Breakout Workshop:

Lidar applications for ocean color

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Description

Active remote sensing of global ocean plankton properties presents a renewed opportunity for overcoming some of the major limitations of passive ocean color data that have challenged the community for decades. Passive remote sensing of ocean color observations has revolutionized our understanding of global plankton ecosystems and provide multi-spectral retrievals at many advantages: multiple wavelength bands, good spatial resolution (300-1000 meters) and on high repetitive cycles (~2 days). However, the ocean color signal is limited to the very near surface layer, provides no information on plankton vertical structure, is extremely limited in polar regions, suffers from cloud cover and absorbing aerosols, and provides no information on day-night changes in plankton properties. Active remote sensing can address some of these challenges and would provide an exceptional complement to passive observations.

This Breakout Session will only focus on Lidar (Light detection and ranging) as this active remote sensing technique can provide ocean retrievals under thin clouds, between holes in broken clouds, and throughout the polar annual cycle. Lidar measurements can also retrieve plankton vertical structure and information on day-night changes. In the last decade, lidar systems applied to ocean color have reached maturity thanks to field deployments of multiple airborne and in-situ sensors and to recent studies using lidar measurements from atmospheric satellite missions to obtain significant scientific results in the ocean color field. These advances make the transition to an ocean-optimized satellite system foreseeable in the next generation of missions.

Objectives

The goal of the breakout session is to showcase what has been done so far with lidar through examples of successes in the field and from airborne, in-situ and satellite active sensors and to discuss potential avenues for further advances for ocean applications. Additionally, the session will delve into the features that a future ocean-optimized Lidar should possess, such as blue laser, High-Spectral Resolution

Lidar, among others. A main focus will be in the instrumentation part, on how to develop in-situ lidar for monitoring bio-optical biogeochemical parameters from ships.

Key Questions

1. How do we get a 3D and diel observation of the ocean color?
2. What are the currently available technologies and what are the potential technologies for the future?
3. How can active measurements be used to validate and improve passive ocean color retrieval algorithms?