



United Nations  
Educational, Scientific and  
Cultural Organization



Intergovernmental  
Oceanographic  
Commission

Workshop Report No. 288

# **Workshop on data sharing between UN agencies as a contribution to the UN decade of ocean science for sustainable development**

Online meeting, 20 April 2020, 14:00-17:15 CET

UNESCO 2020

IOC Workshop Report No. 288  
Oostende, 4 May 2020  
English only



(25 of the 44 participants)

For bibliographic purposes this document should be cited as follows:

Workshop on data sharing between UN agencies as a contribution to the UN decade of ocean science for sustainable development, Online meeting, 20 April 2020. Paris, UNESCO, 40 pp. 2020. (IOC Workshop Report No. 288) (English)

## Table of Contents

1.	INTRODUCTION .....	1
2.	INTRODUCTION OF PARTICIPANTS .....	2
3.	UN DECADE OF OCEAN SCIENCE FOR SUSTAINABLE DEVELOPMENT ..	2
3.1	General .....	2
3.2	Data chapter .....	4
4.	OCEAN DATA AND INFORMATION SERVICES OF THE UN PARTNERS .....	5
4.1	Food and Agriculture Organization of the United Nations (FAO) .....	6
4.2	Intergovernmental Oceanographic Commission of UNESCO (IOC) .....	9
4.3	International Seabed Authority (ISA) .....	11
4.4	United Nations Development Programme (UNDP).....	13
4.5	United Nations Environment Programme, Environment for Development (UNEP) .....	14
4.6	United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) .....	15
4.7	United Nations Framework Convention on Climate Change (UNFCCC) Secretariat .....	16
4.8	United Nations (UN Statistics) .....	18
4.9	UNEP World Conservation Monitoring Centre (WCMC).....	18
4.10	World Meteorological Organization (WMO).....	21
5.	ODISCat, ODIS and OCEAN INFOHUB .....	23
5.1	Ocean InfoHub.....	23
5.2	ODISCat .....	25
5.3	IOC Ocean Data and Information System (ODIS) .....	26
6.	Inter-sessional working group to propose a strategy on ocean data and information stewardship for the UN Ocean Decade (IWG-SODIS).....	30
7.	DISCUSSIONS AND NEXT STEPS .....	32
8.	CLOSING OF THE MEETING .....	35

ANNEX I: [LIST OF PARTICIPANTS](#)



# 1. INTRODUCTION



The workshop was opened by Dr Vladimir Ryabinin, IOC Executive Secretary who briefly welcomed the participants. He stressed that the UN Decade of Ocean Science for Sustainable Development will provide a “once in a lifetime” opportunity for nations to work together to generate the global Ocean Science needed to support the sustainable development of our shared ocean. Scientifically underpinned ocean data and information will be key to delivery of the outcomes expected from this ambitious undertaking.



Mr Ariel Troisi, IOC Chair then addressed the workshop. He welcomed the participants and briefly explained the objectives of the meeting. He recalled that it was originally planned to have the meeting at the IOC Project Office for IODE, Oostende, Belgium on 20-21 April 2020 but that the Covid19 pandemic had forced us to have the meeting as a short online event instead. He explained that the UN Decade of Ocean Science for Sustainable Development that will start in 2021 is the driving force behind this meeting as reaching the goals of the Decade will require collaboration across the wide spectrum of UN agencies, other IGOs, NGOs and private sector which, as a whole, manage a huge body of ocean knowledge but which today is fragmented and scattered. This meeting would be a first step towards discovering and, hopefully, establish mechanism to sharing this body of knowledge. He further explained that in addition to this meeting of UN agencies a second meeting was planned bringing together other IGOs, NGOs and private sector so ultimately we will have established a global partnership of stakeholders in ocean related data and information.



Mr Peter Pissierssens, Head of the IOC Project Office for IODE and IOC Capacity Development coordinator then informed the participants that the provisional agenda, documents and list of participants are available online on <https://www.iode.org/undata1>. He invited participants to let the Secretariat know if they preferred not to share their PPT beyond the duration of the meeting. He further informed the participants that the meeting would be recorded and that the recording would be made available online.

## 2. INTRODUCTION OF PARTICIPANTS

Mr Peter Pissierssens, Head of the IOC Project Office for IODE in Oostende, Belgium and IOC Capacity Development coordinator invited online participants to briefly introduce themselves. The list of participants is available in [Annex I](#).

He recalled that this workshop had been planned as a face-to-face meeting on 20 and 21 April 2020 but that the Covid19 pandemic had forced us to implement the workshop as an online event of 2 ½ hours.

He noted that because this severe shortening, time for presentations had to be limited and some discussions would probably need to be held after the meeting by email or additional online meetings in the near future. He further thanked participants in the various time zones for making themselves available.

## 3. UN DECADE OF OCEAN SCIENCE FOR SUSTAINABLE DEVELOPMENT

### 3.1 General

This agenda item was introduced by Mr Ariel Troisi and Ms Alison Clausen. The PowerPoint Presentation is available [online](#).



Mr Ariel Troisi and Ms Alison Clausen briefly explained the objectives of the UN Decade of Ocean Science for Sustainable Development. He explained that several global frameworks will directly benefit from the Decade such as Agenda 2030, Climate, SIDS, Disaster Risk and Reduction, UN General Assembly and Law of the Sea as well as a future international agreement on biodiversity beyond national jurisdiction (BBNJ).

On 5 December 2017, the United Nations declared that a Decade of Ocean Science for Sustainable Development would be held from 2021 to 2030. This Decade will provide a common framework to ensure that ocean science can fully support countries to achieve the 2030 Agenda for Sustainable Development. The Decade will provide a 'once in a lifetime' opportunity to create a new foundation, across the science-policy interface, to strengthen the management of our oceans and coasts for the benefit of humanity. The Decade will strengthen the international cooperation needed to develop the scientific research and innovative technologies that can connect ocean science with the needs of society serving, at the same time, several major frameworks and processes. The Decade will require the engagement of many different stakeholders to

create new ideas, solutions, partnerships and applications, these include: scientists, governments, academics, policy makers, business, industry and civil society. The Intergovernmental Oceanographic Commission (IOC) of UNESCO has been tasked by the UN General Assembly to work with all interested stakeholders in the preparation of the Decade.

The vision of the Decade is the 'science we need for the ocean we want' and it will mobilise resources and technological innovation in ocean science needed to deliver key outcomes:

1. A clean ocean where sources of pollution are identified and removed
2. A safe ocean where people are protected from ocean hazards
3. A healthy and resilient ocean where marine ecosystems are mapped and protected
4. A sustainably harvested and productive ocean ensuring the provision of food supply
5. A predictable ocean where society has the capacity to understand current and future ocean conditions
6. A transparent ocean with open access to data, information and technologies

They explained that this meeting would focus on outcome 6 "A transparent ocean with open access to data, information and technologies" – although the issue of data management underpins all the Decade outcomes.

They noted that a draft Implementation Plan for the Decade has been prepared and that data management was a priority issue raised by stakeholders during the consultations around the Plan. The draft Implementation Plan is not prescriptive in terms of its approach to data management but instead lists the following principles:

1. Data access, management and use as one of top priorities of the Decade.
2. By the end of the Decade a common operating system for ocean data developed and operational.
3. Build national & regional capacity and develop data platforms and centres with a focus on SIDS and LDCs.
4. Inventory of existing and potential data platforms and technologies.
5. Develop artificial intelligence, big data, disruptive technologies and other tools.
6. Capture local and indigenous knowledge.
7. Systems and data meet end-users needs and assess impacts on societal outcomes.
8. Promote UN Platform and international policy on data management.

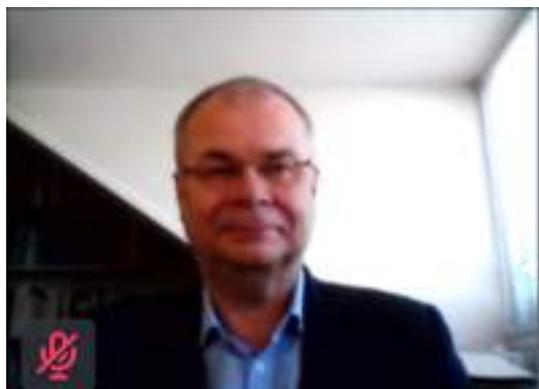
The draft Implementation Plan for the Decade has 3 elements: (i) setting the scene; (ii) decade action framework and (iii) mechanics of implementation, and is currently undergoing peer review. The future key milestones are shown in Figure 1.



Figure 1: key milestones and 2020 planning

A brochure entitled “The Science We Need for the Ocean We Want” is available from [https://www.oceandecade.org/assets/The\\_Science\\_We\\_Need\\_For\\_The\\_Ocean\\_We\\_Want.pdf](https://www.oceandecade.org/assets/The_Science_We_Need_For_The_Ocean_We_Want.pdf)

### 3.2 Data chapter



This agenda item was introduced by Mr Taco de Bruin, IODE Co-Chair. The PowerPoint Presentation is available [online](#)

This agenda item was introduced by Mr Taco de Bruin, IODE Co-Chair. The PowerPoint presentation is available [online](#)

Mr de Bruin, IODE Co-Chair, started by pointing out that the UN Ocean Decade (and thus the building of the data framework for the Decade) is a truly global enterprise, involving all nations and all of humankind.

He recalled that the draft Implementation Plan defines “The vision for data, information, and knowledge management during the Decade is that the ocean community will:

**collectively co-design and construct a shared multidisciplinary digital representation of the ocean’s socio-environmental system, viewable from multiple perspectives and**

*through multiple interfaces*

**tailored to stakeholder needs and capacities, i.e. ‘a digital twin of the ocean’.**

He emphasized that this will need to be a joint effort, inclusive, cross-disciplinary and aimed at full range of users and uses.

Regarding the “joint effort” he noted that this would need to involve UN Oceans organisations, non-UN IGOs, NGOs and private sector, global and regional observation and data networks, projects and programmes, fisheries management, socio-economic systems, marine spatial planning and management, and a long list of hundreds of systems and networks. These would need to be interoperable components of a “global commons” and should include local and traditional knowledge as well as span all relevant disciplines from natural sciences to social sciences and economics. The basic need for data, information and systems within the UN Decade framework would be based on the FAIR principles: Findable, Accessible, Interoperable and Re-usable. The data framework would need to be adaptive and flexible to user needs and to developing technical capabilities.

Mr de Bruin noted that many excellent data and information systems already exist and are operational, both within and outside the various UN organisations, but these are not linked or interoperable and therefore, from a user perspective not always (re-)usable. Fortunately, building upon these existing and excellent data systems and making use of the currently developed building blocks, such as ODISCat (the catalogue of data, information, products and services), OBPS (Ocean Best Practices System), OIH (Ocean InfoHub project) and ODIS (IOC Ocean Data and Information System), it will be possible to jointly, and in close cooperation, develop the UN Decade data framework.

He concluded by saying that the UN Ocean Decade offers all of us a ‘once in a lifetime opportunity’ to build the ‘data ecosystem’ suited to our needs and to the needs of the UN Ocean Decade.

## **4. OCEAN DATA AND INFORMATION SERVICES OF THE UN PARTNERS**

In preparation for the meeting all agencies were invited to enter descriptions of their online ocean related data/information products and services into the ODISCat (<http://catalogue.odis.org>) catalogue of sources. Under this agenda item the UN agencies were invited to provide a brief overview of their ocean related data and information activities and to report on the records entered into ODISCat. It is noted that agencies may host their own organizational products/services (eg bibliographic database, numerical databases, etc) or they may coordinate a network of

products/services hosted by their member states.

#### 4.1 Food and Agriculture Organization of the United Nations (FAO)



This agenda item was introduced by Mr Marc Taconet, Chief, FAO Fishery statistics and information Branch, FAO.

He informed the meeting that the presentation was authored by himself with contributions from FIAS colleagues Aureliano Gentile, Anton Ellenbroek and Kiran Viparthy.

The PowerPoint Presentation is available [online](#).

Mr Taconet noted the relevance of the workshop and of the ODISCat initiative to FAO: he highlighted the importance of the fishery and aquaculture sectors to the Ocean. Data sharing is a key issues for cross-sectoral analysis in e.g. BBNJ: area-based management, RFMO role, environmental impact assessments, marine genetic resources and capacity building. Further he informed the meeting that FAO/Fisheries has very significant information system assets and extensive information sharing between Regional Fishery Bodies (RFB). FAO has also extensive collaboration experience with other international organizations on system interoperability (e.g. iMarine – see <http://www.i-marine.eu/Pages/Home.aspx> ), and the “[Global Atlas of AIS-based fishing activity](#)” is another example of collaboration on new information technologies. Finally the ODISCat comes in a timely fashion as FAO is now engaged in the “**Hand-in-Hand**” initiative which was introduced:

“**Hand-in-Hand**” is an evidence-based, country-led and country-owned initiative of the Food and Agriculture Organization of the United Nations (FAO) to accelerate agricultural transformation and sustainable rural development to eradicate poverty (SDG 1) and end hunger and all forms of malnutrition (SDG2). In doing so, it contributes to the attainment of all the other Sustainable Development Goals. The Initiative prioritizes countries where national capacities and international support are most limited or where operational challenges, including natural- or man-made crises, are greatest. This is in keeping with the UN’s priority commitment to “leave no one behind.”. The Initiative uses the most sophisticated tools available, including advanced geo-spatial modeling and analytics, to identify the biggest opportunities to raise the incomes and reduce the inequities and vulnerabilities of the rural populations, who constitute the vast majority of the world’s poor. It also uses these tools to improve targeting and tailoring of policy interventions, innovation, finance and investment, and institutional reform. At the same time, the Initiative adopts a market-oriented food systems approach to increase the quantity, quality, diversity and accessibility of

nutritious foods available in local, regional and national food markets and to improve food system capacities to deliver nutrition and healthy diets for everyone. The initiative focuses on the well-recognized, but under-supported potential of agriculture and agri-food value chains to lift large numbers of the rural poor out of poverty. And it ensures that UN norms and standards are fully reflected in policies that advance all three pillars — economic, social and environmental pillars — of sustainable development. To this end, the Initiative promotes the sustainable use of biodiversity, natural resources and ecosystem services, and supports climate change adaptation, mitigation and resilience. It provides data and analysis to evaluate interactions and tradeoffs among objectives and actions, helping to pinpoint key bottlenecks and focus policy dialogue.

With a robust monitoring and evaluation framework, the initiative aims to deliver a first set of benchmark results by 2023. (see also <http://www.fao.org/news/story/en/item/1235059/icode/> )

Mr Taconet then informed the meeting that FAO/Fisheries has very significant information system assets and extensive information sharing between Regional Fishery Bodies (RFB). FAO has extensive collaboration experience with other international organizations on system interoperability (e.g. iMarine – see <http://www.imarine.eu/Pages/Home.aspx> ). The “[Global Atlas of AIS-based fishing activity](#)” is another example of collaboration on new information technologies.

Mr Taconet then introduced the FAO “Fisheries and aquaculture Knowledge base” and how it **informs the environmental, economic, and social pillars of the SDGs**

- 12 databases of **classifications** or **glossaries**
- 13 global and regional **statistics** databases
- 34 databases of **records** and fact sheets
- 8 **geospatial** databases
- 68 thematic **websites**
- 20 **software** or special interfaces and mobile apps
- repository of 15 200 **publications** and meeting reports

The conceptual diagram is shown in Figure 2.

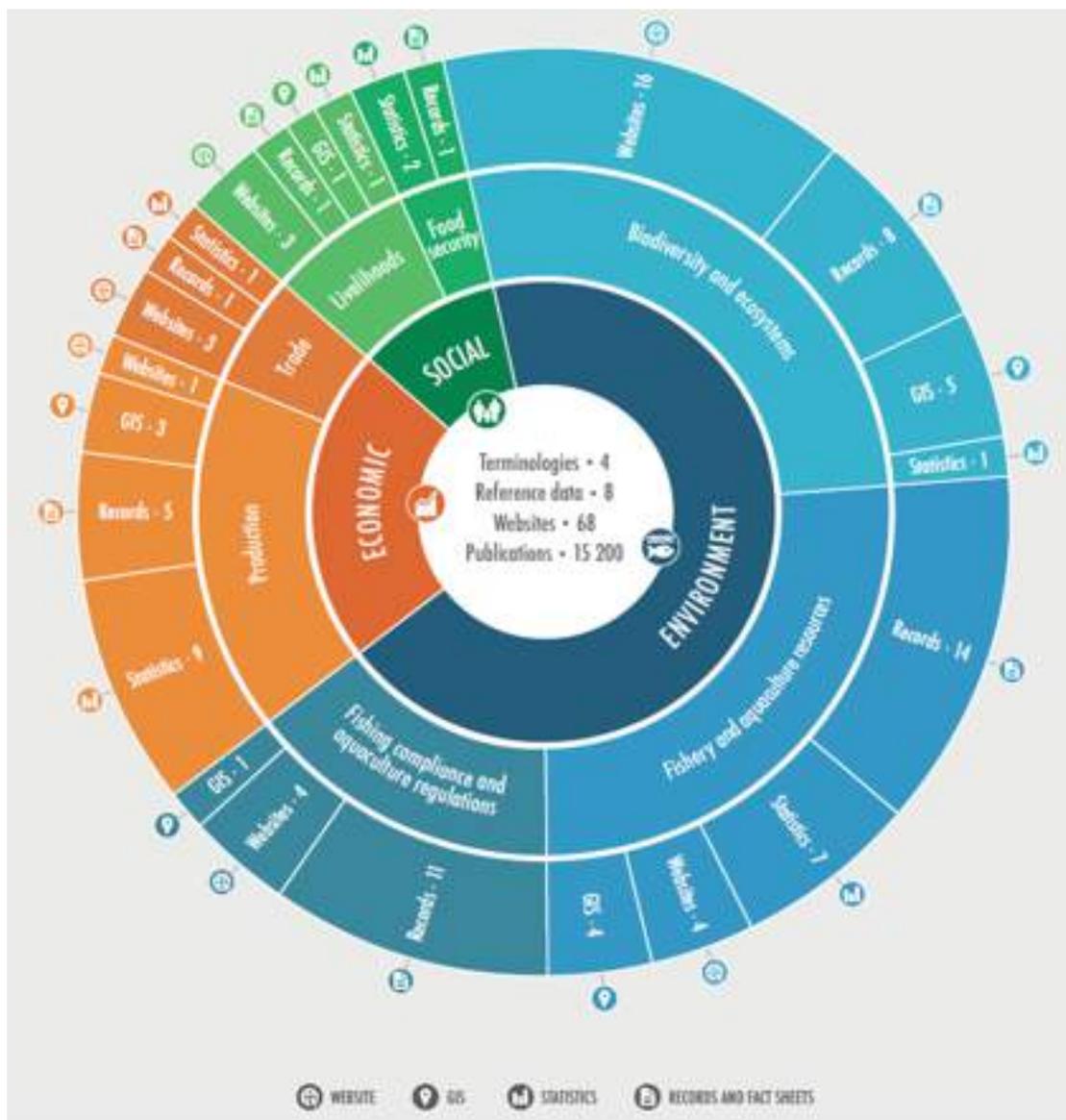


Figure 2: FAO fisheries and aquaculture Knowledge base

Mr Taconet informed the meeting that FAO's data systems are mostly global in scope and coverage, and FAO owns directly most of them but in some cases also plays the role of custodian organization on behalf of countries or Regional Fishery Bodies (RFBs). Countries are direct sources for 11 statistical data sets, 3 vessel records data sets and for bibliographic records and terminologies (through the ASFA – Aquatic Sciences and Fisheries Abstracts partnership – see <http://www.fao.org/fishery/asfa/en>). Countries are indirect sources, through RFBs) for 2 statistical data sets and “Stocks and fisheries inventories”.

Mr Taconet reported that FAO has submitted 105 records for inclusion in ODISCat:

- >45 Data catalogues, Data systems/portals
- 15 Code lists and vocabularies systems
- 11 maps and atlases

- 10 software
- 9 bibliographic infobases
- 7 information on vessels
- 5 education and training material
- 2 standards, best practices
- 2 data products
- 1 information on experts and organizations
- 1 information on projects
- 1 multimedia content

Regarding the further development of ODISCat Mr Taconet recommended:

- (i) addressing how to handle granularity issues of ODISCat content, in particular regarding websites>data systems/portals/data catalogues;
- (ii) revising “themes” (he recommended using a standard such as the “International Aid Transparency Initiative (IATI) standard (<http://www.fao.org/economic/ess/ess-events/tag-piccolo/en/>) and <https://iatistandard.org/en/>);
- (iii) revising “types”: better definitions are needed to distinguish e.g. data catalogues, data systems. He recommended adding “data services” (for APIs), possible “web sites” as a type;
- (iv) revising “sea regions”: consider mapping with other geo-classifications;
- (v) for “data policies”: shouldn’t we promote the mention of the Terms of Use / any CC licenses;
- (vi) “metadata standards”: can we add to the list / refer other standards;
- (vii) “Machine to machine interaction technologies”: how to we engage into interoperability.

## 4.2 Intergovernmental Oceanographic Commission of UNESCO (IOC)



This agenda item was introduced by Dr Sergey Belov, IODE Co-Chair. The PowerPoint Presentation is available [online](#).

Dr Belov noted that UNESCO’s Intergovernmental Oceanographic Commission (IOC) promotes international cooperation and coordinates programmes in marine research, services, observation systems, hazard mitigation, and capacity development in order to understand and effectively manage the resources of the ocean and coastal areas. Dr Belov explained that IOC coordinates the Global Ocean Observing System (GOOS) which is a system of multiple in-situ ocean observing systems such as profiling

floats (Argo), data buoys (DBCP), Timeseries (OceanSITES), Ship based Measurements (SOT), Repeated Hydrography (GO-SHIP), Sea level (GLOSS). GOOS is a collaborative initiative co-sponsored by IOC, WMO, UNEP and ISC. WMO and IOC supporting JCOMM Observations Programme Support centre (JCOMMOPS) responsible for the support the implementation of an integrated framework for the ocean observing networks. The JCOMMOPS provides integrated information, maps and tools to help coordinate and monitor the global ocean observation efforts.

Secondly, IOC coordinates and implements the IOC's International Oceanographic Data and Information (IODE) programme, established in 1961 to "to enhance marine research, exploitation and development, by facilitating the exchange of oceanographic data and information between participating Member States, and by meeting the needs of users for data and information products". The IODE system now includes a network of over 100 IODE National Oceanographic Data Centres (NODCs), IODE Associate Data Units (ADUs) and IODE Associate Information Units. While most NODCs and ADUs manage and host their own national data bases (and provide online services) the IODE programme has also developed a number of global products such as:

- [World Ocean Database](#) (WOD): the world's largest collection of vertical profile data of ocean characteristics
- [Ocean Biodiversity Information System](#) (OBIS): global open-access data and information clearing-house on marine biodiversity for science, conservation and sustainable development
- [IOC Ocean Data Portal](#) (ODP): interconnected data repository portal
- [OceanDocs](#): global repository of open source documents and publications
- [OceanExpert](#): global directory of Marine and Freshwater professionals (and institutions)
- [Ocean Best Practices](#): secure, permanent document (and other objects) repository. It aims to provide a discovery point for research groups to search and find community accepted existing ocean best practices. This service also invites the ocean research, observation and data/information management communities to submit their own best practice documents to share globally with their colleagues (jointly with IOC/GOOS)

As the IOC programme mandated to coordinate data and information management and exchange, the IODE programme collaborates with several other IOC programmes and projects such as:

- IOC Harmful Algal Blooms (HAB): [Harmful Algae Information System](#)
- IOC [Global Ocean Science Report](#) (GOSR)
- IOC Ocean Acidification

As the majority of IOC Member States are developing countries capacity development (mainly through training and education) has always been a priority of IOC, and of its IODE. This has led to the development of the OceanTeacher Global Academy which aims at building equitable capacity related to ocean research, observations and

services in all IOC Member States. The specific objectives of the [OceanTeacher Global Academy \(OTGA\)](#) Project are: (i) Promoting the establishment, and assisting with the start-up, of Regional Training Centres (OTGA RTCs) that will plan, organize and implement training courses that are of relevance to, and serve needs within their region; (ii) Promoting the use of local experts as lecturers and training assistants by the OTGA Regional Training Centres; (iii) Promoting the collaboration between the OTGA Regional Training Centres by enabling (through advanced information technology) lecturers from multiple regions to contribute lectures. (iv) Further developing the OceanTeacher Learning Management System to cover multiple IOC (and associate) programmes.

IODE also collaborates with BBNJ through OBIS and with the Aquatic Sciences and Fisheries Abstracts (ASFA).

Dr Belov briefed the meeting about the IOC Ocean Data and Information System (ODIS) to be (when developed) an e-environment where users can discover coastal and ocean data, information and associated products or services provided by IOC Member States, projects and other partners associated with. He referred to agenda item 5 where ODISCat and Ocean InfoHub projects will be introduced as a first steps in building complete ODIS.

### 4.3 International Seabed Authority (ISA)



This agenda item was introduced by Mr Sheldon Carter, Database Manager, ISA. The PowerPoint Presentation is available [online](#).

The International Seabed Authority (ISA) secretariat launched ISA database *DeepData* on 25 July 2019 in Kingston, Jamaica during the ISA's 25<sup>th</sup> session.

- In 2002, the Legal and Technical Commission (LTC) formally identified the need for the ISA to collect and centralize systematically all data and information on marine mineral resources. Preliminary discussions on how to operationalize such responsibility started soon after the signature of the first contracts for exploration of polymetallic nodules in 2001 (ISBA/8/C/6 para.12).
- The Secretariat started to assemble the first Central Data Repository (CDR) in 2000, succeeding the initial ISA's database of polymetallic nodule resources of the Area, called POLYDAT (ISBA/5/C/6). In 2003, following the LTC request, the CDR was then expanded to include information on all types of mineral resources under exploration namely: polymetallic nodules, cobalt-bearing ferromanganese crusts

and polymetallic sulphides (ISBA/9/LTC/3).

- In 2015, the LTC further recommended that a data management strategy be formulated as a matter of priority. The rationale for this echoed the need to ensure that the necessary information be accessible in the context of the development of the draft exploitation regulations and sound environmental protection measures (ISBA/21/C/16).
- Subsequently, a dedicated working group was established within the LTC. Its main functions were to assist in the formulation of the data management strategy and related issues and make recommendations for implementing routines and technical means to manage all data and information in a structured manner (ISBA/22/LTC/15).
- After several years of work, a new database has been developed. This database, called “ISA Deep Seabed and Ocean Database” (*DeepData*) has been designed to serve as a spatial, internet-based data management system. Its main function is to host all data related to deep-seabed activities and with specific emphasis on those collected by the contractors on their exploration activities as well as any other relevant environmental and resources related data for the Area.

*DeepData* contains information on mineral resource assessment (geological data) and environmental baseline/assessment data. However, only the environmental data will be accessible to the public. This will include biological, physical and geochemical parameters of the marine ecosystems from the seafloor to the ocean surface. The geological data is formally identified as confidential in the regulations on prospecting and exploration of mineral resources (ISBA/19/A/9, ISBA/19/C/17, ISBA/16/A/12/Rev.1, and ISBA/18/A/11).

The types of data to be submitted to ISA as well as the procedures to be followed to ensure confidentiality of the data are also clearly provided in these regulations.

Contractors are required to submit the metadata and results of their sample analysis from exploration surveys in contract areas, using the reporting templates published by the LTC. Such templates are to be found in the *Recommendations for guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area* (ISBA/19/LTC/8) and for the content, format and structure of annual reports (ISBA/21/LTC/15, Annex IV).

The reporting templates developed to facilitate submission of structured geological and environmental data are available on ISA’s website<sup>1</sup>. In addition to “structured data” extracted from templates, *DeepData* also hosts “unstructured information,” including maps, photographs, videos, graphics and relevant publications published in peer-review journals received from contractors.

The Geographical Information System (GIS) is part of *DeepData* functionalities. As such, it allows visualization of contract areas, reserved areas and designated areas of particular environmental interest (APEIs). GIS information accessible through

*DeepData* also include sampling locations containing biological, physical and/or geochemical parameters of the seabed sediments and water column.

For clarity and transparency purposes, the ISA Secretariat will publish a file catalogue on regular basis, listing all publicly available data files contained in *DeepData*.

#### **4.4 United Nations Development Programme (UNDP)**



This agenda item was introduced by Dr Vladimir Mamaev, UNDP/GEF Regional Team Leader and Technical Advisor, UNDP Istanbul Regional Hub.

The UNDP Water & Ocean Governance Programme is one of the main global mechanisms contributing to the delivery of the ocean aspects of the UNDP Strategic Plan and the organization's contribution toward achieving the Sustainable Development Goals (SDGs).

The WOGP set of projects and programmes bring a diverse suite of actors together to address the challenges related to SDG 14—to conserve and sustainably use ocean, seas and marine resources.

The WOGP consists of a number of coordinated programmes and projects that deliver on particular aspects and subthemes, and support water, coastal and ocean-related endeavours throughout UNDP and in collaboration with a wide range of implementation partners, including governments, the UN system, intergovernmental organizations, NGOs and the private sector.

The WOGP works at national, local, global and regional levels to enhance 'good water and ocean governance' in a specific thematic area: Large Marine Ecosystems and regional fisheries.

Most of data are generated through the LMEs projects supported by the GEF and are all stored in the participating institutions, frequently in the regional LME management bodies – convention secretariat and all the meta data are stored in the IW:learn portal and can be freely available to all.

UNDP has also few projects supported by other donors, one of the good example is the EMBLAS project in the Black Sea supported by the EU, where we supported three open sea monitoring cruises and several national near-coastline monitoring activities for the past 5 year in Georgia, Russia and Ukraine. All the data from these cruises are stored in the regional data base in Odessa Ukrainian Center for the ecology of the sea.

Information on all GEF supported LME-Ocean project from all GEF agencies can be easily found in the [iwlearn.net](http://iwlearn.net)

#### **4.5 United Nations Environment Programme, Environment for Development (UNEP)**



This agenda item was introduced by Mr Dani Ghafari, Programme Management Officer, UNEP Nairobi.

The PowerPoint Presentation is available [online](#).

Mr Ghafari explained about the UNEP contribution to ODISCat. He explained that UNEP has contributed 2 items and is going to contribute 2 additional items in the near future. The first one is a video that show how the index for coastal eutrophication potential (ICEP) is measured. It has been entered under the category (Education and Training Material). The second, entered under “Data catalogues” is the metadata catalogue for “Marine pollution and coastal eutrophication – SDG 14.1.1a and 1b”, explaining the progressive monitoring approach used in this methodology, Level 1: Globally available data from earth observations and modelling, Level 2: National data which will be collected from countries (through the relevant Regional Seas Programme, where applicable (i.e. for countries that are a member of a Regional Seas Programme) and Level 3: Additional indicators which are suggested that countries might consider collecting (these are not discussed in this document).

Shortly 2 more records will be added: under “Guidelines” an entry will be made on “Global Manual on Ocean Statistics for Measuring SDG 14.1.1, 14.2.1 and 14.5.1” and a fourth record under “Data systems/portals” on “World Environment Situation Room, UNEP’s data, information and knowledge platform for the environment. The WESR will host the data series for SDG 14.1.1 and 14.2.1 in addition to other SDG and environment related data. The link to WESR: <https://wesr.unep.org>. The last point was the collaboration between UNEP and a group of ontology experts including Pier Luigi Buttigieg on the development of the SDG Interface Ontology (SDGIO) aiming to capture the existing definitions (i.e. semantics) of terms in the SDG domain in SDGIO. The SDGIO is now mapped to the SDG data ontology developed by UNSD for better discoverability of SDG’s and their data. At the end Mr Ghafari suggested the integration or usage of Statistical Data and Metadata eXchange (SDMX) standard to facilitate the interoperability between systems.

## 4.6 United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP)



This agenda item was introduced by Ms Gemma Van Halderen. The PowerPoint Presentation is available [online](#).

She referred to the background document entitled “OCEAN ACCOUNTS - Briefing from UN ESCAP and Global Ocean Accounts Partnership” available from

[https://www.iode.org/index.php?option=com\\_oe&task=viewDocumentRecord&docID=26624](https://www.iode.org/index.php?option=com_oe&task=viewDocumentRecord&docID=26624)

Ms Van Halderen explained that in Asia Pacific ESCAP has 53 Member States and 9 associate member states, representing 2/3 of the world population and 22 of the Member States are SIDS. In terms of progress with 2030 Agenda, the region is not on track to meet any of the Goals by 2030 including SDG14. The region is also lacking in sufficient data to track progress towards the ambitions of the 2030 Agenda, especially for SDG14 where sufficient data exists for only one of the 10 official indicators and one approved proxy indicator.

Ms Van Halderen explained that ESCAP can provide contributions for bibliographic infobases (4), data catalogues (1), data products (1), data systems (1), education and training materials (1), information on organisations and experts (1), information on projects (3) and manuals, guidelines, standards and best practices (1).

Regarding data catalogues, she reported that ESCAP has created an “Ocean Accounts Global Ocean Data Inventory” with about 136 unique data sets (entered into ODISCat). These datasets are all publicly available. These are focused on a user community interested in who is using the oceans, what is the condition of the ocean and what is the ocean supplying. As an example of a ‘who is using the oceans’, she referred to FAO which mentioned fish stocks in their presentation but also use of the ocean for travel services. The inventory is structured around a conceptual framework called “ocean accounts”, which is based on a globally agreed conceptual framework called the System of Environmental-Economic Accounts. This framework is the blueprint for all national statistical offices in the world when officially measuring and accounting for environmental wealth, production and use.

Regarding manuals & guidelines, she reported “Technical Guidance on Ocean Accounting for Sustainable Development” has been drafted and is on course to become a global statistical standard in 2021.

Regarding information on organisations and experts, she reported on the Global Ocean Accounts Partnership co-chaired by ESCAP and the Canadian Fisheries Department and supported by the University of New South Wales, Australia. The global partnership is open to all and is providing considerable support to development of ocean accounts.

Ms Van Halderen also referred positively to the UN decade implementation plan under development, especially its recognition of a multi-disciplinary representation of the ocean. She encouraged a conceptual representation of the ocean be adopted, not just a digital representation, especially with regard to data sources: how shall we represent data for the oceans? The ocean accounts framework is such a conceptual framework, geared not only to ecosystems and data but also focusing on socio-economic dimensions with a strong policy focus. ESCAP and the Global Ocean Accounts Partnership are keen to collaborate in this regard.

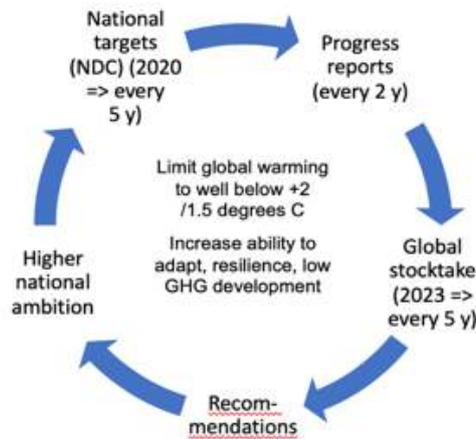
#### **4.7 United Nations Framework Convention on Climate Change (UNFCCC) Secretariat**



This agenda item was introduced by Ms Joanna Post.

The PowerPoint Presentation is available [online](#).

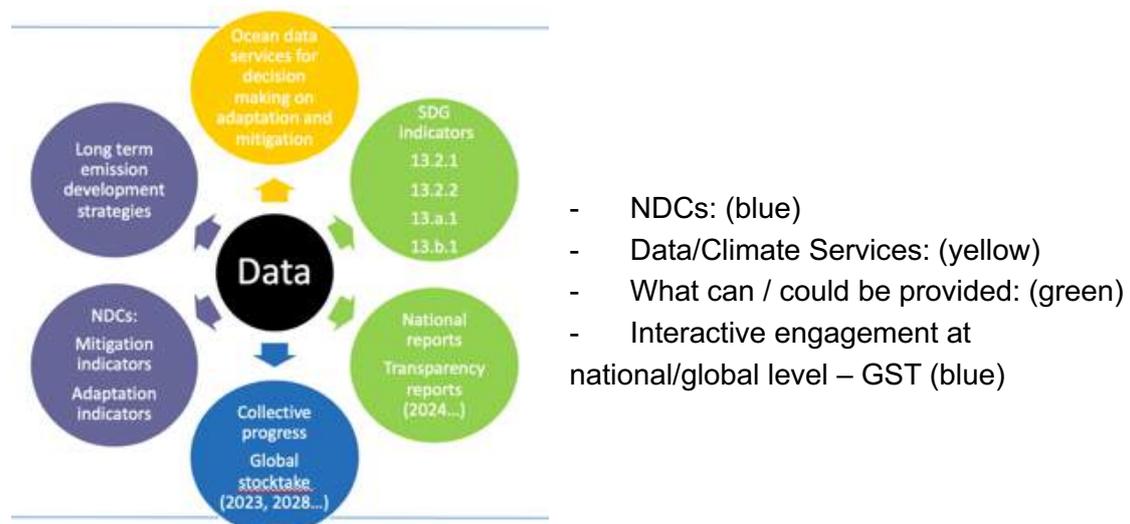
Ms Post explained that the UNFCCC secretariat is not an implementing agency and do not collect ocean data. However, it operates as coordinator for the United Nations Framework Convention on Climate Change and the Paris Agreement. Under the UNFCCC Parties report on a range of information through their national reports. The Paris Agreement is a cyclical process (see Figure 3). Under the Paris Agreement Parties communicate their intended national targets through nationally determined contributions (NDCs). Parties will provide progress reports through the transparency framework. The global stocktake will assess global collective progress every five years which will advise higher national-level ambition.



**Figure 3: Paris agreement cycle**

Ms Post then provided examples of possible ocean data and information uses and sources for the UNFCCC process. Figure 4 shows data/Information that could be sourced from NDCs (dark blue); provided by the IODE to support Parties' decision making (yellow); Useful for the IODE (green); provided by the IODE and useful for assessing collective progress (blue). For example, Parties in their transparency reports will provide a range of data on mitigation such as net GHG emissions and removals, percentage reduction of GHG intensity, relevant qualitative indicators for a specific policy or measure, mitigation co-benefits of adaptation actions and/or economic diversification plans.<sup>1</sup>

In regards to SDG indicators, the UNFCCC is custodian agency of the SDG 13 indicators 13.2.1, 13.2.2, 13.a.1 and 13.b.1.<sup>2</sup>



**Figure 4: UNFCCC data**

<sup>1</sup> Decision 18/CMA.1 paragraph 66

<sup>2</sup> <https://sustainabledevelopment.un.org/sdg13>.

## 4.8 United Nations (UN Statistics)



This agenda item was introduced by Ms Alessandra Alfieri, Chief, Environmental-Economic Accounts Section, United Nations Statistics Division.

The PowerPoint Presentation is available [online](#).

Ms Alfieri provided a background of the work done by UN statistics. The UN statistics division is responsible for coordination, developing standards and CD in statistics. They are secretariat for SDG indicators, working closely with agencies.

She then provided an overview of the “system of environmental economic accounts” (SEEA) which is an integrated statistical framework to bring together information of economy and environment. Part of this is the Ocean Accounts mentioned by Gemma Van Halderen. SEEA builds on national accounts and expand it to the environment. It provides conceptual framework. Now working on revision of ecosystem accounts so we can include ocean into the standard. The objective is to elevate ecosystem accounts to international statistics standards. Countries will be encouraged to compile data. Right now we are not compiling data but working towards developing a “palette”. Objective to use national and global data and use algorithm to generate ecosystem extent conditions and ecosystem services accounts. Focus is on land-based ecosystems but we are open to expand into oceans as well. So we would like collaboration to support the revision of ecosystems accounts and develop a conceptual framework for ocean accounts which Gemma mentioned and led by ESCAP. In future we could develop ecosystem accounts using open data approach.

## 4.9 UNEP World Conservation Monitoring Centre (WCMC)



This agenda item was introduced by Ms Lauren Weatherdon, Senior Programme Officer; Knowledge Management Lead. The PowerPoint Presentation is available [online](#).

Ms Weatherdon provided a high-level overview of UNEP-WCMC’s contribution to the UN Decade. In this regard, she explained the contribution of UNEP-WCMC to the UNEP World Environment Situation room and UN Biodiversity Lab. She described efforts to define criteria for assessing the “readiness” of ‘global public good’ datasets for use in indicators tracking progress toward the UN Decade and related SDG targets.

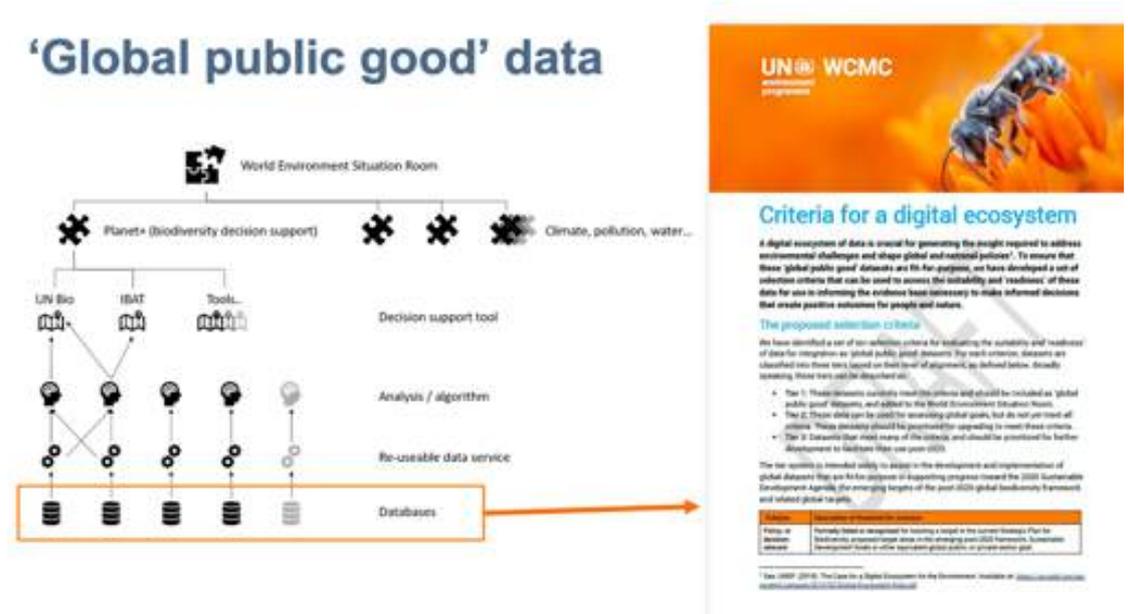


Figure 5: World Environment Situation Room

She then presented a few examples of “global public good” data as part of the Protected Planet and Ocean+ initiatives, as well as the [Biodiversity Indicators Partnership](#):

[The World Database on Protected Areas \(WDPA\)](#) is the authoritative and government-validated database on the world's terrestrial and marine protected areas, updated monthly and used to track progress toward Aichi Target 11 and SDG Targets 14.2 and 14.5. The total number of protected area records in the April 2020 release of the WDPA was 248,560, covering 245 countries and territories. It is managed by the United Nations Environment World Conservation Monitoring Centre (UNEP-WCMC) with support from IUCN and its World Commission on Protected Areas (WCPA). UNEP-WCMC further curates the recently launched [World Database on Other Effective Area-based Conservation Measures \(WD-OECM\)](#) and the [Global Database on Protected Area Management Effectiveness \(GD-PAME\)](#), and the [Indigenous and Community Conserved Areas \(ICCA\) Registry](#).

Together, these databases are hosted on [Protected Planet](#), which is the most up-to-date and complete source of information on protected and conserved areas, updated monthly with submissions from governments, non-governmental organizations, landowners and communities.

As part of UNEP-WCMC's [Ocean+ initiative](#), the [Ocean+ Data Viewer](#) (ODV) offers a portal for viewing and downloading global spatial datasets useful for managing and conserving marine and coastal biodiversity. The ODV was first designed in 2011 to provide easy access to view and download global marine biodiversity spatial data, with more than 2.5 million records covering 2.1 million km<sup>2</sup> of marine and coastal areas.

- These data are provided by internationally respected scientific institutions and other institutions;
- Among other uses, they can help governments, companies and other decision-makers to avoid or minimize threats to biodiversity arising from their operations;
- There are more than 30 datasets available—some examples include legacy datasets on sea turtle nesting and feeding sites, habitat data (such as mangroves, seagrasses and cold- and warm-water corals), and environmental data on sea surface temperature and chlorophyll-a, among others.

UNEP-WCMC is also collaborating with the GOOS Essential Ocean Variables (EOV) habitat networks to try define data schema, monitoring protocols and data flows in order to update 'global public good' datasets related to marine and coastal habitats, such as seagrasses:

1. Data synthesis, providing greater transparency regarding gaps in knowledge;
2. Standardised data schema (DarwinCore-compliant, allowing integration with OBIS);
3. Habitat *in situ* and remote sensing monitoring protocols, which could be linked to IODE Ocean Best Practices; and
4. Defining data flows (e.g. data providers submitting data to OBIS, which in turn could be used by 'global public good' dataset custodians to curate global layers).

Related to these efforts, [Ocean+ Habitats](#) is an evolving tool that focuses on working with governments and partners to build national inventories of marine and coastal habitat data, providing insight into the known extent, protection and other statistics of ecologically and economically important habitats such as corals, mangroves, seagrasses and saltmarshes. The platform will record the current state of our evolving knowledge on the location and protection of these habitats, with monthly updates drawn from the World Database on Protected Areas.

[Ocean+ Library](#) offers links to a further 190+ resources of global data and information relevant to marine and coastal biodiversity-related decision-making, including marine spatial planning, education, environmental impact assessment, ecosystem assessment, and ecosystem services. Detailed metadata are [available for 116 of these resources](#).

Finally, the [Biodiversity Indicators Partnership \(BIP\)](#) is a global initiative to promote and coordinate the development and delivery of biodiversity indicators for use by the Convention on Biological Diversity (CBD) and other biodiversity-related conventions, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the Sustainable Development Goals (SDGs) and national and regional agencies. The [BIP Dashboard](#) and other indicator-related resources have direct relevance to the UN Decade on Ocean Science. The Secretariat of the BIP is hosted at UNEP-WCMC.

Ms Weatherdon ended her presentation with recommendations for the improvement of ODISCat and the Implementation Plan for the UN Decade of Ocean Science for Sustainable Development:

1. Integrate DOIs, facilitating tracking of use of data/products, and linking back to data providers.
2. Promote Creative Commons licensing—particularly CC BY 4.0 or CC BY-SA.
3. Promote metadata standards (ISO 19115, EML)
4. Identify clear data custodians for 'global public good' datasets, to ensure clear methodologies and long-term updates.
5. Nested/hierarchical ontologies of information on ODIS, and quality assurance
6. Define clear governance, interoperability and business models.

#### 4.10 World Meteorological Organization (WMO)



This agenda item was introduced by Mr Peilang Shi and Ms Champika Gallage. The PowerPoint Presentation is available [online](#).

Mr Shi provided a brief overview of the WMO Information System (WIS) which originated from the WMO GTS which was established from the need of operational data exchange. With the technological advances this has evolved into the WIS. The new WIS 2.0 will be more open.

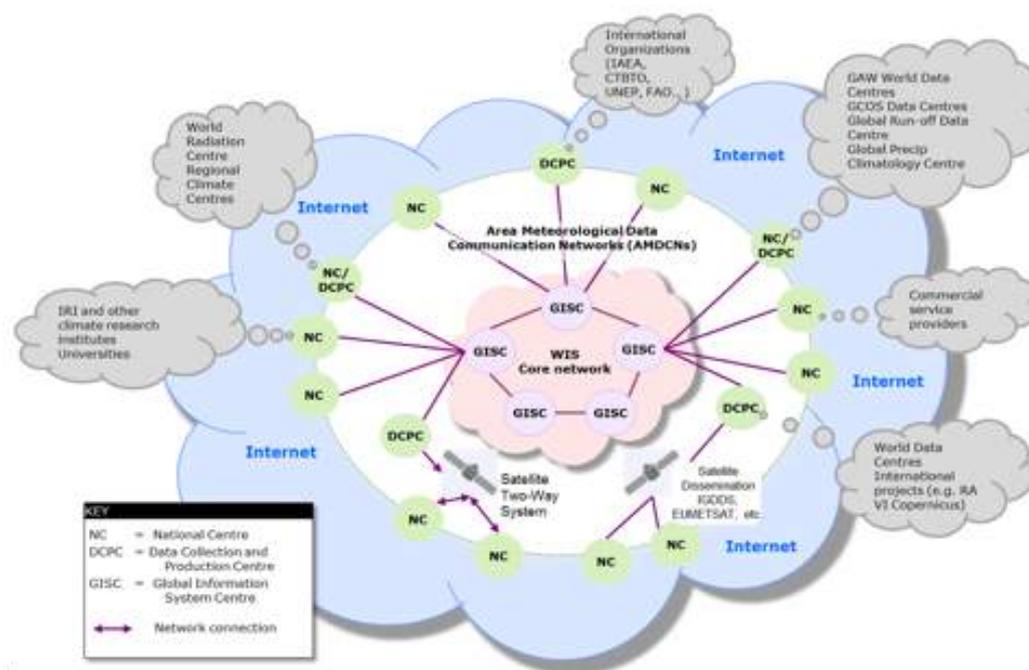


Figure 6: WMO Information System (WIS) architecture

This complex network is crucial for the real-time exchange of data. In WIS there are 3 types of centres:

- **National centres:** contribute information to WIS; distributes WIS information to national users
- **Data Collection or Production Centre (DCPC):** collects, prepares or analyses information, or, manages sub-regional exchange of information
- **Global Information System Centre (GISC):** holds catalogue of all information available through WIS; manages global exchange of information. There are 15 of these.

The WIS provides three fundamental services:

**1. Routine collection and dissemination service for time-critical and operation-critical data and products:**

This service is based on real-time “push” mechanism including multicast and broadcast; it would be implemented essentially through dedicated telecommunication means providing a guaranteed quality of service.

**2. Data Discovery, Access and Retrieval service:**

This service is based on request/reply “pull” mechanism with relevant data management functions; it would be implemented essentially through the internet.

**3. Timely delivery service for data and products :**

This service is based on delayed mode “push” mechanism; it would be implemented through a combination of dedicated telecommunication means

and of public data-communication networks, especially the internet.

A wide range of technical documentation, manuals and guides have been developed to describe the WIS and to assist its partners and users.

Ms Gallage then introduced a few key activities started under the former Joint WMO-IOC Commission for Oceanography and Marine Meteorology(JCOMM) which will continue under the WMO new structure in collaboration with IOC/IODE. The former “Inter-Programme Expert Team on Integrated Marine Meteorological and Oceanographic Services within WMO and IOC Information Systems (IPET-MOIS)” tasks included (i) develop criteria to certify/monitor oceanographic data centres as WIS centres; (ii) identification of oceanographic centres; and (iii) implementation and technical specification of an accreditation process; guidance of candidate oceanographic data centres to participate in WIS and the IOC ODIS in future.

Former Expert Team on Marine Climatology established the Marine Climate Data System (MCDS). It enables provision, on a free and unrestricted basis, of consistent, coherent, discoverable, documented marine meteorological and oceanographic climate data sets of known quality to address the needs of WMO and IOC applications. It assures the flow and quality control of the required data from various sources, and to compile added value variable-based products, including EOVs and ECVs. Number of data centers are already certified and providing data services of MCDS while the work continues towards enrolling more data centers to be part of the MCDS.

Finally Ms Gallage reiterate that these activities will be continued under the appropriate new Technical Commissions, Standing Committees, Study Groups and Expert Teams in collaboration with IOC/IODE.

## 5. ODISCAT, ODIS AND OCEAN INFOHUB

### 5.1 Ocean InfoHub



This agenda item was introduced by Mr Ariel Troisi, IOC Chair and Chair of the IOC Group of Experts on Capacity Development and Ms Lucy Scott, IOC Ocean InfoHub Project Manager.

The PowerPoint Presentation is available [online](#).

Mr Troisi recalled that the IOC Criteria and Guidelines for the Transfer of Marine

Technology – CGTMT (<https://unesdoc.unesco.org/ark:/48223/pf0000139193>) expressly indicated the need to establish and co-ordinate a clearinghouse mechanism (CHM) in order to provide interested users with direct and rapid access to relevant sources of information, practical experience and scientific and technical expertise in the transfer of marine technology as well as to facilitate effective scientific, technical and financial co-operation to that end.

Following the adoption of the IOC Capacity Development Strategy ([http://www.ioc-cd.org/images/3897\\_15\\_IOC\\_E\\_F\\_2\\_langues\\_WEB.pdf](http://www.ioc-cd.org/images/3897_15_IOC_E_F_2_langues_WEB.pdf)), an IOC Group of Experts on Capacity Development (GE-CD) was established. This GE-CD created a Task Team to work on the implementation of a TMT/CHM portal and related activities, and taking into account the Decade preparations. In close coordination with the IODE Project Office, a proof-of-concept CHM was developed and presented to the IOC Assembly in 2019. The Assembly finally requested the GE-CD to prepare a detailed and costed proposal for the development of an IOC CHM to be developed in a step-wise modular approach, in collaboration with IODE and its Project Office, and taking into account the regional prototype developed as well as addressing evolving requirements.

The proposed mechanism is meant to allow for, promote and facilitate scientific and technical cooperation, provide easy access to and exchange of data and information, provide access to experts and expertise, facilitate networking, provide access to capacity development opportunities, access infrastructure, ensure interoperability with other systems, allow for monitoring, provide access to best practices, manuals, guidelines, legal framework and, fundamentally, be responsive to the needs of the users.

Ms Scott explained that the *Ocean Infohub* will establish and anchor a network of regional and thematic nodes that will contribute to the transfer of marine technology (TMT) by enhancing shared scientific and technical capacities to render a wide range of data and information products and services.

*The Ocean Infohub* will develop a proof-of-concept for an underlying Ocean Data and Information System (ODIS) architecture to enable scalable development of the global Ocean Infohub and interoperability with local, regional and thematic data and information infrastructures.

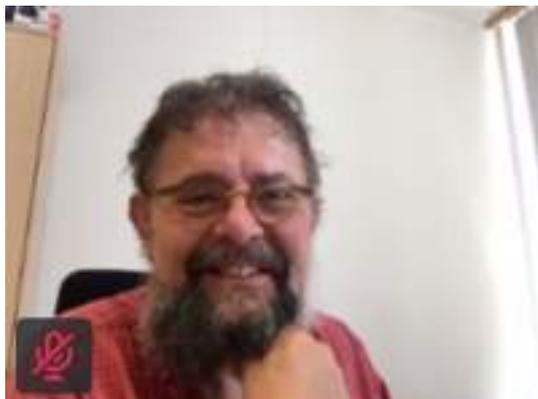
*The Ocean Infohub* will promote and foster awareness and collaboration with established organizations and systems providing enabling support to the marine community, connecting contributors and users with the resources to support their efforts.

The OIH will first consolidate IOC-associated online resources - including OceanExpert, OceanDocs, the Ocean Best Practices System, the Ocean Biodiversity Information System (OBIS), the World Ocean Database (WOD) and Ocean Data Portal (ODP) –

extended by partnerships with EurOcean, Marinetraining.eu, EMODNET, and other sources in the IOC ODIS Catalogue of Sources (ODISCat).

The project will benefit marine and coastal stakeholders across the globe, but its initial focus will be on responding to requests for data products and services from three regions: IOCAFRICA, LAC and the Pacific SIDS to meet their unique user community (thematic and language) requirements. The initial priorities for the Project will be to develop communities of practice for the three pilot regions, as well as to formalize partnerships with other UN agencies and key international partners. A global ODIS (Ocean Data and Information System) architecture will be developed to enable scalable development and interoperability with local, regional and thematic infrastructures. Through these actions, the OIH will enable a digital ecosystem where users, from any entry point, can discover content and services that they require, while also having opportunities to become content creators themselves.

## 5.2 ODISCat



This agenda item was introduced by Mr Arno Lambert, IT Services Manager, IOC Project Office for IODE. The PowerPoint Presentation is available [online](#).

This agenda item was introduced by Mr. Arno Lambert. He pointed to the fact that the ODIS Catalogue of Source (ODISCat) (<http://catalogue.odis.org>) is not to be confused with ODIS (nor with SODIS, OIH or OBIS) but that ODISCat will be the foundation on which ODIS and OIH will be built. Mr. Lambert also stressed the fact that ODISCat is not a (data) portal, an ocean database or metadata (as description of data sets) repository. He highlighted that the current ODISCat is not a final, finished product but a work in progress that needs the help of the complete ocean community far beyond the borders of IOC/IODE.

Mr. Lambert continued by explaining that ODISCat aims to be an **online browsable and searchable catalogue** of existing ocean related web-based sources/systems of data and information as well as products and services and that ODISCat will provide information on products and **visualize the landscape** (entities and their connections) of ocean data and information sources. He explained that ODISCat will guide us to **online sources** where we can **find** these data, products and services by using **descriptive information** such as the URL, title, description, language, point of contact, geographic scope, available technologies for machine-to-machine interaction,

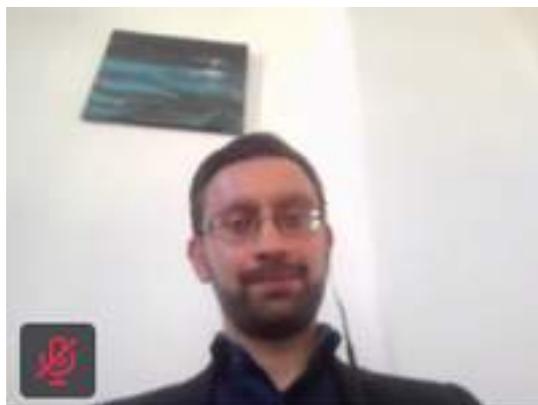
keywords, etc. Once again Mr. Lambert drew our attention to the fact that ODISCat is aimed at a far larger number of stakeholders than our own IOC communities, it should also be of interest to policy makers, private sector etc. and it is a first, small, but very important step to ODIS and OIH.

In the second part of the presentation Mr. Lambert wanted to convince the meeting that entering any source into ODISCat is not a burden and showed us how, in 5 simple steps (login, Submitter Info, Basic Description, Advanced Description, save and check entry), we can enter a new source using any of the **16 content types** and entering the mandatory fields. He also offered a very easy way to enter large amounts of source descriptions into the ODISCat by the use of an Excel file. It was mentioned that both ESCAP and FAO were already using this method to get their content in the database. Mr. Lambert will provide an Excel template with all possible field to anyone who wishes to enter his/her data that way into ODISCat.



Figure 7: ODISCat homepage

### 5.3 IOC Ocean Data and Information System (ODIS)



This agenda item was introduced by Dr Pier Luigi Buttigieg, Data Scientist, Alfred-Wegener-Institut (Helmholtz-Zentrum für Polar- und Meeresforschung). The PowerPoint Presentation is available [online](#).

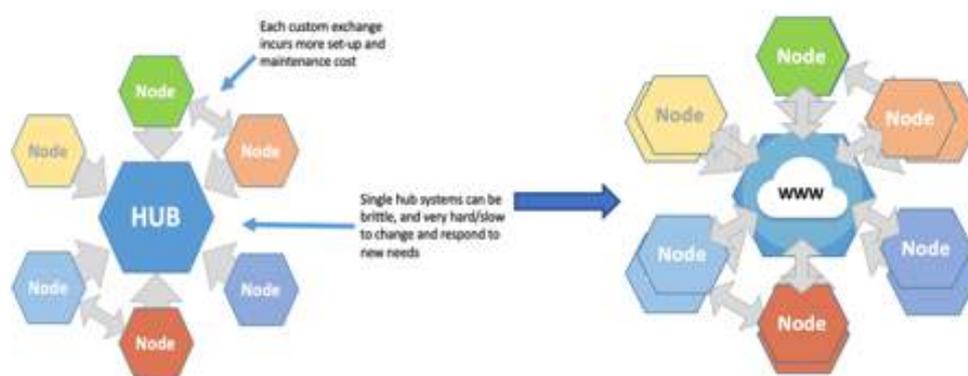
Pier Luigi Buttigieg presented the key implementation principles of the IOC Ocean Data and Information System (ODIS), as well as the high-level features of its underlying

technical architecture (ODIS-Arch).

ODIS and ODIS-Arch will serve as a *robust, inclusive, and extensible foundation of our planet's digital ocean ecosystem*.

It was made clear that ODIS will be a distributed system which will be co-designed, co-implemented, and co-governed through the alignment of existing and emerging digital stakeholders to a common interoperability architecture (ODIS-Arch).

Rather than a "hub-and-spoke" model, ODIS will use the Web itself to link participating nodes, be they major regional data centres or local contributors. (See Figure 8)



**Figure 8: from hub-and-spoke to the Web as the hub**

Using the “Web centered” approach:

- The Web is our collective Hub (the digital commons)
- Data/Infrastructure/Software/Platform as a Service (DaaS, IaaS, SaaS, PaaS, resp.) and other Web-enabled models will be encouraged to reduce unneeded duplication of effort and allow efficient sharing of capacities
- Each node is in charge of their own contribution (data, services, dashboards, stakeholder-specific portals)
- Linked Open Data and Semantic Web technologies will bridge nodes
- A set of interoperability and exchange standards will allow any node to continuously cross-talk to any other (ODIS-Arch)
- Anyone can “spin up” solutions like portals & thematic hubs (or “hublets” for smaller applications) using the interoperability architecture, leading to greater inclusivity

Linked Open Data and Semantic Web technologies, standards, and best practices will create a robust and flexible digital ecosystem for ocean data, information, and knowledge to be used to rapidly address societal needs and challenges as they emerge. The Ocean InfoHub is a first implementation example of this concept (Figure

9): a Ocean InfoHub user or partner can pull together resources that it knows can fulfill a certain mission, pull additional digital resources out of the global linked data universe (made interoperable by alignment to ODIS-Arch) and then dynamically create regional and global solutions (e.g. dashboards, portals, hublets) according to the needs of their stakeholders.



Figure 9: OIH diagram

Dr. Buttigieg proposed that the “digital ecosystem” concept should be treated as more than a metaphor: deploying a global, distributed, but interlinked ODIS can learn much from real ecosystems. ODIS will be a digital ecosystem with high cyberdiversity (Figure 10), but where its components operate using the same underlying rules (a base “digital ecology”). In this system every component has a “niche”, a role which can change over time.

This digital ecosystem will have producers of products and services, consumers at varying levels, and de/recoposers which will innovate around the wealth of legacy data already existing (Figure 10). Overall, we must promote the principle of symbiotic mutualism across all interactions.

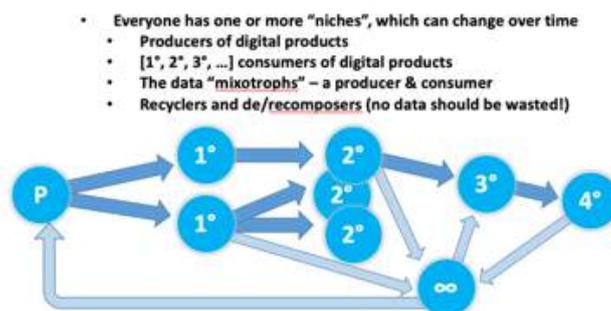
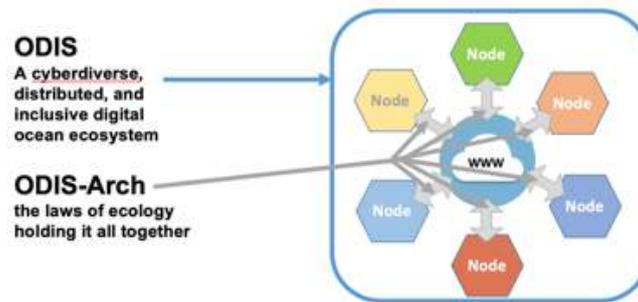


Figure 10: Digital ecology facilitated through ODIS

The ODIS-Arch will provide “the laws of ecology” (i.e. the collection of interoperability conventions and standards) that holds all pieces of the structure together (Figure 11)



**Figure 11: ODIS and ODIS-Arch**

As an index and guide to this digital ecosystem, ODISCat can provide humans and machines rapid navigation and discovery of resources.

ODIS will adhere to the following key principles:

1. No one “owns” the ecosystem, but we’re all charged with tending to it and keeping it healthy;
2. Nodes in our digital ecosystem:
  - a. should have all the independence they need;
  - b. should have clear “niches” (roles) to prevent redundancy and increase partnership;
  - c. can pull and push resources to other nodes under automatically recognised usage conditions / licenses;
3. Reuse over re-invent, adapt as a community;
4. Easy to spin up solutions, minimal loss when spinning down;
5. Success is not measured by individual use of a node, but by how many nodes are used in a single user session;
6. Multiple entry points and levels of commitment to the ODIS network;
7. Digital products and streams should align to the FAIR principles, and link to metadata and related data to allow automatic discovery, quality diagnostics, and much more.

The strategy to achieve these goals will need to be based on co-design and co-development of the architecture with all stakeholders. This will require: (i) stepwise and responsive co-development based on stakeholders capacities, needs, and shared interests; (ii) ODISCat will be the nucleus – a common index that all nodes can reliably reference for trusted ocean data and information; (iii) based on the needs and visions of the collaborating nodes, the details of ODIS’ implementation will take shape, around the core principles of linked open data and continuous interoperability.

Dr Buttigieg further noted that most of the obstacles to realising ODIS are not technical, but centred on building a culture of cooperation. The need of “digital diplomacy” to overcome obstacles to sharing and co-implementation was noted, with a call for UN leadership in its development. A global community of practice should be created, where the interests of each node must be heard and accommodated for a digital commons to be sustained.

The community looks to the UN partners to show how agreements can be forged to create a mutualistic digital ecology, turning competition into collaboration.

The presentation concluded with reference to a broader vision, in which the ODIS ecosystem will nest within a "digital biosphere" linking marine, terrestrial, atmospheric, human-focused, and other thematic data systems in order to respond to the cross-cutting needs of the SDGs and their successors.

Dr Buttigieg presented the following questions to the participants for further discussion:

1. How can we connect our digital ecosystems in the same biosphere?
2. How can ODIS provide your systems with sustainable digital products and services for the oceans?
3. What should ODIS reuse for your system(s)? What interoperability solutions have worked for you?
4. How do we align incentives and credit one another?

## 6. INTER-SESSIONAL WORKING GROUP TO PROPOSE A STRATEGY ON OCEAN DATA AND INFORMATION STEWARDSHIP FOR THE UN OCEAN DECADE (IWG-SODIS)



This agenda item was introduced by Dr Hernan Garcia, Head WDS Oceanography and Chair of the Inter-sessional working group to propose a strategy on ocean data and information stewardship for the UN Ocean Decade (IWG-SODIS). The PowerPoint Presentation is available [online](#).

Dr Garcia recalled the vision of the Decade regarding data: *“A sustainable world informed by world-class open access data. Data and information gathered during the Decade will be transparent and accessible to all through a network of interoperable resources, readily available in standardized forms, and served through open access in accordance with the applicable legal framework”*. He informed the meeting that the IOC Committee on International Oceanographic Data and Information Exchange (IODE), at its 25<sup>th</sup> Session (2019) had established the “Inter-sessional working group to propose a strategy on ocean data and information stewardship for the UN Ocean Decade (IWG-SODIS). The Working Group had been

given the following tasks:

1. Explore through UN-Oceans the interest of relevant UN bodies to develop a joint data and information system under the Decade and to start assessing respective data and information guidelines and policies and identify relevant data and information access and repositories that may contribute to such a system,
2. Investigate the future scope of scientific data and information stewardship activities of the Decade, including and not limited to:
  - i. Agreement on common data contributions, flow, latency, discovery, access, and re/use principles,
  - ii. Documenting data and information requirements and best practices,
  - iii. Agreement on data and information protocols and metadata content and structure,
  - iv. Agreement on science-based quality control/quality assurance requirements and procedures for all data types,
  - v. Agreement on modalities for contribution and dissemination of data and information,
  - vi. Agreement on modalities and establish a strategy for the long-term preservation of Decade data for future use,
  - vii. Agreement on access and use of potential data synthesis and tailored data products derived from the Decade,
  - viii. Develop and update data and information management capacity,
  - ix. Identify and review potential data and information management infrastructure that could be established during the implementation phase (2021-2030) to coordinate data management activities,
3. Prepare a proposed Ocean Data and Information Stewardship Strategy including a work plan, timetable, and required resources to be submitted to the Executive Planning Group (EPG) before its Second EPG meeting (November 2020) for their consideration and inclusion in the preparatory process and the Science Plan of the Decade.
4. Identify a group of subject matter experts that may continue providing advice and expertise on scientific data stewardship during the operational phase of the UN decade.

Dr Garcia then identified key challenges in developing a “global data policy framework” for the decade: (i) The data reside in many non-inter-operable online services at different geographic locations in varying formats, described using different vocabularies and metadata; (ii) Data users may need to request permission to use the data from a particular data source. In addition, researchers may then need to convert the data into a common digital formats that facilitate data comparisons and data syntheses products; (iii) There is a lack of a single universal data policy that is applicable to all available international ocean data collected during the Decade.

Dr Garcia proposed a “universal data, metadata and product sharing principle”:  
***Data, metadata, and products should be freely and openly shared online with minimum delay and restrictions, subject to national and international jurisdictional laws and policies.***

He noted that this principle supports the data policies of international initiatives including GEO, IOC, WMO, and WDS to cite a few instances.

Dr Garcia informed the meeting that the current membership of the IWG includes mostly experts from IODE’s network of National Oceanographic Data Centres (NODCs), IODE Associate Data Units (ADUs), observing networks, and ocean data projects.

**Dr Garcia invited the Organizations participating in the workshop to join the IWG in order to better represent the communities that will collaborate within the UN Decade.**

## 7. DISCUSSIONS AND NEXT STEPS



This agenda item was introduced by Mr Ariel Troisi. He thanked all participants for their participation and for the information provided. He stated that we are looking at a “data ecosystem” for the digital ocean we want under the UN Decade data framework. Such digital ecosystem includes different niches and roles, and a clear need for partnerships. As such, the data ecosystem is not conceived as owned by any particular stakeholder but collectively by all. Participants also highlighted the need to ensure that data is actionable. The objectives and societal outcomes of the Decade call for the integration of different dimensions (e.g. social, human, environmental). being global ocean accounts an example. A conceptual framework to combine human and social science is therefore needed. There were some points and issues for further discussions such as data policy, terms of use, licensing, clarifying the interpretation of data catalogues, data systems and services, machine to machine services, ontologies. The proposed objectives of such data ecosystem for the decade will not be achieved unless what is built is responsive, resilient and sustainable.

It was noted that while there are many ocean observation initiatives that report on Essential Ocean Variables (EOVs) there is often no agreement on how the collected data will be exchanged or shared. Only then will we be able to build a truly global and multi-disciplinary “data ecosystem”.

The meeting also noted that the organizations participating in the meeting covered a wide range of communities and thus a wide range of users. It will be important to clearly

identify the various user communities and their requirements in terms of data and information. Not all users require numerical observations. Many require information products that are derived from these observations. It is that type of product that is needed by decision makers.

In order to ensure follow-up to the meeting it was agreed to establish the following working groups:

## **WORKING GROUP 1: ODISCat DEVELOPMENT**

Objectives: the working group will consider:

- i. addressing how to handle granularity issues of ODISCat content, in particular regarding websites>data systems/portals/data catalogues;
- ii. revising “themes” (he recommended using a standard such as the “International Aid Transparency Initiative (IATI) standard (<http://www.fao.org/economic/ess/ess-events/tag-piccolo/en/>) and <https://iatistandard.org/en/>);
- iii. revising “types”: better definitions are needed to distinguish e.g. data catalogues, data systems. He recommended adding “data services” (for APIs), possible “web sites” as a type;
- iv. revising “sea regions”: consider mapping with other geo-classifications;
- v. for “data policies”: promote the mention of the Terms of Use / any CC licenses (particularly CC BY 4.0 or CC BY-SA);
- vi. “metadata standards”: can we add to the list / refer other standards;
- vii. consider the use of nested/hierarchical ontologies
- viii. “Machine to machine interaction technologies”: how do we engage into interoperability.
- ix. Respond to the need (stated across the Decade’s regional meetings) for cataloguing projects, initiatives, and people (through interoperability with other services) with the ODISCat technology.
- x. Usage model alignment to re3data and fairsharing.org
- xi. Support for automatic syncing with asset catalogues of partners (cross-link to ODIS-Arch)

Initial membership:

- FAO: Marc Taconet
- IOC: Arno Lambert, Pauline Simpson
- WCMC: Lauren Weatherdon
- Invited experts: Pier Luigi Buttigieg

It is noted that the group can identify additional membership as required. The group will designate its Chair.

## **WORKING GROUP 2: CONCEPTUAL FRAMEWORK**

Objectives: ODIS is a multifaceted and complex undertaking, thus there is a need to develop a clear and easily communicable conceptual framework to help partners align and interact with the system.

The objectives of this working group are:

- i. To develop a conceptual description of ODIS' core features, paying special attention to the following perspectives:
  - a. Alignment to the ODIS and Decade visions and missions
  - b. Cultural dimensions
  - c. Technical dimensions
- ii. To express these concepts in multiple forms, according to the needs of partners (e.g. technologists, professionals, oceanographers, policy makers, the public)

Initial membership:

- IOC: Pieter Provoost
- ESCAP: Gemma Van Halderen and Rikke Munk Hansen
- Invited experts: Pier Luigi Buttigieg, Michael Bordt, Canadian Department of Fisheries and Oceans (Global Ocean Accounts Partnership (GOAP))

It is noted that the group can identify additional membership as required. The group will designate its Chair.

## **WORKING GROUP 3: IDENTIFICATION OF STAKEHOLDERS TO INVITE FOR NON-UN IGO, NGO AND PRIVATE SECTOR WORKSHOP**

Objectives: data and information are held by UN agencies (and their associated networks in Member States) but also by many non-UN IGOs, NGOs and private sector. In order to obtain a more complete picture of available knowledge these communities will need to be involved in the development of the proposed data ecosystem. The working group will identify a comprehensive list of stakeholders (including relevant contact points) that can then be invited to a second workshop.

Initial membership:

- All participating UN agencies (to 1st workshop): each agency to designate member to collaborate on the "list"

It is noted that the group can identify additional membership as required. The group will designate its Chair.

The meeting then agreed on the following next steps:

- 1- Preparation and circulation of the summary report of the meeting by 4 May 2020;
- 2- Establishment of working groups that will deal with the key questions and issues defined during the meeting (as soon as possible after publication of the meeting report)
- 3- Facilitate meetings of the working groups;
- 4- Organize second session of the UN ocean data meeting.

## **8. CLOSING OF THE MEETING**

Mr Peter Pissierssens closed the workshop on 20 April 2020 at 17:15 CET.

## Annex I LIST OF PARTICIPANTS

### UN agencies

Ms. Alessandra ALFIERI  
Statistician  
Statistics Division/DESA  
United Nations Headquarters  
Two United Nations Plaza  
New York NY 11215  
United States of America  
Email: [alfieri@un.org](mailto:alfieri@un.org)

Mr. Sheldon CARTER  
Database Manager  
Office of Environmental Management and  
Mineral Resources  
International Seabed Authority  
14 - 20 Port Royal Street  
Kingston Jamaica  
Email: [scarter@isa.org.jm](mailto:scarter@isa.org.jm)

Mr. Anton ELLENBROEK  
FAO Fisheries Officer  
FI - 309  
FAO Food and Agriculture Organization of  
the UN, Headquarters  
Viale delle Terme di Caracalla  
Roma 00153  
Italy  
Email: [anton.ellenbroek@fao.org](mailto:anton.ellenbroek@fao.org)

Ms. Champika GALLAGE  
Scientific Officer, Observing Systems  
Division  
Observing and Information Systems  
Department  
World Meteorological Organization  
Case Postale 2300  
Geneva CH-1211  
Switzerland  
Email: [cgallage@wmo.int](mailto:cgallage@wmo.int)

Mr. Aureliano GENTILE  
Information Manager Officer  
Fisheries and Aquaculture Department of  
FAO  
The Food and Agriculture Organization of  
the United Nations (FAO)  
Viale delle Terme di Caracalla  
Rome RM 00153  
Italy  
Email: [aurelgen@protonmail.com](mailto:aurelgen@protonmail.com)

Mr. Dany GHAFARI  
Programme Management Officer  
Science Division  
United Nations Environment Programme,  
Environment for Development, Kenya  
United Nations Avenue, Gigiri  
Nairobi Nairobi 30552, 00100  
Kenya  
Email: [dany.ghafari@un.org](mailto:dany.ghafari@un.org)

Ms. Rikke Munk HANSEN  
Statistician  
Statistics Division  
United Nations Economic and Social  
Commission for Asia and the Pacific  
Statistics Division  
Rajdamnern Avenue  
Bangkok Bangkok 10200  
Thailand  
Email: [hansenrm@un.org](mailto:hansenrm@un.org)

Mr. Miles MACMILLAN-LAWLER  
UNEP-GRID (UNEP-Arendal)  
Teaterplassen 3  
Arendal N-4836  
Norway  
Email: [Miles.Macmillan-Lawler@grida.no](mailto:Miles.Macmillan-Lawler@grida.no)

Mr. Vladimir MAMAEV  
UNDP/GEF Regional Team Leader and  
Technical Advisor  
UNDP Istanbul Regional Hub  
Merkez Mahallesi  
Şişli/İstanbul 34381  
Turkey  
Email: vladimir.mamaev@undp.org

Ms. Joanna POST  
United Nations Framework Convention on  
Climate Change (UNFCCC) Secretariat  
UNFCCC secretariat UN Campus Platz der  
Vereinten Nationen 153113 Bonn Germany  
Bonn 53113  
Germany  
Email: jpost@unfccc.int

Mr. Peiliang SHI  
Director  
WIS/OBS  
World Meteorological Organization  
Case Postale 2300  
Geneva CH-1211  
Switzerland  
Email: pshi@wmo.int

Mr. Marc TACONET  
Chief, FAO Fishery statistics and  
information Branch  
Fisheries and Aquaculture Department  
FAO Food and Agriculture Organization of  
the UN, Headquarters  
via delle Terme di Caracalla,  
Rome 00153  
Italy  
Fax: +390657052476  
Email: marc.taconet@fao.org

Ms. Gemma VAN HALDEREN  
Statistics Division  
UNITED NATIONS ECONOMIC AND  
SOCIAL COMMISSION FOR ASIA AND  
THE PACIFIC

UNITED NATIONS BUILDING,  
RAJADAMNERN NOK AVENUE  
BANGKOK 10200  
Thailand  
Email: gemma.vanhalderen@un.org

Ms. Lauren WEATHERDON  
Senior Programme Officer; Knowledge  
Management Lead  
UNEP World Conservation Monitoring  
Centre  
219 Huntingdon Road  
Cambridge CB3 0DL  
United Kingdom of Great Britain and  
Northern Ireland  
Email: lauren.weatherdon@unep-wcmc.org

#### **IOC Chair**

Mr. Ariel TROISI  
Head Oceanography  
Oceanography Department  
Servicio de Hidrografia Naval  
Avda. Montes de Oca 2124  
Buenos Aires C1270ABV  
Argentina  
Email: atroisi@hidro.gov.ar

#### **Invited experts**

Mr. Zulfikar BEGG  
Ocean Science Officer  
Ocean and Coastal Geoscience  
Secretariat of the Pacific Community -  
Regional Office  
Ratu Mara Road  
Suva Fiji  
Email: zulfikarb@spc.int

Mr. Sergey BELOV  
deputy director  
All-Russian Research Institute  
Hydrometeorological Information - World  
Data Center, Obninsk  
6, Koroleva Street

Obrinsk Kaluga region, 249020 249020  
Russian Federation  
Email: belov@meteo.ru

Mr. Pier Luigi BUTTIGIEG  
Data Scientist  
HGF-MPG Group for Deep Sea Ecology  
and Technology  
Alfred-Wegener-Institut (Helmholtz-Zentrum  
für Polar- und Meeresforschung)  
Am Handelshafen 12  
Bremerhaven 27570  
Germany  
Email: pbuttigi@mpi-bremen.de

Mr. Taco DE BRUIN  
Scientific Data Manager  
National Marine Facilities  
Koninklijk Nederlands Instituut voor  
Onderzoek der Zee  
PO Box 59  
Den Burg Texel 1790 AB  
Netherlands  
Email: Taco.de.Bruin@nioz.nl

Mr. Hernan GARCIA  
Oceanographer, head WDS Oceanography  
NOAA National Centers for Environmental  
Information (NCEI)  
NOAA NESDIS National Centers for  
Environmental Information (NCEI)  
151 Patton Avenue  
Asheville NC 28801  
United States of America  
Email: Hernan.Garcia@noaa.gov

Mr. Somkiat KHOKIATTIWONG  
Department of Marine and Coastal  
Resources  
Phuket Marine Biological Center  
Cape Panwa, 51 Sakdidech Rd.  
Phuket 83000  
Thailand  
Email: skhokiattiwong@gmail.com

Ms. Paula SIERRA-CORREA  
Research and Information Coordinator  
Research and Information for Coastal Zone  
Management  
Instituto de Investigaciones Marinas y  
Costeras José Benito Vives de Andreis  
Calle 25 No. 2-55, Playa Salguero,  
Rodadero  
Santa Marta D.T.C.H. Magdalena Colombia  
Email: paula.sierra@invemar.org.co

Mr. Tobias SPEARS  
Head, Ocean Data and Information Section  
Fisheries and Oceans, Science Branch,  
Maritimes Region  
Fisheries and Oceans Canada – Bedford  
Institute of Oceanography  
P.O. Box 1006  
Dartmouth Nova Scotia B2Y 4A2  
Canada  
Email: spearstobias@gmail.com

#### **IOC Secretariat**

Mr. Bernardo ALIAGA ROSSEL  
Programme Specialist  
Intergovernmental Oceanographic  
Commission of UNESCO  
7, place de Fontenoy  
Paris cedex 07 75732  
France  
Email: b.aliaga@unesco.org

Ms. Alison CLAUSEN  
Programme Specialist  
Marine Policy & Regional Coordination  
Section  
Intergovernmental Oceanographic  
Commission of UNESCO  
7, place de Fontenoy  
Paris cedex 07 75732  
France  
Email: a.clausen@unesco.org

Mr. Henrik ENEVOLDSEN  
Head of Centre, IOC UNESCO Programme  
Coordinator, Technical Secretary IPHAB  
IOC Science and Communication Centre on  
Harmful Algae  
IOC Science and Communication Centre on  
Harmful Algae, University of Copenhagen  
University of Copenhagen, Department of  
Biology  
København K DK-1353  
Denmark  
Email: h.enevoldsen@unesco.org

Ms. Kirsten ISENSEE  
Programme Specialist - Ocean Carbon  
Sources and Sinks  
Ocean Science Section  
Intergovernmental Oceanographic  
Commission of UNESCO  
7, place de Fontenoy  
Paris cedex 07 75732  
France  
Email: k.isensee@unesco.org

Mr. Jiuta KOROVULAVULA  
Tsunami Unit  
Intergovernmental Oceanographic  
Commission of UNESCO  
Secretariat of the Pacific Community (SPC)  
Private Mail Bag GEM Division, Mead Rd,  
Nabua  
Fiji France  
Email: j.korovulavula@unesco.org

Mr. Mika ODIDO  
IOC Coordinator in Africa  
UNESCO/IOC Sub Commission for Africa  
and the Adjacent Island States  
UNESCO Nairobi Office  
UN Gigiri Complex Block C  
P.O. Box 30592  
Nairobi 00100  
Kenya  
Email: m.odido@unesco.org

Mr. Vladimir RYABININ  
IOC Executive Secretary  
Intergovernmental Oceanographic  
Commission of UNESCO  
7, place de Fontenoy  
Paris cedex 07 75732  
France  
Email: v.ryabinin@unesco.org

Mr. Cesar TORO  
IOC Secretary for IOCARIBE  
IOC of UNESCO Sub-Commission for the  
Caribbean and Adjacent Regions  
Torices, Edificio Chambacu, Oficina 405Cra  
3B # 26-78  
Cartagena de Indias Bolivar 1108  
Colombia  
Email: c.toro@unesco.org

#### **IOC/IODE Secretariat**

Mr. Ward APPELTANS  
Project Manager OBIS, GOOS Biology &  
Ecosystems, IOC Capacity Development  
UNESCO / IOC Project Office for IODE  
Wandelaarkaai 7  
Oostende 8400  
Belgium  
Email: w.appeltans@unesco.org

Ms. Cláudia DELGADO  
OTGA Project Manager, IODE Training  
Coordinator  
UNESCO / IOC Project Office for IODE  
Wandelaarkaai 7  
Oostende 8400  
Belgium  
Email: c.delgado@unesco.org

Mr. Arno LAMBERT  
IT Services Manager  
UNESCO / IOC Project Office for IODE  
Belgium

Belgium  
Email: a.lambert@unesco.org

Mr. Peter PISSIERSENS  
Head, IOC Project Office for IODE,  
Oostende, Belgium and IOC capacity  
development coordinator  
UNESCO / IOC Project Office for IODE  
Wandelaarkaai 7  
Oostende 8400  
Belgium  
Email: p.pissierssens@unesco.org

Mr. Pieter PROVOOST  
OBIS Data Manager  
UNESCO / IOC Project Office for IODE  
Wandelaarkaai 7  
Oostende 8400  
Belgium  
Email: p.provoost@unesco.org

Mr. Greg REED  
IOC consultant  
UNESCO / IOC Project Office for IODE  
Wandelaarkaai 7  
Oostende 8400  
Belgium  
Email: g.reed@unesco.org

Ms. Lucy SCOTT  
Marine / Freshwater Scientist  
UNESCO / IOC Project Office for IODE  
Wandelaarkaai 7  
Oostende 8400  
Belgium  
Email: l.scott@unesco.org

Ms. Pauline SIMPSON  
IOC Consultant  
UNESCO / IOC Project Office for IODE  
Wandelaarkaai 7  
Oostende 8400  
Belgium  
Email: p.simpson@unesco.org

