**Eighth Meeting,** 1-3 May 2019[goosocean.org/goos-sc-8](http://goosocean.org/goos-sc-8)

# Document: Requests and recommendations for the SC by GOOS Biogeochemistry Panel of Experts

*Agenda item: 9.2. GOOS Biogeochemistry Panel (IOCCP)*

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*Prepared by: Artur Palacz, Maciej Telszewski, Masao Ishii, Kim Currie*

# Marine plastics contamination and Human Pressure Variables

During the 7th Session of the GOOS Steering Committee (June 2018), it was recommended that GOOS Biogeochemistry Panel takes charge of scoping the community needs for international coordinating of sustained ocean observations of marine plastics.

The IOCCP SSG discussed whether or not IOCCP was willing and capable to get involved in coordination of sustained observations of marine plastics, and if so, in what capacity and to what extent? The IOCCP Executive proposed two modes of operation in case of an affirmative. First, was to outsource these tasks to external groups with IOCCP acting as liaison with GOOS, similar to how we responded to the request to curate the Ocean Colour EOV; or second, to handle the matter internally.

SSG agreed that the issues of marine plastics monitoring are vital from the societal perspective, as recognized by the regional and global conventions (e.g. EU Marine Strategy Framework Directive, UN Agenda 2030) and as reflected in the GOOS Strategic Objectives. The SSG also recognized the challenges related to even identifying what part of this highly complex variable should and could be measured. Aspects such as monitoring various species of plastic, various fractions (micro vs macro), and whether in situ or space-borne observations are more feasible and why, are just a few examples of fundamental questions which need addressing as soon as possible. Recognizing these challenges, the group suggested that it is likely premature to establish standard operating procedures for monitoring marine microplastics. However, developing common methodology would be a priority for the global community involved in plastics monitoring efforts. It was also mentioned that IOCCP, in its form, could not comfortably advise on data management issues related to marine plastics. Biogeochemistry Global Data Assembly Centre could potentially be considered but it is pre-mature to make any recommendations as data management practices in marine plastics community have very low maturity level.

The group argued on the extent to which marine plastics were in fact part of biochemical cycles and therefore to what extent this theme falls with the IOCCP/GOOS Biogeochemistry mission. There was no consensus on the role of biogeochemical breakdown of these compounds, perhaps reflecting both the lack of sufficient knowledge on the topic and the lack of sufficient expertize on our panel. It was recognized that GESAMP, UN Environment and lately also SCOR have expert working groups dedicated to this topic and they would be more suited to herding the relevant members of the community.

**Decision:**

The IOCCP SSG decided that in the short-term IOCCP will be involved in collecting information on the status and needs of marine plastics monitoring, acting as a conduit for some other organizations on behalf of GOOS and not assuming any leadership role in the process.

*See below for the brief summary of key actors and 2018-2019 scoping activities related to setting requirements for marine plastics observations.*

**Recommendation:**

The IOCCP SSG recommended that a long-term solution would be to create a dedicated expert panel of GOOS, or a development program aiming towards calling such a panel, which would in partnership with the relevant organizations (e.g. UN Environment, GESAMP WG 40, EU EuroSea project if funded) and expert working groups take up the challenge of coordinating ocean observations of marine plastics.

This Panel need not be limited to marine plastics, but would account for all “Human Pressure Variables”, as per original idea put forward by GOOS in 2016.

As a side note, the IOCCP SSG noted that CO2 concentration and fluxes (Inorganic Carbon EOV) have a substantial anthropogenic pressure component which could be subject to such Panel’s scope of work as well. Similar overlaps likely exist for a few other EOVs.

**List of key actors and scoping activities towards setting requirements for sustained observations of marine plastics contamination:**

*1) UN Environment & IOC UNESCO*

In 2018, IOCCP Office has joined the "SDG 14.1.1 Marine Pollution Community of Practice" established and coordinated by UN Environment. The membership list is long and to some extent gives an overview of the academic, government and inter-government institutions interested/engaged in the issue globally.

Three GOOS Staff members attended a remote conference of the SDG Community of Practice in January 2019. As an outcome, the group decided to split into experts working on indicators describing three aspects of nutrient and marine litter pollution: i) sources ii) states, and iii) impacts. It is the latter where some interaction with the World Health Organization (WHO) might also be relevant, e.g. for developing indicators of human health. Citizen Science Organizations, strongly represented in the SDG Community of Practice, appear very interested in this aspect.

The SDG Community of Practice also held a workshop in Paris in Fall of 2018, jointly with IOC-UNESCO. Emma Heslop attended the Paris workshop in person and has had further interactions with UN Environment staff on the topic.

With regard to the issue of marine pollution, it is important that GOOS builds and maintains a strong partnership on the leadership level of GOOS and UN Environment, as well as on the technical level of expert work. Pending sufficient funding for project officer is available, GOOS Biogeochemistry Panel will continue its activities in this domain, including involvement in the SDG Community of Practice and where relevant other initiatives of UN Environment and IOC UNESCO.

*2) GESAMP WG 40 - http://www.gesamp.org/work/groups/40*

Regarding the state of marine litter pollution, as well as observing capacity, GESAMP WG 40 is a key partner. In addition, the Terms of Reference of this WG specify examining the effects of marine plastics pollution and making adequate policy recommendations. GOOS Biogeochemistry Panel established early dialogue with representatives of the WG. Some early technical work has also been conducted as early as in December 2016.

*3) SCOR WG FLOTSAM - http://scor-flotsam.it/*

A group of technical experts with a strong focus on identifying gaps in understanding and modelling capabilities for marine litter distribution and transport, including from remote sensing. As such, the outcomes of this SCOR WG are directly relevant and should be viewed in parallel to the first sub-group of the SDG 14.1.1 Marine Pollution Community of Practice.

*4) National space agencies, e.g, NASA, ESA.*

There are ongoing efforts to provide (future) capacity to monitor marine litter from space. It is recommended that interaction with space agencies occur via the community of practice and expert WGs listed above.

*5) MICRO 2018 Conference - https://micro2018.sciencesconf.org/*

IOCCP Director attended the Micro 2018 Conference to obtain a better overview of different academic institutes involved in marine plastics research and monitoring. Except for presenting the Framework for Ocean Observing and GOOS in the context of future sustained observations of marine plastics pollution, a few observations were made at the meeting. First, it became quite apparent that there is a numerous early-career scientist community employed in microplastics research. This community is growing rapidly, with high potential for innovation. Second, there is a wide array of methodologies being applied globally and any efforts to promote standards and best practices among this community will be very challenging but are at the same time urgent.

Regarding long-term observations from existing GOOS observing networks, it’s worth noting the 60-year time series of macroplastic observations in the North Atlantic provided by the Continuous Plankton Recorder (Ostle et al., 2019; <https://www.nature.com/articles/s41467-019-09506-1>).

*6) VOLVO Ocean Race Sustainability Program (active collaboration with UN Environment, Toste Tanhua heavily engaged)*

This partnership takes full advantage of a universal sport as a fantastic conduit for raising awareness on the issue of marine plastics pollution and the importance of its sustained monitoring. At the same time, it presents a unique opportunity for global monitoring and research, with some obvious caveats and limitations.

See e.g. this news item: <https://www.volvooceanrace.com/en/news/12047_Sustainability-Programme-continues-to-ride-the-crest-of-a-wave.html>

# Strategy for IOCCP’s full transition into Biogeochemistry Panel

As nominal curators of all Biogeochemistry EOVs, the IOCCP attempts to gradually expand our coordination and communication activities in order to help the ocean observing community increase the readiness levels of individual EOVs. Over the past 6 years we lead the community to establish a set of biogeochemistry EOV’s and we managed to provide a wide coordination support for three out of nine EOVs. We now work to develop a careful strategy and conservative time plan to further expand our portfolio and perhaps add another three EOVs over the next 5-10 years.

IOCCP Executive selected three candidate EOVs to choose from for the implementation into the Panel’s activities: nitrous oxide, dissolved organic carbon and particulate matter. Prior to the SSG discussion on priorities and strategies for these EOVs, it was noted that the Oxygen Theme has only been added to the IOCCP portfolio in 2018 and that the coordination and communication efforts related to oxygen observations have likely not yet reached their full capacity. With respect to the Ocean Colour EOV, any implementation activities will continue to be a joint venture of the International Ocean Colour Coordinating Group (IOCCG) and GOOS BGC and BioEco Panels. IOCCP’s main role is to curate the Ocean Colour EOV Specification Sheet – and not to lead all coordination and communication efforts related to this EOV.

Several criteria were put forward to judge the impact and feasibility of taking up new responsibilities with respect to EOVs: size and leadership in the observing community (if any), connection to observing networks (and satellite agencies), technological advancement, use of standards and best practices, data availability and quality, societal drivers and value for data users (scientific and non-scientific), importance for constraining mass balance of biogeochemical cycles.

IOCCP Executive determined the order and timing of adding new EOVs to IOCCP portfolio of activities. However, the decision to expand has ultimately been delayed due to insecurity in maintaining a two-staff office without which further expansion of Panel’s coordination activities will not be possible.

**Decision:**

IOCCP SSG decided to gradually expand its portfolio of coordination and communication activities onto the remaining six of the nine Biogeochemistry EOVs, starting from 2019.

IOCCP Executive decided to delay the expansion until funding for project officer is confirmed for beyond 2019. On that condition, a new SSG member position and theme will be created within IOCCP in 2020.

# Procedure for adding new EOVs through a consistent impacts vs feasibility assessment

GOOS has been receiving requests for changing and adding new EOVs for the past years. These requests often come from scientific communities gathered around specific observations (e.g. microbes, water isotopes), or as recommendations from projects (e.g. the Deep Ocean Observing Strategy). Currently, the process of handling these requests and recommendations is neither formalized within GOOS nor clearly communicated to the observing community. Depending on the GOOS Panel’s assessment, a new variable can either be added to the list (e.g. ocean surface stress) or be initially approved as an emerging EOV (e.g. microbe biomass and diversity). DOOS EOVs are currently loosely affiliated with the work of the GOOS Panels, and it is unclear how to proceed with their proper integration.

Moreover, each Panel has adopted their own method of assessing the impact and feasibility of a proposed measurement. The Panels have demonstrated good cross-disciplinary collaboration on setting EOV requirements (e.g. Ocean Colour EOV) and cross-panel discussions should precede any decisions on adding new EOVs. The challenge is to make the process transparent to the community and as far as possible consistent across GOOS structures. Formalizing the process is aligned with the GOOS Strategic Objective #5: “Provide authoritative guidance on implementation for integrated observing; synthesizing across evolving requirements.”

Following a proposal from the GOOS Co-Chair, Toste Tanhua, the Biogeochemistry Panel recommends to establish a process which considers the following steps:

* Request for adding a new EOV is taken up by the GOOS Panels Secretariat.
* At least one GOOS Panel is tentatively assigned to analyze impacts and feasibility of the proposed EOV based on a filled out draft EOV Specification Sheet.
* If necessary, the assessment should be carried out jointly by representatives from two or three Panels, and potentially external experts.
* Upon a positive recommendation from the Panels, the proposal is presented to the GOOS SC for approval at the nearest meeting.

**Recommendation:**

The Panel recommends to set up a process for reviewing proposals for new EOVs, based on a consistent analysis of impact vs feasibility; and to communicate the process clearly to the community via GOOS website.