If you wish to go fast, go alone
If you wish to go far, go together
(unknown origin)
To date, oceanic methane and nitrous oxide observations have always been conducted by independent laboratories with no coordination of measurements.

SCOR WG#143 began the process of having a coordinated international program of methane and nitrous oxide measurements.
1. Conduct an intercalibration exercise between the time series programs


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


3. Recommend the analytical reporting procedures to be used for N$_2$O and CH$_4$

   ongoing

4. Establish framework for an N$_2$O/CH$_4$ ocean time series network and write a global oceanic N$_2$O/CH$_4$ summary paper for publication in an open access journal.


SCOR Working Group #143 Terms of Reference

Working Group Terms of Reference

1. Conduct an intercalibration exercise between the time series programs

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

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

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.

Lessons learned after 6 years

It takes time!

Invest in the scientific community. The publications include approximately 60 authors in total.

Seek help and learn from other groups who have conducted similar activities e.g. CO2, GEOTRACES

Try to establish clear goals e.g. what is the definition of high quality measurements? What are the priority areas of research?

The SCOR Working Group will end but the work continues
Long term process of coordinating methane and nitrous oxide measurements

- **2009**: Data portal created (‘MEMENTO’)
- **2014**: SCOR Working Group #143
- **2017**: Production of compressed gas standards
- **2018**: Publication of intercomparison exercises & OCB workshop on research priorities
- **2020**: Publication of SOPs
- **2021**: Production of consensus material
- **>2022**: Global Data Products & Coordinated Observations

Lifetime of SCOR Working Group #143
Highlights specifically from 2020 #1

Ideas and perspectives: A strategic assessment of methane and nitrous oxide measurements in the marine environment

Samuel T. Wilson¹, Alia N. Al-Haj², Annie Bourbonnais³, Claudia Frey⁴, Robinson W. Fulweiler², John D. Kessler⁶, Hannah K. Marchant⁷, Jana Milucka⁷, Nicholas E. Ray⁵, Parv Suntharalingham⁸, Brett F. Thornton⁹, Robert C. Upstill-Goddard¹⁰, Thomas S. Weber⁶

https://doi.org/10.5194/bg-2020-270
Preprint. Discussion started: 23 July 2020
Highlights specifically from 2020 #2

Best Practices for Dissolved Methane and Nitrous Oxide Measurements

SOP1 Sampling
SOP2 Calibration
SOP3 Internal controls
SOP4 Purge-and-trap measurements
SOP5 Headspace measurements
SOP6 Underway measurements
SOP7 Data reporting

SOP on Process measurements of CH4
SOP on Process measurements of N2O

Lead authors include:
Damian Arévalo-Martínez, Annie Bourbonnais, Bonnie Chang, Mercedes de la Paz, Sara Ferrón, Claudia Frey, John D. Kessler, Annette Kock, Cara Manning, Gregor Rehder, Robert Upstill-Goddard, Sam Wilson

Highlights include:
• Best Practices for Purge & Trap and Headspace Equilibrium measurements
• Working with the Electron Capture Detector
• Establishing internal controls
• Best practices with continual underway measurements

Each SOP will be posted on the Ocean Carbon & Biogeochemistry website for 2 months, prior to uploading to the Ocean Best Practice portal
Process for production of SOPs

1. Lead authors draft the SOP (authors identified based on interest and expertise)
2. The SOP is ‘community reviewed’ by 2-3 experts who are invited to become coauthors
3. Formatting of the SOP into a proper document by the OCB program.
4. Posting onto the OCB website for ~2 months for further input and comments.
5. Advertise the presence of the SOPs via social media and a mailing list of ~70 scientists that has evolved from a 2018 workshop
6. Posting of the SOPs onto the Ocean Best Practice Portal and submission of a manuscript to Frontiers providing a background to their creation and a summary of their contents
Looking beyond 2020...

Text Box 1. Relevant Definitions
- Internal Controls: Material of sufficient accuracy to provide a useful self-assessment evaluation of the analytical method.
- Consensus Material: Material with properties of a communally agreed value better than 1%, as measured by multiple laboratories.
Acknowledgements

The progress made so far and the ongoing efforts are the results of a large number of scientists. Publications resulting from this work are included below:


