



## **SOCAT governance, SOCAT links with SOCONET and a possible joint structure for SOCONET, SOCAT and SOCOM**

- Workshop Report -

8-9 June 2026, Flanders Marine Institute (VLIZ), InnovOcean Campus, Ostend, Belgium

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### **Rationale for the meeting**

The Surface Ocean CO<sub>2</sub> Atlas (SOCAT, [www.socat.info](http://www.socat.info)) provides quality-controlled synthesis products of in situ global surface ocean CO<sub>2</sub> measurements since 2011. It is the second step in the surface ocean carbon value chain in which collection of surface ocean CO<sub>2</sub> measurements (in SOCONET - Surface Ocean CO<sub>2</sub> Observing Network, <https://www.ioccp.org/soconet>), their synthesis (in SOCAT), mapping and analysis (in SOCOM - Surface Ocean CO<sub>2</sub> Mapping program) enables quantification of ocean CO<sub>2</sub> uptake in the Global Carbon Budget, which informs policy makers via UNFCCC (United Nations Framework Convention on Climate Change). SOCAT and other elements of this value chain are key for implementation of WMO's (World Meteorological Organization) Global Greenhouse Gas Watch (G3W) program.

Recent developments include:

1. The call for a governance structure for SOCAT by the G7 FSOI (Future of the Seas and Ocean Initiative, <https://www.g7fsoi.org/>) and the EU G7 FSOI representative as deemed essential for SOCAT being able to receive long term funding;
2. The need to discuss the links between SOCONET and SOCAT upon the establishment of SOCONET as an emerging GOOS (Global Ocean Observing System) network;
3. The suggestion that a single structure for SOCONET, SOCAT and SOCOM would provide greater visibility for the ocean carbon value chain.

These three topics were explored in a series of online meetings in March 2026. SOCAT global group members and regional group leads (as representatives of SOCAT data providers and quality controllers) then discussed these three topics and agreed on ways forward for each of them in this 2-day meeting at VLIZ. Representatives of SOCONET and SOCOM attended on 9 June for discussion of the second and third points. This document

summarizes the main discussion points and lists agreed action points. Sessions were not recorded.

| Day 1 - Monday 8 June 2026 – SOCAT governance |                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time                                          | Theme                                                                                                                                                                                                                                                                                                                                                                         |
| AM                                            | <ul style="list-style-type: none"> <li>→ <b>Welcome and Aims of the meeting</b></li> <li>→ <b>Welcoming words</b> - Peter Grönwoldt, for the German Ministry of Science, Technology and Space (BMFTR)</li> <li>→ <b>Terms of Reference for the SOCAT Steering Committee - Governance Document 1</b></li> <li>→ <b>How does SOCAT work? - Governance Document 2</b></li> </ul> |
| PM                                            | <ul style="list-style-type: none"> <li>→ <b>SOCAT hubs – Define their scope and framework - Governance document 2</b></li> <li>→ <b>Links of SOCAT hubs to other organisations - Governance document 2</b></li> <li>→ <b>Links of SOCAT to other organisations - Governance document 2</b></li> <li>→ <b>Launch of European SOCAT hub</b></li> </ul>                          |

# **1. Terms of Reference for the SOCAT Steering Committee - Governance Document 1** - Dorothee Bakker, with slides by Are Olsen

## **Background**

Draft Terms of Reference (ToR) for the SOCAT Steering Committee (SC) were developed using input from an online meeting of the global group with regional group leads on 4 March 2026 and a follow-up meeting by Are Olsen, Maciej Telszewski and Dorothee Bakker. Participants of the meeting on 4 March also agreed to a second governance document for SOCAT, with the provisional title: How does SOCAT work? Both documents were circulated to workshop participants and the wider SOCAT community with a request for comments. The discussion below addresses these comments.

Ideally the ToR would not have to be changed often. It was suggested that the ToR should reference the ‘How does SOCAT work? Governance document 2’.

**ToR: Overview** (same for both governance documents)

## **Should “data assembly centre” be capitalised?**

No, SOCAT is currently not an official Data Assembly Centre (DAC), so no capital letters. Should SOCAT become an officially recognised International Oceanographic Data and Information Exchange (IODE) DAC or an IODE Associated Data Unit (ADU)? SOCAT already carries out many of the functions of a DAC and an ADU, so gaining formal recognition would require additional work, but would also bring benefits such as certification,

improved visibility, stronger official status (for example with G3W), participation in IODE meetings, and possibly better access to funding. The process would likely be led by the SOCAT hub at PMEL (NOAA's Pacific Marine Environmental Laboratory) and would require coordination between hubs, but it would not affect the ToR or How does SOCAT work? (governance document 2). Participants agreed that the requirements and resources need to be evaluated, and that this could be a future step towards a more formal SOCAT structure.

### **ToR: SOCAT Steering Committee**

No comments

### **ToR: Membership of the SOCAT Steering Committee**

#### **What is a “science member”? - Clarification needed.**

It was proposed that science members of the SC should represent major contributors to data provision and/or quality control and possibly to represent major users. Some supported limited or non-voting participation for data users, while others preferred to involve users through consultation rather than governance. Including users in the definition of science members could cover what we need.

The group agreed to include users within the science member category and to clarify roles and terminology. It was agreed that clearer distinctions are needed between SC members, stakeholders, and their respective roles, including voting rights and rotation of positions.

The group discussed that representatives of the hubs, the OceanOPS SOCONET Technical Coordinator and representatives of government agencies, international and intergovernmental bodies and national scientific programs would be ex officio, but it is still unclear what this means in practice. Voting rights are not currently defined in the document. It was noted that people can always be invited to SC meetings when specific expertise is needed.

- ☐ Define: a “science member”,
- ☐ Clarify that “Contribution” means data provision and / or quality control.
- ☐ Add ‘and/or major users’.
- ☐ Include users in the science member category,
- ☐ Define: ex officio members,
- ☐ Restructure membership descriptions by roles (science members.... etc.)
- ☐ Make it clear that the OceanOPS SOCONET Technical Coordinator and the second SOCONET SC member on the SOCAT SC are two different people.

## **How are members nominated to the SOCAT SC?**

The group discussed that the current SOCAT Global Group will become the SC, noting that it needs to be checked whether current Global Group members would like to join the SC. Once the new SC is in place, it will carry out a skills review and decide whether additional SC members are needed.

There is a demand to clarify that the SC is not just a renaming of the Global Group. It should represent the community more widely. That is where the science members can come in. Additional regional group leads could join the SC, to give one possible example.

Indicate the start date of the SC: The ToR will be activated and the SC will become operational once the amended ToR have been approved by the SOCAT Global Group members and regional group leads (i.e. the workshop participants and some that could not attend).

- ☐ Dorothee (chair of Global Group) will ask current SOCAT Global Group members if they would be willing to sit on the SC for (at least) one 4-year term.
- ☐ The new SC will review its membership using a skills matrix and, depending on the outcome of this, put out a call for new members.

## **ToR: Responsibilities of the SOCAT Steering Committee**

The group agreed that identifying potential SOCONET operators is not needed in the ToR. The SOCAT SC could be linked to SOCONET through “interaction” or “information exchange” rather than “reporting.” It was noted that SOCAT should remain connected to higher-level structures (e.g. GOOS / WMO), but detailed reporting requirements are not defined. SOCONET’s role in this was highlighted (via the SOCONET SC members on the SOCAT SC).

The group discussed the addition of ‘developing an implementation plan’ to complement the SOCAT strategy (including future ambitions and to support funding requests) as a responsibility for the SOCAT SC. No agreement on developing an implementation plan as a SC responsibility was reached.

It was pointed out that it is not clear how regional groups relate to the SC. A suggestion was made to include in the SC responsibilities the need to communicate and coordinate with these groups, which was supported.

- ☐ “Identify potential SOCONET operators” - to be removed,
- ☐ What’s the difference between “protocols and methods (10)” and “maintain and improve...quality control (4)” → Remove item 10 (co-design protocols).
- ☐ Include in the SC responsibilities the need to communicate and coordinate with SOCAT quality controllers in regional groups, as well as with data providers and hubs.

## **ToR final discussion**

- ☐ Amend the ToR (Governance Document 1) by August 2026
- ☐ Circulate the ToR by email to workshop participants for agreement. Absence of responses will be considered as a sign of agreement.

## **How does SOCAT work? - Governance Document 2 - Siv Lauvset**

### **Status and parts of “How does SOCAT work?”**

This second governance document could be amended regularly and remain flexible, while modifications to the ToR will be infrequent. The group decided that the second SOCAT governance document will have two parts: Part 1 will describe current SOCAT operations. Part 2 will describe SOCAT ambitions. The current draft will be amended accordingly with text to be added on SOCAT ambitions.

- ☐ Split draft governance document 2 into two parts: Current operation of SOCAT and ambitions of SOCAT.

### **Will “How does SOCAT work?” be an implementation plan?**

No, the second governance document will not be an implementation plan. An implementation plan would be a separate document. An implementation plan should be visible to external stakeholders and could support funding requests. No decision was made on whether SOCAT will write an implementation plan.

## **How does SOCAT work? Structure of SOCAT**

### **Discussion using Denis Pierrot’s organogram for SOCAT made with AI.**

The group agreed to remove duplicate regional groups and to name the hubs clearly. The group agreed to name hubs by their function, rather than by region. There was discussion on whether “hubs” is the right term with suggestions made for alternatives such as “topical hubs.”

The diagram made with AI showed where draft governance document 2 is not clear or omits SOCAT structures and activities. For example, regional groups and their leads are integral to quality control in SOCAT. The arrows in any diagram need to make this clear.

The need to better show links with external bodies (e.g. SOCONET, GOOS) was highlighted, as well as positioning SOCAT within the wider data value chain. It was also suggested that

data providers, rather than the Steering Committee, should be at the centre of the structure in the organogram.

The group agreed that roles, tasks (including quality control), funding, and the contribution of voluntary work should be more clearly described in the document. Some proposed adding structured tables with information such as effort (FTE), status, and whether tasks are funded or voluntary, to improve transparency and support funding discussions. However, there were concerns about including costs directly in this document. Overall, the need to clearly define roles, tasks, and resource needs was emphasised, including funding for core activities and for the Steering Committee itself.

- ☐ Major review of the organogram for governance document 2.
- ☐ Hubs will be renamed by function and all mention of regional hubs will be removed. The exact names of the hubs are to be decided. For example, Hub 1 for SOCAT Data Management and Hub 2 for SOCAT Coordination.
- ☐ Archiving of (many, not all) data submitted to SOCAT and of SOCAT data products at NOAA National Centers for Environmental Information (NCEI) will be part of Hub 1.
- ☐ Mention should be made of backup of SOCAT data products at GEOMAR.
- ☐ Add funding to the document, possibly as an appendix, in a table or a figure, both for the present (Part 1) and the ambitions (Part 2). This will need thought.

#### **Data providers, quality controllers, regional groups, regional group leads**

The group discussed where data providers, quality controllers (QCers), regional groups and regional group leads should fit, agreeing that they do not need to be detailed in Table 1 with tasks for the SC and the hubs but that they should be clearly described elsewhere (e.g. mentioned in the introductory text, description in sections and tasks in a separate table).

- ☐ Ensure that the importance of data providers, quality controllers, regional groups and regional group leads is made clear in governance document 2 by naming them in the 'Overview', by adding sections on them and by adding a separate table with their tasks and in the organogram.

#### **How does SOCAT work? Table 1 on the SOCAT hubs and their tasks**

Table 1 (in part 1 of document 2) with tasks for the SC and the hubs should focus on listing tasks and who is responsible, including shared responsibilities, and should reflect current operations (e.g. removing Hub 3). Several items currently in Table 1 will be moved to a similar Table in part 2 of the document, on SOCAT ambitions.

- ☐ Separate Table 1 into 1) current operations and 2) ambitions
- ☐ Remove any mention to Hub 3 (in part 1 of document 2)

## **2. Discussion on collaboration of the SOCAT hubs - Eugene Burger**

The discussion emphasised that SOCAT and SOCONET are evolving, with SOCONET as part of an emerging GOOS network, where harmonised and structured metadata will be essential for integration, data exchange, and network monitoring. The use of a common metadata editor, aligned with OceanOPS requirements, is seen as a key step towards this goal, with shared metadata standards across SOCONET and SOCAT.

At the same time, there is a need to clarify roles and responsibilities for metadata management and operations between the two frameworks (i.e. SOCONET and SOCAT). Data preservation was also raised as a concern: NCEI can archive original data submitted to SOCAT, but only on request, and many contributors manage their own data storage, sometimes without clear links back to SOCAT. This creates gaps in traceability and long-term access to original data sets.

Participants highlighted that ensuring systematic data archiving should become a clearer responsibility within SOCAT or a designated hub. However, challenges remain, including differing national practices, existing workflows (e.g. ICOS (Integrated Carbon Observation System, <https://www.icos-cp.eu/>) assigning its own DOIs), and sensitivities about where data are stored. While backup solutions (e.g. at GEOMAR) exist, improving coordination with national data centres and tracking distributed archives would require additional effort and collaboration.

These recommendations were made:

- ☐ Finalising the metadata editor is a top priority for SOCAT in autumn 2026. If the metadata editor is completed on time (by mid-October 2026), then use of the metadata editor will be made compulsory for data submission to version 2027.
- ☐ Update of the metadata editor is likely to require training or training videos for data providers.
- ☐ The SOCAT quality control system and the public Data Set Viewer will be updated in summer / autumn 2027, to be completed by October 2027. This update will require revision of relevant parts of the SOCAT quality control cookbook and training of quality controllers.
- ☐ Identify missing DOIs in the SOCAT synthesis product v2026
- ☐ Track the missing DOIs

## **3. Launch of the SOCAT Coordination Hub at VLIZ - Thanos Gkritzalis**

Thanos Gkritzalis formally launched the SOCAT Coordination hub at the Flanders Marine Institute (VLIZ). Formally this hub started on 1 March 2026 with the employment of S. Poelmans. VLIZ funds the hub, initially for two years.

| Day 2 - Tuesday 9 June 2026 (AM) - SOCAT links with SOCONET |                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time                                                        | Theme                                                                                                                                                                                                                                                                                                                                        |
| AM                                                          | <ul style="list-style-type: none"> <li>→ Introduction on links between SOCONET and SOCAT</li> <li>→ Outcomes of the SOCONET survey</li> <li>→ Discussion on links between SOCONET and SOCAT</li> <li>→ Links of SOCONET and SOCAT to stakeholders</li> <li>→ Discussion on joint webinars / online workshops by SOCONET and SOCAT</li> </ul> |

### **Introduction on links between SOCONET and SOCAT** - Tobias Steinhoff

SOCONET Tiers represent an assessment of observational capability for surface ocean fCO<sub>2</sub> data collection and do not automatically guarantee assignment of the corresponding SOCAT data set flag. The final SOCAT data set flag will depend on the actual quality of the surface ocean fCO<sub>2</sub> data produced.

SOCONET Tiers are under development. Generally, SOCONET will define the Tier levels in a way that they map onto SOCAT flags:

SOCONET Tier 1 - SOCAT flag B (A)

SOCONET Tier 2 - SOCAT flag C

SOCONET Tier 3 - SOCAT flag E

SOCONET Tier 1 will be the reference network. SOCONET is discussing whether the reference network should include atmospheric xCO<sub>2</sub> (mole fraction of CO<sub>2</sub>) in the marine boundary layer. SOCONET and SOCAT will need to solve how moorings and USVs (uncrewed surface vehicles) with air-water equilibration fit into SOCONET Tier 1, even when they currently get a SOCAT flag C.

SOCONET data will be identifiable within SOCAT data products through an internal WIGOS ID, enabling traceability. Responsibility for assigning WIGOS IDs is still under discussion, with the aim of assigning them at installation (SOCONET) where possible, and at data submission (SOCAT) if necessary. This process will be coordinated between SOCONET, SOCAT and OceanOPS. While linking WIGOS IDs to data DOIs will be technically feasible, implementation details are still under development. Non-SOCONET data may receive WIGOS IDs, but this is considered unlikely. A dedicated SOCONET sequence within the WIGOS ID will allow SOCONET data to be clearly identified in SOCAT data products.

Metadata was highlighted as the critical element linking systems and workflows. Two distinct metadata layers need to be managed: instrument-level metadata (handled via OceanOPS) and dataset-level metadata. Work is ongoing with OceanOPS to ensure metadata is sufficient for both operational and scientific requirements. Future developments, such as the transition from categorical SOCAT data set flags to numerical uncertainties for individual fCO<sub>2</sub> measurements and the inclusion of new fCO<sub>2</sub> data streams, e.g. from new sensors, will further increase metadata demands.

Key challenges include achieving complete, machine-readable metadata with controlled vocabularies. Structural differences between monitoring systems and data systems remain an issue, for example OceanOPS' reliance on programmes, which are not currently used within SOCAT. SOCONET is seen as a mechanism to enforce higher metadata standards among its contributors, while ongoing dialogue with the community is needed to balance metadata requirements with practical feasibility.

### **Outcomes of the SOCONET survey** - Vlad Macovei

A SOCONET survey was conducted at the Ocean Sciences Townhall, Glasgow, in February 2026. The survey had participants from a variety of backgrounds, but the majority were scientists.

There is a clear need to engage specific community groups, especially those collecting surface ocean CO<sub>2</sub> data but not submitting them to SOCAT. SOCONET might therefore establish regular, improved surveys and better capture stakeholder information at events with global representation. Expanding the narrative beyond surface ocean CO<sub>2</sub> (e.g. acidification, coastal data, Sustainable Development Goals (SDGs), marine carbon dioxide removal (mCDR)) will help broaden relevance and engagement.

A key challenge is demonstrating the value of participation in SOCONET and SOCAT, particularly for regionally focused communities; benefits include increased visibility, contribution to global assessments (e.g. Global Carbon Budget, Sustainable Development Goals - SDGs), and potential support for funding.

Participation in SOCONET must be accessible. SOCONET should define clear, low-barrier pathways and begin network implementation, while avoiding exclusion of future participants. While all SOCONET contributors will submit their data to SOCAT, data submission to SOCAT will not require participation in SOCONET.

Improved communication and coordination mechanisms (e.g. mailing lists, platform-specific channels) are needed, in collaboration with SOCAT and OceanOPS.

Near real-time (NRT) data is a growing requirement, but would represent a significant shift for SOCONET and SOCAT, requiring new resources and system adaptations.

### **Discussion on links between SOCONET and SOCAT** - Tobias Steinhoff, Kevin O'Brien, Dorothee Bakker

There is an interest in integrating SOCONET and SOCAT, as this could improve clarity, especially for funders, and better represent the value chain from observations to quality-controlled data. However, full integration may also introduce risks, such as reduced funding flexibility and organisational complexity.

In the short term, participants favour close coordination rather than a merger, with potential long-term integration once roles, needs, and future plans are clearer. A strong joint strategy

is needed, alongside a clear definition of governance responsibilities between SOCONET and SOCAT.

Demonstrating impact and data use (e.g. for mapping, modelling, data assimilation) and clarifying the true cost of data submission and quality control are key to securing funding. Ultimately, improving how the system is presented externally — as a coherent, end-to-end framework — will support funding, communication, and stakeholder understanding.

### **Links of SOCONET and SOCAT to stakeholders** - Dorothee Bakker

The discussion recognised the WMO's G3W as an important initiative, but emphasised that SOCAT and SOCONET should not focus on it exclusively. Surface ocean CO<sub>2</sub> observations were considered essential both as inputs to atmospheric inversion models and as constraints through ocean carbon sink estimates, particularly as these inversion systems become more operational. Participants noted that surface ocean CO<sub>2</sub> data already support a broader range of applications, including pCO<sub>2</sub> reconstructions of quantification of ocean CO<sub>2</sub> uptake, ocean acidification studies, satellite validation and evaluation of Earth System Models and sensors. G3W was therefore viewed as one important opportunity to strengthen and formalise the surface ocean CO<sub>2</sub> observing network and synthesis, but not the only relevant framework.

There was agreement on the need to broaden perspectives and identify several key application areas beyond G3W. Developing a clear plan would help position SOCONET and SOCAT contributions across multiple initiatives, such as the Global Carbon Budget and other programmes, and better reflect the full value of the data.

### **Joint webinars / online workshops by SOCONET and SOCAT** - Tobias Steinhoff, Kevin O'Brien, Siv Lauvset

While several priorities for webinars and online workshops were already recognised — including metadata handling and updated secondary quality control (QC) tools — participants highlighted the difficulty of systematically identifying specific training gaps across different user groups. There was agreement that some training topics, such as quality control, should target both data providers and SOCAT secondary QC operators, suggesting a need for integrated approaches between SOCONET and SOCAT.

Existing initiatives, such as IOCCP summer schools and ICOS workshops, already address links between observations and data quality, but these are resource-intensive and not always accessible to all (e.g. ICOS is a European Research Infrastructure). As a result, participants emphasised the importance of developing flexible and cost-effective training formats, including online tutorials, webinars, instructional videos, and practical events such as hackathons. Plans exist to expand SOCAT documentation and to create a dedicated online “how-to” resource section. Regular webinar series could further support continuous learning across the SOCONET and SOCAT communities, subject to funding.

Looking ahead, the introduction of a new SOCAT QC system (expected for v2028, so by fall 2027) will require targeted training activities in fall 2027. More broadly, there is a need to reconsider working practices, as both data submission and QC activities are currently concentrated around annual deadlines. While this reflects common behaviour and efficiency considerations, it creates bottlenecks. Encouraging more continuous engagement with data throughout the year — potentially supported by training and by operational monitoring needs within SOCONET — could help distribute workloads more evenly.

Finally, improving metadata quality and making it fully machine-readable was identified as a key opportunity to streamline processes, particularly by enabling greater automation of SOCAT secondary QC.

N.B. Comment made: An AISBL (Association Internationale Sans But Lucratif) is an international non-profit organisation under Belgian law. An AISBL was proposed as a possible way to create a legal entity for e.g. SOCAT.

**Day 2 - Tuesday 9 June 2026 - A possible joint structure for SOCONET, SOCAT and SOCOM**

| Time | Theme                                                                                                                                                                                                                                  |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PM   | <ul style="list-style-type: none"> <li>→ An integrated approach to Ocean Carbon Observations in the context of the fit-for-purpose observing system</li> <li>→ Possible joint structure for SOCONET – SOCAT – SOCOM in SOCS</li> </ul> |

**An integrated approach to Ocean Carbon Observations in the context of the fit-for-purpose observing system** - Toste Tanhua

The discussion examined the origin and relevance of the commonly cited 10% uncertainty target for net carbon fluxes between the ocean and the atmosphere. This target originates from earlier GCOS (Global Climate Observing System) implementation plans and was designed for large-scale, Earth system carbon cycle assessments. However, participants noted that it has not been explicitly adopted in recent frameworks such as G3W, and may not be appropriate for all applications. In particular, it was considered insufficient for more demanding contexts such as mCDR or local-scale climate interventions, where different and more precise targets may be required.

There was agreement that uncertainty targets must always be clearly defined in context, including their spatial and temporal scales and whether they apply to net or gross fluxes. The current lack of clearly defined targets from organisations such as WMO or UNFCCC was identified as a challenge, as these are needed to provide a mandate and direction for observational network design. At the same time, participants emphasised that such targets should not be imposed arbitrarily, but emerge from scientific understanding and must be refined through dialogue between scientists and policy bodies.

The group also stressed the importance of communicating that accurate carbon tracking is essential for evaluating climate mitigation strategies, and that observational efforts should be framed not only as scientific research but as directly addressing societal needs.

Finally, coordination challenges were discussed. While organic carbon observations were seen as a related but separate domain, maintaining links between communities is important, particularly as new sensors and shared platforms emerge. The need for continued scientific research alongside operational observations was also emphasised, as well as the importance of broader system integration, including atmospheric CO<sub>2</sub> measurements over the ocean. Organisations such as IOCCP (within GOOS) could play a role in fostering these connections, subject to available resources.

**Possible joint structure for SOCONET - SOCAT - SOCOM in SOCS** - Maciej Telszewski, Jamie Shutler, Peter Landschützer, Ute Schuster, Vlad Macovei

The discussion explored whether SOCOM (Surface Ocean CO<sub>2</sub> Mapping program) should become more formally integrated with SOCONET and SOCAT via the creation of an overarching group, suggested to be called SOCS (Surface Ocean Carbon System), or whether SOCONET, SOCAT and SOCOM should remain informal, loosely coordinated activities. At present, SOCOM operates mainly as an intercomparison effort and lacks a formal structure, formal leadership, and dedicated funding, despite producing regular outputs such as annual contributions to, and guidance for, the Global Carbon Budget. This creates tension between its informal organisation and its quasi-operational role.

There was broad recognition that closer integration across SOCONET, SOCAT, and SOCOM could strengthen the overall surface ocean carbon value chain — from observations to data products and synthesis — and make the value chain more visible and understandable to funders and stakeholders. Formalisation could also help clarify roles, ensure more reliable data flow, quantify costs, and support obtaining sustained funding. However, concerns were raised about the risks of over-integration, including increased administrative burden, reduced flexibility, and the possibility that some parts of the system (e.g. data collection and synthesis) could lose visibility compared to final products.

Several intermediate options were discussed, including maintaining separate entities while strengthening coordination through joint strategies, formal agreements (e.g. MOU - memorandum of understanding), or focused working groups for specific outputs such as mapping for the Global Carbon Budget. There was also recognition that SOCOM relies on a broader ecosystem of data sources and contributors beyond SOCAT, as it relies extensively on a broad range of satellite data and re-analysis datasets. These critical dependencies (and their communities) mean that it appears useful if SOCOM remains open and flexible, rather than being solely linked to SOCAT and SOCONET.

Overall, participants agreed on the need for a clear external identity and strategy for SOCONET-SOCAT-SOCOM, alongside stronger alignment across the three components, while leaving open the possibility of deeper integration in the future if clear benefits can be demonstrated.

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## Workshop Agenda

| Day 1 - Monday 8 June 2026 – SOCAT governance |                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time                                          | Theme                                                                                                                                                                                                                                                                                                                                                                  |
| 09:00                                         | <b>Welcome and Aims of the meeting</b><br>Thanos Gkritzalis, Dorothee Bakker                                                                                                                                                                                                                                                                                           |
| 09:15                                         | <b>Welcoming words</b><br>Peter Grönwoldt, German Ministry of Science, Technology and Space ( <a href="#">BMFTR</a> )                                                                                                                                                                                                                                                  |
| 09:30                                         | <b>Terms of Reference for the SOCAT Steering Committee - Governance document 1</b><br>Intro to set stage, present draft ToR for SC and comments received on it, highlight discussion points from online meetings.<br>Dorothee Bakker with slides by Are Olsen                                                                                                          |
| 09:45                                         | <b>Discussion on Terms of Reference for the SOCAT Steering Committee</b><br><u>Expected outcome:</u> Agree on ToR for SOCAT SC<br>Dorothee Bakker, Maciej Telszewski, Kevin O'Brien                                                                                                                                                                                    |
| 10:30 Coffee & Tea                            |                                                                                                                                                                                                                                                                                                                                                                        |
| 11:00                                         | <b>Discussion on Terms of Reference for the SOCAT Steering Committee</b> (continued)                                                                                                                                                                                                                                                                                   |
| 11:30                                         | <b>How does SOCAT operate? - Governance document 2</b><br>Intro to set the scene on relationships between SC, regional group leads, regional groups, hubs, SOCONET. What can be improved?<br>Siv Lauvset                                                                                                                                                               |
| 12:30 Lunch and Photo                         |                                                                                                                                                                                                                                                                                                                                                                        |
| 14:00                                         | <b>SOCAT hubs – Define their scope and framework - Governance document 2</b><br><u>Expected outcome:</u> Table with tasks for each hub for governance document 2.<br>S. Poelmans, Eugene Burger, Kevin O'Brien, Thanos Gkritzalis                                                                                                                                      |
| 15:00                                         | <b>Links of SOCAT hubs to other organisations - Governance document 2</b><br>Intro and discussion on links of European hub (VLIZ, ICOS) and US hub (NOAA, GOMO)<br><u>Expected outcome:</u> Describe relationships, aspirations, commitment of VLIZ hub with ICOS and US hub with NOAA for governance document 2.<br>Eugene Burger, Thanos Gkritzalis, Richard Sanders |
| 15:30 Coffee & Tea                            |                                                                                                                                                                                                                                                                                                                                                                        |
| 16:00                                         | <b>Links of SOCAT hubs to other organisations - Governance document 2</b> (continued)                                                                                                                                                                                                                                                                                  |
| 16:45                                         | <b>Launch of European SOCAT hub</b><br>Thanos Gkritzalis, Lennert Tyberghein, Peter Landschützer, Steve Jones, S. Poelmans                                                                                                                                                                                                                                             |
| 17:00                                         | <b>Icebreaker Reception - Until 19:30</b>                                                                                                                                                                                                                                                                                                                              |

| Day 2 - Tuesday 9 June 2026 - SOCAT links with SOCONET and a possible joint structure for SOCONET, SOCAT and SOCOM |                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time                                                                                                               | Theme                                                                                                                                                                                                                                                                      |
| 09:00                                                                                                              | <b>Introduction on links between SOCONET and SOCAT</b><br>Tobias Steinhoff                                                                                                                                                                                                 |
| 09:15                                                                                                              | <b>Outcomes of the SOCONET survey</b><br>Vlad Macovei                                                                                                                                                                                                                      |
| 09:30                                                                                                              | <b>Discussion on links between SOCONET and SOCAT</b><br><u>Expected outcome:</u> Outline for agreement on collaboration between SOCONET and SOCAT.<br>Tobias Steinhoff, Kevin O'Brien, Dorothee Bakker                                                                     |
| 10:30 Coffee & Tea                                                                                                 |                                                                                                                                                                                                                                                                            |
| 11:00                                                                                                              | <b>Links of SOCONET and SOCAT to stakeholders</b><br>Intro and discussion on links of SOCONET (GOOS) and SOCAT to SOCOM, GCB, policymakers<br><u>Expected outcome:</u> Identify existing links and requirements and map potential future opportunities.<br>Dorothee Bakker |
| 12:00                                                                                                              | <b>Discussion on joint webinars / online workshops by SOCONET and SOCAT</b><br>Joint webinars / workshops on installation, data processing, data submission, metadata, QC, etc.<br>Tobias Steinhoff, Kevin O'Brien, Siv Lauvset                                            |
| 12:30 Lunch                                                                                                        |                                                                                                                                                                                                                                                                            |
| 14:00                                                                                                              | <b>An integrated approach to Ocean Carbon Observations in the context of the fit-for-purpose observing system</b><br>Toste Tanhua                                                                                                                                          |
| 14:15                                                                                                              | <b>Possible joint structure for SOCONET – SOCAT – SOCOM in SOCS</b><br>Surface Ocean Carbon System – Formalising the surface ocean CO <sub>2</sub> value chain<br>Maciej Telszewski                                                                                        |
| 14:30                                                                                                              | <b>Discussion on SOCS (Surface Ocean Carbon System)</b><br><u>Expected outcome:</u> Summary of how these three entities collaborate and point of view on whether to formalize this in future<br>Maciej Telszewski, Peter Landschützer, Ute Schuster, Vlad Macovei          |
| 15:30 Coffee & Tea                                                                                                 |                                                                                                                                                                                                                                                                            |
| 16:00                                                                                                              | <b>Discussion on SOCS (Surface Ocean Carbon System) (continued)</b><br>Peter Landschützer, Jamie Shutler                                                                                                                                                                   |
| 17:00                                                                                                              | <b>End of SOCONET - SOCAT - SOCOM Day 2</b>                                                                                                                                                                                                                                |
| 17:00                                                                                                              | <b>Visit</b> to Marine Station Oostende (MSO) facilities in Slipwaykaai 2                                                                                                                                                                                                  |
| 18:00                                                                                                              | <b>Reception</b> at MSO facilities followed by dinner                                                                                                                                                                                                                      |

## **Participants**

| <b>Name</b>         | <b>Attendance (in person unless specified otherwise)</b> | <b>Affiliation</b>                                                 |
|---------------------|----------------------------------------------------------|--------------------------------------------------------------------|
| Adrienne Sutton     | day 1 & 2                                                | NOAA-PMEL, USA                                                     |
| Alex Kozyr          | day 1 & 2                                                | NOAA NCEI, USA                                                     |
| Alizee Roobaerts    | day 2 afternoon                                          | VLIZ, Belgium                                                      |
| Alyse Larkin        | day 1 & 2                                                | NOAA, USA                                                          |
| Amanda Fay          | day 2 afternoon                                          | LDEO, USA                                                          |
| Are Olsen           | Apologies - slides for day 1                             | UiB, Norway                                                        |
| Bronte Tilbrook     | day 1 & 2                                                | CSIRO, Australia                                                   |
| Dan Ford            | day 2 afternoon                                          | UExeter, UK                                                        |
| Dorothee Bakker     | day 1 & 2                                                | UEA, UK                                                            |
| Eugene Burger       | day 1 & 2                                                | NOAA PMEL, USA                                                     |
| Galen McKinley      | day 2 afternoon                                          | LDEO, USA                                                          |
| Hannelore Theetaert | day 1                                                    | VLIZ, Belgium                                                      |
| Jamie Shutler       | day 2 afternoon                                          | UExeter, UK                                                        |
| Jella Kandziora     | day 1 & day 2 (online)                                   | JPI Oceans, Belgium                                                |
| Julia Getzlaff      | day 1 & day 2 (online)                                   | Germany                                                            |
| Kevin O'Brien       | day 1 & 2                                                | OceanOPS, France                                                   |
| Lennert Tyberghein  | day 1                                                    | VLIZ, Belgium                                                      |
| Louise Delaigue     | day 2                                                    | LOV, France                                                        |
| Maciej Telszewski   | day 1 & 2                                                | IOCCP, Poland                                                      |
| Marion Gehlen       | day 2 afternoon                                          | LSCE, Paris                                                        |
| Maurie Keppens      | day 2 afternoon                                          | VLIZ, Belgium                                                      |
| Nathalie Lefèvre    | day 1 & 2                                                | LOCEAN, France                                                     |
| Paul Trautendorfer  | day 2                                                    | JPI Oceans, Belgium                                                |
| Peter Grönwoldt     | day 1 morning (online)                                   | German Federal Ministry of Education and Research (BMFTR), Germany |
| Peter Landschutzer  | day 2 afternoon                                          | VLIZ, Belgium                                                      |
| Richard Sanders     | day 1 & 2                                                | NORCE, Norway                                                      |
| Rik Wanninkhof      | day 1 & 2                                                | USA                                                                |
| S. Poelmans         | day 1 & 2                                                | VLIZ, Belgium                                                      |
| Siv Lauvset         | day 1 & 2                                                | NORCE, Norway                                                      |
| Siya Hamnca         | day 1 & 2                                                | CSIR, South Africa                                                 |
| Steve Jones         | day 1 & 2                                                | VLIZ, Belgium                                                      |
| Thanos Gkritzalis   | day 1 & 2                                                | VLIZ, Belgium                                                      |
| Tobias Steinhoff    | day 1 & 2                                                | Geomar, Germany                                                    |
| Toste Tanhua        | day 1 & 2                                                | Geomar, Germany                                                    |
| Ute Schuster        | day 1 & 2                                                | UExeter, UK                                                        |
| Vlad Macovei        | day 1 & 2                                                | Hereon, Germany                                                    |



Photo : Participants to the SOCAT Meeting on 8 June 2026, VLIZ, Ostend, Belgium. Additional participants joined the SOCAT meeting on 9 June.