

## Template for Annual SCOR Working Group Reports to SCOR

### Summary:

The SCOR WG#143 brought international scientists together to improve the analysis of the greenhouse gases methane and nitrous oxide across the global oceans. An overall goal was to lay the foundations for sustained and coordinated dissolved methane and nitrous oxide measurements. Working Group #143 also wanted to ensure that the datasets were going to be comparable and be used to determine long-term changes to the ocean inventory of methane and nitrous oxide. There were several key actions undertaken by members of the Working Group during its lifetime that were critical to successful progress. This included several intercomparison exercises, distribution of common standards, comparison of underway systems conducted at sea, and the production of Standard Operating Protocols. A workshop hosted by the US Ocean & Carbon Biogeochemistry program on Oceanic Methane and Nitrous Oxide also brought sixty scientists together to discuss current and future research opportunities. The results of these activities were published to disseminate the information with the wider scientific community and provide a lasting record of the outcomes. With the Working Group in its final year, the last remaining task is to complete the Standard Operating Protocols and deposit them with the Ocean Best Practices network.

The SCOR Working Group facilitated international researchers to assemble and discuss dissolved methane and nitrous oxide measurements. A scientific community emerged consisting of individuals wanting to ensure that methane and nitrous oxide measurements were of high quality and comparable with other laboratories. There is still more work required to integrate methane and nitrous oxide measurements as part of repeat hydrographic expeditions, time-series stations, and individual expeditions. It is also necessary to engage with trace gas researchers working in other ecosystems e.g. freshwater and terrestrial systems to ensure the interoperability of measurements. However, as a result of the SCOR Working Group, marine scientists now have the analytical tools, community, and best practice case studies to constrain and predict the dynamics of methane and nitrous oxide in oceanic environments.

#### 1. Name of group

SCOR Working Group #143: Oceanic methane and nitrous oxide

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

In the past 12 months we have continued to work on the Standard Operating Protocols for dissolved methane and nitrous oxide measurements. The draft documents have been posted on a publicly available website (<https://web.whoi.edu/methane-workshop/sops/>) for the community to comment on. We are now working with the OCB program to convert the word documents into pdfs with consistent formatting.

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

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 published (Bullister et al., 2016)

*3. Recommend the analytical reporting procedures to be used for N<sub>2</sub>O and CH<sub>4</sub>*

We are halfway through the publication of the Standard Operating Protocols (SOPs) for methane and nitrous oxide. There are 9 Chapters which cover all aspects of the measurements from sampling, analysis, data reporting. The draft documents are available at <https://web.who.edu/methane-workshop/sops/>.

*4. Establish framework for an N<sub>2</sub>O/CH<sub>4</sub> ocean time series network and write a global oceanic N<sub>2</sub>O/CH<sub>4</sub> 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

We will complete the SOP document which is to be the last activity of WG#143.

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

Completion of the SOP document has taken longer than originally timetabled. This is because the lead author, Sam Wilson, moved from the USA to UK and has been extremely busy. The coauthors have been very supportive and the final editing has resumed.

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

Request that SCOR keeps WG#143 going until the SOPs are completed

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.