PLANNING OF GESAMP ACTIVITIES:
ATMOSPHERIC INPUT OF CHEMICALS TO THE OCEANS

Report of the Co-Chairs of Working Group 38

History, early meetings and their results

Working Group 38 was first formed in 2008 because of growing concern about the impact of atmospheric deposition of both natural and anthropogenic substances on ocean chemistry, biology, and biogeochemistry as well as climate. It has held meetings at the University of Arizona, Tucson, Arizona in 2008; at IMO in London in 2010; in Malta in 2011; and at the University of East Anglia, Norwich, UK in 2013 and 2017. The 2013 workshop focused on nitrogen inputs from the atmosphere to the ocean and their impacts. Sponsors of those WG 38 efforts have included WMO, IMO, SCOR, SIDA, the European Commission Joint Research Centre, the University of Arizona, the International Environment Institute at the University of Malta, the University of East Anglia, and the US National Science Foundation. Following the initial terms of reference and the meetings through 2013, twelve scientific papers have been published in the peer-reviewed scientific literature. These were as follows:


Following the completion of the publication of the papers resulting from the 2013 workshop on the impacts of atmospheric nitrogen deposition to the ocean, WG 38 prepared a synthesis of the results from the scientific papers derived from that workshop. That report was reviewed by GESAMP and published by WMO in 2018 as GESAMP Reports and Studies No. 97, The Magnitude and Impacts of Anthropogenic Atmospheric Nitrogen Inputs to the Ocean. The primary conclusions of that report were presented in the 2018 WG 38 report and will not be repeated here.

Current activities of Working Group 38

For the sixth year in a row WG 38 organized a session on atmospheric input of chemicals to the ocean for the 2019 European Geosciences Union meeting, held in Vienna, Austria in April – “Air-sea Exchanges: Impacts on Biogeochemistry and Climate”. A number of oral and poster papers at this session were presented by a combination of WG 38 members and other scientists.

Tim Jickells attended the INMS International Nitrogen Management System annual meeting in Edinburgh, United Kingdom from 16 to 19 April 2018 to represent WG 38 and supported by INMS. At the meeting he informally presented the work of WG 38 to relevant leaders of the INMS activity, particularly those leading initiatives in South East Asia, and he presented them with details of our synthesis report. He made clear the enthusiasm of WG38 to work with the INMS initiatives if they felt that would be useful, and we await their responses.

Tim Jickells then attended and participated in the 2nd East Asia Nitrogen Conference in Tsukuba, Japan from 19 to 22 November 2018, where he gave a keynote talk on the atmosphere/ocean aspects of the nitrogen cycle on behalf of WG 38. He also participated in a subsequent workshop in Tsukuba. We hope that this effort will increase our interactions with the INMS activity, and we hope to contribute to an INMS initiative on methods to quantify nitrogen deposition.


8 At the meeting of GESAMP 42 at IOC in Paris in September 2015, GESAMP approved two new workshops for WG 38. These two simultaneous workshops were related to the changing acid/base character of the global atmosphere and ocean and the impact of these changes on certain air/sea chemical exchange processes. Funding was obtained for these workshops from the US National Science Foundation (through SCOR), from WMO, and from IMO. SOLAS also sponsored these workshops. The workshops took place at the University of East Anglia (UEA) in Norwich, United Kingdom, from February 27 through March 2, 2017. The topics of the two workshops were as follows: a) Impact of Ocean Acidification on Fluxes of Atmospheric non-CO₂ Climate-Active Species; and b) Changing Atmospheric Nutrient Oceanic Solubility.

9 The workshops took the form of rather informal presentations from experts followed by very lengthy discussion sessions exploring multiple issues and feedbacks evident in these complex air-sea interaction issues. The invited scientists were selected for their expertise and interest in these areas, and also to provide a wide spectrum of expertise from modellers to experimentalists. 34 scientists from 16 countries and also from a wide range of career stages, from senior scientists through to graduate students, participated in the workshops. At the present time the following papers have been published, are in press, have been or shortly will be submitted, and are still in preparation from the workshop discussions:

Published:


To be submitted by the end of the summer, 2019:


In preparation, for submission later in 2019:

20. Peter Croot, lead author, “Controls and impacts of atmospheric nutrient solubility in the ocean”.

21. Peter Croot, lead author, “Impacts of the episodic atmospheric deposition on ocean biogeochemistry”.

22. Steve Archer, lead author, “A synthesis of the DMS response to ocean acidification observed in mesocosm experiments”. Dr. Archer also presented a paper on this topic at the AGU/TOS Ocean Sciences meeting in 2018.

On June 28, 2019 a preliminary planning meeting was held for a possible WG 38 workshop in 2020 entitled “The Atmospheric Input of Chemicals to the Ocean – Management and Policy Implications”. This workshop would bring together appropriate players to discuss the management and policy implications of current knowledge about atmospheric inputs of nutrients and possibly other substances to the ocean and their interactions and impacts within the marine environment. The planning meeting was held in Norwich, United Kingdom, and included Tim Jickells, Alex Baker, Peter Liss, Peter Kershaw, David Vousden, Michael Roberts, and Robert Duce. A tentative decision was made to hold such a workshop in the spring, 2020, assuming that the workshop is approved by GESAMP. The location is still to be determined. A more detailed description of the outcomes of this planning meeting is now being prepared and will be discussed with GESAMP at GESAMP 46 at the United Nations, in New York in September.

**Future activities of Working Group 38**

One goal of WG 38 for the next year is to complete the submission and publication of all papers resulting from the 2017 workshop at the University of East Anglia.

A second goal for the next year will be to carry out the workshop described briefly in paragraph 9 above, assuming that this is approved by GESAMP.

**Action requested of GESAMP**

GESAMP is invited to consider the information provided and to take action as appropriate.