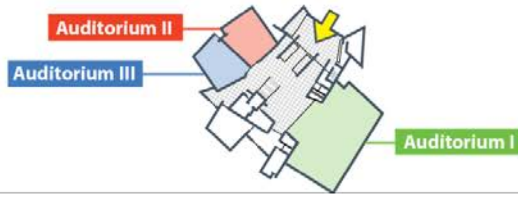

TUESDAY 16 MAY — **AUDITORIUM II**

BREAKOUT SESSION 6: Active Remote Sensing for Ocean Colour

Co-Chairs: **Cedric Jamet** (LOG /ULCO/CNRS), **James Churnside** (NOAA ESRL), **Chris Hostetler** (NASA LaRC)

Four key questions:

1. How to get a 3D observation of ocean colour?
2. What is the technology currently available?
3. How can active measurements be used to validate and improve passive ocean colour retrieval algorithms?
4. How to link active measurements to ocean colour parameters?

14:00 - 14:20	**Introduction to the session and presentation of SAR technique** Cédric Jamet
14:20 – 14:40	**Airborne ocean profiling lidar** James Churnside
14:40 – 15:00	***Space-borne ocean lidar*** Chris Hostetler
15:00 – 16:00	**Discussion**
16:00 – 16:45	**Write-up of the discussion and recommendations**

Synopsis:

Active remote sensing of global ocean plankton properties (such as satellite-based lidar) presents an unprecedented new opportunity for overcoming some of the major limitations of passive ocean colour data that have challenged the community for decades. Passive remote sensing of ocean colour observations have revolutionized our understanding of global plankton ecosystems and provide multi-spectral retrievals and many advantages: multiple wavelength bands, good spatial resolution (300-1000 meters) and high repetitive cycles (~2 days). However, the ocean colour 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. Satellite active remote sensing can address some of these challenges and would provide an exceptional complement to passive observations.

For instance, Lidar (Light detection and ranging) 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. Lidar technology has rapidly matured through field deployments of multiple airborne sensors, making transition to an ocean-optimized satellite system foreseeable in the next generation of missions.

On the other side, SAR (Synthetic Aperture Radar) technique has been shown to help determining phytoplankton blooms and oil sticks using the modification of the roughness of the sea surface. SAR is able to provide patterns of mesoscale and sub-mesocale ocean surface signatures. The image contrasts are associated with the ocean surface roughness, variations linked to changes in the near-surface winds, waves, and currents as well as the presence of surface contaminants. Space-borne SAR sensors have provided images since the mid-1980s at a very high spatial resolution (5-30 meters).

The goal of the breakout session is to present the basics of active remote sensing, provide examples of successes in the field and from airborne and satellite active sensors (with a focus on lidar technique), and to discuss potential avenues for further advances for ocean applications.