

Reports to SCOR (2020)

1. Name of group

SCOR WG#143: Dissolved N₂O and CH₄ measurements: Working towards a global network of ocean time series measurements of N₂O and CH₄

2. Activities since previous report to SCOR (e.g., virtual or in-person meetings, email discussions, special sessions). Limit 1000 words

- Overview poster presented by Sam Wilson, co-chair of SCOR WG#143, at the Ocean Obs'19 conference in Honolulu, Hawaii, 16-20 September 2019.
- An OCB workshop in 1-3 October 2019 discussed potential activities of US scientists relevant to the Surface Ocean Lower Atmosphere Study (SOLAS) program. Sam Wilson attended this workshop and reported on the outcomes of the SCOR WG#143 and the 2018 Lake Arrowhead workshop.
- WG lunchtime meeting with 25 participants organized by Sam Wilson on 18 Feb 2020 during the AGU Ocean Sciences Meeting, San Diego, CA.

3. Documents published since previous report to SCOR (e.g., peer-reviewed journal articles, reports, Web pages) and should be limited to publications that resulted directly from WG activities and which acknowledge SCOR support

In April 2019 a movie about the Lake Arrowhead workshop in October 2018 was released on 'YouTube': <https://www.youtube.com/watch?v=0DyMyIVs4Qs> .

4. Progress toward achieving group's terms of reference. List each term of reference separately and describe progress on each one. Limit 1000 words

1. Conduct an intercalibration exercise between the time series programs (for methane and nitrous oxide)

This is completed and published (Wilson et al., 2018).

2. Establish the appropriate standards to be used by the scientific community

This is completed and the Technical Report has been published on the SCOR website (Bullister, J.L., D.P. Wisegarver and S.T. Wilson (2016) Technical Report: The production of methane and nitrous oxide gas standards for Scientific Committee on Ocean Research (SCOR) Working Group #143. pp 1-9)

3. Recommend the analytical reporting procedures to be used for N₂O and CH₄

All members of SCOR WG#143 publish their own respective research on methane and nitrous oxide, and are therefore very familiar with their own analytical procedures. However, as a community of trace gas analysts there is no published consensus about the most appropriate methods and we have not yet agreed on the reporting procedures. In response to this, we are currently writing the Standard

Operating Protocols (SOPs) for methane and nitrous oxide. See also '5. WG activities planned for the upcoming year'.

4. Establish framework for an N₂O/CH₄ ocean time series network and write a global oceanic N₂O/CH₄ summary paper for publication in an open access journal.
This is completed and published (Bange et al., 2019).

5. WG activities planned for the coming year. Limit 500 words

On the basis of the discussions and recommendation of the Lake Arrowhead workshop we are about to write a perspective article for Biogeosciences:

Wilson, S. T., Al-Haj, A. N., Bourbonnais, A., Frey, C., Fulweiler, R. W., Kessler, J. D., Marchant, H. K., Milucka, J., Ray, N. R., Suntharalingam, P., Thornton, B. F., Upstill-Goddard, R. C., Weber, T. S., Bange, H. W., Benway, H. M., Bianchi, D., Borges, A. V., Chang, B. X., Crill, P. M., del Valle, D. A., Farías, L., Kock, A., Labidi, J., Manning, C. C., W., P. J., Rehder, G., Sparrow, K. J., Tortell, P. D., Treude, T., Valentine, D. L., Ward, B. B., Yang, S., and Yurganov, L. N.: Ideas and perspectives: A strategic assessment of methane and nitrous oxide measurements in the marine environment, Biogeosciences, in preparation, 2020.

Moreover, we are about to finish writing the Standard Operating Protocols (SOP)
SOP1 - Gas Sampling, SOP2 - Calibration, SOP3 - Internal controls, SOP4 - Purge&Trap method, SOP5 - Headspace method, SOP6 - Underway, SOP7 - N₂O process measurements, SOP8 - CH₄ process measurements, and SOP9 - Data. All participants from the WG intercomparison studies and the 2018 Lake Arrowhead workshop were invited to contribute the SOPs. The SOPs will be submitted to the IODE/IOC Ocean Best Practices Repository (www.oceanbestpractices.org). The individual SOPs are citable as they receive a DOI when uploaded to the repository. In addition, a summary paper about all the SOPs will be written and submitted to the ongoing Frontiers special issue on 'Best Practices for Ocean Observing'. Frontiers will explicitly have a link to the SOPs repository.

6. Is the group having difficulties expected in achieving terms of reference or meeting original time schedule? If so, why, and what is being done to address the difficulties Limit 200 words

No difficulties to report.

7. Any special comments or requests to SCOR. Limit 100 words.

None at this time. Thank you to Ed Urban, Patricia Miloslavich and SCOR for supporting the activity of WG#143 during the past years. It has been extremely helpful to the progress of methane and nitrous oxide measurements in the ocean.

Additional information can be submitted and will be included in the background book for the SCOR meeting at the discretion of the SCOR Executive Committee Reporter for the WG and the SCOR Secretariat.