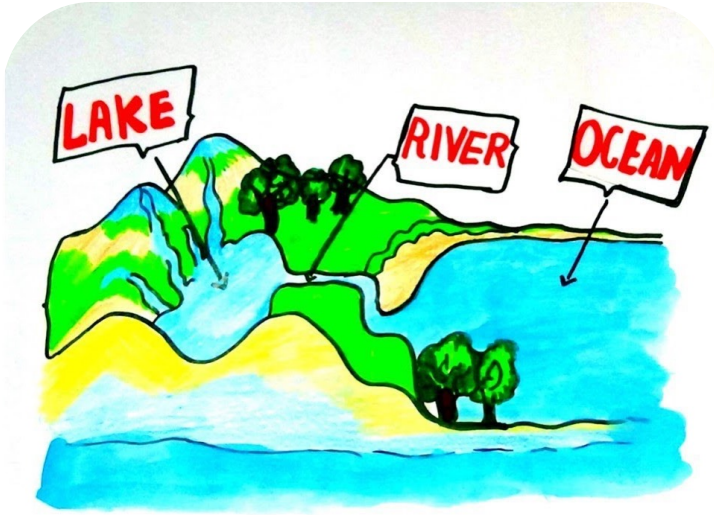
International Ocean Colour Science Meeting 2023
IOCS-2023 Breakout Workshops
Advancing Global Ocean Colour Observations

Global carbon budget for the land to ocean aquatic continuum (LOAC) from remote sensing

Hubert Loisel, Claudia Giardino



Speakers:
Tiit Kutser (lakes)
Mortimer Werther (lakes)
Antonio Mannino (coastal and estuaries)

Global carbon budget for the land to ocean aquatic continuum (LOAC) from remote sensing

Objectives

1. Identify the main advances and limitations in the satellite assessment of aquatic carbon over the inland (lakes and rivers) and oceanic (coastal) waters.
2. Exchange on best practices from the two communities for the space retrieval of carbon related parameters.
3. Identify priority actions over the next decade for the monitoring of the carbon pools and fluxes for the land to ocean aquatic continuum (LOAC) from remote sensing.

Global carbon budget for the land to ocean aquatic continuum (LOAC) from remote sensing

Key Questions

- Which components of the carbon cycle, with their degree of uncertainties, can (and cannot) be estimated from remote sensing for inland and coastal aquatic environments?

- What are the common or different challenges in the estimation of the carbon pools and fluxes for the land to ocean aquatic continuum from space?

- How can we address the vertical dimension ?

Global carbon budget for the land to ocean aquatic continuum (LOAC) from remote sensing

Some facts

- The following parameters and processes that can be adressed from OCR have been identified by the 2 communities:
  - POC, DOC, PIC, pCO2, macrophytes (OCR)
  - Primary production, photo-degradation (OCR+Modeling)
- OWT approach as a common framework in both communities (bleending algorithms). What about an unique classification for all the continum? should be disscused in the ioccg working group (meeting tomorrow).
- POC and DOC estimations are usually fair to good for coastal waters and lakes but fair to bad for estuaries.

Global carbon budget for the land to ocean aquatic continuum (LOAC) from remote sensing

Recommendations

- Community exchange on their measurement protocol for in situ measurements – need a inter-community meeting.
- Necessity to develop an open-acess database on POC and DOC for inland and coastal waters (could be leaded through ioccg).
- Adjacency effects and ice cover has been identified by the 2 community as a fondamental issue to adress to get proper $R_{rs}(\lambda)$ data (3 posters at iocs). Operational products are useless without per-pixel uncertainties.
- High frequency observations (geostationay or constellation) are needed in these highly dynamics systems.

Recommendations

Need of ancyllary data :

- LIDAR: to improve the Rrs retrieval (altitude of the aerosol layers), and to get information of the vertical structure of the water column.
- Information about the physical environment and forcing parameters of the considered water pixel: to get integrated values on the vertical (NN approach, modeling).

Global carbon budget for the land to ocean aquatic continuum (LOAC) from remote sensing

These recommendations will be developped in the next 2 weeks.