

## **2023 Annual Report of the Section on Carbon and Climate**

The meeting of the Section on Carbon and Climate (S-CC) was held virtually from 17:00-20:00 on Sept 5, 2023 (US/Canada Pacific time). Alex Kozyr and Tsuneo Ono acted as meeting chairs. 10 members were present, representing the US, Canada, Japan, Korea, and China (Endnote 1). Machiej Telsewski also attended the meeting representing International Ocean Carbon Coordination Project (IOCCP). The meeting agenda was reviewed and adopted (**Agenda Item 1**; Endnote 2).

### **Progress report of "inventory table" for coastal OA/deoxygenation monitoring sites (Agenda Item 2)**

Tsuneo Ono reported current progress on the construction of an inventory table of domestic OA/deoxygenation monitoring sites in each PICES country, a program launched in 2022. Information on coastal monitoring sites including carbon parameters and oxygen in the US, Canada, Japan, and Korea was uploaded to the PICES TCODE catalog homepage by 2021, and Chinese representatives planned to report their metadata at next year's meeting. However, this process has been suspended due to problems with the TCODE catalog homepage. The Chinese group will restart their submission after restoration of the home page.

### **S-CC session in PICES 2023 (Agenda Item 3)**

The S-CC chaired session "Ocean acidification and deoxygenation in ocean margin ecosystems: causes and consequences for ecosystems and fisheries" was held in PICES 2023. 15 speakers and two posters were submitted and presented.

### **Reports from collaborating organizations and agencies (Agenda Item 4)**

Alex Kozyr announced that a new version of the GLODAP database (GLODAPv2.2023) will be published in November 2023. This new version will include data from 23 new cruises, fewer than previous years because of effects from the COVID-19 pandemic. Several PICES countries including the US, Canada, and Japan contributed to these cruises.

Tsuneo Ono announced the recent publication of SOCATv2023 on behalf of Shin'ichiro Nakaoka. This version has 35.6 million fCO<sub>2</sub> data from 1957 to 2022 with the accuracy less than 5 matm, and 6.4 million sensor data with the accuracy from 5 µatm to 10 matm. Although the number of annual pCO<sub>2</sub> data in the North Pacific is still sufficient, the global number of annual pCO<sub>2</sub> data declined after 2017. Additionally, SOCAT is faced with the

risk of the closure of the European Data Management Node. The possible disturbance of the conventional data flow system and its countermeasures were discussed. Alex Kozyr presented additional information regarding SOCAT, saying that "Taro Takahashi's pCO<sub>2</sub> climatology" had been updated by using data from SOCATv2022.

Machiej Telsewski announced the upcoming "Workshops on surface ocean pCO<sub>2</sub> observations, synthesis and data products" that will be held in Bergen, Norway in Nov. 2023 and encouraged members to participate. One S-CC member, Shin'ichiro Nakaoka, assumes the science steering committee of this event.

### **Introduction of recent activities in IOCCP (Agenda Item 5)**

Machiej Telsewski reported recent movements of the World Meteorological Organization (WMO) for the launching of "Global Greenhouse Gas Watch" (GGGW) to construct a comprehensive value chain of a carbon flux observing system including ocean surface carbon observations. WMO are now preparing the implementation plan of GGGW and welcome any input from PICES countries.

He also mentioned IOCCP's efforts for re-construction of the global supply chain of ocean carbon reference materials (RM). The European group is establishing their own RM production system to alleviate burden of the existing RM source in the US. We will require one more RM source in Asia and/or Australia or New Zealand, although such a source has not established in these regions. The possible contribution of PICES countries to this issue was discussed. S-CC will follow this issue and discuss possible solutions.

For oxygen, IOCCP is now developing a new oxygen data portal to create a global ocean oxygen database and atlas. This activity is included as a part of the "Global Ocean Carbon Decade", a UNDOS program. Additionally, the Integrated Marine Debris Observing System (IMDOS) was introduced, a n. This is a new project related to the Global Ocean Observation System (GOOS).

Telsewski also reported on a training course on a Suite of Biogeochemical Sensors that was held in June 2023 in Kristineberg, Sweden. IOCCP will continue holding similar training courses in the future and Telsewski asked about the possibility of PICES's support for these activities. Currently, only a few people from the Asian side of PICES countries have joined this training course. Telsewski asked S-CC members to help promote this program and to encourage participation

### **Introduction of new Japan-China Joint research plan in ECS (Agenda Item 6)**

Tsuneo Ono introduced a new Japan-China research plan submitted to both the Japan Society for the Promotion of Science and the National Science Foundation of China. This joint research aims to obtain comprehensive understandings of spatiotemporal oxygen variation in the East China Sea and its propagation to other oceanic areas such as the Sea of Japan by creating a hydrographic database that contains historical oxygen data obtained by both Japanese and Chinese scientists. This program is now under examination by both founding agencies and the results will be available in December 2023.

### **Discussion for 2023-2024 section business plans (Agenda Item 7)**

A science session for PICES 2024 titled "Changing ocean carbon cycle and its consequences for the ocean environment: Detection, prediction, and mitigation" was discussed and approved for submission. In this session, we included topics for marine carbon dioxide removal so that S-CC can cover this new scientific topic. This session was proposed to the parent committees (POC and BIO) and will be examined by GC.

## **Endnote 1**

### **Participation list**

#### Members

James Christian (Canada)

Zhongyong Gao (China)

Xianghui Guo (China)

Masao Ishii (Japan)

Tsuneo Ono (Japan)

Toru Suzuki (Japan)

Geun-Ha Park (Korea)

Alex Kozyr (USA)

Simone Alin (USA)

Samantha Siedlecki (USA)

#### Observers

Maciej Telszewski (IOCCP)

## **Endnote 2**

**Meeting Agenda (17:00 – 2000 September 5 in US/Canada Pacific time, held virtually)**

- 17:00 - 17:10    Opening (Ono, Kozyr)  
Review and adopt agenda**
- 17:10 - 17:30    Progress report of "inventory table" for coastal OA/deoxygenation  
monitoring cites (Ono)**
- 17:30 - 17:45    Announce for S-CC session in PICES 2023 (Ono/Kozyr)**
- 17:45 - 18:30    Information exchange  
\*GLODAP (Kozyr)  
\*SOCAT (Nakaoka)  
others\_TBA**
- 18:30 - 19:00    Introduction of recent activities in IOCCP (Maciej Telszewski)**
- 19:00 - 19:30    Introduction of new Japan-China Joint research plan in ECS  
(Tsuneo Ono)**
- 19:30 - 20:00    Discussion for 2023-2024 section business plans**
- 20:00            Adjourn**