Welcome!

환영

hwan-yeong
IOCCG Mandate
Established in 1996

- To provide a common voice for the user community: three successful International Ocean Colour Science (IOCS) meetings to date
- To advocate the importance of ocean-colour data: Scientific WGs, IOCCG Report series, news bulletins, website
- To foster expertise in using ocean-colour data: training courses including four successful IOCCG Summer Lecture Series
- To ensure continuity and quality of the ocean-colour data stream: liaise with space agencies, participate in CEOS OCR-VC, OCT-IT
International Ocean Colour Coordinating Group

- Annual Committee Meetings
- Comprehensive Website
- Quarterly News Bulletins

- Advanced Summer Lecture Series (SLS)
- Introductory courses
- Over 570 students from ~90 countries

- Associated member of CEOS

Scientific Research

IOCCG Members

Space Agency Representatives

Project Office

Capacity Building

Scientific Working Groups

Liaison with CEOS

Affiliated Program of SCOR

IOCCG Task Forces on Calibration, Carbon etc

- 17 IOCCG Reports
- 2 more imminent
- Handbook
- New online IOCCG Protocol Series

OCR-Virtual Constellation
OCR-IT
Sensor Calibration Task Force
GEO Blue Planet
GOOS and GCOS

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IOCCG Scientific Report Series

- Scientific Working Groups investigate various aspects of ocean-colour technology and its applications
- 17 IOCCG Reports published to date (plus a handbook). Widely cited, have an ISBN and DOI and are indexed in Thomson Reuters Book Citation Index (included in Web of Science).
- Available for free on IOCCG website

Minimum Requirements for an Operational Ocean-Colour Sensor (1998)
Remote Sensing of OC in Coastal and Other Waters (2000)
Ocean-Colour Data Merging (2007)
Remote Sensing in Fisheries and Aquaculture (2009)
Partition of the Ocean into Ecological Provinces (2009)
Atmospheric Correction (2010)
Bio-Optical Sensors on Argo Floats (2011)
Ocean-Colour Observations from a Geostationary Orbit (2012)
In-flight Calibration of Satellite Ocean-Colour Sensors (2013)
Phytoplankton Functional Types from Space (2014)
Current IOCCG Working Groups

• **Harmful Algal Blooms**  
  Chair: Stewart Bernard

• **Uncertainties in Ocean colour Remote Sensing**  
  Chair: Frédéric Mélin

• **Role of Ocean Colour in Biogeochemical, Ecosystem and Climate Modelling**  
  Chair: Stephanie Dutkiewicz

• **Atmospheric Correction Algorithms over Optically-Complex Waters**  
  Chair: Cédric Jamet

• **Long Term Vicarious Adjustment of Ocean Colour Sensors**  
  Co-Chairs: Christophe Lerebourg, Ewa Kwiatkowska, Carol Johnston
Primary Productivity @ Early Writing Stage coming 2021?

Absorption (particles) COMPLETED!!! Nov. 2018

Beam-c available May 2019

AOPs @ Associate Editorial Board Coming June 2019

Scattering Properties @ Early Writing Stage coming 2020?

Phytoplankton Taxonomy WG on Data Reporting @ Writing Stage coming late 2020

CDOM Absorption @ Final writing Stage coming late 2019

POC @ Final Writing Stage coming late 2019

Inline Flow-Through IOPs @ Associate Editorial Board coming June 2019

• Updates of the NASA Ocean Optics Protocols (ca. 2002-2003), under the auspices of IOCCG to encourage broad international acceptance
• Available on IOCCG website

See Poster #111

See Poster #13
Overall Goal of IOCS Meetings

- To build and reinforce the voice of the global ocean colour community
- To promote international linkages amongst different communities
- To provide a forum for discussion on various topics and come up with recommendations/advice for IOCCG, the community and the space agencies
- To allow more people from the ocean colour community to be involved in IOCCG activities
- To help the IOCCG in its oversight role with respect to high-level discussions with space agencies

IOCS Meetings

- 2023 – Venue: USA/TBD
- April 2019 – Busan, South Korea (~251 attendees from 31 different countries)
- May 2017 – Lisbon, Portugal (344 attendees from 41 different countries)
- June 2015 – San Francisco, USA (262 attendees from 29 different countries)
- May 2013 – Darmstadt, Germany (244 attendees from 36 different countries)
Aquatic Carbon from Space Special Issue

• **Why:** Aquatic carbon is a critical component of the Earth system in carbon cycling and carbon sequestration

• **What:** how can remote sensing help assess carbon sources, stocks, and fluxes in any of the regions identified

• **Topics to be covered**
  • Wetlands
  • Ocean/Land interface Ocean/Atmosphere interface
  • Open ocean and large lakes
  • Global C from space
  • Global/regional modeling
  • Future observational and modeling requirements

• Being organized by Chuanmin Hu

Seeking nominations for Guest Editors! Self-nominations welcome
IOCS recommendations and agency/community take-up

**IOCS Break-Out Groups**

- **Hyperspectral remote sensing**
- **Geostationary Ocean Colour Remote Sensing**
- **Lidar & Polarimetry for ocean colour**
- **Pre-, Post-Launch & Vicarious Calibration**

- **Ecosystems and Climate Change Applications**
  - **Carbon From Ocean Colour**
  - **Ocean Colour High Latitudes & Southern Ocean**
  - **Estimating Uncertainty in Ocean Colour**
  - **Advances in Atmospheric Correction**
  - **Multi-water algorithms**
  - **Phytoplankton Community Structure**
  - **Water Quality**
  - **Inland & Coastal Waters**
  - **Very High Resolution Satellites**
  - **In Situ Measurement Protocols**
  - **International Training & Outreach**
  - **Software, tools & data sharing**
  - **Research to Operations**

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**EUMETSAT**
- Copernicus Ocean Colour System Vicarious Calibration, e.g. FRM4SOC +
- OC-BPC approaches for the NIR-based clear water Atmospheric Correction
- Sentinel advances in phytoplankton fluorescence retrievals
- Spectral matching AC for Sentinel
- Sentinel IOP inversion in oceanic and inland surface waters
- Enhanced geostationary capabilities of MSG-3

**CSA**
- Additional SWIR bands for COCI sensor

**JAXA**
- GCOM-C Operational Applications

**NOAA**
- CoastWatch implementation of IOCS 2013 R2O recommendations

**NASA**
- PACE and Earth Venture mission planning

**JAXA**
- GCOM-C Operational Applications

**KSIO**
- GOCI II mission planning

**ESA**
- CARBON + project

**Additional satellite user training courses in Asia and Africa**

**New tools & processing capabilities for high resolution applications**

**Carbon special issue**

**NASA: PACE and Earth Venture mission planning**

**静电**

**Carbon Task Force**

**KIOS: GOCI II mission planning**

**Additional satellite user training courses in Asia and Africa**

**New tools & processing capabilities for high resolution applications**

**Carbon special issue**
Where Lisbon ended….

**New Sensors/Capabilities**
- Enhanced CALIOP sensor
- Hyperspectral (2)
- Multi-sensor coastal & inland mission(s)
- Phycoerythrin bands @ high res
- Integrated EO, autonomous obs & modelling around earth system questions

**Improved Atmospheric Corrections**
- Coastal & Inland (3)
- Trichodesmium apps

**Community Knowledge**
- Trichodesmium protocols
- Radiometric protocols
- Inland & coastal protocols
- Algorithm performance metrics

**Assessment of Value & Impact**
- Better translation into agency actions

**Capacity Building**
- Vicarious Calibration
- Better integrated approach with more opportunities

**Infrastructure**
- Resources for sustainable vicarious calibration

**Algorithms, Products & Uptake**
- Multi-water alg drive (2)
- Ocean carbon products – value and uptake
- Big data for hyperspectral

**In situ & Validation**
- Improved validation efforts & better uncertainties
- Phyto community measurements & metrics

**Better translation into agency actions**
IOCS-2019 Breakouts

- Phytoplankton Characterisation
- High Temporal/Spatial Resolution Applications
- Optically-Complex and Shallow Waters
- Vicarious Cal/Val Protocols
- Atmospheric Correction under Complex/Extreme Environments
- Satellite Sensor Calibration
- Emerging New Technologies
- Research to Operations Applications
- Open Course Scientific Computing
- Ocean Color Community Activities
- IOCCG Activities
- Agency Actions
IOCS-2019 Breakout Group

- Open source scientific computing tools and resources
- Requirements for phytoplankton composition
- High temporal/spatial resolution applications
- Remote sensing of optically-complex and shallow waters
- Vicarious calibration and validation protocols
- Research to operations (R2O) applications
- Emerging new technologies for ocean colour research
- Sensor calibration
- Atmospheric correction under complex/extreme environments

**By Thursday Evening**
- One sentence on the ideal future capability and impact
- Three bullet points on key recommendations

**By April 30th**
- 1-2 page summery of breakout discussion
- List of key recommendations
Tuesday Agenda

09:15-10:00   Keynote 1: GOCI experience, Young-Je Park (KIOST)
10:00-10:30   Coffee Break
10:30 -12:15  Session: Emerging Applications and Science in SE Asia
12:15-14:00   Lunch
14:00- 16:30  Breakout Workshops
  1: Open source scientific computing tools and resources (Auditorium 2, 2nd floor)
  2: Requirements for phytoplankton characterization (Auditorium 1, 2nd floor)
  3: High temporal/spatial resolution applications (Auditorium 3, 22nd floor)
16:30-17:30   Lightening Poster Session (Auditorium 1, 2nd floor)
18:00-20:00   Icebreaker (Terrace Hall, 6th Floor)
Friday Bus Tour of Busan

- Free Bus Tour
- From 5 – 8 pm on Friday
- Can accommodate 86 participants
- Sign-up at the Busan Tour Information Booth in the lobby
Thank You

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