (IOC/GE-CD-V/3), held from 27 to 29 February 2024, provided an opportunity to assess the work of the group and its results in support of the IOC Capacity Development Secretariat. The group proposed revised Terms of Reference in accordance with the requirements of the new IOC Capacity Development Strategy 2023–2030, taking into account consultations with the global programmes and regional subsidiary bodies for their regional CD workplans. The revised Terms of Reference of the GE-CD are presented to the Executive Council in draft decision EC-57/4.6 of the Action Paper for the session.

236. As part of the UN Decade of Ocean Science for Sustainable Development (2021–2030), the GE-CD is consulted in the implementation of the UN Decade of Ocean Capacity Development Facility (CDF), which develops a community of practice among LDCs, SIDS and ECOPs in the Caribbean and African region. In addition, the GE-CD contributed to the public review of the White Paper on the Ocean Decade Challenge 9: Skills, knowledge and technologies for all, presented at the 2024 Ocean Decade Conference (Barcelona, Spain, 10–12 April 2024).

237. The CD workplans of the global programmes and regional sub-commissions were prepared at joint meetings with the global programmes and regional subsidiary bodies in the first semester of 2024. The CD elements of their workplans are being mapped in a matrix to the outputs of the IOC CD Strategy 2023–2030. The matrix exercise will help identify gaps where an output, activity or action is currently not being addressed, and identify the associated efforts and resource needs to fill these gaps. This will identify where assistance and guidance will be most needed and useful, which can then guide the development of project proposals and other new initiatives with the assistance of the IOC CD Secretariat for submission to interested donors.

238. Following the decision of the IOC Executive Council, at its 57th Session through Dec. EC-57/4.6 to continue the role of the GE-CD and revise its Terms of Reference in June 2024, IOC Circular Letter [3001](#) was issued to invite Member States to nominate experts to the IOC Group of Experts on Capacity Development. The IOC Executive Secretary approved the renewed IOC GE-CD with 29 members (<https://oceanexpert.org/group/540>). The Group elected Dr Suzan El-Gharabawy and Dr Lina Eyouni as Co-Chairs of the IOC GE-CD.

239. At the sixth session of the IOC Group of Experts on Capacity Development (IOC/GE-CD-V/3), held from 22 to 24 October 2024 in Ostend, Belgium, the Group established a Task Team on Needs Assessment and the Working Group on the Implementation Plan of the IOC CD Strategy 2023–2030 to prepare the draft Implementation Plan to be presented to the 33rd session of the IOC Assembly.

240. In April 2024, the implementation of the IOC Ocean Training Internships to enhance global human capacity related to the IOC mandate, which was one of the five activities under the support for IOC capacity development provided by NORAD, started with a call for potential host institutions and mentors. Six host institutions, including two OBIS nodes (Australia and Germany), two OTGA Regional Training Centres (RTC India and RTC Colombia), one OTGA Specialized Training Centre

and International Tsunami Information Center (ITIC), and one NODC (NODC Argentina). The working plans submitted were on ocean data management and tsunami resilience.

241. Six interns from six Member States were selected in the 2024 cohort and placed in each of the host institutions. One deferred the internship into 2025. The Tsunami global programme supported one intern placed at ITIC Hawaii. In total, six interns were trained from September 2024 to April 2025. The call for 2025 host institutions was launched in February 2025 and the intern applications will be open by April 2025.

### **IODE's OceanTeacher Global Academy**

242. Funded by the Government of Flanders (Kingdom of Belgium), the IODE OceanTeacher Global Academy programme component has established a global network of Regional Training Centres (RTCs), Specialized Training Centres (STCs), and affiliated partners to deliver customized training for the global ocean community, including experts, practitioners, decision-makers, and young scientists, and to increase national and regional capacity in coastal and marine knowledge, services, and management. OTGA currently has 17 RTCs/STCs (Argentina, Belgium, China, Colombia, Ecuador, Denmark, Fiji, Ghana, India, Indonesia, Kenya, Malaysia, Mozambique, Norway, Portugal, Uruguay/Brazil, and USA). Within this network, the IOC Science and Communication Centre on Harmful Algae, University of Copenhagen (Denmark) serves as a Specialized Training Centre for HAB and IOC International Tsunami Information Centre, the US National Oceanic and Atmospheric Administration National Weather Service serves as a Specialized Training Centre for Tsunami. During the reporting period, OTGA organized 110 online, face-to-face, and blended training focussing on a range of topics in ocean science, observations, and services, such as data management, marine spatial planning, satellite remote sensing, blue carbon, ocean literacy, weather forecast, marine pollution, metagenomics, and many more. OTGA training have successfully supported the implementation of the *IOC Capacity Development Strategy* by building equitable capacity and delivering high-quality training addressing the priority areas of all IOC Programmes, the UN Decade of Ocean Science for Sustainable Development, and the 2030 Agenda and its SDGs. These trainings contribute for upskilling of individuals and enhanced institutional capacity to support sustainable management of oceans and coastal areas worldwide, and relevant to Member States in the regions. Four different languages (English, Spanish, Portuguese, and French) were used to deliver training courses depending on audience. All training resources were hosted by the OceanTeacher e-Learning Platform ([www.oceanteacher.org](http://www.oceanteacher.org)). Nearly 15,000 users are registered on the OTGA e-Learning Platform, and approximately 4000 participated in trainings during the reporting period.

243. OTGA enables a complete set of learning services and products openly available to the global ocean community, including: planning, development, and delivery of training; coordination and management of courses and alumni; shared e-Learning Platform; creation of learning resources and activities; mechanisms for connecting experts, facilitators, and centres; guidance on learning services procedures and standards; and training and mentoring exchange and internships. This approach enables OTGA support to the implementation of the *IOC Capacity Development Strategy (2023–2030)*, mainly its *Outputs 1, 2, and 5*, through knowledge exchange in a standardized and coordinated way, promoting student and teacher mobility, and leading regional and inter-regional collaboration through community building.

244. OTGA continued collaborating with dozens of partner organizations to jointly develop its trainings, including POGO, Marine Environmental Data and Information Network (MEDIN), Flanders Marine Institute (VLIZ), European Marine Observation and Data Network (EMODnet) Alfred Wegener Institute for Polar and Marine Research (AWI), Marine Biodiversity Observation Network (MBON), United Nations Development Programme (UNDP) Cape Verde, and Ocean Decade Capacity Development Facility (CDF).

245. It is important to recall that in 2018, the IOC Project Office for IODE, host of the OceanTeacher Global Academy, achieved ISO 29990 certification as a Learning Services Provider



for non-formal education and training and was accredited by the Belgian Accreditation Body (BELAC) having satisfied the requirements of the International Standard. This certification is a recognition of the quality of learning opportunities offered by OTGA, through the IOC Project Office for IODE, and the high standard of quality learning services delivered that can support all IOC programmes in providing specialized training. This certification was renewed in 2023 and 2024 against the new ISO standard (ISO 29993:2017 Learning services outside formal education—Service requirements).

246. The Steering Group for OTGA met in June 2024 to assess the achievements of the network and co-design a workplan for future years, including funding strategy. RTCs/STCs confirmed their participation in the programme for the next years. OTGA has received more than 80 requests for training courses in 2025, reflecting its value to the ocean community and IOC capacity development. OTGA foresees a significant increase in staff demand in the next years, which will require planning, collaboration, and extra-budgetary funds to sustain high-quality operations and incorporate new developments. For 2025, RTCs/STCs were able to mobilize approximately USD 500,000 to support their training activities, apart from current in-kind contributions.

247. OTGA has been working closely with IOC CD secretariat to ensure that the trainings delivered and the new courses created address global and regional needs, and requests from IOC Member States and IOC Regional Sub-Commissions. OTGA-secretariat participated in the Fifth and Sixty meetings of the IOC Group of Experts on Capacity Development (GE-CD). OTGA has also collaborated with IOC Ocean Decade Capacity Development Facility in the development and implementation of new training frameworks.

### **Capacity development initiatives bolstered by NORAD funding**

248. The IOC assisted Namibia and Morocco in developing pilot early warning systems for harmful algal blooms. This has involved coordinating two workshops, one on *Data Needs and Code of Practice for Establishing an Early Warning System (EWS) for Harmful Algal Blooms (HABs)* in Namibia 28 October–1 November 2024 and a second on *Training on Monitoring Methods and Data Management for establishing an Early Warning System (EWS) for Harmful Algal Blooms (HABs)* in Morocco, 2–6 December 2024. During the workshop In Namibia, the discussions emphasized the need for a more stakeholder-focused phytoplankton bulletin to enhance early warning capabilities. As a result, a demo bulletin was created and shared for stakeholder feedback. Additionally, an outline for a Code of Practice on Phytoplankton and Biotoxin Monitoring was drafted, aiming to clearly define stakeholder roles and Terms of Reference. Recognizing the need for improved data analysis skills, an online training course was launched and is currently ongoing to support efficient data visualization and management.

249. In Morocco, the workshop engaged 28 participants from six regional centres involved in HAB monitoring. Using a standardized approach, participants entered and analysed cleaned data on biotoxins in shellfish and causative toxin producing phytoplankton species. A newly developed R script helped generate risk heat maps and time series, providing valuable insights for monitoring optimization and identification of risk periods and risk areas.

250. Activities in 2025 include:

- Namibia: an online training course involving one-hour weekly sessions over three months with the goal of producing two scientific papers on national HAB trend analysis, finetuning of Early Warning System bulletins and a workshop to revise national alert thresholds for phytoplankton based on national data to be held in the second half of 2025.
- Morocco: meetings with six INRH regional centres with a focus on data interpretation and developing recommendations for strategy revision and EWS model development as well as delivering training on HAB sampling techniques



251. The next phase focus on substantially expanding efforts across all IOC programmes and with critical support of IOCAFRICA focused on developing early warning systems for HABs in Africa. The project will build capacity and establish standardized systems for ocean observations, data management and early warning systems, and community notification with the longer-term view of achieving healthier and more resilient coastal communities.

## **Ocean Literacy**

252. Recognizing that sustainable development cannot be achieved without ocean literate societies, the Ocean Decade Ocean Literacy With All (OLWA) Programme is being implemented by a group of international partners under the leadership of the UNESCO-IOC. A major initiative of the programme is the Ocean Literacy Dialogues (OLD)—a series of public events organized with the aim of enabling knowledge exchange across different geographical and socio-cultural context. The latest editions were held in Tanzania (November 2023), with the support of the Government of Sweden, and in Spain, and in India (November 2024) in collaboration with the Jane Goodall Institute, the British Council and the UNESCO New Delhi Office.

253. The second edition of the 'Kindergarten of the Lagoon' project supported by the PRADA group in the context of the Sea Beyond initiative, was launched in September 2023 and a third edition launched in September 2024. The project has already engaged 200 pre-school students since its creation and supports innovative educational practices towards the ocean based in the outdoor education approach. Sea Beyond also includes an online course for secondary school students. At the end of the third edition, the online course had engaged 34,000 students from 56 countries.

254. The interactive exhibition 'Ocean&Climate Village' continued to travel to Qingdao in October 2023, Brussels in March 2024 and Barcelona in April and again in September 2024, enriched with the 'Feel the change' installation for visually impaired and blind people. This project was developed with the support of the Government of Sweden, which also allowed the organization of the first Ocean Literacy Training for urban planners, architects and designers, in partnership with the OTGA e-platform. The second Barcelona exhibition was organized in the framework of a partnership with the Luna Rossa PRADA Pirelli on the occasion of the 37<sup>th</sup> America's Cup.

255. As a contribution to the EU4Ocean coalition and under the three-year partnership signed with the European Commission Directorate-General for Maritime Affairs, UNESCO-IOC organized a training on ocean science communication for youth. Summer and winter schools in Italy (with a focus on the Mediterranean) and Portugal (with a focus on the Atlantic) were organized in 2023 to promote soft-skills, collaboration and empathy towards the ocean. In 2024 a summer school as organised in partnership with the Municipality of Malmö (Sweden) in July 2024 focussing on ocean literacy and nature-based solutions. Collaboration with DG MARE also strengthened the Global Blue Schools Network (composed of approximately 8,400 students, 2,240 teachers and 1,261 schools), allowing individual meetings with national coordinators and the creation of a common platform. An event was organized at the European Parliament in March 2025 to launch the ocean literacy policy brief, developed in collaboration with the UNESCO International Bureau of Education.

256. In October 2023, the Decade Coordination Office 'Connecting People and Ocean' was established. Hosted at the UNESCO-IOC Project Office of the Regional Bureau for Science and Culture in Europe (Venice), it will coordinate the implementation of Ocean Decade Challenge 10. A scientific advisory board, composed of international and multidisciplinary experts was established to promote diversity, equity and inclusion to achieve the collective impact of Challenge 10.

257. The first ocean literacy World Conference took place in Venice on 7–8 June 2024 to highlight the importance of Ocean Literacy for achieving SDG 14 and the objectives of the Ocean Decade. Developed in collaboration with the Government of Italy, the Municipality of Venice, and the Prada Group, the conference brought together ocean literacy experts from 76 countries to discuss challenges, opportunities, and best practices in ocean education and conservation. The conference endorsed the Venice Declaration for Ocean Literacy in Action. The Declaration is designed to

catalyse a new wave of action to establish Ocean Literacy in the spheres of education, science, policy, economics, and culture. By restoring and expanding humanity's understanding of the ocean, Ocean Literacy will empower communities to respect the marine environment and preserve ocean cultures around the world.

258. In the context of the increased 2024–2025 regular budget for Intersectoral Programme 2 (IP2), new ocean literacy activities are being developed in UNESCO sites in collaboration with the IOC regional sub-commissions.

259. At COP28, UNESCO-IOC and the Federal University of Sao Paulo, and in the context of the Ocean Decade Ocean Literacy With All Programme, organised three side events on how the blue school programme can become a testing group for the UNESCO Blue Curriculum proposal, advocating for the inclusion of ocean literacy in curriculum frameworks.

260. In April 2025 a new Ocean Literacy Centre was inaugurated in the island of San Servolo of the Venice Lagoon. The centre is designed to host students and citizens of all ages and to engage them in interactive workshops and activities with the support of digital installations presenting ocean data and ocean information. The centre is the result of the collaboration with architects, designers, scientists and educators.

### **IOC Sub-Commission for Africa and the Adjacent Island States (IOCAFRICA)**

261. IOCAFRICA prioritizes **capacity development** as a foundational enabler for effective ocean governance, scientific advancement, and the sustainable use of marine resources in Africa. This commitment is aligned with broader strategic frameworks such as the United Nations Decade of Ocean Science for Sustainable Development (2021–2030), the IOC Capacity Development Strategy (2023–2030), and the African Union's Agenda 2063. Recognizing the widening capacity gaps that hinder Africa's effective participation in ocean governance, scientific research, and blue economy development, IOCAFRICA focuses on strengthening institutional capabilities, developing a skilled technical workforce, and mobilizing financial mechanisms for sustainable ocean initiatives across the continent. A central framework for capacity development is the Rolling Plan for Ocean Capacity Development in Africa, which was endorsed for phased implementation as IOCAFRICA's guiding framework for 2025–2030. This plan offers a flexible, demand-driven, and regionally anchored model for operationalizing the IOC Capacity Development Strategy and complementing global implementation plans. The IOCAFRICA Secretariat is tasked with coordinating a consultative process with Member States and partners to define its priority themes, operational modalities, and monitoring indicators. Technical training continues to be a main area of focus, with three Regional Training Centres for the new phase of the Ocean Teacher Academy programme designated at the University of Ghana (Accra, Ghana), the Eduardo Mondlane University (Maputo, Mozambique) and the Kenya Marine and Fisheries Research Institute (Mombasa, Kenya). While over 30% of existing Decade Actions report that they were working in Africa, or planned to work there in the next 12 months, few of these Decade Actions are led by African partners. To contribute to redressing this situation, Call for Decade Actions No. 06/2023 is focusing on identifying partners in Africa who will benefit from tailored support and mentoring in co-design of Decade Actions that align with the priorities of the Roadmap. In parallel, consultations are underway with donors to increase access of African partners to new funding sources and sharing of in-kind resources. The Ocean Decade Capacity Development Facility which was launched in December 2023 is focusing on Africa as a priority geography. Policy briefs were prepared and published, in collaboration with the African Group of Negotiators Experts Support (AGNES) on climate change adaptation in coastal zones of Africa focusing on: (i) Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities; (ii) Changing Oceans, Marine Ecosystems and Dependent Communities; (iii) Extremes, Abrupt Changes and Managing Risks; and (iv) Climate Change & Ocean Economy.

### **IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE)**

262. Following the approval of the IOC's new Capacity Development Strategy, the Sub-Commission convened four (4) regional webinars on its regional implementation, with the IOCARIBE Board and program Coordinators, Member States, regional universities, research institutions and ECOPs, and with the private sector and NGOs. This broad level of regional engagement led to the plan for an inclusive working group on capacity development and facilitated the involvement of new researchers in regional programs. The outcomes also informed the drafting of new proposals to be implemented within the Ocean Decade framework.

263. The Sub-Commission convened a virtual meeting of the HAB-ANCA Working Group in October 2023, focused on widening the scope and capturing the interest of other regional HAB researchers, ECOPs, other member States not participating, and users. This meeting resulted in increased participation from several new researchers and ECOPs joining the group. Two new Member States have also joined. Members of the tourism sector who participated, have requested further information about the sector's vulnerability to HABs.

264. The Sub-Commission jointly convened, with UNEP, a training workshop on Marine Spatial Planning (MSP) and discussion on the Caribbean digital twin for the ocean. This workshop was targeted towards ECOPs and involved the use of the MSP Challenge Board Game to enhance decision making in the use of ocean and coastal natural assets. The Sub-Commission also convened the region's second regional MSP Forum with several regional OCM partners, and is providing national support to countries. IOCARIBE is a Procaribe+ Implementing Partner for its regional MSP activities, with national projects in Colombia and the Dominican Republic, and capacity development targeting countries who have not yet begun the process.

265. IOCARIBE is implementing the Ocean Best Practices Caribbean Pilot, co-designing a training course on observing systems in English and Spanish. The course is being tested in two regional training workshops and will contribute to the ocean Teacher Global Academy suite of courses.

266. The Pollutants Observatory and Multiple Stressors projects have been accelerated through the IAEA-funded Red de Investigación de Estresores Marinos – Costeros en Latinoamérica y el Caribe (REMARCO) project building capacity in 18 Latin American countries to address communication, ocean acidification, microplastics, harmful algal blooms, and pollution. A similar project is ongoing for the Caribbean SIDS which will be accelerated by the new agreement with the IAEA.

267. IOCARIBE will support the Government of Ireland as they fund co-design training for Decade-endorsed SIDS projects, by maintaining communications with country representatives, and by establishing a Coordinators' roundtable, to encourage interaction as implementation advances.

268. The TAC Ocean Observing and Forecasting System Decade project (TAC-OOFS) objective is to accelerate the governance and technical inputs to IOCARIBE-GOOS. Through this project, the technical group is working on a turn-key basic observing toolkit for SIDS. The Sub-Commission is supporting the deployment of two new glider systems to improve hurricane forecasting in the Caribbean. Additionally, the multi-sectoral, wide-ranging proposal to increase coastal resilience is ongoing and IOCARIBE is now a partner in the regional EW4ALL initiative, facilitating partnerships with departments of meteorology, hydrology and disaster risk reduction.

### **IOC Sub-Commission for the Western Pacific (WESTPAC)**

269. Capacity development has been an integral part of each WESTPAC programme and activity. To assist Member States achieving the SDG 14, the Sub-Commission endeavours to accelerate transformations in capacity development through the integration of training and research, the enhancement of endogenous capabilities and ownership of Member States, and the well-established mutual assistance and cooperation in the region. Over the last intersessional period, WESTPAC

continuously co-designed and co-implemented its capacity development activities with Member States in the region.

270. The Sub-Commission started to implement the *IOC Capacity Development Strategy (2023–2030)*, and fulfill its voluntary commitment to the UN Ocean Conference '[Develop research capacity and transfer of marine technology through the UNESCO/IOC Regional Network of Training and Research Centers \(RTRCs\) on Marine Science](#)' (#OceanAction15266), and the UN Decade Action 23: '[Accelerating capacity development transformations in the Western Pacific – Regional Network of Training and Research Centres \(RTRCs\) on Marine Science](#)'. Over the last intersessional period, the Regional Training and Research Centre on Marine Biodiversity and Ecosystem Health (RTRC-MarBEST) in Indonesia organized its 7<sup>th</sup> training on Fish Taxonomy (October 2023), in partnership with the Archipelagic & Island States (AIS) Forum. The Regional Training and Research Center on Coral Reef Restoration and MPAs in the Philippines organized [a training workshop on Coral Larval Reseeding](#), 1–11 April 2023. The Regional Training and Research Centre on Ocean Dynamics and Climate (RTRC-ODC) conducted its 12th International training on Ocean Models and Data Assimilation from 10–21 July 2023. The Regional Training and Research Center on Plastic Marine Debris and Microplastics in Shanghai, China co-organized an international workshop in November 2023 on Asia Rivers' Plastic Emission and associated training for participants from the region. To further improve its quality delivery, the Regional Training and Research Centre on Marine Toxins and Seafood Safety in Nha Trang, Viet Nam conducted an evaluation in September 2023 with the technical assistance of an international team of experts, organized by the Sub-Commission.

271. The RTRCs initiative gained wide recognition and support from Member States in the region. In light of the region-wide consultation and excellent evaluation result, all Member States expressed their unanimous support and thus approved the establishment of a new Regional Training and Research Centre on Coastal Contaminant Monitoring and Marine Innovative Technologies (Coastal COMMIT), hosted by the City University of Hong Kong. Since late 2023, the RTRC-Coastal COMMIT will assist countries, particularly the developing nations in the region, in strengthening their monitoring capacity for marine pollution focusing on chemical contaminants monitoring, phycotoxin producing algal species monitoring; promote the development of marine innovation technologies; and facilitate international research collaboration to promote marine environmental protection and sustainable development.

272. Meanwhile, to improve national and international capacity for molecular techniques for resources management and biodiversity conservation, in November 2023 the Sub-Commission successfully completed the implementation of the third phase of a UNESCO/Korean Funds in Trust project 'Enhance the Capacity for Species Identification and Genetic Analysis on Marine Organisms in the Coral Reef Ecosystems in the Western Pacific'. In addition, in November 2023, WESTPAC also successfully completed the implementation of the UNESCO/Japanese Funds-in-Trust project, which greatly promoted the transfer of marine technology for marine biodiversity conservation and seafood safety, particularly on coastal habitat conservation, marine toxin analysis and seafood safety, and other hotspot biodiversity related issues, such as the impact of ocean acidification and climate change, and coral reef restoration.

### **IOC Regional Committee for the Central Indian Ocean (IOCINDIO)**

273. The IOC Regional Committee for the Central Indian Ocean considers that Capacity Development (CD) cannot and should not be a stand-alone programme, action or activity. It is a long-term, dynamic and evolving cross-cutting mechanism. Subsequently, IOCINDIO uses an approach based on Training-Through-Research based on both permanent academic and on-job training and career development. IOCINDIO established cross-cutting Capacity Development Working Groups on critical issues in the region, including: (i) Ocean policy, economy, and governance; (ii) Coastal vulnerability, Sea-Level Rise, storm surges prediction and forecasting in the Indian Ocean; (iii) Cross-cutting Capacity Development and Recommendation. More generally, CD cuts across the entire Workplan of IOCINDIO. IOCINDIO, in cooperation with the Global Ocean Teacher Academy, the International Training Centre for Operational Oceanography (ITCOOCean)



and INCOIS organized training workshop and courses on the Coastal Vulnerability Mapping–QGIS with a total number of 23 overseas participants from 7 countries (Bangladesh, Guinea, Maldives, Kenya, Sri Lanka, Seychelles, India). The workshop provided tools and understanding to participants on the Geospatial science helping to generate vital information on the sustainable use of the coastal resource and planning. The use of such techniques helped for managing densely populated coastal environs. This course provided an overview of GIS applications pertaining to coastal vulnerability and analysis. It also provided the basic GIS mapping techniques on storm surge vulnerability, and its socio-economic impact using open-source GIS tools. Course integrated data acquisition, processing, analysis, and interpretation of coastal spatial data. In addition, extensive hands-on sessions to use tools for preparation of thematic base maps for coastal vulnerability due to Tsunamis, Storm surges and their impact. Participants gained knowledge on understanding of spatial data: raster and vector models, core tasks involved in the GIS analysis process including data acquisition, management, manipulation and analysis, and presentation and output, the use of QGIS, GRASS tools and Plug-in tools, creating and editing spatial data, basic understanding of coastal and marine GIS data applications.

### **UNESCO Category 2 Centres (C2C) and Chairs in ocean-related fields**

274. The two Category-2 Centres (C2Cs) under the auspices of UNESCO in the fields of competence of the IOC, namely the Regional education and research Centre on Oceanography for West Asia (RCOWA) in Islamic Republic of Iran and the International Training Centre for Operational Oceanography (ITCOOcean) in India and the UNESCO Chairs in Iran, Oman, and Qatar conducted several research and training activities in ocean sciences, operational oceanography, data management and tsunami warning and mitigation. Both C2Cs duly and timely reported to UNESCO through the dedicated online reporting platform and webpage <https://en.unesco.org/ocean-category-2-centres>. The IOC Secretariat undertook the review of the ITCOOcean and the renewal of the agreement was approved by the UNESCO Executive Board at its 221<sup>st</sup> session.

275. The International Centre for Capacity Development: Sustainable Use of Natural Resources and Societal Change (GRO) in Iceland is the first UNESCO cross-sectoral Category 2 Centre. Its training programme in science for sustainable fisheries has 25 years of experience, graduated to date 464 fellows, supported 66 countries, and held 52 short courses and workshops. There is dialogue with IOCAFRICA and with OTGA view a view to announcement of training opportunities and usage of the OTGA platform in the FTP activities.

276. There are a number of UNESCO Chairs in the fields of competence of the IOC, notably in Australia, Benin, Brazil, Canada, Chili, Germany, Islamic Republic of Iran, Latvia, Oman, Portugal, Qatar, Russian Federation, Senegal, Spain, Tanzania, the United Kingdom, and Uruguay. The UNESCO-IOC Secretariat contributed to the organization of the international Conference which celebrated the 30 years anniversary of the UNITWIN/Chairs Programme on the theme: 'Transforming Knowledge for Just and Sustainable Futures to mark the 30th Anniversary of the UNITWIN/UNESCO Chairs Programme', UNESCO HQ, Paris, 3–4 November 2022. In this context, the IOC Secretariat convened the first global meeting of the IOC-related Chairs on the theme: 'Ocean Science and Knowledge for Sustainable Development: Towards a Global UNITWIN Network of UNESCO Chairs and Category 2 Centres (C2C) under the auspices of UNESCO in Ocean and Climate Sciences, Technology and Governance'. The Secretariat is now working on establishing a network that will bring relevant Chairs together to foster collaboration and synergies.