



International Ocean Colour Coordinating Group (IOCCG) **Summary 2023**

Shubha Sathyendranath, IOCCG Chair
Raisha Lovindeer, IOCCG Project Coordinator



Promoting development and applications of science and technology that underpin remote sensing of ocean colour across all aquatic environments (in-land, coastal, open-ocean), through coordination, training, liaising between providers and users, advocacy, and provision of expert advice.



Structure

IOCCG International Context

'Parent' orgs



SCOR Affiliate Programme
CEOS Associate Member

Sponsoring agencies



Conference



IOCS Meeting Coordinator

The IOCCG Committee

The IOCCG committee consists of:

- sponsoring agency representatives
- scientists from the ocean colour community that serve 3-year terms
- a chair on a 3-year term, which may extend for a second term

The Committee meets once annually.
Find minutes of past meetings at:

ioccg.org/what-we-do/committee-meetings

Our 2022 Committee meeting
hosted by ESA in Frascati, Italy →



Current chair

Dr. Shubha Sathyendranath
Plymouth Marine Lab, UK





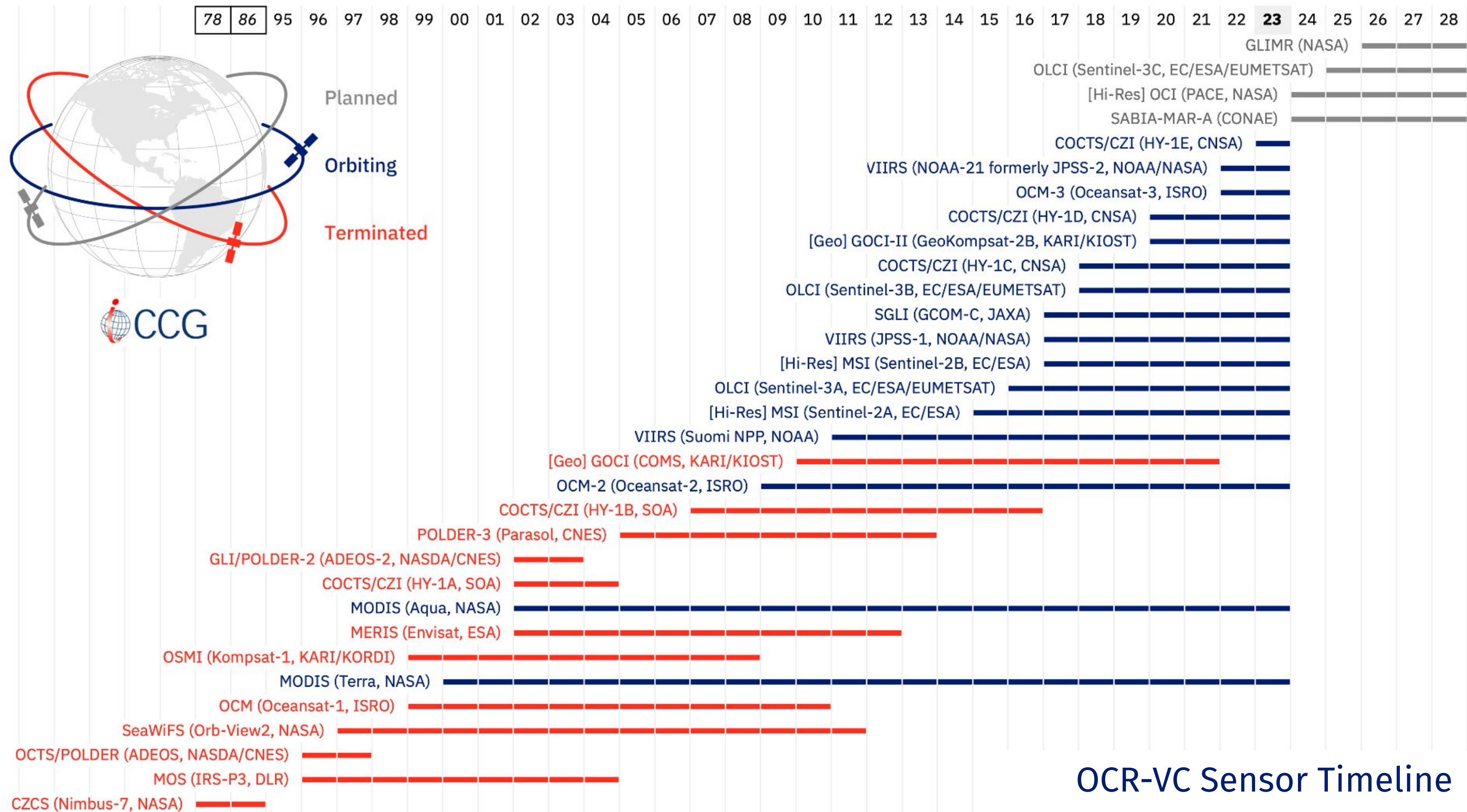
CEOS Ocean Colour Radiometry Virtual Constellation (OCR-VC)

Activities of the OCR-VC

- Developed *International Network for Sensor Inter-comparison and Uncertainty assessment for Ocean Colour Radiometry (INSITU-OCR)* white paper (ioccg.org/wp-content/uploads/2016/02/INSITU-OCR-white-paper.pdf)
- Established the OCR Implementation Team (OCR-IT) to prepare a rolling implementation plan encompassing CEOS deliverables
- Contributes themes to current UN Decade of Ocean Science
- Provides support to Group on Earth Observation (GEO) Blue Planet initiatives

Implementation Plan includes:

- ESA FRM4SOC (frm4soc.org/) and EUMETSAT FRM4SOC-2 (frm4soc2.eumetsat.int/) projects
- IOCCG Task Force activities
- IOCCG Scientific Reports
- IOCCG Ocean Optics and Biogeochemistry Protocols
- CEOS COVERAGE initiative (coverage.ceos.org)



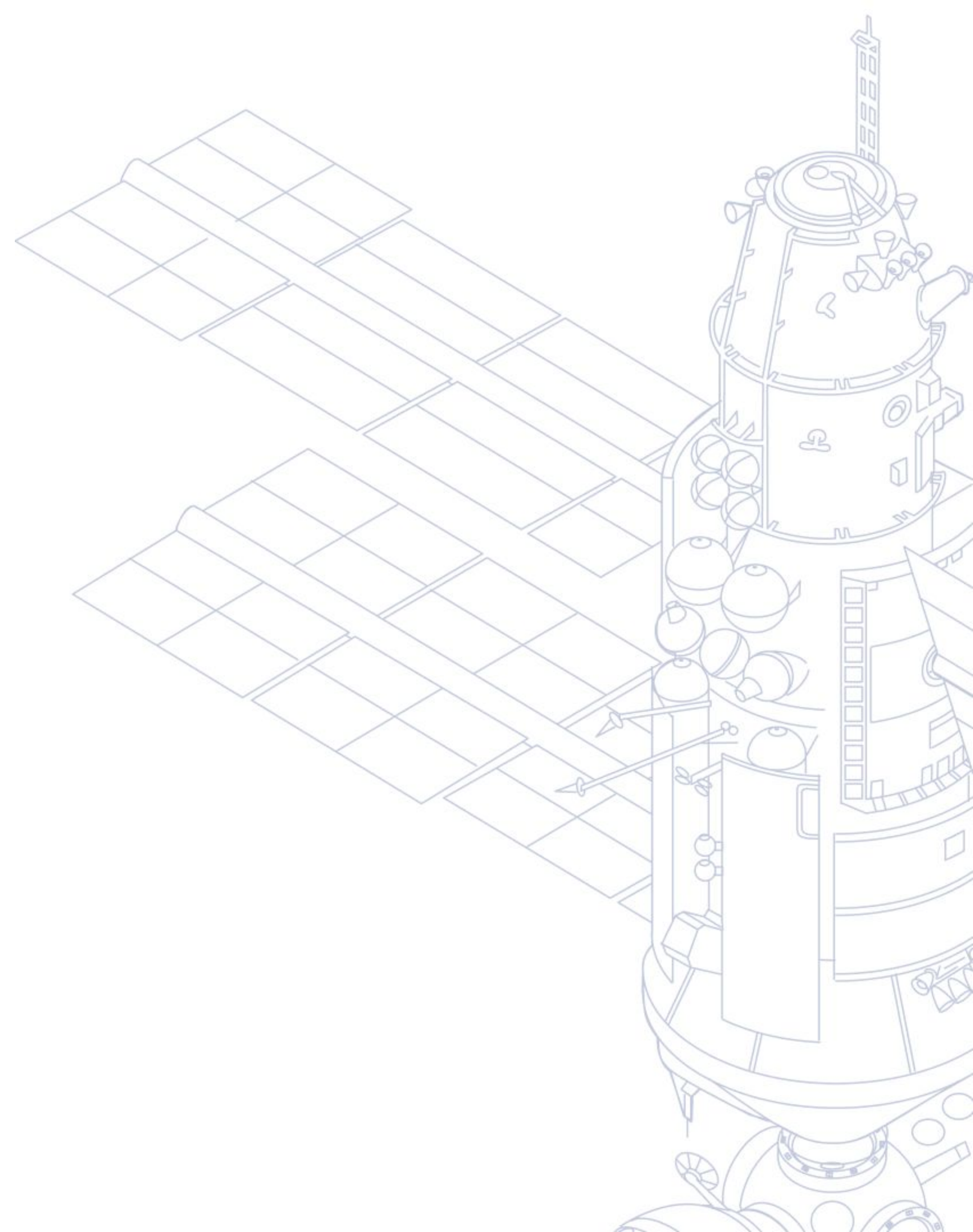
OCR-VC Sensor Timeline

Ocean Carbon from Space Workshop

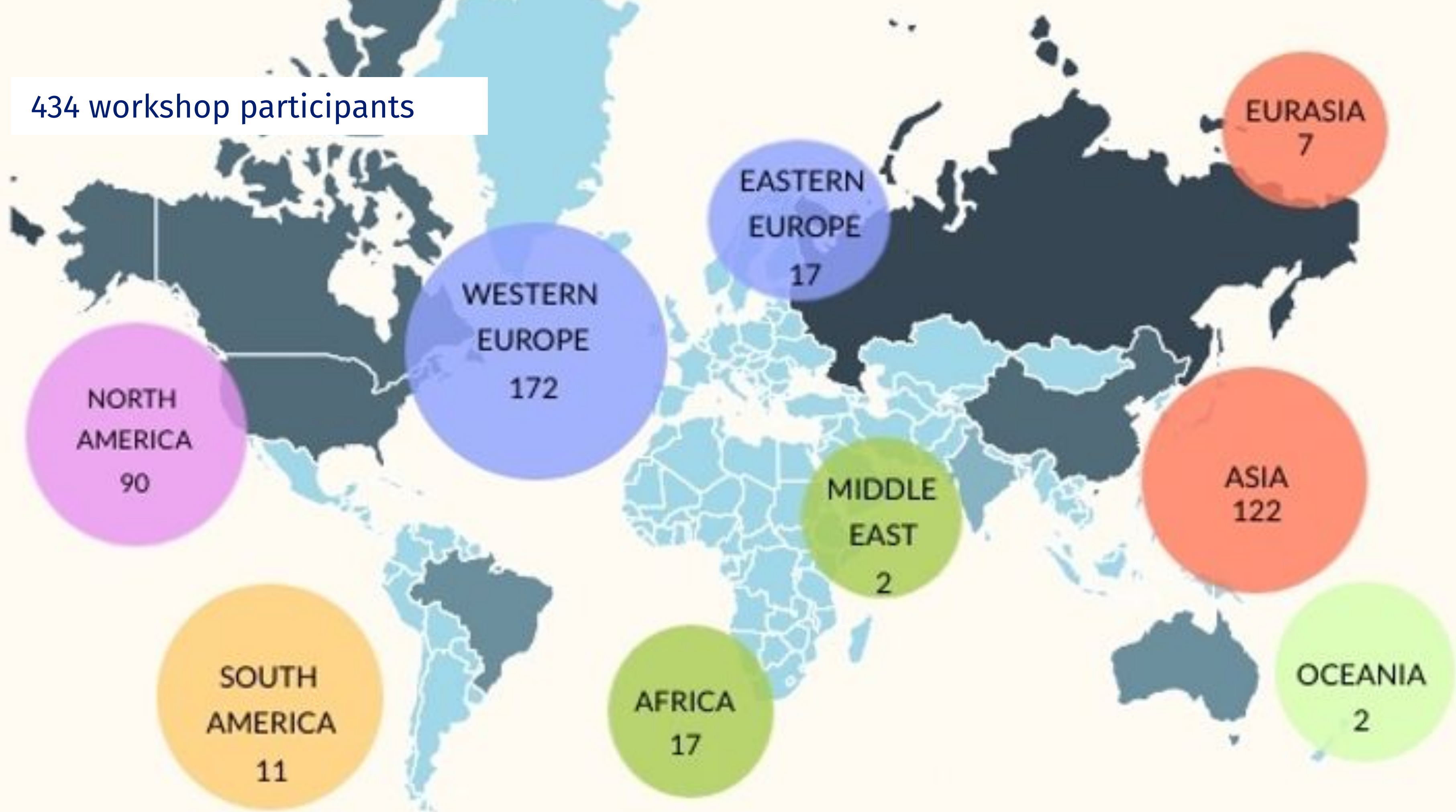
Hosted by OCR-VC with ESA in Feb 2022, leading to:

- special issue in *Frontiers in Marine Science* to capture individual contribution to the workshop and related work
- a community whitepaper to gather the workshop outcomes and recommendations, submitted to the *Aquatic Carbon From Space* Special Issue in Earth Science Reviews (expected to be finalised early 2023).
- creation of a strong momentum around aquatic carbon from space, a key contribution to the Global Carbon Budget.

oceancarbonfromspace2022.esa.int



434 workshop participants



Aquatic Carbon Roadmap

- To improved understanding of what controls the trends and variability in the ocean carbon sink, and better align model carbon estimates with observation-based data
- A deliverable to CEOS led by the OCR-VC
- To include contributions from
 - OCCG Task Force on Aquatic Carbon from Space
 - IOCCG Working Group on Ocean Primary Production





Scientific Working Groups and Reports

Scientific working groups

- Investigate aspects of ocean colour science, technology and its applications
- Contribute to CEOS deliverables
- Publish their findings in scientific reports
- Progress is reviewed annually at the IOCCG Committee meeting

Latest in the IOCCG Report Series →

Observation of Harmful Algal Blooms with Ocean Colour Radiometry

Reports of the
International Ocean-Colour
Coordinating Group

REPORT NUMBER 20



An Affiliated Program of SCOR
An Associate Member of CEOS



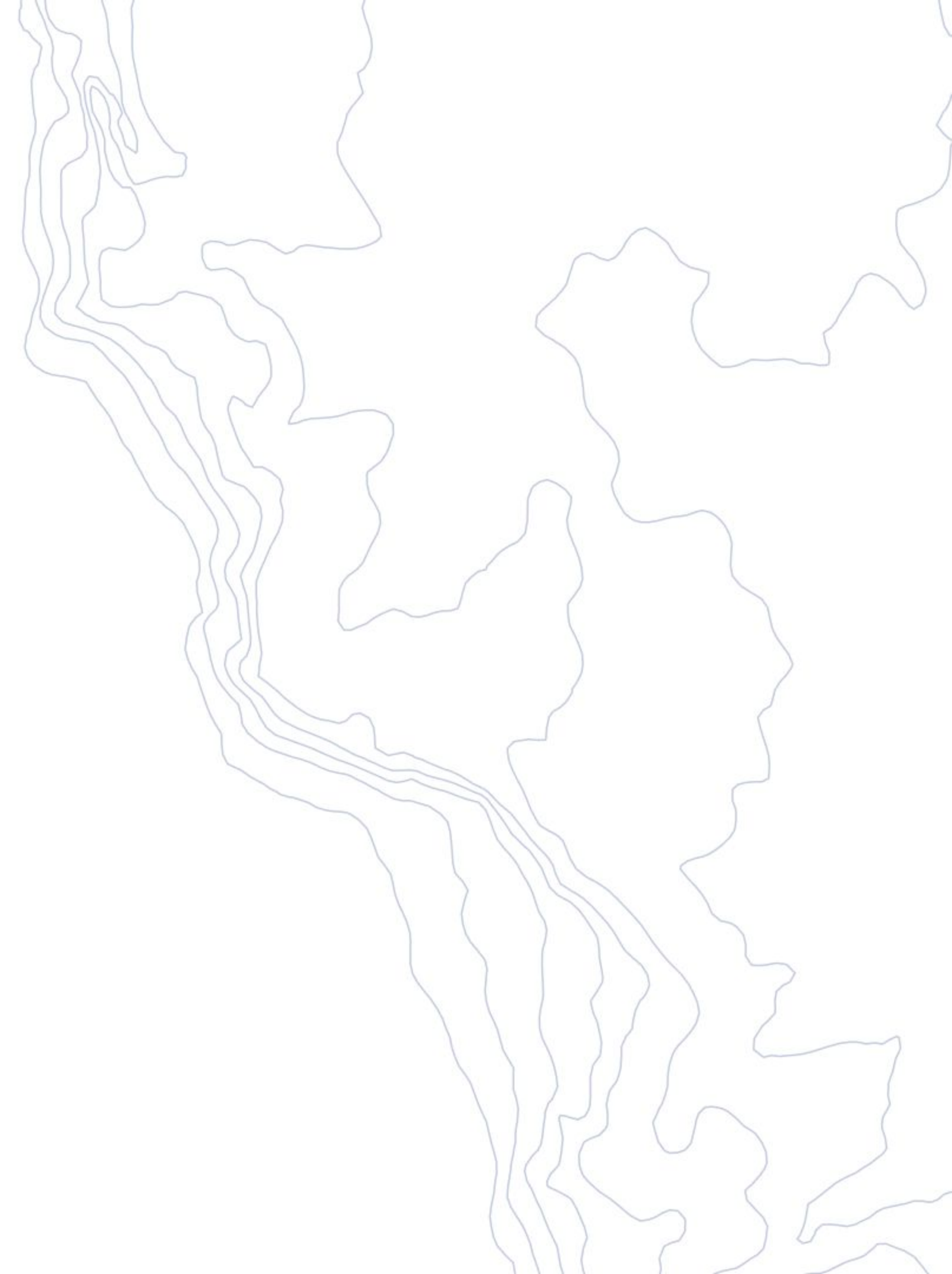
IOCCG Scientific Report Series, Volume I

1. Minimum Requirements for an Operational Ocean-Colour Sensor (1998)
2. Status and Plans for Satellite Ocean-Colour Missions (1999)
3. Remote Sensing of Ocean Colour in Coastal and Other Waters (2000)
4. Ocean-Colour, Level-3, Binned Data Products (2004)
5. Remote Sensing of IOPs: Fundamentals and Algorithms (2006)
6. Ocean-Colour Data Merging (2007)
7. Why Ocean Colour? The Societal Benefits of Ocean-Colour Technology (2008)
8. Remote Sensing in Fisheries and Aquaculture (2009)
9. Partition of the Ocean into Ecological Provinces (2009)
10. Atmospheric Correction (2010)
11. Bio-Optical Sensors on Argo Floats (2011)
12. Ocean-Colour Observations from a Geostationary Orbit (2012)
13. Mission Requirements for Future Ocean-Colour Sensors (2012)
14. In-flight Calibration of Satellite Ocean-Colour Sensors (2013)
15. Phytoplankton Functional Types from Space (2014)
16. Ocean Colour Remote Sensing in Polar Seas (2015)
17. Earth Observations in Support of Global Water Quality Monitoring (2018)
18. Uncertainties in Ocean Colour Remote Sensing (2019)
19. Synergy between Ocean Colour and Biogeochemical/Ecosystem Models (2020)
20. Observation of Harmful Algal Blooms with Ocean Colour Radiometry (2021)

(series editor: Venetia Stuart)

Current IOCCG Working Groups

- **Intercomparison of atmospheric correction algorithms over optically-complex waters**
ioccg.org/group/atm-corr
established 2014
- **Conducting benthic reflectance measurements**
ioccg.org/group/benthic
established 2020
- **Ocean primary production**
ioccg.org/group/oceanpp
established 2023
- **Classification of optical water types in aquatic radiometry**
ioccg.org/group/owt
established 2023





Ocean Optics & Biogeochemistry Protocol Series

Ocean Optics & Biogeochemistry Protocol Series

- Community consensus protocols for ocean colour sensor validation.
- Vetted by the ocean colour community during a 60-day review period.
- Available on the IOCCG website & OBP Repository.
- Initially formed through workshops and working groups sponsored by NASA.
- Now developed by specialized working groups also supported by IOCCG.

Latest in the IOCCG Protocol Series →

Ocean Optics & Biogeochemistry Protocols for Satellite Ocean Colour Sensor Validation

Volume 7: Aquatic Primary Productivity Field Protocols for Satellite Validation and Model Synthesis (v7.0)

Editors

Ryan A. Vandermeulen and Joaquín E. Chaves

Authors

Balch, W.M., Carranza, M., Cetinić, I., Chaves, J.E., Duhamel, S., Fassbender, A., Fernandez-Carrera, A., Ferrón, S., García-Martín, E., Goes, J., Gomes, H., Gundersen, K., Halsey, K., Hirawake, T., Isada, T., Juranek, L., Kulk, G., Langdon, C., Letelier, R., López-Sandoval, D., Mannino, A., Marra, J.F., Neale, P., Nicholson, D., Silsbe, G., Stanley, R.H., Vandermeulen, R.A

International Ocean Colour Coordinating Group (IOCCG) in collaboration with National Aeronautics and Space Administration (NASA)

IOCCG, Dartmouth, Canada

September 2022

Ocean Optics & Biogeochemistry Protocol Series

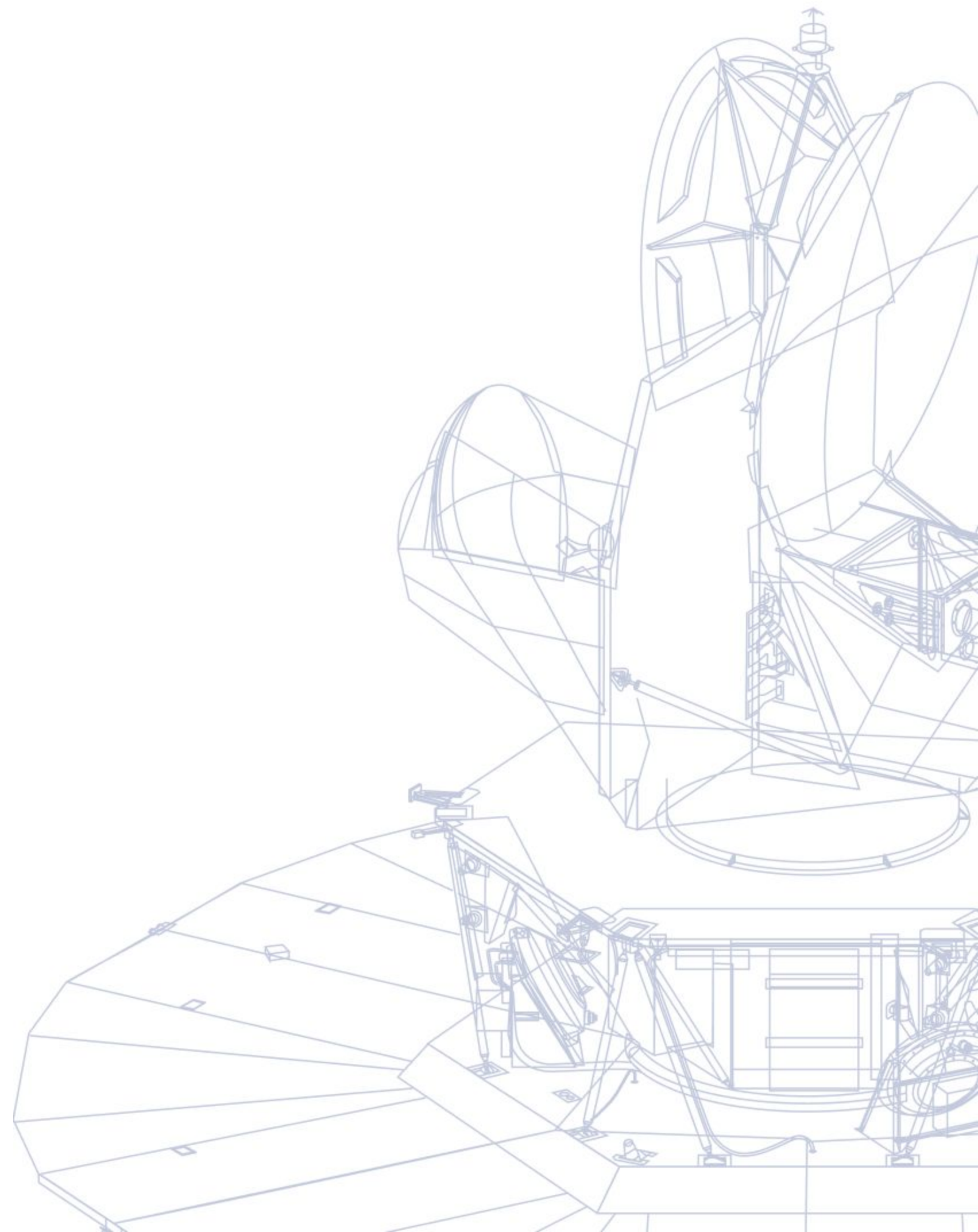
1. Inherent Optical Property Measurements and Protocols: Absorption Coefficient (2018)
2. Beam Transmission and Attenuation Coefficients: Instruments, Characterization, Field Measurements and Data Analysis Protocols (2019)
3. Protocols for Satellite Ocean Colour Data Validation: In Situ Optical Radiometry (2019)
4. Inherent Optical Property Measurements and Protocols: Best Practices for the Collection and Processing of Ship-Based Underway Flow-Through Optical Data (2019)
5. Measurement Protocol of Absorption by Chromophoric Dissolved Organic Matter (CDOM) and Other Dissolved Materials (in review)
6. Particulate Organic Matter Sampling and Measurement Protocols: Consensus Towards Future Ocean Color Missions (2021)
7. Aquatic Primary Productivity Field Protocols for Satellite Validation and Model Synthesis (2022)
 - Noteworthy and Supplemental Topics on Ocean Colour Radiometry Protocols is a volume that contain a series of smaller chapters on practical protocols, including measurements in suboptimal conditions
 - On-Water Radiometry Measurements: Skylight-Blocked Approach and Data Processing (in review)



Task Forces

Semi-Permanent Task Forces

- address issues that require ongoing capabilities or expertise
- help to facilitate interagency collaboration on an ongoing basis
- remain until the need they serve no longer exists
- progress is reviewed annually at the IOCCG Committee meeting



Current Task Forces

- **Ocean Colour Satellite Sensor Calibration**
ioccg.org/group/calib-tf
to create a framework for active and hands-on collaboration among instrument calibration and characterization experts
- **Remote Sensing of Marine Litter & Debris**
ioccg.org/group/marine-litter-debris
to improve our ability to monitor floating plastic debris from space
- **Ocean Colour System Vicarious Calibration (OC-SVC)**
ioccg.org/group/vicarious-adjustment (ocsvc-tf)
to coordinate SVC infrastructure development and maintenance
- **Aquatic Carbon from Space**
ioccg.org/group/ocean-carbon-tf
to provide expert guidance on how to correctly exploit satellite observations in relation to ocean carbon
- **Hyperspectral Ocean Colour Radiometry**
ioccg.org/group/hyperspectral-tf
to define key advantages of hyperspectral ocean colour radiometry and the science it enables



Capacity Building and Community Engagement

Communication Channels

Quarterly news bulletins

ioccg.org/news

- News from IOCCG & sponsoring agencies
- Upcoming events
- Featured ocean colour publications
- Released Feb, May, Aug, & Nov annually

Our mailing list

ioccg.org/news/subscribe-ioccg-mailing-list

- Official communications from the IOCCG Project Office
- Community announcements

Our website

ioccg.org

- Training & education resources
- Committee meeting minutes
- IOCCG scientific reports, protocols, & task force white papers
- Employment and funding opportunities
- Ocean colour bibliography

Summer Lecture Series

- Biennial 2-week training course at Laboratoire d'Océanographie de Villefranche since 2012.
- 20+ Students
- All course material made available on the IOCCG website after the courses along with a host of ocean colour resources

ioccg.org/what-we-do/training-and-education/educational-links-and-resources

Location of the SLS from 2012-2022 →





Students & Lecturers, 2022 Summer Lecture Series

Trevor Platt Memorial Scholarship

USD \$5000 awarded to a student / scholar from a developing country to conduct hands-on research or receive in-depth training in ocean colour at a foreign institution for up to 3 months.



Our 2023 awardees →



Arjun Adhikari
India

Proposed research: Satellite derived coastal colour components and physical processes: a numerical study with Hans Burchard at the Leibniz Institute for Baltic Sea Research, Germany.



David Alejandro Gonzalez Rivas
Mexico

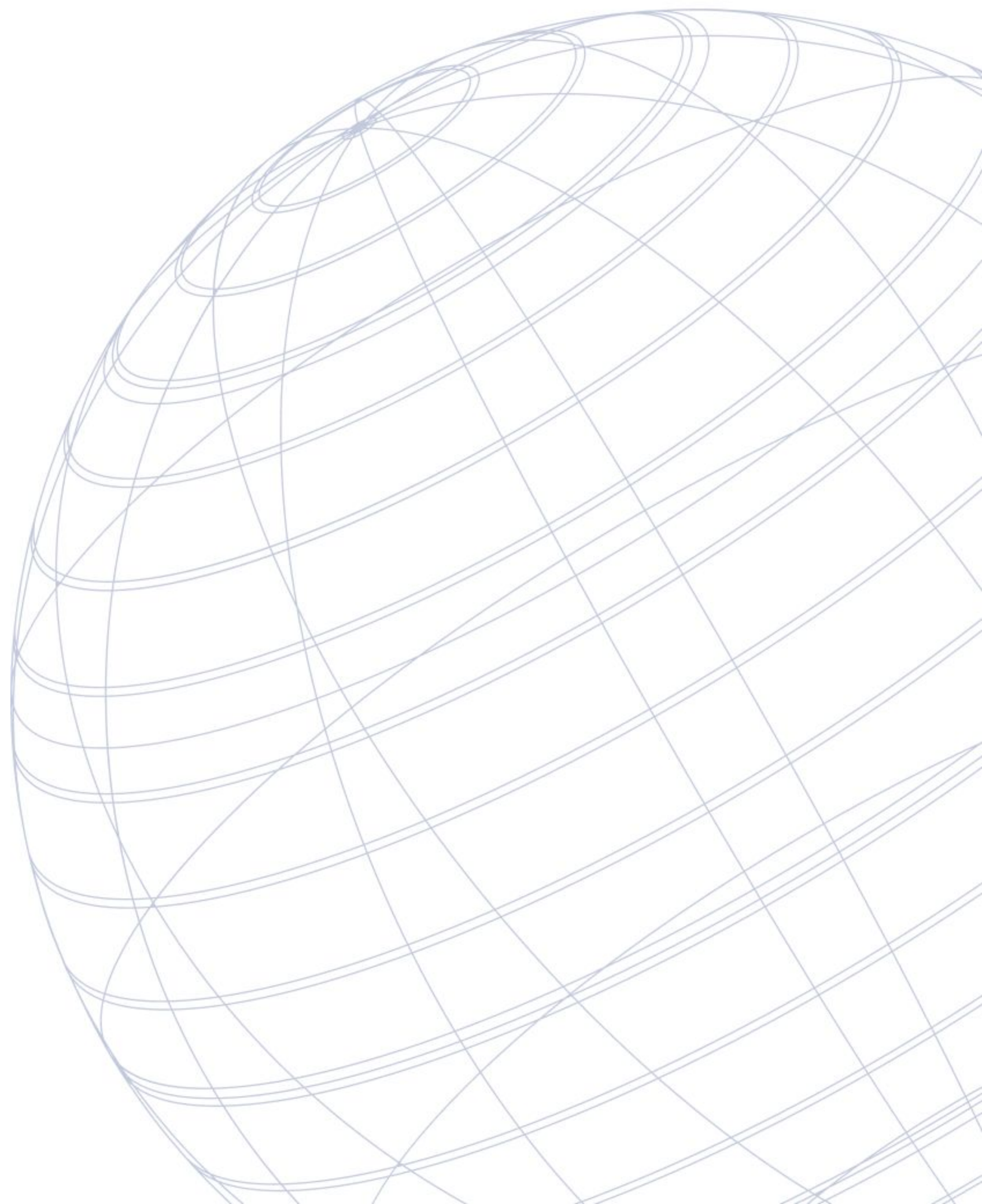
Proposed research: Using Ocean color data for understanding shrimp farms water discharge in the coastal ecosystems of the Gulf of California with Heidi Dierssen at the University of Connecticut, USA.



International Ocean Colour Science Meeting

- Builds, represents, and reinforces global ocean colour community voice
- Promotes international links among ocean & Earth science communities
- Provides forum for discussion on key research and technology
- Facilitates broader engagement of the ocean colour community in IOCCG activities

iocs.ioccg.org





Last IOCS (2019) in Busan, South Korea



International Ocean Colour Science Meeting 2023

- 14 - 17 Nov 2023, St. Petersburg, Florida, USA.
- Theme: *Impact and Value of Ocean Colour Observations in a Changing World: Water in all its Colours.*
- Hosted by the University of South Florida, NOAA & NASA.
- Associated training in SeaDAS, CoastWatch, MAPEO-water, HyperCP, and OLCI processing.
- GEO AquaWatch Side meeting on 13 Nov 2023.

iocs.iocccg.org

The 2023 venue →





IOCCG Chair

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