

# ICES WGCCBOCS REPORT 2016

SCICOM STEERING GROUP ON ECOSYSTEM PROCESSES AND DYNAMICS

REF. SSGEPD

## Kick off meeting report of the ICES/PICES Working Group on Climate Change and Biologically-driven Ocean Carbon Sequestration (WGCCBOCS)

17 June 2016

Hong Kong, China



**ICES**  
**CIEM**

International Council for  
the Exploration of the Sea

Conseil International pour  
l'Exploration de la Mer



## **International Council for the Exploration of the Sea Conseil International pour l'Exploration de la Mer**

H. C. Andersens Boulevard 44-46  
DK-1553 Copenhagen V  
Denmark  
Telephone (+45) 33 38 67 00  
Telefax (+45) 33 93 42 15  
[www.ices.dk](http://www.ices.dk)  
[info@ices.dk](mailto:info@ices.dk)

Recommended format for purposes of citation:

ICES. 2016. Kick off meeting report of the ICES/PICES Working Group on Climate Change and Biologically-driven Ocean Carbon Sequestration (WGCCBOCS), 17 June 2016, Hong Kong, China. 11 pp.

For permission to reproduce material from this publication, please apply to the General Secretary.

The document is a report of an Expert Group under the auspices of the International Council for the Exploration of the Sea and does not necessarily represent the views of the Council.

© 2016 International Council for the Exploration of the Sea

## Contents

---

Executive summary .....	2
1 Administrative details .....	3
2 Terms of Reference a) – z) .....	3
3 Summary of Work plan .....	3
4 List of Outcomes and Achievements of the WG in this delivery period .....	4
5 Progress report on ToRs and workplan .....	4
6 Next meetings .....	7
Annex 1: List of participants.....	8

## Executive summary

---

### 2016 Kick off meeting of the **Joint ICES/PICES Working Group on Climate Change and Biologically-driven Ocean Carbon Sequestration**

Date: 17 June 2016

- (1) Background of the working group (WG) was introduced, including the significance of the carbon sequestration by the oceans, the WG connections to science and policy, and the main mission of the WG in integrating different approaches and studies and improving prediction and advice for climate policies;
- (2) The participants introduced themselves, including their countries and their membership in the WG;
- (3) The participants reviewed the Terms of References (ToRs);
- (4) The participants discussed and set up several task teams (TTs) that should lead the WG's future activities for the different ToRs;
- (5) The participants discussed specific tasks for ToRs.

#### **The meeting reached the following agreements/conclusions:**

- (1) Report the expertise of present members to PICES and ICES;
- (2) Identify gaps in expertise based on the Term of References (ToRs) among WG members and invite additional members to fill either gaps;
- (3) All the members are encouraged to attend the WG's business meeting during the PICES 2016 Annual Meeting;
- (4) It was clarified that there is currently no extra financial support from ICES, PICES or other organizations for the WG' members to participate in the WG's activities;
- (5) The participants volunteered to join different task teams that should lead the WG's activities for different ToRs, the WG members who were not in attendance are invited to identify which of the above ToRs they will contribute to;
- (6) The WG will not aim to contribute collectively to IPCC's next assessment report;
- (7) Specific tasks for each ToRs were decided;
- (8) All ToRs should exchange the information and the products from their work.

## 1 Administrative details

---

<p><b>Working Group name</b> ICES/PICES Working Group on Climate Change and Biologically-driven Ocean Carbon Sequestration (WGCCBOCS)</p> <p><b>Year of Appointment</b> 2016</p> <p><b>Reporting year within current cycle (1, 2 or 3)</b> 1</p> <p><b>Chair(s)</b> Nianzhi Jiao, China Louis Legendre, France Richard Rivkin, Canada</p> <p><b>Meeting venue</b> Hong Kong, China</p> <p><b>Meeting dates</b> 17 June 2016</p>
---

## 2 Terms of Reference a) – z)

---

- a) Document and identify current knowledge about the biologically-driven carbon pumps
- b) Develop standard monitoring protocols
- c) Promote international collaboration for developing new experimental approaches and facilities
- d) Explore techniques for prediction of biologically mediated carbon sequestration in oceans
- e) A science symposium

## 3 Summary of Work plan

---

Year 1:

- (1) Hold an initial organizational meeting.
- (2) Review and document current understanding of the mechanisms the pumps, the estimate of the magnitude of the pumps, and the existing approaches.
- (3) Propose and plan the future directions of research and new approaches and facilities.
- (4) Develop conceptual models.

Year 2:

- (1) Hold an annual meeting to review the progress.
- (2) Continue to develop new approaches.
- (3) Recommend improvements to numerical models for integrating biologically-driven carbon pump processes.

Year 3:

- (1) Continue to develop and review the new approaches.
- (2) Continue to recommend improvements to numerical models and review their results concerning the biologically mediated sequestration of carbon in oceans.
- (3) Hold a scientific symposium to review the outcome of the WG, and draft the final report of the WG and the advice of climate policy to international organizations.

#### **4 List of Outcomes and Achievements of the WG in this delivery period**

---

N/A (This is a report for the WG's first organizational/ kick off meeting and therefore no achievements have been reached.)

#### **5 Progress report on ToRs and workplan**

---

**In the meeting:**

- (1) Background of the working group (WG) was introduced by WG's secretary Rui Zhang, including the significance of the carbon sequestration by the oceans, the WG connections to science and policy, and the main mission of the WG in integrating different approaches and studies and improving prediction and advice for climate policies.
- (2) The participants introduced themselves, including their countries and their membership in the WG.

Dr. Robinson reported that she was the chair of the scientific steering committee of the IMBER (Integrated Marine Biogeochemistry and Ecosystem Research) project and could therefore provide a connection between the work of the WG and that of IMBER. Dr. Anderson reported that she was co-chair of prior and current ICES WGs and offered to provide advice to the WG based on her experience with ICES. Dr. Peña reported that she was also the chair of the PICES Biological Oceanography Committee (BIO), the parent committee of the WG in PICES, and could thus help the WG to satisfy the requirement of PICES.

There are three researchers funded by Xiamen University, China, who will support the activities of the WG: Yanbin Guo, a postdoc, will support work on carbon emissions trading. Yao Zhang, a professor, will support the development of ocean carbon sink measurements protocols. Nannan Wang, a postdoc, will support summarizing current knowledge of ocean carbon pumps.

- (3) The participants reviewed the Terms of References (ToRs):
  - On the ICES website (<http://ices.dk/community/groups/Pages/WGCCBOCS.aspx>), there are five ToRs:
    - a) Document and identify current knowledge of the biologically-driven carbon pumps;
    - b) Develop standard monitoring protocols;
    - c) Promote collaboration for developing new experimental approaches and facilities.
    - d) Explore techniques for prediction of biologically mediated ocean carbon sequestration;
    - e) Hold a science symposium;
  - On the PICES website (<http://meetings.pices.int/members/working-groups/wg33>), there are three additional ToRs:
    - f) Hold annual meetings and business meetings;
    - g) Provide scientific advice to international organizations such as IPCC
    - h) Publish a final report.
- (4) The participants discussed and set up several task teams (TTs) that should lead the WG's future activities for the different ToRs.
- (5) The participants discussed specific tasks for ToRs #a), b), c) & d).

#### **Agreements/Conclusions reached during the WG Meeting**

- (1) Report the expertise of present members to PICES and ICES, and put this information on the WG's websites on PICES (<http://meetings.pices.int/members/working-groups/wg33>) and ICES (<http://ices.dk/community/groups/Pages/WGCCBOCS.aspx>).
- (2) Identify gaps in expertise based on the Term of References (ToRs) among WG members. The current members are invited to suggest additional members to the three co-Chairs to fill either gaps in expertise or to build depth of expertise in specific areas.
- (3) Time has been allocated for the WG on Nov 2-3, 2016 during the PICES 2016 Annual Meeting in San Diego, USA. All the members of the WG who could participate are encouraged to submit abstracts before the deadline and register to attend the meeting.
- (4) It was clarified that there is currently no extra financial support from ICES, PICES or other organizations for the WG' members to participate in the WG's activities such as the ICES and PICES annual meetings and symposia.

- (5) The participants volunteered to join different task teams that should lead the WG's activities for different ToRs as shown in the list below. The names of the "contact point" persons are in **bold underlined characters**:

ToR a), **C Zhang**, N Wang, Olsen, Jiao, Robinson, R Zhang

ToR b), **Robinson**, Suzuki, Kaartokallio, Amann, F Wang, Y Zhang, Guo, R Zhang

ToR c), **Olsen**, C Zhang, Legendre, Jiao, Robinson, Suzuki, Kaartokallio, Amann

ToR d), **Peña**, Gehlen, Kwon, Anderson, Luo, Rivkin

ToR e), Jiao, Rivkin

ToR f), Jiao, Rivkin

ToR g), **Anderson**, Jiao, Gehlen, Peña, Rivkin

ToR h), Jiao, Rivkin

The co-Chairs will be responsible for ToRs e), f) and h). The WG members who were not in attendance are invited to identify which of the above ToRs they will contribute to.

- (6) The WG will not aim to contribute collectively to IPCC's next assessment report. Some members of the WG that have links with organizations that have been invited by IPCC to make contributions.
- (7) For ToR a): A review paper is the obvious product. In order to make a first announcement to all members interested in participating, the contact point will set up a table of contents that members could use to indicate their interests. Gaps in current knowledge should also be identified. The review paper should include products from other ToRs (2,3,4). It should also be a prospective, not just a review.

A second deliverable could be to establish a website (current reviewing of carbon pumps) at XMU before the PICES 2016 annual meeting and keeping it up to date to make our WG more visible.

- (8) For ToR b): Compile information about the current methods used to measure indicators of the biological and microbial carbon pumps. Prepare and distribute a questionnaire to send to the community to request information on current use of methods. Use the ICES WG Share Point (or similar) to discuss the plans of the WG and the advantages and disadvantages of the various methods. Compile information on established standard methods, integrate new methods, and predict future optimal methods, in order to publish a 'best practice' protocol. The indicators would include respiration and carbon export and storage.



The challenge is lack of comparability among different data from different sea areas, environments, and investigators.

The WG should focus on a series of physical-chemical and biological indices and parameters, in order to build an index system for carbon storage. The WG should hold a workshop to discuss and decide what should be the main core measurements.

Reviewing paper(s) and a technical report will be the main products of ToR b).

- (9) For ToR c): Gap identification from ToR a) should feed into ToR c). Many new interesting tools from the laboratory can be included. Focus on experimental approaches and think how we could develop new approach to answer those important but unknown scientific questions. The Marine Environmental Chamber System (MECS) facility proposed to be built in China is an example.

A workshop could perhaps be a good way to meet the ToR.

- (10) For ToR d): The first task is to modify this ToR to what could be achievable.
- (11) For ToR g): A training course could be organized to let young scientists know where their advice for policy makers could go, and how their advice could be used. Discuss any ideas about what should be done to maintain the 2.0 and even 1.5°C as the upper limit of temperature increase, like iron fertilization or other geo-engineering.
- (12) All ToRs should exchange the information and the products from their work.

## **6 Next meetings**

---

Next meeting will be held on 2 November 2016, San Diego, California, USA, during the PICES 2016 annual meeting.

## Annex 1: List of participants

Name	Address	Phone/Fax	Email
Nianzhi Jiao	State Key Laboratory of Marine Environmental Science Xiamen University, Xiang-An Campus Zhou Long Quan A3-301 Xiamen , Fujian China, PR 361102	Phone: (86-592) 2880199	jjiao@xmu.edu.cn
Louis Legendre	Laboratoire d'Océanographie de Villefranche 181 Chemin du Lazaret 06230 Villefranche- sur-Mer FRANCE	Phone: +33 (0)4 9376 3836, Fax: +33 (0)4 9376 3834	legendre@obs-vlfr.fr
Richard Rivkin	Department of Ocean Sciences Memorial University of Newfoundland Elizabeth Ave. St. John's , NF Canada A1C 5S7	Phone: (1-709) 864 3720	rrivkin@mun.ca
Robin Anderson	Fisheries and Oceans Canada Northwest Atlantic Fisheries Centre 80 White Hills Road East St. John's, NL A1C 5X1 Canada	Phone: +1 (709) 772- 0460 Fax: +1 (709) 772- 5315	M.Robin.Anderson@dfo-mpo.gc.ca
Marion Gehlen	Laboratoire des Sciences du Climat et de l'Environnement Orme des Merisiers, Bat 712 CEN Saclay Gif Sur Yvette 91191 France	Phone: +33 1 68 08 86 72	gehlen@lsce.saclay.cea.fr

Hermanni Kaartokallio	Finnish Environment Institute Erik Palmenin aukio Helsinki 00560 Finland	Phone: +358 503257580	hermanni.kaartokallio@ymparisto.fi
Yngvar Olsen	Norwegian University of Science and Technology Trondhjen Biological Station Bynesveien 46 Trondheim 7491 Norway	Phone: +47-97778249 Fax: +47-73591597	yngvar.olsen@ntnu.no
Carol Robinson	University of East Anglia School of Environmental Sciences Norwich NR4 7TJ United Kingdom	Phone: +44-1603 593174	carol.robinson@uea.ac.uk
Eun Young Kwon	School of Earth and Environmental Sciences Seoul National University 1 Gwanak-ro Gwanak-gu Seoul Korea, R 08826	Phone: (82-10) 4731-1566	ekwon76@snu.ac.kr
Angelica Peña	Fisheries and Oceans Canada Institute of Ocean Sciences 9860 W. Saanich Rd., P.O. Box 6000 Sidney, BC Canada V8L 4B2	Phone: (1-250) 363-6576 Fax: (1-250) 363-6746	angelica.pena@dfm-mpo.gc.ca
Koji Suzuki	Faculty of Environmental Earth Science Hokkaido University North 10 West 5, Kita-ku Sapporo, Hokkaido Japan 060-0810	Phone: (81-11) 706-2370 Fax: (81-11) 706-2370	kojis@ees.hokudai.ac.jp

Fengping Wang	Shanghai Jiao Tong University 800 Dongchuan Rd., Minhang District Shanghai China, PR 200240	Phone: +86-21-34207208	fengpingw@sjtu.edu.cn
Chuanlun Zhang	State Key Laboratory of Marine Geology Tongji University 1239 Siping Rd., Yangpu District Shanghai China, PR 200092	Phone: +86-21-65987697	archaeazhang_1@tongji.edu.cn
Yawei Luo	State Key Laboratory of Marine Environmental Science Xiamen University, Xiang-An Campus Zhou Long Quan A3-301 Xiamen , Fujian China, PR 361102	Phone: +86-592-2880841	ywluo@xmu.edu.cn
Rui Zhang	Institute of Marine Microbes and Ecospheres Xiamen University A3-314 Zhoulongquan Bldg. Xiamen , Fujian China, PR 361102	Phone: 86-592-2880152	ruizhang@xmu.edu.cn
Yanbin Guo	State Key Laboratory of Marine Environmental Science Xiamen University, Xiang-An Campus Zhou Long Quan A3-301 Xiamen , Fujian China, PR 361102	Phone: +86-186-1819-5776	elgyb@163.com

---

Nannan Wang	State Key Laboratory of Marine Environmental Science Xiamen University, Xiang-An Campus Zhou Long Quan A3-301 Xiamen , Fujian China, PR 361102	Phone: +86-182- 5070-1361	nannan_wangpearl@126.com
<hr/>			
Yao Zhang	State Key Laboratory of Marine Environmental Science Xiamen University, Xiang-An Campus Zhou Long Quan A3-301 Xiamen , Fujian China, PR 361102	Phone: +86-592- 2880810	yaozhang@xmu.edu.cn

---