

# Welcome!

환영

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International Ocean Colour Coordinating Group (IOCCG) Cara Wilson IOCCG Chair

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# **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

CCG



# **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

Handbook



Handbook of Satellite Remote Sensing Image Interpretation: Applications for Marine Living Resources Conservation and Management (2011)

# **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

### **Status of IOCCG Protocol Activities**



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

## International Ocean Colour Science Meeting Cesa Colour Science

Advancing Global Ocean Colour Observations

### **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)



# **Relationship between IOCS break-outs and IOCCG activities**

#### **IOCCG WG/Reports**

Ocean-Colour Observations from a Geostationary Orbit

In-flight Calibration of Satellite Ocean-Colour Sensors

Long Term Vicarious Adjustment of Ocean Colour Sensors

Ocean Colour in Biogeochemical, Ecosystem & Climate Modelling

Mission Requirements for Future Ocean-Colour Sensors

Ocean Colour Remote Sensing in Polar Seas

Uncertainties in Ocean colour Remote Sensing

Ocean Colour and Harmful Algal Blooms

Phytoplankton Functional Types from Space

Earth Observations in Support of Global Water Quality Monitoring

# IOCS Break-Out Groups Hyperspectral remote sensing

Geostationary Ocean Colour Remote Sensing

Lidar & Polarimatery 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 Data

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** 

**Other IOCCG Activities** 

Task Force: Satellite Sensor Calibration

New Task Force: Hyperspectral

New Task Force: Carbon and Special Issue

Technical Report: AC in Optically-Complex Waters

Protocols: Particle Absorption

Protocols: Flow through IOPs

Protocols: Beam C

Protocols: In Situ Radiometry

Summer Lecture Series & Training Courses

fppt.com

## 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

NASA: PACE and Earth Venture mission planning

#### 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<sup>4</sup>

CSA: Additional SWIR bands for COCI sensor

JAXA: GCOM-C Operational Applications

NOAA: CoastWatch implementation of IOCS 2013 R2O recommendations

Geostationary Ocean Colour Remote Sensing

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**Ocean Colour High Latitudes & Southern Ocean** 

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**Research to Operations** 

Hyperspectral Task Force

**KIOST: GOCI II mission planning** 

Carbon special issue

Carbon Task Force

ESA: CARBON + project

Additional satellite user training courses in Asia and Africa

New tools & processing capabilities for high resolution applications

fppt.com

### Where Lisbon ended....

# 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

#### Infrastructure

 Resources for sustainable vicarious calibration

#### **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

Assessment of Value & Impact

Better translation into agency actions

#### **Capacity Building**

- Vicarious Calibration
- Better integrated approach with more opportunities

#### Improved Atmospheric Corrections

Coastal & Inland (3)

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• Trichodesmium apps

#### **Community Knowledge**

- Trichodesmium protocols
- Radiometric protocols
- Inland & coastal protocols
- Algorithm performance metrics



## 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 30<sup>th</sup>

- 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, 2<sup>nd</sup> floor)
  - 2: Requirements for phytoplankton characterization (Auditorium 1, 2<sup>nd</sup> floor)
  - 3: High temporal/spatial resolution applications (Auditorium 3, 22<sup>nd</sup> floor)
- 16:30-17:30 Lightening Poster Session (Auditorium 1, 2<sup>nd</sup> floor)
- 18:00-20:00 Icebreaker (Terrace Hall, 6<sup>th</sup> 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**

# 고맙습니다

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