



GESAMP

Joint Group of Experts on the
Scientific Aspects of Marine
Environmental Protection

GESAMP 43/4/5

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Agenda item 4

**PLANNING OF GESAMP ACTIVITIES:
INCEPTION MEETING OF GESAMP WORKING GROUP 41
ON MARINE GEOENGINEERING**

Report of the co-Chairmen of Working Group 41

Activities of the working group

1 The main activity of this new working group (WG) was the inception meeting which took place from 23 to 25 May 2016, at the headquarters of IMO, London, United Kingdom. The workshop was opened by the co-Chairs, Chris Vivian (United Kingdom) and Philip Boyd (Australia, via Skype), who welcomed the participants. In attendance were: Alex Baker (United Kingdom), Miranda Boettcher (Germany), John Cullen (Canada), Fei Chai (China/USA), Timo Goeschl (Germany), Richard Lampitt (United Kingdom), Andreas Oschlies (Germany), Ros Rickaby (United Kingdom), Kate Ricke (United States) and Andrew J. Lenton (Australia, via Skype). Several members were unable to attend the meeting. Edward Kleverlaan and Chrysanthé Kolia (IMO) also attended the meeting.

2 The WG was first addressed by Stefan Micallef, Administrative Secretary of GESAMP and Director of the Marine Environment Division, IMO. He emphasized the importance IMO places on demonstrating the utility of independent, sound science through GESAMP. Next, Silvina Carou (WMO Technical Secretary) made reference to the overarching goal of the recently signed Paris agreement to limit warming to well below 2°C above pre-industrial levels and the potential implications for the employment of climate intervention. Edward Kleverlaan (Technical Secretary) described IMO's interest in climate change and mechanisms to reduce greenhouse gas emissions from international shipping and to address other point sources of carbon dioxide to mitigate ocean acidification.

3 The WG commenced the inception meeting with a discussion on how the membership could best build on prior assessments of geoengineering (such as the 2009 UK Royal Society report and the 2015 US NRC reports). The number of metrics that can be used to assess the merits and drawbacks of the various geoengineering approaches has grown, as has an emphasis on a wider more integrated approach to assessment that includes socio-economic, legal and ethical dimensions. Two key advances were identified by the WG: the development of new metrics (in particular the knowledge available on a specific approach), and secondly the role of modelling to advance the geoengineering debate.

4 Desirable metrics that were identified included: economics – welfare endpoints; biodiversity – ecological integrity (linked to welfare endpoints via ecosystem services); modelling (to provide Earth system metrics) and knowledge (specifically, the need to provide sufficient information to meet a threshold for inclusion in a scientific assessment). These metrics were then included in a discussion that centred on which metrics to include in the development of a scoring sheet to rank a wide range of marine geoengineering proposals as part of the terms of reference (ToR) for the initial phase of WG41.

5 There was considerable discussion devoted to the role of regional, basin scale and global modelling in maintaining momentum in the marine geoengineering debate; there is a danger of a vacuum hindering this debate in the absence of pilot studies, due to moratoria and other constraints surrounding research governance. Many ocean properties (temperature, salinity, density, oxygen, pH, nutrients, primary productivity) can be included in high resolution global model runs, and they provide invaluable insights, robust checks and balances, and permit 'thought experiments' across a range of geoengineering techniques. Modelling intercomparison experiments such as GEOMIP (Geoengineering Model Intercomparison Project) and CRDMiP (Carbon Dioxide Removal Model Intercomparison Project) increase confidence in the skill of models to provide consensus-based results, error estimates and hence to offer potential as a further rigorous tool for an initial quantitative assessment of proposed ocean geoengineering methods.

6 The WG recognised that models alone will be insufficient to deliver a more comprehensive assessment. Nonetheless, they have an invaluable role to play in identifying key unknowns that the models are particularly sensitive to. Model simulations could also help to provide a more quantitative comparison between metrics, which was another area the WG identified as problematic in both the development of a scoring sheet, and intercomparisons of the merits of different geoengineering approaches using such a scoring method.

7 Since the May 2016 inception meeting we have refined the scoring sheet for assessment criteria and circulated it to the members of the working group to complete. The collated scores from this assessment will help to better define our ToR for 2017 activities. The co-Chairmen have also sent around a draft report from the inception meeting along with an executive summary for feedback. The second WG 41 meeting is scheduled for April 2017.

Action requested of GESAMP

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