

OCEAN OPTICS XXIV

Valamar Lacroma Dubrovnik Hotel | Dubrovnik, Croatia | October 7–12, 2018

<https://oceanopticsconference.org>

Monday, October 8

Oral Session 2

14:00–16:00

15:40–16:00

PHYTOPLANKTON COMMUNITY COMPOSITION CHARACTERIZED USING HIGH SPECTRAL RESOLUTION LIDAR

High Spectral Resolution Lidar (HSRL) systems collect quantitative measurements of depth-resolved backscatter (bbp) and the depolarization ratio which cannot be observed by existing passive remote sensing techniques. We present measurements of backscatter and depolarization collected with an airborne HSRL system in conjunction with in situ phytoplankton community composition observations to evaluate phytoplankton community composition in an anticyclonic eddy in the North Atlantic as part of the November 2015 NAAMES field campaign. We show that subsurface maxima in bbp and depolarization coincided with changes in the phytoplankton community and that the phytoplankton community changes over the anticyclonic eddy, with abrupt gradients in bbp and depolarization observed along the eddy periphery. Specifically, smaller phytoplankton cells with a greater degree of eccentricity were observed inside the eddy compared to outside and were associated with lower backscattering coefficients and depolarization ratios. This is consistent with the results of Kouzoubov et al. (1999) who observed lower polarization in the upper water column associated with spheroid cells when compared to spheres. Our work highlights the need for space-based lidar that will allow for global assessments of depth-resolved ocean properties, including phytoplankton community structure.

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