

Integrated Ocean Carbon Research (IOC-R)
Notes from IOC-R Co-chairs meeting with IMBeR Chair
14 March 2023

Present:

Chris Sabine (IOC-R co-Chair), Carol Robinson (IOC-R co-Chair), Nina Bednaršek (IMBeR SSC rep for IOC-R), Diana Ruiz Pino (IMBeR Chair), and Lisa Maddison (IMBeR IPO-Canada Deputy Director).

Apologies: John Claydon (IMBeR IPO Director)

Diana outlined the aims of the meeting, to:

- **Understand IOC-R's contribution to IMBeR (a sponsor the working group)**
- **Understand IOC-R's current position and the mission/goal?**
- **Discuss IMBeR post-2025 and how IOC-R fits into this**

Presentation by Chris Sabine

Chris gave a brief presentation on why and how IOC-R was formed, what has been achieved and future plans

- There had never been a dedicated international ocean carbon research project - different components were done by several international research projects, including IMBeR and SOLAS.
- In 2018, SOLAS and IMBeR ocean carbon researchers decided to get all the groups involved in ocean carbon research together to decide on the research gaps that still need to be addressed. IOC was approached to coordinate the group and align it with the United Nations (UN) Decade of Ocean Science for Sustainable Development (2021-2030). The Integrated Ocean Carbon Research (IOC-R) programme became a formal working group of the Intergovernmental Oceanographic Commission (IOC) .
- A meeting of experts from IMBeR, SOLAS, CLIVAR, the Global Carbon Project and OOCPP was convened at IOC in Paris in October 2019, and resulted in the publication of the research report ([Integrated ocean carbon research: a summary of ocean carbon research, and vision of coordinated ocean carbon research and observations for the next decade](#)) in 2021. The report outlines how and why the IOC-R was formed and outlines how and why IOC-R was formed and identified four key research questions to be addressed:
 1. Will ocean uptake of anthropogenic carbon continue as an abiotic process?
 2. What is the role of biology in the ocean carbon cycle and how is that changing?
 3. What are the exchanges of carbon between the land-ocean-ice continuum and how are they evolving over time?
 4. How are humans altering the ocean carbon cycle and resulting feedbacks, including possible purposeful carbon dioxide removal (CDR) from the atmosphere
- Next steps were proposals of oversight/management mechanisms needed to explore these integrated questions.
- A major expectation of the Decade is predicting the state of the ocean that relies on the integration of modelling and ocean observing systems – this is the vision of IOC-R for the next decade, to make progress, through modelling, data assimilation, remote sensing, and by solidifying and expanding the network of core ocean carbon observations, including new biological observing techniques. This recognises the role the ocean carbon cycle on global well-being and the need to consider what new process studies and experiments are needed and identify new tools and approaches that can be applied to these questions e.g., Argo floats. Must develop regional priorities,
- Consider the ocean's role in climate solutions - mitigation approaches. Only way can have a future that doesn't lead to dangerous climate change, must look at carbon storage
- The last meeting was held online in December 2022 to consider whether the questions were still relevant - decided that they were
- An in-person meeting will be held in Brussels in May to determine who is doing what with respect to these different components (and is therefore addressing the questions). It is not as integrated as hoped, so want to meet to consider the gaps, explore how to work together to progress and determine the role that IOC-R can play in this going forward.

Diana pointed out there are many similarities between IOC-R and IMBeR's legacy with regard to ocean carbon (this is because IOC-R evolved out of the SOLAS-IMBeR Carbon working groups – Surface Ocean, Interior Ocean and Ocean Acidification (SIOA) Diana noted that most of the key questions refer to anthropogenic carbon. There is more knowledge about biological carbon, and many regions don't have data on anthropogenic carbon. Must develop techniques to measure other types of carbon. In addition to these, also need new observations and capacity development. Must compliment the obs we have and expand into other regions where there is limited carbon data.

Chris mentioned that many groups are addressing these and other questions – need to know who is doing what and where the gaps are, for example, [GOA-ON](#) is working in the Caribbean where there is very limited information, particularly in the coastal areas

Diana suggested that producing a synthesis document would highlight IMBeR's legacy

Diana said noted that the biological pump is very complicated, and that observations and new technology and models are needed to answer the questions. A key question for future IMBeR is to better understand the biological pump in regions where it is the key component e.g. Arctic Ocean. Capacity development, e.g. with [BIO ARGO](#) is essential to ensure to getting data for these areas. Diana asked whether IOC-R undertakes capacity building? Carol responded that the IOC-R network is a group of experts, without funding and leaves it to other groups with very good capacity building programs (e.g. 2019 report mentions new capacity building programs in UK).

Carol mentioned that a gap analysis of the partners and the UN Decade was undertaken. When meetings are held, call on experts who can help (advertised by the UN Decade). IOC-R recognises the need for global representation, but many Decade projects have global representation. Diana asked how IMBeR will continue working with IOC-R going forward? Carol responded that all the partners are asked for experts to contribute to IOC-R – e.g. Ingrid van Putten (ex IMBeR SSC member and Human Dimensions WG Chair) is invited to the Brussels meeting in May 2023.

Diana invited Carol to explain IOC-R's future plans at the IMBeR SSC meeting on (4 April - session on IMBeR's legacy). Lisa pointed out that Nina would be the IOC-R representative at the SSC meeting. Chris and Carol would help her with the presentation. Carol was unsure if she will be able to attend, and mentioned that would help if they knew what IMBeR is going to do post-2025. Diana answered that this will be discussed on the final day of the SSC meeting (5 April)

Action: Lisa to send the SSC meeting agenda to Carol to see if she could join the SSC meeting remotely DONE

Carol asked for confirmation that IMBeR will be able to provide support the IOC-R meeting to be held in Brussels, Belgium in May 2023. Diana agreed: IMBeR will provide the allocated \$2000 for travel and accommodation and subsistence for Nina, and if possible, accommodation for Ingrid van Putten and transport for Jean-Pierre Gattuso. Diana would find it useful to meet with Nina after the meeting in May to discuss any addition questions that might have arisen.