



International Ocean Colour Science Meeting 2015

Advancing Global
Ocean Colour
Observations

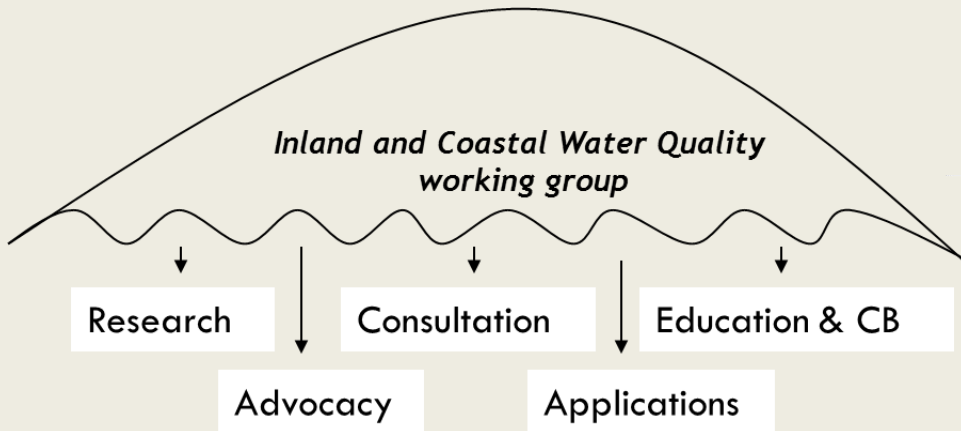
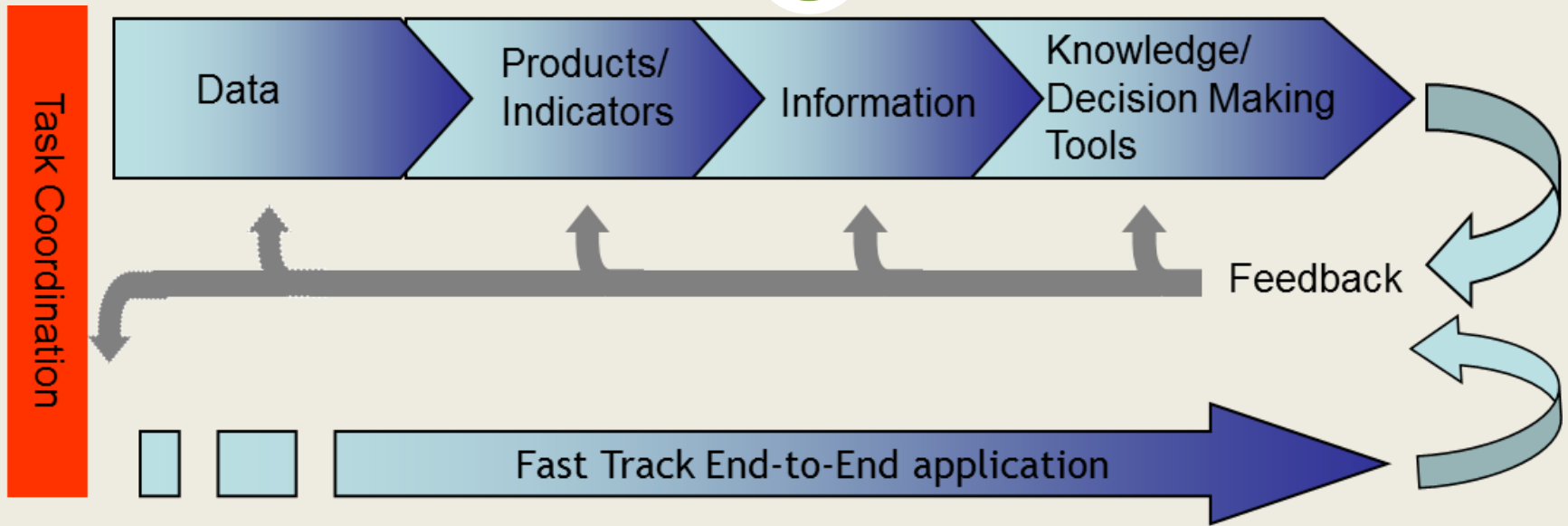
BREAKOUT SESSION 4 - CRYSTAL LOUNGE

TOOLS TO HARNESS THE POTENTIAL OF EARTH OBSERVATIONS FOR WATER QUALITY REPORTING AND MANAGEMENT

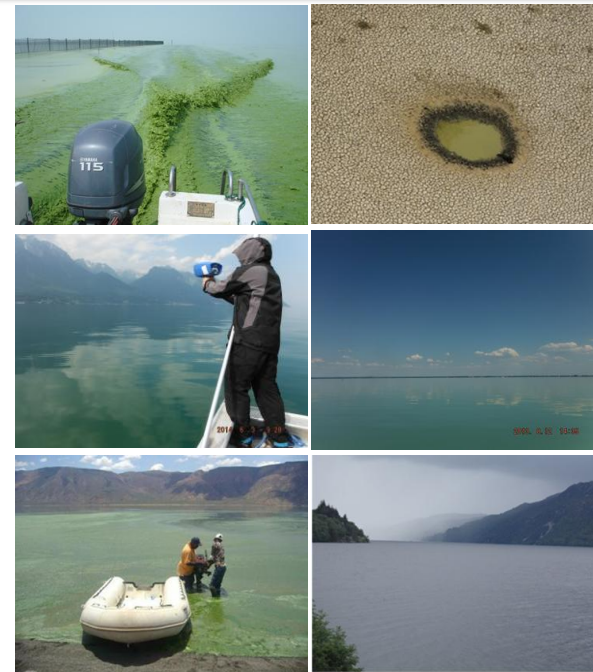
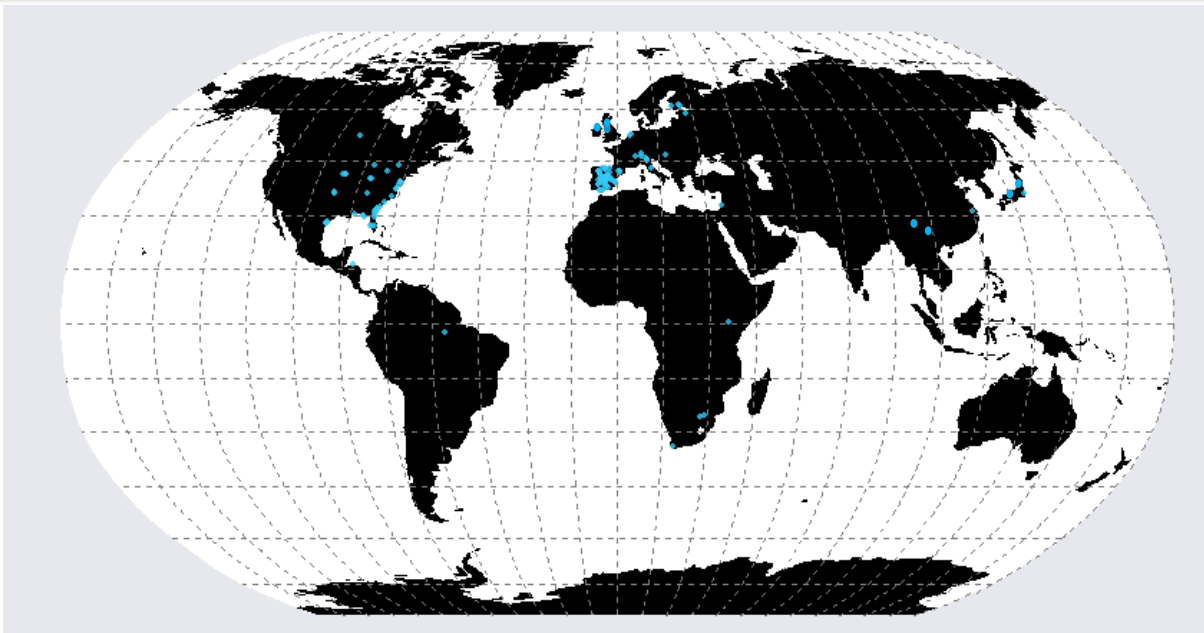
Co-Chairs: Blake Schaeffer (EPA/Office of Research and Development) and
Vittorio Brando (Italian National Research Council, CNR)



GEO Inland and Coastal Water Quality Working Group



Over 100 members in WQ working group



Photos provided by: Y. Zhang; E. Tebbs & A. Tyler

- "not only sql" MongoDB
- Data from almost **1500** lakes
- Radiometric data from **>3500** stations on **>250** lakes
- **>650** stations with *in situ* IOP data
- **Chla**: 0.03-13,297 [mg/m³]; **TSM**: 0.15-2,533 [mg/L]; **$\alpha_{\text{CDOM}(440)}$** : 0.03-12.3 [1/m]
- MERIS match-ups



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Lake Bio-optical Measurements and Matchup Data for Remote Sensing

LIMNADES is an initiative to establish a centralised database of ground bio-optical measurements of worldwide lakes through voluntary cooperation across the international scientific community.

LIMNADES will provide a repository for:

1. inherent and apparent optical property datasets and associated water constituent measurements;
2. in situ water constituent measurements for satellite validation.

Our long-term vision is to maintain this database beyond the end of the GloboLakes project (ends 2017). The database will be held in trust by GloboLakes where further post-processing and quality control will be performed. Further information on this initiative will be provided to potential contributors as it develops.

Data Access & Policy

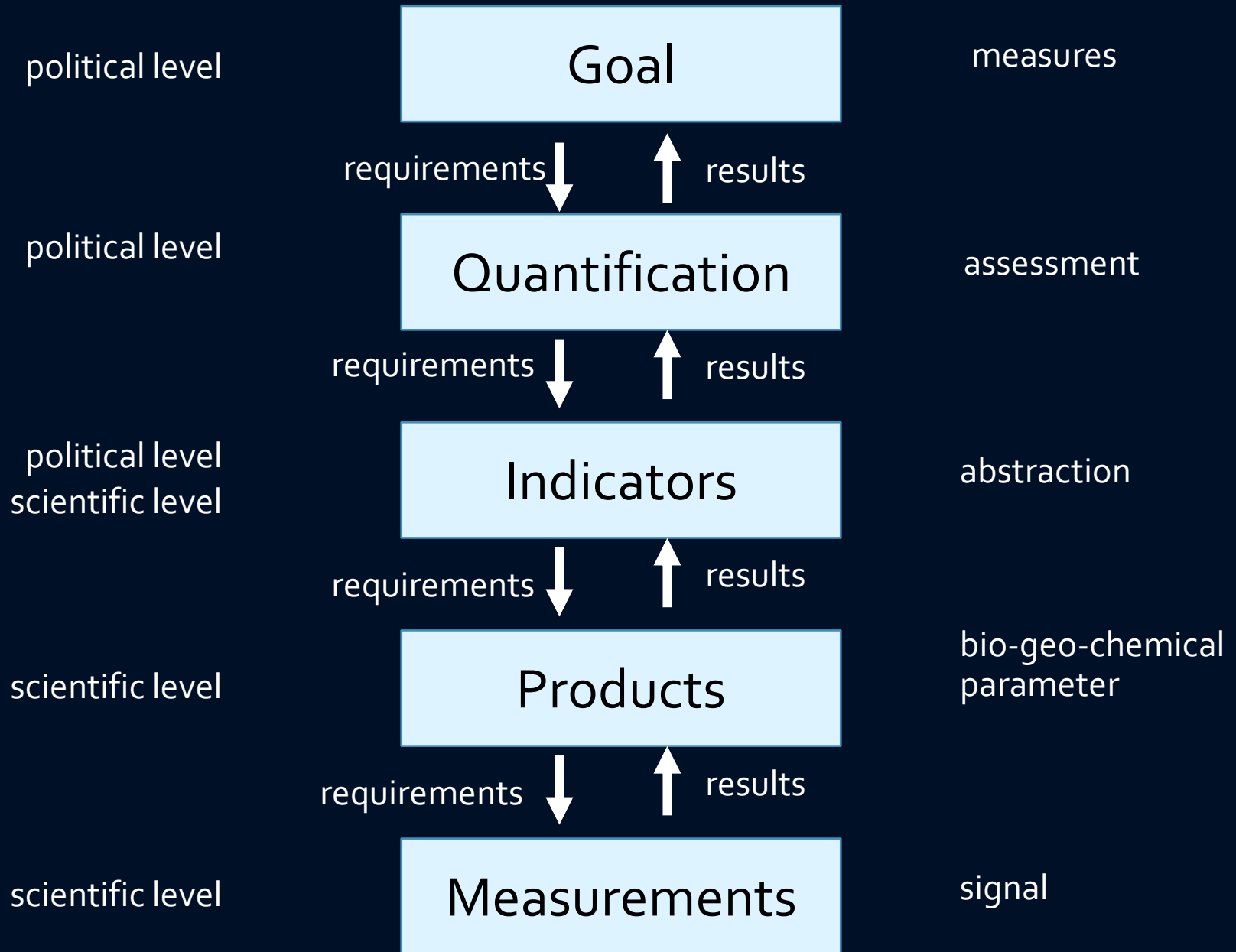
[Data access and policy is explained here.](#)

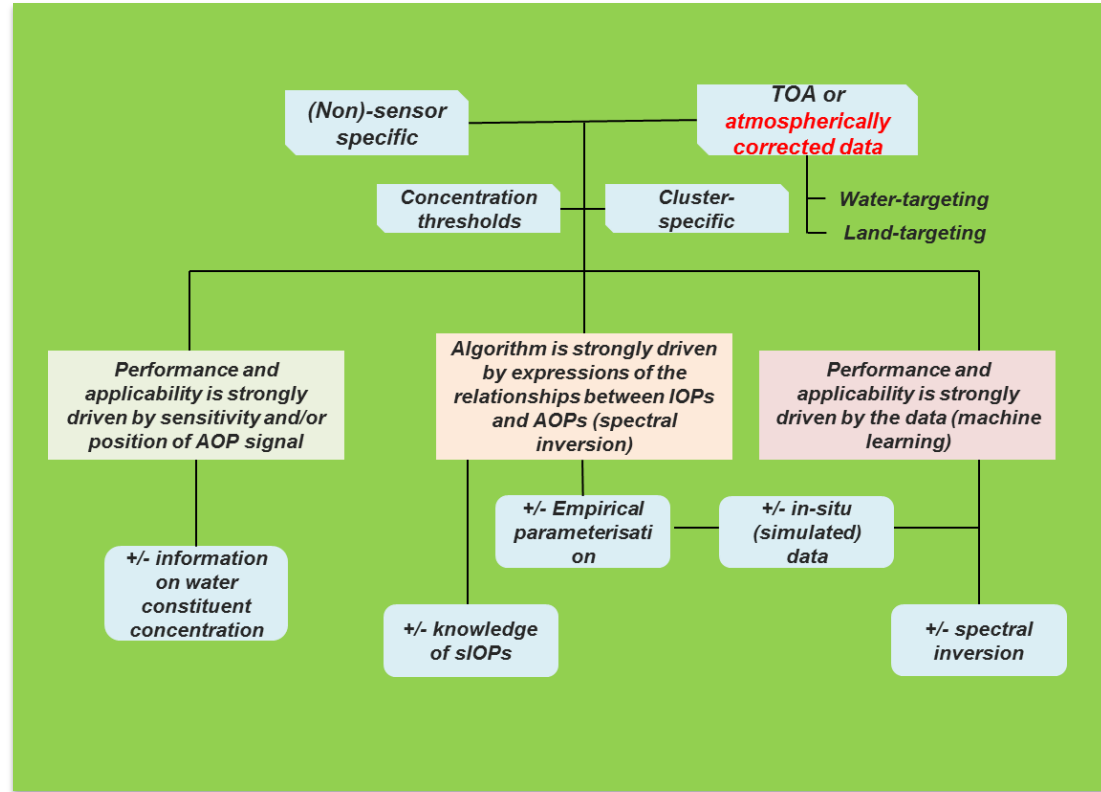
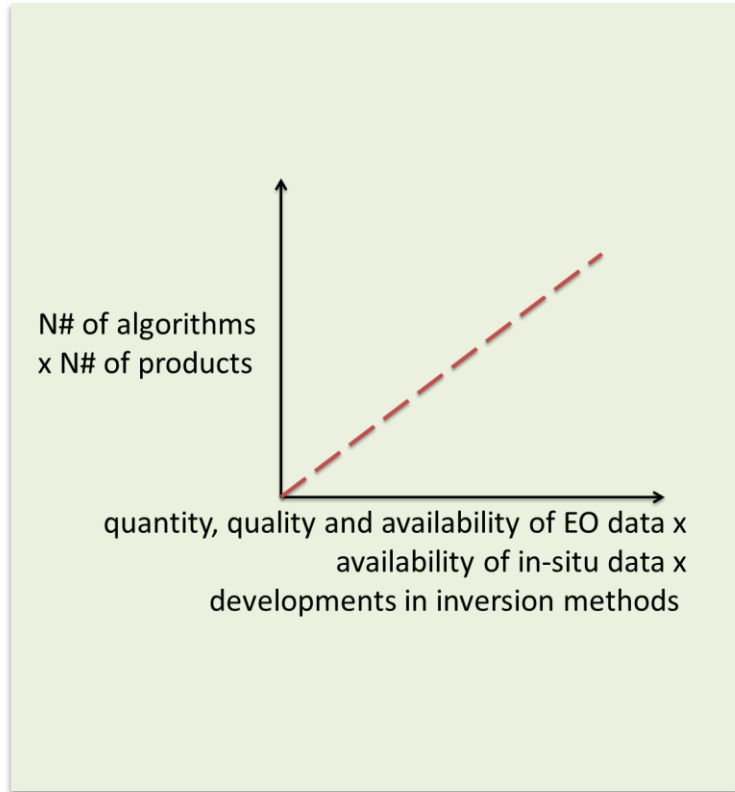
Please feel free to [contact us using this email address](#) if you have any questions or concerns regarding the data policy and access.

Contributing to LIMNADES

If you are interested in becoming LIMNADES user please [complete the LIMNADES form](#). Further data restrictions are applied to the datasets indicated with an asterisk. To request access to the data please [contact us](#) and the data PI.

Credit: Celine Addie-Lagorio,
Dr Kevin Swingler



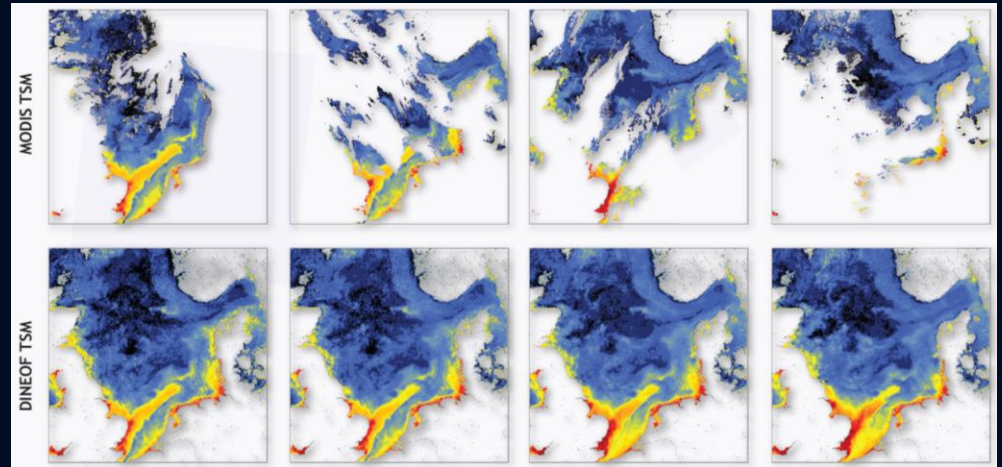


- Subject to EO scientists – end users

- Subject to benchmarking and characterisation

From Product to Indicator

- Often the same basic quantity – e.g. Chl-a concentration
- Temporal and spatial aggregation
 - proper data filtering!
 - Geostatistics
 - Level 3 binning
 - Big Data
- Statistical quantities
 - P₉₀
 - median
- Combination of basic quantities
 - Water Type classification
 - Fish population density



The advantage of EO data is the dense spatial and temporal sampling!



FILLING IN THE SPATIAL GAPS

- DEVELOPING INDICATORS BASED ON REMOTE SENSED INFORMATION IN CONJUNCTION WITH IN-SITU DATA AND CITIZEN SCIENCE MEASUREMENTS
 - WATER TEMPERATURE
 - NUTRIENTS
 - SOIL MOISTURE
 - SEDIMENTS
 - BEST MANAGEMENT PRACTICES
- MULTIVARIATE STATISTICS
- CROWD SOURCED CITIZEN SCIENCE DRIVEN FIELD MEASUREMENTS
 - TEMPERATURE
 - WATER LEVEL
 - SPECTROSCOPY ?

User Uptake – Situation (not comprehensive)

	SERVICE (operational, validated)		REPORTING	
	coastal	inland	coastal	inland
Germany	Green	Light Green	Light Green	Light Blue
France	Green	Light Blue	Green	Grey
Belgium	Green	Grey	Light Green	Grey
Finland	Green	Light Blue	Light Green	Light Green
Sweden	Green	Light Green	Light Green	Light Green
Norway	Green	Orange	Light Green	Orange
USA	Green	Light Blue	Green	Light Blue
Australia	Green	Grey	Green	Grey

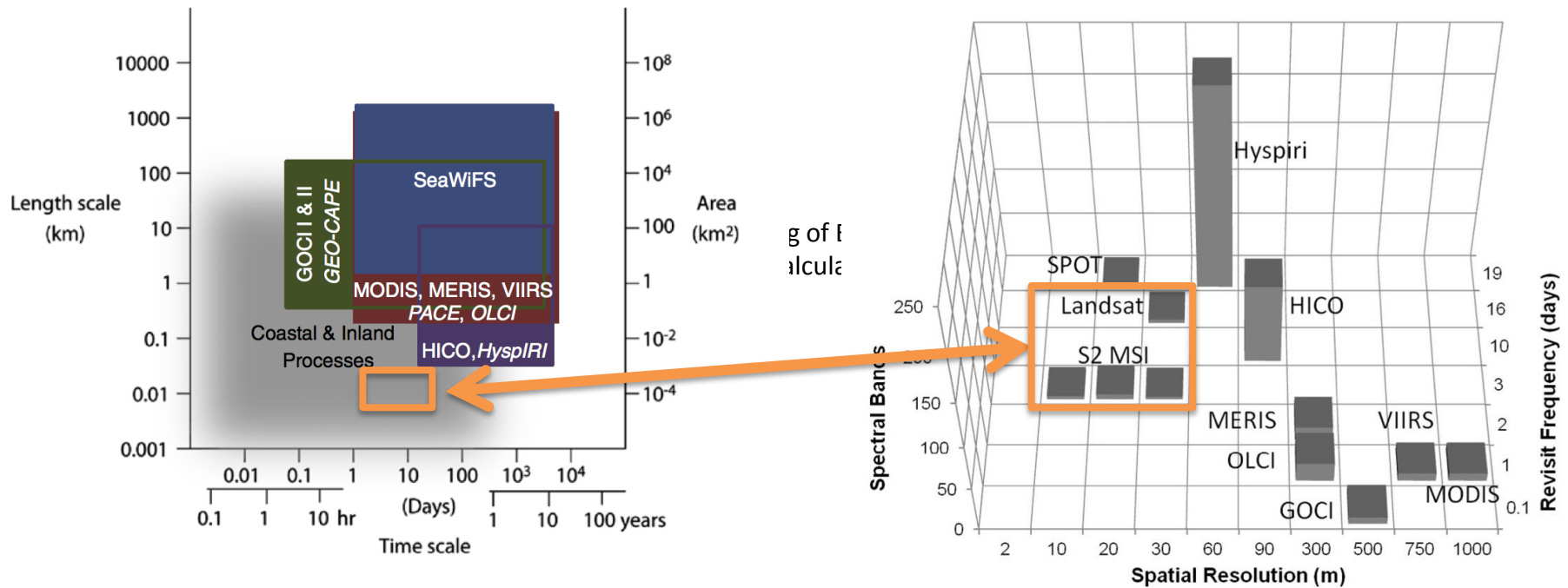
Service is ...

- operational and validated
- running, under evaluation
- in preparation
- planned
- no activities
- unknown or N/A

EO is

- officially accepted method
- considered a valid method
- seriously evaluated method
- not used
- not considered
- unknown or N/A

Inland waters need for spatial resolution



Contents lists available at ScienceDirect

Remote Sensing of Environment

journal homepage: www.elsevier.com/locate/rse



Review

Aquatic color radiometry remote sensing of coastal and inland waters: Challenges and recommendations for future satellite missions



Colleen B. Mouw^{a,*}, Steven Greb^b, Dirk Aurin^c, Paul M. DiGiacomo^d, Zhongping Lee^e, Michael Twardowski^f, Caren Binding^g, Chuanmin Hu^h, Ronghua Maⁱ, Timothy Moore^j, Wesley Moses^k, Susanne E. Craig^l



Contents lists available at ScienceDirect

Remote Sensing of Environment

journal homepage: www.elsevier.com/locate/rse



Measuring freshwater aquatic ecosystems: The need for a hyperspectral global mapping satellite mission

Erin Lee Hestir^{a,b,*}, Vittorio E. Brando^{a,c}, Mariano Bresciani^c, Claudia Giardino^c, Erica Matta^c, Paolo Villa^c, Arnold G. Dekker^a

A GLOBAL WATER QUALITY DATA PRODUCT

Be honest about objectives

Select research questions that help us answer policy questions

Work with others to frame results in ways that are meaningful to them

Proactively reach out to users

Fit for purpose applications and services:

- **Trade off between data quality and user needs?**
 - Usability vs accuracy ... validity
 - Accuracy expectations on global vs local scale?
 - When is good enough good enough?
 - Are data/products mature enough to be used operationally ?
- **Is any data better than inaccurate data?**
- **Being able to tell a story is very important**
- Meet the monitoring needs or other reporting needs?
- **IOCCG WG Earth Observations in Support of Global Water Quality Monitoring ... report in ~ 2016**