



International Ocean Colour Science
Meeting 2019

Advancing Global
Ocean Colour
Observations

Research to operations (R2O) and applications

IOCS 2019 - Breakout Workshop #6

Co-chairs: Veronica Lance (NOAA) and Ewa Kwiatkowska (EUMETSAT)



Workshop agenda

14:00 – 14:10 Overview “operational” ocean colour satellite remote sensing, review and update on the 2013 recommendations, set out the objectives for this workshop, Veronica Lance (NOAA) and Ewa Kwiatkowska (EUMETSAT)

14:10 – 14:20 Discussion: identification of recommendations from 2013 which are incomplete but still relevant, input on session objectives

Obstacles and successes with operational OC data services

14:20 – 14:30 Dabin Lee (Ph.D. student, Pusan National University, S. Korea) – Remote sensing for applied fisheries research

14:30 – 14:40 Cara Wilson (NOAA, US) – NOAA Fisheries Management

14:40 – 14:50 Stewart Bernard (CSIR, South Africa) - National Oceans and Coastal Information Management System (OCIMS)

14:50 – 15:00 Mario Castro de Lera and Pablo Ruiz Sánchez, Deep Blue Globe, UG (EU commercial; ESA incubator)

15:00 – 15:20 Discussion: where is the biggest gap in achieving fit-for-purpose OC data? Where should the main research, technical, training and outreach efforts be focused?

Approaches, techniques, tools to address users at multiple levels of sophistication

15:20 – 15:30 Experience from user training Hayley Evers-King (EUMETSAT / PML)

15:30 – 15:50 Discussion: what details best to supply what to do not to overwhelm

Bringing agencies, information services and users together

15:50 – 16:00 Assuring the broad uptake of OC data services, Gianluca Volpe (CMEMS)

16:00 – 16:20 Discussion: how to know if data are “fit-for-purpose”?

16:20 – 16:30 Key points, synthesis and actions, Veronica Lance (NOAA) and Ewa Kwiatkowska (EUMETSAT)

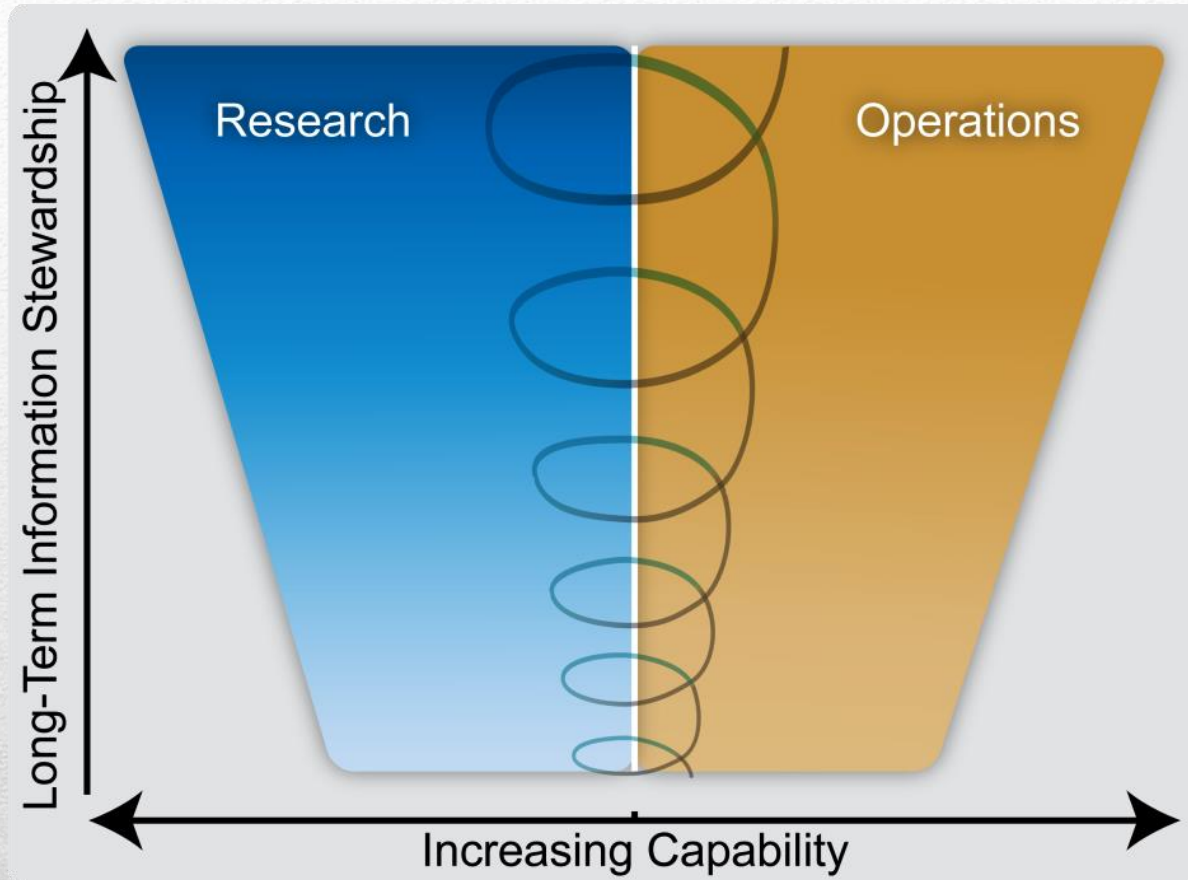


Proposed working definition of “Operational”

- Routine
- Robust
- Well-described
- Consistent
- Includes near real-time AND high quality delayed mode and long term time series
- “Fit for purpose” (i.e., is it fit for your purpose, the right product to do the job)



Review and update on the 2013 recommendations



- **Operational** \equiv systematic and long-term quality routine measurements and their uninterrupted provision for a variety of diverse applications



Objective for session

- This workshop will aim to answer the question:
Where are the biggest gaps or obstacles in achieving fit-for-purpose OC data that meet the needs of operational users and how can we close these gaps and reduce obstacles:
- - data quality
- - value-added products
- - data availability, access and discovery
- - documentation, training and outreach
- - ease of use, inter-operability, standardization, tools?



Key Questions for 2019

- 1) What are the user requirements for operational OC products and where should the main research and technical efforts be concentrated?
- 2) What developments in approaches, techniques and/or tools are needed to address users at multiple levels of sophistication, how best to supply necessary details while not overwhelming as needed for free and open access to data through multiple outlets and serving distinct and diverse audiences?
- 3) What mechanisms are useful to bring developers and users together at early stages and how best to engage parties to achieve successful implementation?



IOCS'13 four main recommendations

- ✓ **Recommendation 1:** The **quality** of operational ocean colour data is of critical importance. Operational agencies should develop and maintain infrastructure and scientific and technical activities to ensure that the accuracy and long-term stability requirements are met across regions.
- ✓ **Recommendation 2:** Define long-term data **stability** goals for operational ocean colour applications.
- ✓ **Recommendation 3:** Assure data **continuity and sustainability** of product delivery via operational missions. Operational services require satellite data from two operational data streams and one experimental stream as a backup, or three streams in the optimal case, to provide robust services.
- ✓ **Recommendation 4:** Distribute **regional and global** data to marine service and cal/val users early in the mission, even if the data are not well calibrated.
- ✓ **Recommendation 5:** Ensure that operational capabilities are **achieved soon after launch**.



IOCS'13 four main recommendations

- ✓ **Recommendation 6:** Produce and distribute **Level-3** data.
- **Recommendation 7:** Provide open source modular software that matches the operational processor and that can be run in batch mode on local user computers; preferably multi-mission software.
- ✓ **Recommendation 8:** Disseminate data in NRT via dedicated interfaces, internet and broadcast (by means such as **EUMETCast**), where the acceptable NRT timeliness is less than 12 hours. Distribute reprocessed consolidated data within a few days, where a maximum of 4 days is adequate.
- **Recommendation 9:** **Provide all data** online for downloading (instead of a limited rolling archive).
- **Recommendation 10:** Distribute Level-1A uncalibrated radiances with calibration tables.
- **Recommendation 11:** Expand the core product suite to satisfy the **modellers and end-users**.
- **Recommendation 12:** Provide NRT information on the status of service provision, data stream continuity and quality.
- **Recommendation 13:** Support outreach to and empowerment of all **stake holders**, including commercial users.



IOCS'13 four main recommendations

- **Recommendation 14:** Define ocean colour requirements for services, ecosystem and management applications. Involve international data users, other stakeholders and the scientific community and draw on existing information on user requirements gathered by various projects and agencies.
- **Recommendation 15:** Create a framework within which the wider international community can collaborate through permanent working groups on specific topics identified by the IOCCG/IOCS meeting and the stakeholder community. Support harmonization where appropriate, accounting for the regional diversity in the methodological/algorithmic requirements, user needs and societal challenges.



IOCS'17 breakout session recommendations

- There is substantial and growing operational and scientific user community
- Non-specialist users require simple, ready-to-go products
- Ocean colour uptake can be improved if expert decisions on best product and algorithm selection are incorporated upfront into the data services and products



NOAA Ocean Color and CoastWatch wrt 2013 IOCS recommendations:

- Expanding the operational paradigm: adopted approach NRT plus delayed mode consistent time series
- Regional and global; L2, L3, L1b for some
- International: CW serves EUMETSAT native OLCI etc.; CW provides NOAA MSL12 VIIRS data routinely to EUMETSAT, CSIRO, CSIR, (known)
- CW users need multi-mission time series such as OC-CCI.
- CW users need higher level and gap-filled analysis products. NOAA ocean color is generating daily global NOAA-20 plus SNPP VIIRS Chl, Kd490 and DINEOF method gap-filled (“just give us 1 product per day”)



R2Applications/Operations

NOAA JPSS Proving Ground /Risk Reduction “Oceans and Coasts Initiative” – some recently funded projects include:

- Fisheries for resource management and stock management plans
- Air quality
- HABS
- Model assimilation of OC for BGC ecological modeling and WCOFS; OC in physics, etc.
- Fusion of multi-mission data (SST project)

Will hear about others today



CW future focus and suggestions for IOCCG

- Better inter (cross)-parameter viewing and access
- On-the-fly processing (vs. “download everything”); provide tools for online analyses
- Continuity of mission long and fusion datasets
- Serving model results and downstream applications (but see bullet #2)
- Metadata (describing the dataset); “interoperability”, e.g. GHRSSST?
- Describe the quality of datasets (performance, uncertainties, what are the data “fit” for?)
- TRAINING, TRAINING, TRAINING (learn from weather service)



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