United Nations A/77/119

General Assembly

Distr.: General
24 June 2022

Original: English

Seventy-seventh session
Item 72 (a) of the preliminary list*
Oceans and the law of the sea: oceans and the law of the sea

Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its twenty-second meeting

Letter dated 23 June 2022 from the Co-Chairs of the Informal Consultative Process addressed to the President of the General Assembly

Pursuant to General Assembly resolution 76/72, we were appointed as Co-Chairs of the twenty-second meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea.

We have the honour to submit to you the attached report on the work of the Informal Consultative Process at its twenty-second meeting, which was held from 6 to 10 June 2022 at United Nations Headquarters. The outcome of the meeting consists of our summary of issues and ideas raised during the meeting, in particular with regard to the topic of focus "Ocean observing".

In line with past practice, we kindly request that the present letter and the report be circulated as a document of the General Assembly, under item 72 (a) of the preliminary list.

(*Signed*) Isabelle F. **Picco**
Viliami Va'inga **Tone**
Co-Chairs

* A/77/50.

Twenty-second meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea

(6–10 June 2022)

Co-Chairs' summary

1. The United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea held its twenty-second meeting from 6 to 10 June 2022. Pursuant to General Assembly resolution 76/72, the meeting focused its discussions on the theme "Ocean observing".

2. The following supporting documentation was made available to the meeting: (a) report of the Secretary-General on oceans and the law of the sea on the topic of focus of the twenty-second meeting of the Informal Consultative Process (A/77/68); (b) format and annotated provisional agenda of the meeting (A/AC.259/L.22); (c) contribution to the meeting submitted by Turkey (A/AC.259/22); and (d) contribution to the meeting submitted by the United States of America (A/AC.259/23).

Agenda items 1 and 2
Opening of the meeting and adoption of the agenda

3. The Co-Chairs, Isabelle Picco, Permanent Representative of Monaco to the United Nations, and Viliami Va'inga Tone, Permanent Representative of Tonga to the United Nations, appointed by Abdulla Shahid, President of the General Assembly at its seventy-sixth session, opened the meeting.

4. Opening remarks were delivered on behalf of the Under-Secretary-General for Legal Affairs and United Nations Legal Counsel, João Miguel de Serpa Soares, by the Director of the Division for Ocean Affairs and the Law of the Sea, Vladimir Jares, and, through a video message, by the Under-Secretary-General for Economic and Social Affairs, Liu Zhenmin.

5. Delegations adopted the format and annotated provisional agenda and approved the organization of work.

Agenda item 3
General exchange of views

6. A general exchange of views took place at the plenary meeting held on 6 June. Several delegations, including one group of States, highlighted the importance of the Informal Consultative Process, which they considered to be a useful forum for discussing issues related to oceans and the law of the sea, including in support of the conservation and sustainable use of the ocean. Several delegations expressed their gratitude to the Co-Chairs and to the Division for Ocean Affairs and the Law of the Sea for organizing the twenty-second session of the Informal Consultative Process. Appreciation was also expressed to the Secretary-General for his report on oceans and the law of the sea on the topic of focus (A/77/68).

7. Several delegations, including one group of States, welcomed the decision to focus the discussions of the meeting on the topic "Ocean observing", noting that it provided a valuable opportunity to share knowledge, experiences and best practices and promote greater cooperation in this area. One delegation expressed the hope that discussions on this topic would contribute to other important ocean-related processes such as the United Nations Decade of Ocean Science for Sustainable Development,

the United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development, to be held in 2022, and the intergovernmental conference on an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.

8. A group of States highlighted the important role of the ocean as the main climate regulator and the primary basis for sustaining all life, recalling also its central role in the world's economy and in supporting sustainable development. Several delegations, including one group of States, further emphasized the serious threats the ocean was facing, including sea-level rise, ocean acidification, oxygen depletion, an increase in extreme weather events, pollution, including from marine litter, habitat destruction, biodiversity loss, overfishing and illegal fishing, and the overextraction of non-living resources.

9. Several delegations, including one group of States, affirmed the importance of the Convention as the legal framework within which all activities in the oceans and seas must be carried out and expressed the view that Part XIII of the Convention, on marine scientific research, was the applicable legal regime for ocean observing. A group of States stressed the need to preserve access to maritime areas under national jurisdiction for the purposes of undertaking ocean observation, while respecting the applicable legal framework. In this context, one delegation emphasized the need to avoid fragmenting the concept of marine scientific research, including by distinguishing pure and applied research, and excluding operational oceanography from the notion. It recalled the rights and obligations of States relating to the conduct of marine scientific research, including the requirement to seek coastal State consent to conduct such research in maritime areas under its jurisdiction.

10. The United Nations Decade of Ocean Science for Sustainable Development was highlighted by some delegations as an opportunity to foster international collaboration and develop transformational ocean science in support of actions to reverse the decline in ocean health. One delegation highlighted that this would require an interdisciplinary and inclusive approach involving natural and social sciences, geographical diversity, gender equality and the representation of early-career professionals. Some delegations observed that this would also require technology and infrastructure, with in situ and remote platforms forming critical parts of the ocean observation system. The important role of the traditional knowledge of indigenous peoples and local communities was also recognized in this context.

11. Several delegations, including one group of States, highlighted that the collection of ocean observation data facilitated a better understanding of the state of the ocean and made it possible to monitor the impacts of climate change and human activities, thus contributing to science-based and integrated ocean management policies aimed at effectively conserving and sustainably using the ocean and preparing for the impacts of climate change. Several delegations, including one group of States, highlighted the critical role of ocean observation in implementing Sustainable Development Goal 14, in developing the World Ocean Assessments and in achieving the goals of the Decade.

12. Several delegations, including one group of States, expressed concerns with respect to the limited capacity of many developing countries to effectively conduct and make use of ocean observations. In this regard, several delegations, including one group of States, underscored the importance of capacity-building. Further concerns were raised by several delegations, including one group of States, regarding the lack of sufficient ocean observation data, particularly biological and deep-sea observations, which hampered the effective monitoring of conservation measures.

These delegations also noted the importance of an ecosystem approach and of enabling a transformation from platform-specific to integrated multi-platform observation.

13. Several delegations, including one group of States, highlighted the critical importance of cooperation in addressing the multiple pressures on the world's oceans, as also identified in the two World Ocean Assessments, and called for increased collaboration and coordination to strengthen ocean observation, including at the national, regional and global levels. The relevance of making data widely accessible and of sharing such data among industries, researchers and Governments in a transparent manner was underlined by several delegations, including one group of States, as a means to boost innovation and create value. Several delegations, including one group of States, emphasized the need to develop standardized measures to facilitate the sharing or transfer of information and data at the global level. One delegation also highlighted the role of the private sector in funding and guiding public research to maximize the creation of value and ocean stewardship.

14. Some delegations noted the role of ocean observation in weather and climate predictions and related risk assessment and early warning systems, including in the context of extreme events such as tropical cyclones and tsunamis, and underlined its important contribution to maritime safety, navigation and coastal planning. In this context, one delegation stressed the need to further expand the existing global network of marine meteorological observations, including over inshore and coastal waters, and to address gaps in spatial coverage and capabilities to collect data in order to improve weather and climate prediction to ensure the safety of lives and properties at sea.

15. Several delegations, including one group of States, highlighted research programmes and activities related to ocean observation at the national, regional and global levels, including seabed mapping, research on ocean biogeochemical cycles, tracking of environmental parameters, monitoring of ecosystems and biodiversity, data collection and sharing, modelling and forecasting of weather and climate, including risk assessment and early warning, technological developments, the strengthening of relevant regulatory frameworks and indigenous knowledge-based decision-making.

16. The importance was recognized of the voluntary trust fund for the purpose of assisting developing countries, in particular the least developed countries, landlocked developing countries and small island developing States, in attending meetings of the Informal Consultative Process and ensuring broad participation, with appreciation expressed to those making contributions. The Director of the Division provided an update on the status of the trust fund, noting that the General Assembly, in its resolution 76/72, had expressed its continued serious concern regarding the lack of resources available in the trust fund. The Director of the Division urged delegations to consider making additional contributions.

Topic of focus: ocean observing

17. In accordance with the format and annotated provisional agenda, the discussion panel on the topic of focus was organized in two segments structured around the following: (a) tools, contributions to science-based decision-making in support of sustainable development and challenges relating to gaps in observational data; and (b) international cooperation and coordination in advancing ocean observing and addressing related challenges. The panellists gave presentations, after which discussions were held.

1. Ocean observation: tools, contributions to science-based decision-making in support of sustainable development and challenges relating to gaps in observational data

Panel presentations

18. In the first segment, a Co-Chair of the Global Ocean Observing System Steering Committee of the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO) and Scientific Director and Chief Executive Officer of the Ocean Frontier Institute, Anya Waite, spoke about the urgent need to increase global ocean observations in order to meet climate targets and about the vision of the Global Ocean Observing System for connecting observation providers to end-users by improving observing co-design and increasing the delivery of benefits at multiple scales. A member of the International Argo Steering Committee and Oceanographer at the National Oceanography Centre of the United Kingdom of Great Britain and Northern Ireland, Brian King, gave a presentation on the Argo programme's potential to transform decision-making by increasing scientific knowledge of climate-change-related ocean changes, as well as the challenges facing the programme, including those relating to funding, gaps in coverage, difficulties in data distribution and environmental impacts. The Director of the Center for Operational Oceanographic Products and Services of the National Oceanic and Atmospheric Administration of the United States of America, Richard Edwing, shared insights on building ocean observing systems to meet societal needs based on the evolution, operation and application of the National Water Level Observation Network. The Head of the Department of Innovation and Authorities of the National Space Institute (DTU Space) of the Technical University of Denmark, Niels Anderson, underscored the actual and potential contributions of satellite infrastructure to delivering user-driven ocean observations and data to inform science-based decision-making and prospects for future development, including through public-private partnerships, and highlighted the role of island States as primary stakeholders in this regard. The Director of the Integrated Marine Observing System of Australia, Michelle Heupel, shared the experience of the System in delivering observations, data, products and services to support management and industry and create societal benefits, noting the significant return on investment of ocean observations across sectors. The Group Director of the Ocean Observations, Modelling and Data Assimilation Group of the Indian National Centre for Ocean Information Services, Eluri Pattabhi Rama Rao, in a pre-recorded presentation, outlined the contributions of the Centre and the ocean observing system of India, IndOOS-2, to the country's sustainable development agenda, focusing on the ocean observing system, data modelling and management, and the resulting data, information and advisory services for stakeholders. A Senior Scientific Officer at the French Prime Minister's General Secretariat for the Sea and Chair of the European Marine Board, Gilles Lericolais, provided a European perspective on ocean observation and monitoring of the marine and coastal environment, highlighting the importance of effective and efficient ocean observing systems for monitoring the impacts of climate change on the ocean. A member of the Global Ocean Observing System Biology and Ecosystems Panel and Director of the Central and Northern California Ocean Observing System, Henry Ruhl, described the contributions of ocean observation to understanding and conserving biological diversity, providing an overview of how diversity and biomass distribution was measured and how essential ocean variables contributed to work under various international conventions and by various organizations. A Professor at the Faculty of Aquatic Science of Istanbul University and the Head of the Turkish Marine Research Foundation, Bayram Öztürk, in a pre-recorded presentation, described the tools and methods of ocean observation and their contributions to fishery science and marine conservation, highlighting

existing gaps in ocean observation at the local, national and regional levels and the need for capacity-building and enhanced cooperation. An Associate Professor at the Department of Earth, Ocean and Atmospheric Science of Florida State University College of Arts and Sciences, Amy Baco-Taylor, examined the contributions of ocean observation to understanding and conserving the marine environment of the deep ocean through a case study on vulnerable marine ecosystems and significant adverse impacts, stressing the need to address knowledge gaps, adopt a precautionary approach and strengthen science uptake in ocean management. A Co-Chair of the Ocean Observations Physics and Climate Panel and Professor at the École Normale Supérieure and the Dynamic Meteorology Laboratory of the Institut Pierre-Simon Laplace, Sabrina Speich, gave a presentation on the contributions of ocean observation to understanding, adapting to and mitigating the effects of climate change, and proposed pathways for implementing a fit-for-purpose ocean observing system for climate challenges, including by building an integrated ocean system. The Programme Director at the Institute of Marine Research and Professor at the Geophysical Institute of the University of Bergen, Peter Haugan, in a pre-recorded presentation, discussed the critical role of ocean observation in providing a knowledge base for sustainable ocean-based economies and ocean-based climate solutions and presented the case of Norway in highlighting the importance of integrated ocean management and the contributions of ocean observations in this regard.

Panel discussions

19. The discussions held after the presentations focused, inter alia, on the contributions of ocean observation to understanding the state of the ocean; climate change and biodiversity; the proposed development of an "international ocean station"; the "digital twin" of the ocean; challenges relating to capacity-building in ocean observation; the uptake of science in decision-making and management; international cooperation in ocean observation; funding; environmental impacts; the integration of traditional and indigenous knowledge; and the impact of bottom trawling.

20. In response to a question regarding the lack of information on oceans' carbon absorption, Ms. Waite noted that, notwithstanding existing technologies, there were not enough observations to provide sufficient data in this regard to inform policymakers. Addressing a further question as to why the North Atlantic Ocean absorbed a high volume of atmospheric carbon dioxide, Ms. Waite explained that, in this area, columns of cooling water known as chimneys, as well as strong biological productivity, caused carbon dioxide to sink to the deep ocean, where it would be stored for a long time.

21. In response to a question regarding the proposed development of an "international ocean station", Ms. Waite noted that this initiative aimed to bring States together to share infrastructure and operate in a coordinated and collaborative manner, leading to a better return on investment and a truly global and integrated ocean observing system.

22. One delegation asked about challenges in the strengthening of capacity for ocean observing, especially in developing States. In response, Ms. Waite noted that the Global Ocean Observing System was committed to supporting capacity-building, including through its "Observing Together" programme, and that countries had an important role in supporting each other to build capacity at the national level. She further observed that educational products were essential for improving youth ocean literacy and that senior ocean scientists should be encouraged to mentor early-career ocean scientists. In response to a related question regarding the gaps in capacity to fully utilize open and freely available ocean observation data, Mr. King noted efforts

to make data collected under the Argo programme more accessible, including by diversifying the ways and formats in which such data and related products were delivered and by conducting educational programmes on access to and utilization of such data. He further noted that his institution was ready to assist interested States in building the capacity of their young scientists in this field.

23. A group of States expressed its concern about Mr. King's statement that funding was not secure for the Argo programme, calling for all who benefited from this programme to continue to support it. The group raised a question regarding the steps being taken by the Argo programme to diminish the environmental impact of its floats. While noting that the environmental impact of Argo floats was insignificant compared to other forms of marine pollution, Mr. King observed that extending the lifetimes of Argo floats, including by using a small amount of anti-fouling paint, was an effective way to reduce the programme's environmental impact, and that efforts had also been made to reduce some components, such as plastics, in the floats. He noted that the environmental cost of recovering floats at the end of their life cycle would outweigh the benefits at this time. Ms. Waite noted that new technologies and materials were being developed which would further improve the sustainability of Argo floats and other ocean observing tools.

24. A question was raised regarding the impact of ocean observation on national-level decision-making in relation to coastal erosion and sea-level rise. In response, Mr. Edwing offered an example of policymakers deciding to elevate a highway based on data relating to sea-level rise and high-tide flooding provided by the National Oceanic and Atmospheric Administration of the United States.

25. Responding to a question regarding the cooperation of the Technical University of Denmark with small island developing States, Mr. Anderson noted that the University had collaborated with those States on space information and establishing reference systems, including to support navigational safety. He further stressed the importance of bottom-up data collection approaches, including the collection of information from non-governmental organizations at the local level.

26. A question was asked about whether aspects of the Copernicus programme of the European Union could be replicated in other parts of the world through the sharing of knowledge and capacity-building. Mr. Anderson, recalling the evolution of the Copernicus programme and benefits it provided, expressed his support for related experiences being shared globally. A delegation noted that the Future of the Seas and Oceans Initiative of the Group of Seven was launched in 2016 to promote the joint implementation of similar programmes, which could be opened to more partners. A group of States highlighted that most information delivered by the Copernicus programme was freely available for any citizens or organizations to access, noting also the cooperation between the programme and several other countries and regions.

27. In response to a question regarding the financing of the Integrated Marine Observing System, Ms. Heupel noted that the system was founded in 2006 as a joint venture of the major marine research institutions of Australia, including seven principal and four associate partners. She further noted that besides the annual government budget of AUD 24 million, additional resources were provided by those partners and the private sector in order to cover its total cost of approximately AUD 60 million per year. In response to a further question on the experience of the System in using different tools to monitor shark populations, Ms. Heupel noted that genetic assessments were done in some cases to provide additional information that would supplement the comparison of movement data and mark-recapture analysis. She stressed that the use of all tools and methods available could facilitate a more holistic understanding of those populations.

28. One delegation queried the integration of traditional and indigenous knowledge into ocean observation programmes. Noting examples of challenges facing such integration, Ms. Waite underscored the importance of building dialogues based on mutual respect and involving diverse stakeholders in ocean observing programmes, including youth, traditional and indigenous knowledge holders and other local ocean users. Mr. Anderson noted the engagement of indigenous peoples in the work of the Arctic Council.

29. In response to a question on the meaning of "digital twin" of the ocean, Mr. Lericolais explained that it referred to a realistic model representing the ocean which would allow for more reliable predictions. He further noted that this model could only be produced with sufficient ocean data, but that data gaps existed in many areas and disciplines, particularly in the deep ocean. Reacting to a question regarding what more should be done beyond the adoption of the Darwin Core metadata standard, Mr. Ruhl noted that the Ocean Biodiversity Information System was implementing the standard, which would allow data from different sources to be more accessible and interoperable and would also allow for better modelling. Much more data was needed, however, to truly understand biodiversity and its changes over time, including in the context of the changing physics and chemistry of the ocean. He also stressed the importance of statistical power analysis and considering the needs of end-users in designing observation products.

30. One delegation observed that, very often, a lack of science prevented the taking of effective sustainability and conservation measures, noting however that, in the example presented by Ms. Baco-Taylor, solid scientific evidence was not taken up sufficiently in fisheries management, thus raising the question of how to improve the uptake of science in relevant processes. In response, Ms. Baco-Taylor noted that improving the representation of scientists in these processes and giving them some power to contribute to decision-making would help.

31. One delegation, noting that the sustainability of ocean observation programmes relied in part on funding from government budgets, asked which other sources of funding were generally pursued, what challenges existed in securing such funding and what Governments could do to help support such pursuits. In response, Ms. Speich noted that there was some funding from the private sector, but it was project-based and therefore not sustained in the long-term. She added that sustained funding should come from government sources, as was the case with atmospheric climate change research, and shared her view that the private sector, which benefited from ocean observation, should provide funding, in addition to philanthropic funding. Mr. Ruhl noted that oceanographers regularly accessed funding from government sources, industries using marine resources and interested philanthropies, and that the main challenges in this regard included the long time it would take to secure funding for specific purposes and the need to clarify the value of ocean observation programmes for industries and society.

32. Citing the First Global Integrated Marine Assessment, an observer delegation stated that the deep sea constituted the largest source of species and ecosystem diversity on earth, but that the widespread destruction of deep-water benthic communities owing to bottom trawling had presumably reduced their ecological and evolutionary resilience. The delegation added that, while there had been substantial progress in this area since the adoption of relevant General Assembly resolutions, bottom trawling was still taking place on a number of seamounts in the high seas, including the Emperor Seamount Chain studied by Ms. Baco-Taylor.

2. International cooperation and coordination in advancing ocean observing and addressing related challenges

Panel presentations

33. In the second segment, a Co-Chair of the Global Ocean Observing System Steering Committee and Senior Scientist at the GEOMAR Helmholtz Centre for Ocean Research Kiel, Toste Tanhua, gave a presentation on the experience of the EuroSea project on optimizing the ocean observing value chain, as well as challenges faced by the ocean observing community in relation to observing in areas under national jurisdiction. The Director General of Mercator Ocean International, Data Hub for the Global Environment Monitoring System for the Ocean and Coasts Programme, Pierre Bahurel, highlighted how the predictive ocean modelling of the Programme would build a responsive and inclusive value chain and evidence-based advocacy for observations and strengthen the science-policy interface. The Secretary-General of the International Hydrographic Organization, Mathias Jonas, gave a presentation on the Organization's General Bathymetric Chart of the Oceans programme, including its Seabed 2030 project, which aimed to complete a high-resolution bathymetric dataset of the ocean floor by 2030, as well as the Organization's work on hydrographic data standardization. A Senior Geologist of the Geological Survey of Norway Mareano Programme Group, Terje Thorsnes, examined potential applications of autonomous platforms to improve seabed observations, as well as the role of artificial intelligence in automatic classification of bathymetric data and underwater video footage. The Head of the Pacific Community Centre for Ocean Science, Jérôme Aucan, introduced Science Monitoring and Reliable Telecommunications (SMART) submarine cable technologies and their potential to consistently monitor critical ocean variables without affecting the functionality of the telecommunications cables into which they would be integrated. The Ambassador for Malta on Climate Change and Professor at the University of Malta, Simone Borg, outlined the role of ocean observing data as an evidence-based source of information for informing policy and highlighted challenges in bridging the science-policy interface, as well as lessons learned. A Physical Oceanographer at the Hydrographic Institute of Portugal, João Vitorino, explored the potential role of citizen science as a means to increase observation in coastal ocean environments, noting the need to develop miniaturized, low-cost sensors and strategies to engage with different communities, guarantee confidentiality and assure best practices and data quality control. The Team Leader of Ocean Management and Literacy at the Geoscience, Energy and Maritime Division of the Pacific Community, Molly Powers-Tora, described, in a pre-recorded presentation, the value of local ownership as a means to strengthen ocean observation capacity through community engagement and shared examples from the region, in which capacity-building and community engagement had helped strengthen predictions, communicate important messages and improve awareness of ocean changes and extreme events. The Government Accounts Director, Americas, of Fugro, David Millar, provided an overview of the role of the private sector in contributing to advancing ocean observation for a sustainable ocean-based economy, pointing out the current favourable environment for public-private partnerships, driven by factors including increased ocean awareness, private sector expertise, resources, activities and investment, and a focus on corporate sustainability and environment, social and corporate governance. An Oceanographer of the South African Environmental Observation Network and Professor at the University of Cape Town, Juliet Hermes, highlighted the importance of collaboration between scientific organizations in ocean observation, emphasizing the need for sharing data, knowledge, methodologies and infrastructure, as well as for co-design and meaningful capacity-building, and outstanding challenges. The Acting Director of the Global Ocean Observing System at IOC-UNESCO, Emma Heslop, provided an

overview of the work of the Global Ocean Observing System to deliver data for services in ocean health, climate, weather and hazard warnings and elaborated on the work of the System with stakeholders to co-design a fit-for-purpose system to address key gaps in an integrated manner and build on existing efforts and lessons learned. The Chair of IOC-UNESCO, Ariel Hernán Troisi, in a pre-recorded presentation, described how international cooperation for ocean observation had been enhanced through IOC-UNESCO in the context of the United Nations Decade of Ocean Science for Sustainable Development, laying out how the objectives of the Decade would be met through specific programmes and actions. A Team Leader of the Global Environment Monitoring System for the Ocean and Coasts Programme and Programme Management Officer at the United Nations Environment Programme, Joana Akrofi, shared the experience of the Global Environment Monitoring System for the Ocean and Coasts Programme in the co-design of a global environment monitoring system and described how it could help address three interlinked planetary crises – climate change, biodiversity loss and pollution – by providing open and easily accessible ocean and coastal transdisciplinary data, analysis and information. The Director of the Global Ocean Monitoring and Observing Program at the National Oceanic and Atmospheric Administration of the United States and Chair of the Observations Coordination Group of the Global Ocean Observing System, David Legler, gave a presentation on how ocean observing co-design was being implemented through the System, highlighting the potential benefits of and challenges to developing a successful co-design programme. Olga Sato, Professor of the Oceanographic Institute of the University of São Paulo, described how the All AtlaNtic Cooperation for Ocean Research and Innovation project, a cross-regional initiative aimed at creating a framework of cooperation in marine science data-sharing, could facilitate the development of better and more accurate monitoring, modelling, planning, management and prediction capacities in the whole Atlantic Ocean and proposed solutions for potential bottlenecks. The Research Director at the National Institute of Fisheries Research of Morocco and National Focal Point and Vice-Chair of IOC-UNESCO, Karim Hilmi, in a pre-recorded presentation, highlighted the efforts of Morocco in developing a national integrated ocean observing system, incorporating information and data from different areas and sources, including Argo floats and gliders, and underscored some of the potential uses of the data collected. A Senior Scientific Officer of the Flanders Marine Institute, Coordinator of the European Marine Observation and Data Network (EMODnet) Biology, and Node Co-Manager of the European Ocean Biodiversity Information System (EurOBIS), Joana Beja, presented the history and experience of EMODnet Biology in cooperating with other entities to create an open database of marine biodiversity data, whereby data could be collected once but utilized multiple times, and highlighted challenges related to the interoperability of data, particularly when working across disciplines.

Panel discussions

34. The discussions held after the presentations focused on challenges posed by the legal framework for marine scientific research under the Convention to the conduct of ocean observing; accessibility to data, including government-held data; certain technologies, including low-cost technologies, and their uses; public awareness of the importance of ocean observing; the role of the private sector; deep seabed mining; the role of ocean observing in monitoring management measures; capacity-building; competition between ocean observing systems; the need for integrated and standardized data; specific projects elaborated upon during the presentations; and the importance of promoting gender equality.

35. Responding to the view expressed by Mr. Tanhua that aspects of the marine scientific research regime under the Convention were incompatible with the

operational reality of sustained ocean observing, several delegations, including one group of States, stressed that the rights of coastal States under the Convention must be respected, including their rights to manage their maritime zones for conservation purposes and to have access to the data collected in such zones. In this regard, those delegations noted that some activities to collect samples and data were carried out under the guise of marine scientific research, but without complying with applicable obligations, and highlighted that certain ocean observing activities could generate data that were useful not only for combating climate change or biological observation, but also for economic or military purposes. The delegations expressed the view that challenges for ocean observing in the exclusive economic zone could be addressed by considering how the provisions of Convention could be implemented in the context of ocean observation. Acknowledging the need to form a coherent understanding at the international level regarding how novel means of ocean observing could be better managed, a delegation expressed the view that relevant discussions should focus on types of measurement, observation and equipment, rather than definitions of relevant terms. A question was also raised regarding what States could do to facilitate the conduct of ocean observing.

36. In response, Mr. Tanhua noted that he was not proposing to change the rules, but rather to adapt the application of rules. In that regard, he suggested that a process be devised to identify ocean variables that would be critical for combating climate change and saving lives for which the collection of data could be exempted from advance clearance, and that a process similar to the Argo notification scheme be developed for the Ship of Opportunity Programme or animal-borne sensors. He stressed that solutions would need to be negotiated among States, potentially under the auspices of IOC-UNESCO and the World Meteorological Organization (WMO). Drawing the attention of delegations to the outcome of a workshop on ocean observations in areas under national jurisdiction held in February 2020, he further emphasized the need to raise awareness of the importance of ocean observing and the need to rethink how ocean observing should be defined and regulated. He noted that it would facilitate ocean observing if States could establish similar procedures for marine scientific research clearance, following common standards and best practices. Mr. Tanhua also emphasized the importance of open access to data and reducing delivery times, drawing attention to the work of the Coordination Group of the Global Ocean Observing System in this respect.

37. In response to a question about the rationale for plans of Mercator Ocean International to become an intergovernmental organization at a time when public-private partnerships are an increasingly popular model for delivering ocean observation projects, Mr. Bahurel explained that his organization aimed to gain predictable long-term funding for its core services and infrastructure, as well as to achieve full alignment with the vision of States for whom it had a history of providing services.

38. One delegation noted that the Seabed 2030 project of the General Bathymetric Chart of the Oceans programme to map the ocean floor at 100 metre pixel resolution would still miss potentially necessary details and that technological developments to achieve submetre accuracy were required. Another delegation raised concerns that States might not be willing to share potentially sensitive bathymetric information, in particular in areas where maritime delimitations with neighbouring States were pending. In response, Mr. Jonas noted that globally only 20 per cent of the ocean depths were mapped with 100 metre accuracy and that half of the waters shallower than 200 metres remained completely unsurveyed. In this context, he considered that the goal of the programme was realistic, even if achieving full coverage would be a challenge. He observed that the area that was the least surveyed was in the Southern Ocean, owing to its remoteness and harsh conditions.

39. An observer delegation called for greater civil society engagement in ensuring an effective science-policy interface and queried whether it would be possible to improve access to data for non-specialists, potentially facilitated through the development of a user-friendly “metaportal”. Mr. Jonas acknowledged that databases were complex, but that they needed to be targeted to an identified audience. He also noted that data standardization was an important tool for easier data transmission and useability by diverse users. He explained that, while the International Hydrographic Organization worked with many stakeholders to create standards for hydrographic data in their domains, other oceanographic data did not yet have such standards. Mr. Bahurel observed that the provision of metadata was an important aspect of ensuring that data is fully understandable.

40. In response to a question regarding the possible impact that higher-quality bathymetric information from autonomous platforms could have on processes before the Commission on the Limits of the Continental Shelf, Mr. Thorsnes noted that autonomous underwater platforms provided higher resolution information than shipborne devices. He observed, however, that it was up to States to utilize the most appropriate technologies for their needs.

41. An observer delegation informed the meeting of distributed acoustic sensing, a technology that used the actual telecommunication fibres as sensing devices, in contrast to SMART cables, which focused on modifying the repeaters used as part of submarine cables to amplify the signal. Mr. Aucan noted that this technology was not within the remit of the Joint Task Force established by the International Telecommunication Union, WMO and IOC-UNESCO to consider SMART cables, and that, although promising, it had limitations. It was also noted that there were unresolved legal and regulatory issues with respect to the use of submarine cables as sensing devices, and, in this regard, Mr. Aucan noted that current project proposals were mainly within the maritime zones of coastal States where there was more clarity on such issues.

42. In response to a question on how to raise the awareness of the general public regarding the importance of ocean observation, including that of non-coastal residents and those from landlocked countries, Ms. Borg explained that a behavioural change would be required for people to appreciate the value of ocean observing, which could be encouraged by outreach at all levels of society, including through early education. She highlighted the importance of working closely with the media in all their forms and employing other major pathways for outreach, ensuring that the message conveyed was scientifically accurate but also sufficiently simple to understand. Mr. Vitorino added that public interest could be captured by remarkable natural phenomena, such as, for example, large swells off the coast of Portugal being used by surfers, and described how this could provide a catalyst for educational outreach to promote understanding of coastal processes to local communities and beyond.

43. One delegation, noting that the panellists had stressed the importance of developing systems that would be accessible and available at a low cost, particularly in areas where there were no existing ocean observation systems, recalled that low-cost observation tools did exist, citing the example of the Partnership for Observation of the Global Ocean, which was developing open-mode programmes that would be easily accessible to many countries. The delegation added that, in terms of participatory sciences, there should be standards in place such that acquired data might be controlled before being placed in the public domain.

44. In response to a question on the compliance of citizen science with the requirements of the Convention relating to marine scientific research, Mr. Vitorino highlighted the importance of engaging local communities and noted the possibility of producing guides for best practices to ensure consistent strategies across countries.

He noted the importance of guaranteeing the broad involvement of communities while meeting data quality standards. Ms. Borg added that citizen science should, like other research, be conducted in compliance with the national legislation of relevant coastal States relating to marine scientific research.

45. In response to a question regarding measures to regulate intervention by the private sector in the field of ocean observing, means to incentivize the private sector and the maintenance of social responsibility standards, Ms. Borg suggested that policymakers should engage with different stakeholders and build the necessary environment and/or frameworks such that the private sector, when pursuing a given area of ocean observation, might also provide funding in other areas. She recommended that this be done creatively in a cross-sectoral manner to enable the private sector to sponsor ocean observing with a broader scope than solely for its own interest. She highlighted that this could be perceived as a part of corporate social responsibility or environmental, social and governance standards.

46. Ms. Speich shared her view that the private sector should not be exclusively relied upon for the observation activities necessary for risk management in the national interest, such as those needed for weather forecasting, adaption to climate change and extreme weather, and food security. She noted that such observation would need to be sustainable, continuous, of a high quality, open and accessible, which were requirements that could be met only with national funding. She further expressed the view that funding from the private sector and philanthropies might instead be used to fund pilot or research projects. Ms. Heslop noted that different economic models could be employed in terms of funding, highlighting, for example, that in Australia and Brazil the private sector invested in observations that were also useful for other stakeholders. She further explained that key stakeholders reliant on data from ocean observing systems could play a role in strongly advocating for their respective Governments to provide sustained support for those systems.

47. Some delegations expressed their concerns that seabed mining in the Area could begin without a legal regime in place or environmental standards being met. An observer delegation expressed its view that deep seabed mining could not be sustainable. In response, Mr. Millar noted that Fugro centred its activities around ocean stewardship and ocean observations as necessary tools to fully assess the potential impacts of any seabed mining activities. He further clarified that Fugro had not been involved in any extractive activities to date.

48. In response to a question on whether the approach to data-sharing was changing and how to make the commercial data collected and held by maritime industries more accessible, Mr. Millar agreed that approaches to data-sharing were indeed changing, with the private sector becoming increasingly willing to share data collected on behalf of clients in the light of environmental, social and governance factors and corporate responsibility. He noted that an Ocean Decade Corporate Data Group had been established by IOC-UNESCO within the context of the United Nations Decade of Ocean Science for Sustainable Development to focus specifically on increasing public sector access to private sector data through the development of equitable frameworks and mechanisms. He further noted the remaining challenges, including where national legislation prevented private sector data from being shared. Ms. Heslop added that it would be crucial to have a dialogue with the private sector on data-sharing, which would require building trust over time. She further noted the increasing awareness of the role of the private sector in addressing the role of oceans and the climate and sustainability issues and the growing interest of the private sector in business models that would generate profit while supporting societal informational needs. She also mentioned the WMO unified data policy, which required States to share certain data sets, such as marine data, that would reach beyond the global meteorological community.

49. One delegation pointed out that there was little information on the seabed in areas beyond national jurisdiction, including in relation to mining practices, and that even greater gaps existed for the biological and ecological aspects of ocean observation. The delegation enquired about ways of strengthening ocean observing to gain a clearer picture of the state of ecosystems in areas beyond national jurisdiction, particularly vis-à-vis the ocean floor. Ms. Heslop responded that there were gaps in the ability to connect biological or ecological observations with coastal observations and noted the need to shift to more sustained coastal observations. She observed that the Global Ocean Observing System co-design project that she had mentioned could assist by connecting with local stakeholders to determine what was being sought from bioecological observations and what kind of observations were needed at the regional and global levels.

50. Mr. Tanhua highlighted the importance of ocean data in assessing pollution and biodiversity, particularly in regional, coastal and transboundary contexts, but noted that national observations were sometimes closed in nature. He queried, in this respect, whether there was a strategy under the Global Environment Monitoring System for the Ocean and Coasts Programme to encourage data exchange between countries, or whether similar experience had been gained under other programmes of the System. Ms. Akrofi remarked, in response, that the exchange of data would be challenging, and partnership and collaboration by all partners would be key. She noted that the Water Programme of the System was more focused on housing data already provided by Governments.

51. One delegation similarly remarked that for effective ocean observation to be realized, transparent participation by States would be key, and queried how to overcome the challenge of certain States not wishing to make government-held ocean data collected within their national jurisdiction freely available. Ms. Akrofi emphasized the need for a bottom-up approach and for action to be taken at the local and regional levels in addressing such challenges. She noted that issues were usually localized and could be more easily discussed at that level.

52. One group of States, highlighting the importance of ocean observation for science-based decision-making for ocean management and the achievement of Sustainable Development Goal 14, queried how ocean observation could be helpful in monitoring the effectiveness of measures taken to tackle major crises, such as climate change, biodiversity loss, marine pollution and illegal, unreported and unregulated fishing. Mr. Legler remarked, in this respect, that marine ecosystem observations were being used to address questions regarding the location of fisheries and changes in response to environmental factors due to climate change, including with respect to species distribution. He noted that fundamental questions remained regarding the causes of such changes, with monitoring of fisheries presence and abundance limited and understanding of how to track biodiversity at a nascent stage. He indicated that new tools and capabilities such as eDNA were available, but many challenges existed in learning how to use those systems, as well as how to process and interpret samples. This was compounded, he noted, by the lack of an adequate workforce to address those challenges at the necessary scale. Ms. Beja noted that one of the main objectives of EMODnet was to ensure that ocean data was accessible to all kinds of users, such as policymakers, citizens, non-governmental organizations and the private sector, including by capturing and publishing monitoring data from States. Ms. Heslop indicated that certain observations made for the purposes of monitoring might not be sufficiently connected with the global observation networks, but efforts were being made to improve such connections, including in the context of the Decade.

53. The group of States followed up by observing that there was a move toward more holistic ecosystem-based management, which required the collection and

compilation of significant amounts of data in order to adopt dynamic measures in the light of changes, including those due to climate change. In response to the delegation's question regarding what sort of planning would be needed in this regard, Mr. Legler noted the learning opportunities provided by the increase in dialogue between the ocean observing community and those establishing ecosystem-based management approaches. Mr. Tanhua noted that the ocean observing community was facing many requests relating to support for climate change adaptation and mitigation, and shared his views on what could usefully be done with respect to adapting observing systems to enable assessment of the effectiveness of relevant adaptation and mitigation measures. Ms. Heupel stressed the need to integrate ocean observation data and data relating to species and biodiversity, as well as the need for adaptive management on a reasonable timescale based on available data.

54. In response to one delegation highlighting gaps in their capacity to collect and interpret data and querying whether the Global Environment Monitoring System for the Ocean and Coasts Programme envisaged providing financial and capacity-building support, Ms. Akrofi acknowledged the need for capacity-building, particularly in areas where structures such as EMODnet were not in place. She highlighted the need for data to be brought down to the level of particular uses and noted work being undertaken to encourage collaboration and create feedback loops with data holders. She further noted that the Programme did not itself have funding available, but that donor support for urgent priorities could be sought.

55. In response to a question regarding whether there would be competition between different systems, such as between the Global Ocean Observing System and the Global Environment Monitoring System for the Ocean and Coasts Programme, Ms. Akrofi indicated that the approach was focused on partnership involving many stakeholders and collaboration rather than competition.

56. One delegation posed a question regarding the steps that had been taken to address the need for standardization of data in the Atlantic region, bottlenecks in achieving such standardization and suggestions for action at the multilateral level. In response, Ms. Sato pointed out that in the Atlantic region, agencies and data centres were already following standards and protocols for data management, with large and small variations. She noted that the development of common standards for data and metadata, such as in relation to measurement units, georeferencing and temporal features, facilitated data transferability, and noted ongoing work with other projects in this respect. Mr. Legler added that communities of practice existed within IOC-UNESCO and the Global Ocean Observing System that were charged with developing standards and best practices for data, with significant international participation, and that the standards and other resources were available, including on the Ocean Best Practices System website, through the International Oceanographic Data and Information Exchange and through the Global Ocean Observing System directly. Ms. Beja noted that data-sharing and interoperability of the European marine biodiversity data in the Ocean Biodiversity Information System was enhanced through the use of a common data standard. She noted the difficulties faced by some countries in publishing data and the technical support provided, but highlighted that greater support was needed.

57. A delegation noted that where there was a high volume of high-quality data, such as in relation to certain fisheries, it would be important to make full use of, and integrate, existing datasets as both an economic and environmental opportunity.

58. Mr. Bahurel, noting the interconnections among the economy, the environment and society and the critical role of ocean observation, as well as the possible contributions of initiatives such as the "digital twin" of the ocean, to integrating and sharing information, asked about the experience of EMODnet in integrating data from

different disciplines. In response, Ms. Beja noted that centralizing and creating interoperability between data across disciplines was a challenge and that the "digital twin" of the ocean initiative could prompt important developments and opportunities.

59. In response to a comment on the importance of promoting gender equality in ocean-related sectors, including women's participation in marine science, general support was expressed for the view that women must receive equal recognition and access to opportunities for participation and leadership as men, and that it was also important to build capacity and provide access to education for girls and women in parts of the world where that was lacking. A delegation also called for strategies to ensure the retention of women within marine science.

60. One delegation expressed concern regarding a map included in one of the presentations, noting the need to ensure that all presentations utilized official maps recognized by the United Nations.

Agenda item 4
Inter-agency cooperation and coordination

61. The Under-Secretary-General for Legal Affairs and United Nations Legal Counsel delivered a statement in his capacity as focal point of UN-Oceans informing delegations of the activities of UN-Oceans since the twenty-first meeting of the Informal Consultative Process, including in relation to the topic of focus.

62. He noted the ongoing collaboration among UN-Oceans members in the implementation of the 2030 Agenda for Sustainable Development, in particular relating to Sustainable Development Goal 14. He highlighted the active involvement of UN-Oceans and its members in the preparations for the United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development, to be held in 2022, including in the drafting of concept papers for the interactive dialogues to be held during the Conference and the organization of a high-level side event to be hosted by UN-Oceans, as well as additional side events organized by UN-Oceans members individually or in collaboration with other members. UN-Oceans members also continued to collaborate with IOC-UNESCO in the implementation of the United Nations Decade of Ocean Science for Sustainable Development, including through the Advisory Board of the Decade. UN-Oceans members had further drawn attention to the ocean-climate nexus during a side event hosted in the margins of the twenty-sixth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, which was held in Glasgow. He noted that UN-Oceans members would also be involved in the marking of the fortieth anniversary of the adoption and opening for signature of the Convention, including by contributing to a publication to celebrate the occasion.

63. Several delegations, including one group of States, emphasized the importance of international cooperation and collaboration on ocean issues and thanked the focal point and UN-Oceans for their continued commitment to the ocean. Several delegations, including one group of States, emphasized the importance of collaboration for the achievement of the Sustainable Development Goals, in particular Goal 14, and expressed regret that many of the targets that matured in 2020 had not been achieved. They expressed the hope that the Conference to be held in 2022 would mark a turning point for the ocean, with one delegation calling for a "summer of ocean action" amidst the "super-year for the ocean".

64. The focal point echoed the sense of urgency regarding the need to achieve the targets of Goal 14, while observing that the Goal was receiving the least amount of financing of all of the Goals. He expressed the hope that the 2022 Conference would create the momentum for the ocean that it deserved.

Agenda item 5
Process for the selection of topics and panellists so as to facilitate the work of the General Assembly

65. Referring to paragraph 352 of General Assembly resolution 73/124, the Co-Chairs invited views and proposals on ways to devise a transparent, objective and inclusive process for the selection of topics and panellists so as to facilitate the work of the Assembly during informal consultations concerning the annual resolution on oceans and the law of the sea.

66. A group of States expressed concern regarding the limited participation of delegations of States in the Informal Consultative Process, recalling consistent calls to strengthen the science-policy interface, an opportunity which the Process provided, and called for the identification of causes and solutions, noting that there was greater participation in the hybrid sessions of the twenty-first meeting. A delegation noted the budgetary difficulties surrounding the organization of hybrid sessions, while stressing the need to ensure the inclusion of the scientific and technical community. The Secretariat was requested to explore technical options in this respect.

Agenda item 6
Issues that could benefit from attention in the future work of the General Assembly on oceans and the law of the sea

67. The Co-Chairs drew attention to a composite streamlined list of issues that could benefit from the attention of the General Assembly and invited comments from representatives.

68. The Co-Chairs also invited representatives to submit additional topics.

69. No suggestions were made for additional topics; however, a group of States noted that it was still considering the matter.