

Interactive comment on “Ideas and perspectives: A strategic assessment of methane and nitrous oxide measurements in the marine environment” by Samuel T. Wilson et al.

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Reviewers comment» In this paper, Wilson and colleagues provide a blueprint for future research effort into constraining N₂O and CH₄ emissions from the marine environment. Overall the paper is well written, clear and covers the main points of interest in this research area.

Authors response» Thank you for these comments

Reviewers comment» One comment that I would make, is that for a perspectives paper on a global issue, the authorship is very USA/Europe heavy. I understand this is a

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reflection of the OCB workshop attendees, but to ensure global collaboration on this very important issue, engagement with researchers from across the world is needed.

Authors response» We thank Reviewer #3 for highlighting the international representation of the authors host countries. The composition of the authors largely derives from participation in the October 2018 workshop, which was sponsored by the US OCB program. To facilitate participation in the workshop by non-US scientists, we secured funding from the Moore Foundation and to a lesser extent, SCOR. The number of participants from non-US and non-European countries was Chile (2), Canada (3), South Africa (1), and China (2). All workshop participants were invited to contribute to the manuscript. Overall, the workshop and accompanying manuscript tried to attain a balance of male/female, early/senior, and international representation. A primary goal of this workshop and its products was to identify research priorities and strengthen collaborations across the community. We agree that the workshop and accompanying manuscript represent only a fraction of the international research community conducting CH₄ and N₂O measurements and we will seek to further engage researchers across all nations as we move forward. For example, the Standard Operating Protocols (SOPs) are currently being written and draft documents will be posted to the website <https://web.who.edu/methane-workshop/> for community input prior to publication. Their existence will be announced via the OCB and international partner program newsletters, websites, and social media feeds. Also, a proposal was submitted to produce consensus material for dissolved methane and nitrous oxide in 2021, which will form the basis for another intercomparison exercise. We welcome the participation of scientists from all countries in both of these capacity building endeavors.

Reviewers comment» While the processes and mechanisms controlling CH₄ and N₂O production and emission are reasonably well understood, the main issue is a set of SOP and certified reference material to guide the research and provide robust and inter-comparable results. Engagement with the broader research community is needed to ensure these best practice protocols are taken up. It is encouraging to read these

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are currently being developed, but I do wonder how reference material of significant quantities can be produced and delivered to the various labs, particularly those using equilibrator-gas analyzer set ups which are becoming the standard (as opposed to discrete samplers with GC analysis). Some details on how this issue may be overcome would be welcomed.

Authors response» Reviewer #3 brings up several topics in this comment. As mentioned in response to Reviewer #1, the SOPs are being written and they will be posted to the website <https://web.whoi.edu/methane-workshop/> prior to uploading to the Oceans Best Practice Network. We would like to point out to Reviewer #3 that the 'consensus material' that will be produced for CH₄ and N₂O does not meet the necessary criteria to be classified as 'reference material'. The working definition of Consensus Material is 'Material with properties of a communally agreed value better than 1%, as measured by multiple laboratories', while reference material is 'Material whose properties are sufficiently established so that it can be used for the calibration of an instrument or the assignment of values to samples'. Finally, the consensus material is primarily intended to help with the analysis of discrete samples, not equilibrator systems. This does not mean that calibration of equilibrator systems for CH₄ and N₂O cannot be achieved with the help of consensus material. Indeed one of the SOPs (SOP#7: Underway system) specifically mentions the evaluation of equilibrator systems using discrete samples.

Reviewers comment» These are the only minor comments I have on this paper, and I look forward to seeing it in print.

Authors response» Many thanks

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