

Summary of Session 1: Beyond Chlorophyll-a – new trophic state indicators for optically complex waters

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Agenda

Quantitative indices and reporting products for tracking inland water algal bloom status and trends

Caren Binding, Environment and Climate Change Canada

Causal bloom research using EO satellites and hydrodynamic models

Daniel Odermatt, Swiss Federal Institute of Aquatic Science and Technology Eawag

Remote sensing derived primary production estimates for the world's largest lakes

Michael Sayers, Michigan Tech Research Institute

Detection of phytoplankton groups in optically complex water: status, challenges and perspectives

Hongyan Xi, Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research

Spatial and temporal changes in the presence of kelp forests: how can remote sensing help?

Maycira Costa, University of Victoria

Phytoplankton and cyanobacteria bloom monitoring and model integration

Relevance:

- High socio-economic interest in bloom monitoring
- Large potential to achieve a better process understanding than with conventional monitoring

Challenges:

- Definitions of blooms and thresholds vary widely
- Modeling requires interdisciplinary competence
- Adaptation across lakes and particular events is not straightforward

Estimating aquatic primary production from EO observables

Relevance:

- Chlorophyll-*a* and other individual ancillary variables may not represent PP trends
- Increasing user interest for carbon budget estimates or combined ecosystem responses (e.g., Quagga)

Challenges:

- Availability and quality of in situ measurements for validation
- Spatial scaling is possible but depends on consistent EO input products (chlorophyll-*a*, K_d , E_d)

Discriminating aquatic primary producers (PFT, macroalgae)

Relevance:

- Allows qualitative assessments of primary production and consequences for the whole food web
- Growing potential due to upcoming hyperspectral missions

Challenges:

- Feasibility across water types differs strongly, expectation management is difficult
- Pigment and/or phytoplankton data required

Conclusions

Strong technological and commercial push on the sensor side in the next 10 years expected
although a dedicated coastal and inland water satellite mission is missing!

Potential for developing actionable ecosystem information from EO products increases strongly

Requirements:

- 1) Programmatic measures (e.g., collaboration, communication) are needed to better connect the EO community to aquatic sciences and local stakeholders, to better identify and fulfill user requirements, and to access interdisciplinary competence for data interpretation
- 2) The transferability, dissemination and value-adding processing of locally specific applications must be supported in research projects, e.g., FAIR standards, open source software and user support