

## **Analysis of HSRL Marine Aerosol and Phytoplankton Backscatter Data Collected during SABOR**

This proposal aims for an improved quantification of surface ocean-atmosphere interactions using the unique dataset collected by the NASA High Spectral Resolution Lidar (HSRL-2) during field campaigns supported by ACE. Obtained knowledge will be used to i) better characterize marine aerosol-ocean ecosystem interaction and ii) refine HSRL aerosol classification algorithms over the ocean. The proposed work is a follow-up on our previous study related to the ACE mission and is designed to demonstrate the capability of ACE lidar in making high-quality concurrent measurements in marine boundary layer and surface ocean.

### **Specific objectives:**

The airborne HSRL-2 instrument is a second-generation prototype for the ACE lidar. It provides unparalleled retrievals of aerosol, sub-surface ocean optics, and wind speed to a very high degree of accuracy. Comprehensive datasets collected by HSRL-2 can help answering questions regarding the near-surface aerosol extinction and backscattering profiles, ocean biogeochemistry and atmosphere interactions, and aerosol source mechanisms as a function of surface roughness and wind speed. The central part of this proposal is an application of innovative analysis methods to the data that have already been collected during recent SABOR (Ship-Aircraft Bio-Optical Research) mission <https://espo.nasa.gov/sabor/content/SABOR>. The HSRL SABOR dataset was collected for the year 2014 from July – August off the coast of the Eastern U.S. and down to Bermuda. The mission was to profile the atmosphere in conjunction with subsurface measurements of particulate matter and ultimately biogeochemistry. Subsurface measurements were performed both by the HSRL and other instruments available on the research vessel Endeavor. Utilization of these measurements will provide future direction for scientists, and help gaining insight on complex interactions of surface ocean chemical/biological properties and sea spray aerosol.