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**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION**

(of UNESCO)

**Twenty-eight Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE-28)**

Santa Marta, Colombia, 12-14 March 2025

**JOINT ACTIVITIES WITH IOC OCEAN SCIENCE PROGRAMME**

Provided by the IOC Ocean Sciences Section

**Introduction**

The activities described below express the desire to collaborate with IODE and how this is mutually beneficial for several IOC programmes and is a prerequisite for the IOC as an organization to deliver in the value chain from data to data products.

The budget estimates for each of HAIS, Go2DAT, SDG 14.3.1, GOSR, STOR are not requests to IODE but estimates of cost of the activity. The support asked from from IODE is described in the text.

The activities described below are referred to in the Action Paper except GOSR and StOR. However, the identification of the need for interaction and collaboration is described below.

**3.6.1.1** **Harmful Algal Information System (HAIS)**

Cooperation of IODE and HAIS goes back to IODE-XIX in 2007 when the IODE Committee adopted Recommendation IODE-XIX.1:

**Recommendation IODE-XIX.1**

**A HARMFUL ALGAL EVENT INFORMATION SYSTEM**

The IOC Committee on International Oceanographic Data and Information Exchange,

**Acknowledging** the data products developed within the IOC Harmful Algal Bloom Programme on harmful algal events, harmful algae monitoring and management systems, current use of taxonomic names of harmful algae, biogeography of harmful algal species, and an expert directory and a bibliography;

**Recognizing** the need for a further development, integration and streamlining of these data products;

**Noting with satisfaction** the invitation by the IOC Intergovernmental Panel on Harmful Algal Blooms (IPHAB) to develop a Harmful Algal Event Information System as a joint IPHAB-IODE activity;

**Re-emphasizing** the importance of high-quality oceanographic data and information, products and services for scientific, observation and ocean based disaster warning and mitigation programmes of the Commission, for member States, the private sector and other users,

**Endorses** the IOC Harmful Algal Event Information System as a joint IPHAB-IODE activity.

The IOC HAB web site ([https://hab.ioc-unesco.org](https://hab.ioc-unesco.org/))  is hosted by the IOC Project Office for IODE, as is the IOC-UNESCO Harmful Algae Information (HAIS) system data portal ([https://data.hais.ioc-unesco.org](https://data.hais.ioc-unesco.org/)) and the Harmful Algae Event Database ([http://haedat.iode.org](http://haedat.iode.org/)).

As part of the Flanders FUST funded DIPS-4-Ocean Assessment project (2014-2021) the IOC published the first ever UN Global HAB Status Report (GHSR), which was released on 8 June 2021 and was an unprecedented analysis of Harmful Algal Bloom (HAB) events worldwide over the past 33 years. The co-authors of the GHSR mined both the global Harmful Algae Event Database (HAEDAT), which at the time consisted of 9,503 events with one or more impacts on human society, and the Ocean Biodiversity Information System (OBIS) database, which contained 7 million microalgal observation records, including 289,668 toxic algal species occurrences. Regional trends of microalgal observations in OBIS were used as a proxy for monitoring effort. Thanks to the financial support from DIPS-4-Ocean Assessments, the IODE/OBIS team also developed a new HAIS data portal ([https://data.hais.ioc-unesco.org](https://data.hais.ioc-unesco.org/)) which visualises the event data from HAEDAT with the HAB species occurrences from OBIS. During 2022-23 a new component of HAIS on algal toxins was developed and it will be linked with the species information. It is intended to serve as a reference list for algal toxins in the same way the Taxonomic Reference List in WoRMS serves as the taxonomic backbone for HAEDAT. Currently new funding is sought to support the further development and maintenance of the HAIS data systems including HAEDAT and OBIS HAB, which are both hosted by IODE.

HAIS, and HAEDAT in particular, will in the near term require an rejuvenation and this is thought into request for extra-budgetary funding.

**Estimated financial implications:**

2025: US$ 25.000 HAEDAT rejuvenation (estimate IODE time and consultant, RP and extra-budgetary funds to be identified)

2026: not assessed

**3.6.1.2** **Global Ocean Oxygen Database and Atlas(GO2DAT)**

**Established**: *The Global Ocean Oxygen Database is an initiative associated to the Global Ocean Oxygen Decade Ocean Decade Programme, and led by the Global Ocean Oxygen Network which was established in 2016 as a IOC working group (*[EC-XLIX/Dec.4.1 (III)](https://oceanexpert.org/document/19158)*).*

**Partners:/Membership:** GO2NE members, IOCCP/GOOS/ROOS, IOC, IODE, existing databases (e.g. WOD, EMODnet, CMEMS, GLODAP), GDACs (Argo, gliders, Moorings, AniBOS ,..)

**Activities**:

Terms of Reference for the GO2DAT Steering Committee:

* Composition: GO2DAT Steering Committee: Representatives of GO2NE, IOCCP/GOOS/ROOS, IOC, IODE, existing databases (e.g. WOD, EMODnet, CMEMS, GLODAP), GDACs (Argo, gliders, Moorings, AniBOS ,..)
* Define and monitor the functioning of GO2DAT GDAC in compliance with the terms of references of an IODE-approved GDAC (see next slide)
* Work with existing GDACs and the IOC UNESCO International Oceanographic Data and Information Exchange program (IODE) towards the definition of common best practices and an alignment between GDACs of metadata structure, QC and QF procedures with respect to oxygen. These community agreed best practices will be communicated to data providers and repositories via the OceanTeacher network.
* Support increased cooperation between GDACs  and the adoption by NODCs of the GO2DAT standards
* For instance, GO2DAT GDAC will receive and assemble marine O2 data and metadata from the data streams described in section “GO2DAT data flow (Grégoire et al., 2021)” check their consistency, identify duplicates, make sure that the data are quality controlled according to the GO2DAT-GDAC standards and methods, provide feedbacks to the source of data regarding quality issues, make data accessible and metadata available through the GO2DAT data portal and to IODE.

IODE is a key partner in this effort to harness and establish, if required, standard operating mechanisms (OBPS), to build capacities (OTGA) and to connect with NODCs and ADUs, many of which are key stakeholders. Additional financial was secured by the Ocean Science Section to support the development of  GO2DAT. GO2DAT is expected to be a main contribution to ODIS over the next two years.

**Estimated financial implications:**

2025: US$ 3.000 IODE participation in Steering group meeting (extra-budgetary funds)

2026: US$ 10.000 IODE participation in Steering group meeting and integration of GO2DAT into the OceanInfoHub (extra-budgetary funds)

**3.6.1.3** **Cooperation with IOC Ocean Science Section in SDG 14.3.1 data portal**

**Established**: *. In Decision XXIX/9.1, the IOC Assembly at its 29th session in 2017 took note of the assignment of IOC as a custodian agency for specific SDG 14 indicators, particularly under Targets 14.3 and 14.a. This means that the IOC is responsible for the methodological development and measurement of these SDG indicators at the global scale. In alignment with the reports delivered at the IODE XXV, IODE reassured its support to the collection of SDG 14.3.1 data for which IOC is custodian agency. To facilitate data submission, IOC has developed an online portal (https://oa.iode.org/) based on the methodology for SDG Indicator 14.3.1 and the associated data and metadata files, in cooperation with the International Oceanographic Data and Information Exchange (IODE). The online data submission interface allows for the uploading of the completed data and metadata files, with some additional information.*

**Partners:/Membership:** GOA-ON Executive Council, IOCCP/GOOS/ROOS, IODE, existing databases (e.g. WOD, EMODnet, CMEMS, GLODAP, NCEI, SOCAT).

**Activities**:

In cooperation with IODE the Commission successfully assumed its custodian role in the development of the methodology to support Member States’ implementation of and reporting on the SDG target indicator 14.3.1: Average marine acidity (pH) measured at agreed suite of representative sampling stations. Over the reporting period, IOC continued its support to its MS towards increasing the scientific and data management capacity for Ocean Acidification data and information. This was delivered via annual webinars addressed NODCs, ADUs, IOC focal points and National Statistical Offices. In addition IOC hosted a workshop, focusing on ocean acidification capacity development in October 2024. Workshop participants included OTGA and IOC Capacity Development colleagues. The output of this meeting will allow to identify how  actors in the field of ocean acidification capacity development  can improve related activities,  measures of success at different levels (detection of ocean acidification, identification of impacts, development of solutions), capacity gaps and to develop future initiatives.The SDG 14.3.1 Data Portal (https://oa.iode.org/), hosted and technically maintained at IODE, is a tool for the submission, collection, validation, storage and sharing of ocean acidification data and metadata submitted towards the Sustainable Development Goal 14.3.1 Indicator:. In 2015, the United Nations adopted the 2030 Agenda and a set of Sustainable Development Goals (SDG), including a goal dedicated to the ocean, SDG 14, which calls to "conserve and sustainably use the oceans, seas and marine resources for sustainable development". The IOC of UNESCO was identified as the custodian agency for the SDG Target 14.3: "Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels", and the associated SDG Indicator 14.3.1 ("Average marine acidity (pH) measured at agreed suite of representative sampling stations").

Thanks to the cooperation and support provided by IODE, IOC is able to receive SDG 14.3.1 data and metadata from the relevant national agencies and researchers. In order to further facilitate the submission, the version control, and to lift the burden on scientists, many of  whom are asked to provide data to several databases during the year, IOC established two tasks team, which work on the metadata and the controlled vocabulary for ocean acidification data, with the aim to develop a federated system for ocean acidification data. With continuous support by the IODE secretariat, the SDG 14.3.1 portal would become one of the platforms to be harvested on a regular basis and could act as a mirror to support visualization/exchange and ensure long term availability of the data.

Additional financial support was obtained to develop some, but not all, additional functionalities in the SDG 14.3.1 portal: (i) allow for the  uploaing of data sets to the in other formats than excel; (ii) identification of relevant data bases and agree on similar metadata templates; (iii) establishment of a federated system to harvest 14.3.1 relevant data on a regular basis (adoption of ERDDAP technology), (iv) improve the visualization available on the 14.3.1 SDG indicator portal. It is envisioned that the federated system will be included in  and supported by ODIS.

It is expected that in 2023 and 2024 IODE support will be required to implement the federated system, to maintain existing functions of the portal and to develop visualization tools for the data user as well as improving the searchability of the existing datasets.

**Estimated financial implications:**

2025: US$ 30.000 IODE participation in related working group meetings, as well as maintenance and further development of the SDG 14.3.1 data portal (extra-budgetary funds, partly identified)

2026: US$20.000 IODE participation in related working group meetings, as well as maintenance and further development of the SDG 14.3.1 data portal (extra budgetary funds, partly identified)

**3.6.1.4** **Support to the GLOBAL OCEAN SCIENCE REPORT (GOSR)**

**Established**: *Through IOC Assembly Decision IOC-XXIX/5.1 (2017), IOC Member States recognized the need for systematic, continuous and long-term data compilation on their ocean science capacity in the editions of the Global Ocean Science Report (GOSR). The first edition of the GOSR was published in June 2017, and it assessed for the first time the status and trends in ocean science capacity around the world. Following its first edition, its second edition was launched in December 2020, which addressed four additional topics: contribution of ocean science to sustainable development; blue patent applications; extended gender analysis; and capacity development in ocean science. IODE recognized the importance of the GOSR and related products and information at its 25th session. The next edition will be published in 2025. IODE supports the Editorial Board and the data collection.*

**Partners:/Membership:**

It is expected that the 2025 edition of the GOSR similar to the 2020 edition will have similar contributors including : IOC Member States, IOC sections and programmes (GOOS, IODE, MPR, Ocean Decade, Ocean Science Section, Tsunami Unit), experts from a IOC electorial groups.

**Activities**:

The GOSR is a resource for policymakers, academics and other stakeholders seeking to assess progress towards the sustainable development goals of the UN 2030 Agenda, in particular SDG target 14.a on scientific knowledge, research capacity and transfer of marine technology. The GOSR provides the information for the indicator for target 14.a as the proportion of total research budget allocated to research in the field of ocean science.

Similar to the first and second edition of the GOSR (2017, 2020), the GOS2025 will provide an overview of the the status and trends in ocean science capacity around the world. It will be a global record of how, where, and by whom ocean science is conducted, and quantitatively identified the key elements of ocean science at the national, regional and global scales, including workforce, infrastructure and publications.  It will present bibliometrics analysis related to scientific production globally.

IODE and affiliated experts contributions will be indispensable  to (i) chapters focusing on ocean data management, (ii) the improvement of the GOSR data portal, (iii) the development of the online GOSR2025 questionnaire.

With the continuous support by the IODE secretariat it is envisaged that the GOSR data portal will be further expanded, including functions to facilitate the data submission for future GOSR editions. It is expected that the GOSR data portal will provide the function of a data repository, and will allow the submission and retrieval of data and metadata, related literature, feature multiple possibilities of visualization of data to meet the needs of multiple stakeholders. Future productions of the GOSR will be only successful if IODE continues maintaining and further developing the GOSR portal, as well as providing and updating the information on ocean data management GOSR.

**Estimated financial implications:**

2025: 25.000 USD (development of GOSR 2025 online questionnaire and updating of GOSR data portal (GOSR RP and VC funds); IODE time for GOSR data portal maintenance)

2026: 5.000 USD (IODE time for GOSR data portal maintenance)

**3.6.1.5** **Support to THE STATE OF THE OCEAN REPORT (StOR)**

**Established**: *, At the 55th session of the IOC EC in June 2022, ‘the pilot edition of the IOC State of the Ocean Report’ was presented, in cooperation with the International Oceanographic Data and Information Exchange (IODE). At this session IOC Member States welcomed the regular publication of the IOC State of the Ocean Report building on the model provided by the pilot edition of the Report and taking into account the comments made during the 55th session of the Executive Council (*[IOC/EC-55/3.3](https://oceanexpert.org/document/30593)*). At 57th session of the IOC EC in June 2024 the second edition of the IOC State of the Ocean Report 2024 published as IOC Technical Series, 190 was presented. The EC appreciated the  work of the StOR Advisory Board,  and its guidance, and the need for its continued efforts to enhance the StOR in line with its intended purpose. It endorses the continued publication of the StOR, reliant on further refinement and subject to the availability of extrabudgetary funding (*[*IOC/EC-55/4.5*](https://oceanexpert.org/document/34591)*).*

**Partners:/Membership:** Contributors to the StOR 2024 include: 99 authors from 25 countries summarizing the State of the Ocean in 70 pages (44% female / 56% male); 45 reviewers (53% female / 47% male); 14 experts as part of the StOR Advisory Board (29% female / 71% male);  IOC sections and programmes (Ocean Science Section, Ocean Observation Section, Marine Policy and Regional Coordination Section, IODE, Tsunami Unit, Ocean Decade Coordination Unit),.

**Activities**:

The State of the Ocean Report (StOR) has the ambition to inform policy-makers about the state of the ocean and to stimulate research and policy actions towards ‘the ocean we need for the future we want’, contributing to the 2030 Agenda and in particular SDG 14, which reads ‘Conserve and sustainably use the oceans, seas and marine resources’, as well as other global processes such as the UNFCCC, the Convention on Biological Diversity and the Sendai Framework for Disaster Risk Reduction. Structured around the seven Outcomes of the UN Decade of Ocean Science for Sustainable Development, the Report provides important information about the achievements of the UN Ocean Decade and, in the longer term, about ocean well-being. The StOR will be used to inform policy and administrative priorities and identify research focus areas that need to be strengthened or developed. The different sections provide insights on ocean related scientific activities and analyses describing the current and future state of the ocean, addressing physical, chemical, ecological, socio-economic and governance aspects.

Thanks to the cooperation and contributions provided by IODE and affiliated experts, the StOR includes storylines addressing marine biodiversity (Outcome 2), ocean observation (Outcome 6) and  data availability and sharing (Outcome 6).

Future productions of the StOR will be only successful if IODE continues providing and update the previously mentioned information/storylines, with biodiversity, ocean observation and data management being key parameters to assess the state of the ocean.

**Estimated financial implications:**

2025: 5000 USD, (IODE time for drafting content for the StOR)

2026: 5000 USD (IODE time for drafting content for the StOR)

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