The 4th Global Ocean Acidification Observing Network (GOA-ON) International Workshop

Apr. 14 - 17, 2019 • Hangzhou, China

Special Event 2: Ocean Carbon from Space (SatCO2): Joint Science Training Workshop

14 April 2019 Hangzhou, China

Ocean acidification and its effects on the ocean carbon cycle have resulted in increasing concern from the scientific community and the public sector. To quantify, understand and predict changes in the ocean carbon system, especially in the highly dynamic marginal seas, observations with various spatial-temporal scales are required. Satellite remote sensing is a critical observational resource at a large spatial-temporal scale, which has been demonstrated as a powerful application in marine carbon research. Yet, the limited parameters and interpretations of current satellite products remain a big gap necessary to link the observations to biogeochemical processes, and ultimately their response to global climate change. Initiated by researchers specialized in remote sensing and biogeochemistry, the Ocean Carbon from Space (SatCO2): Joint Science Training Workshop serves as an inter-disciplinary platform to facilitate and promote interaction and cooperation among scientists who aim to integrate satellite remote sensing data and biogeochemical studies for a better understanding of the ocean carbon system.

Conveners:

Delu Pan, State Key Laboratory of Satellite Ocean Environment Dynamics (SOED/SIO), China Chen-Tung Arthur Chen, National Sun Yat-sen University, Kaohsiung

Yan Bai, State Key Laboratory of Satellite Ocean Environment Dynamics (SOED/SIO), China

Date & Time: 14:30-17:30, 14 April 2019 (Sunday)

Venue: Zhejiang Hotel, Hangzhou, China

This training workshop is consisted of four activities:

1) Keynote speech: Current research efforts targeting satellite remote sensing to increase understanding on the ocean carbon cycle (Ocean Carbon from Space);
2) Product launch: Introduction of the 4th version of SatCO2 software and online database from State

Key Laboratory of Satellite Ocean Environment Dynamics (SOED);

3) Hands-on training: SatCO2 software can be accessed free of charge and technical assistance will be available;
4) Discussion and Q&A.

Who should attend?

Scientists/Experts in remote sensing and biogeochemistry
Scientists/Experts in coastal ocean monitoring
Relevant sectors in the Government
All interested parties are encouraged to attend

Notes:

- The attendance of this special event is free of charge. However, online registration is required.
- The medium of instruction for this special event is English.
- The GOA-ON Workshop will neither charge registration fee nor cover the travel and accommodations of participants who are ONLY attending this special event. If special event participants are interested to join the GOA-ON Workshop, they are welcome to register on-site.
- The GOA-ON Workshop will offer the conference room and coffee breaks to support this special event.

Contacts:

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Appendix: Introduction to SatCO2 Software and database (Free Access)

The SatCO2 software (Satellite-based marine carbon monitoring and analysis system) is a tool to process satellite data and *in situ* data, which is a cooperative product that developed by the State Key Laboratory of Satellite Ocean Environment Dynamics (SOE/SIO/SOA) and the Zhejiang Provincial Key Laboratory of Geographic Information Systems at Zhejiang University.

The SatCO2 software was developed for multi-disciplinary researchers, particularly for non-remote-sensing experts and remote sensing beginners but aiming to promote the application of satellite data, to free them from coding on satellite big data processing. In comparison to the conventional two-dimensional processing software (e.g. ENVI) and the three-dimensional remote sensing image display software (e.g. Google Earth), SatCO2 can simultaneously fulfill the visualization and project the scientific calculation of multiple-sources satellite data, *in situ* data and modelling data on a three-dimensional virtual earth. The software is supported by the database in the Online Data Sharing Center of SOED, which shares the latest datasets of long-term time series of remote sensing data records on ocean carbon cycle.

The major functions of the SateCO2 software can be summarized as follows:

1) Satellite data browsing, extracting and statistical analysis in the user-defined region of interest (ROI) for an individual image or time-series data from online database and/or user's own data on the personal computer. Supported by the SOED/SIO/SOA Satellite Database, there are numerous satellite datasets accessible for free via the SatCO2 software.

2) Cross validation between satellite data and *in situ* data. Users can extract the satellite data that match up with the *in situ* data (user-defined temporal and spatial window), and then conduct regression analysis for direct comparison. Users can evaluate the spatial and temporal representativeness of cruise's data based on the long-term change of satellite observations.

3) Air-sea CO2 flux estimation. User can easily deal with area integration for flux budget calculation either i) by applying all in situ data with several data extrapolation methods (convenient area integration), or ii) by applying partially underway data and partially satellite data (e.g., wind speed and atmospheric pCO2), or iii) by applying all satellite data. In the flux calculation, users can adjust some coefficients or define user's own equations.

4) Generation of new satellite products. Users can input their own algorithms simply by clicking on a formula editor to generate new products based on known satellite products provided by online database. This function provides easy way for tuning and displaying user-defined algorithms, which

can greatly free users from coding and processing satellite data in various formats.

5) Production of a user-defined thematic map (a single one or in batch). Analysis results (data and figures) can be saved for further use.

6) Extension modules. The software has been extended and been updated with new modules embedded the latest satellite algorithms for further application, such as red tide detection, water quality classification, etc. We welcome the collaborators to supplement new modules and extend the database with contributor-signed algorithms and datasets.