

PACE Applications to Case II Waters:

Quantifying the Uncertainty in Inherent Optical and Water Constituent Properties and the Impact On Remotely Sensed Ocean Color

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OBJECTIVES

- 1) Quantify uncertainty in the measurement of Case II water inherent optical and constituent properties.
- 2) Characterize the potential impact of *in situ* parameter uncertainty on PACE Case II product algorithm development and validation for proposed threshold and optional sensor configurations.

The work will consist primarily of an analysis of existing (largely unpublished) in situ observations and airborne and spaceborne hyperspectral data.

TASKS

- Assemble, test, and distribute data sets
 - In situ IOP and AOP
 - Airborne HIS

SeaBASS Format
- Characterize uncertainty through analysis of in situ data
 - Examinations of known relationships
 - Tests of closure
- Examine effects of environmental variability
 - Correlation scales between sensors
 - Impact of sensors on local environment
 - Sub-pixel variability

Sub-Group Formed to address this topic
- Investigate uncertainty impact on RS algorithm development
 - IOP uncertainty propagation through ocean/atmosphere system
 - Contribution by system noise

DATA: In Situ & Hyperspectral Remote Sensing

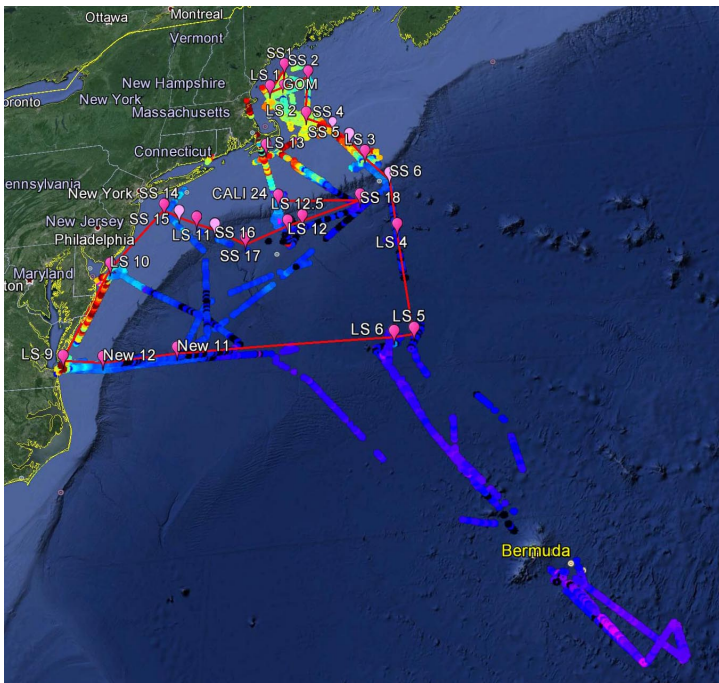
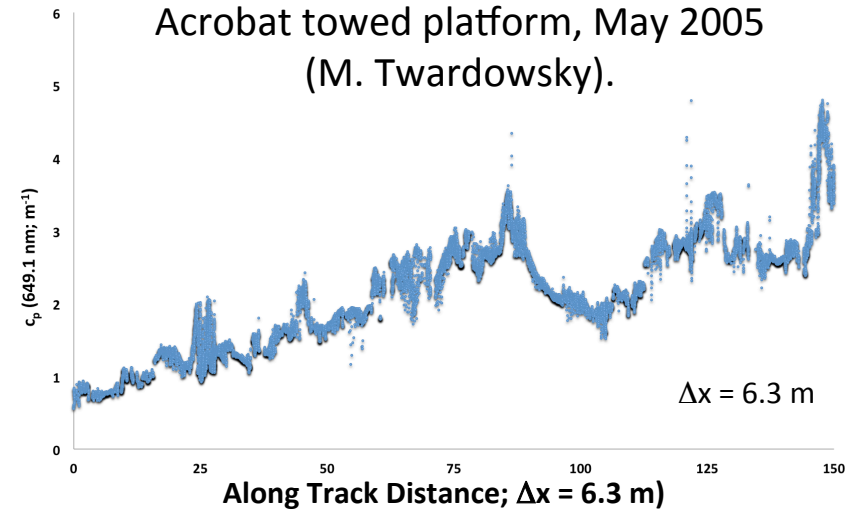
Location	Date	Optics	Water
LEO-15, NJ	08/2001	IOPs, AWR, HIS	
Looe Key, FL	10/2002	IOPs, AWR, HIS	
Monterrey Bay, CA	04/2003	IOPs, HIS	
Chesapeake Bay	03/2004	IOPs, AWR, HIS	
Chesapeake Bay & OBX, NC	08/2004	IOPs, AWR, HIS	
Ft. Lauderdale, FL	06/2005	IOPs, AWR, HIS	
Long Island Sound	05/2005	IOPs, AWR	SPM, Chl, POC
East Sound, WA	09, 2005	IOPs, AWR, HIS	
Houma, LA	02, 2006	IOPs, AWR	
Ft. Lauderdale, FL	06, 2007	IOP, AWR, HIS	
Mobile Bay, AL	02, 2009	IOP, AWR, HIS	
Chesapeake Bay	10, 2009	IOP, AWR, HIS	
Los Angeles, CA	04, 2011	IOP, AWR, HIS	
Marathon, FL	09, 2012	IOP, HIS	
Long/Block Island Sound	2013-14	IOP	SPM, POC, PSD
San Francisco Bay	06, 2014	IOP, AWR	SPM, POC
Chesapeake Bay	08, 2014	IOP, AWR, HIS	SPM, Chl
Patapsco River, MD	12, 2014	IOP, AWR	SPM, Chl, POC

IOP = Inherent Optical Properties (a_{p+g} , a_g , c_p , b_b)
 AWR = Above-Water Radiometry
 HIS = Hyperspectral Imaging Spectrometry

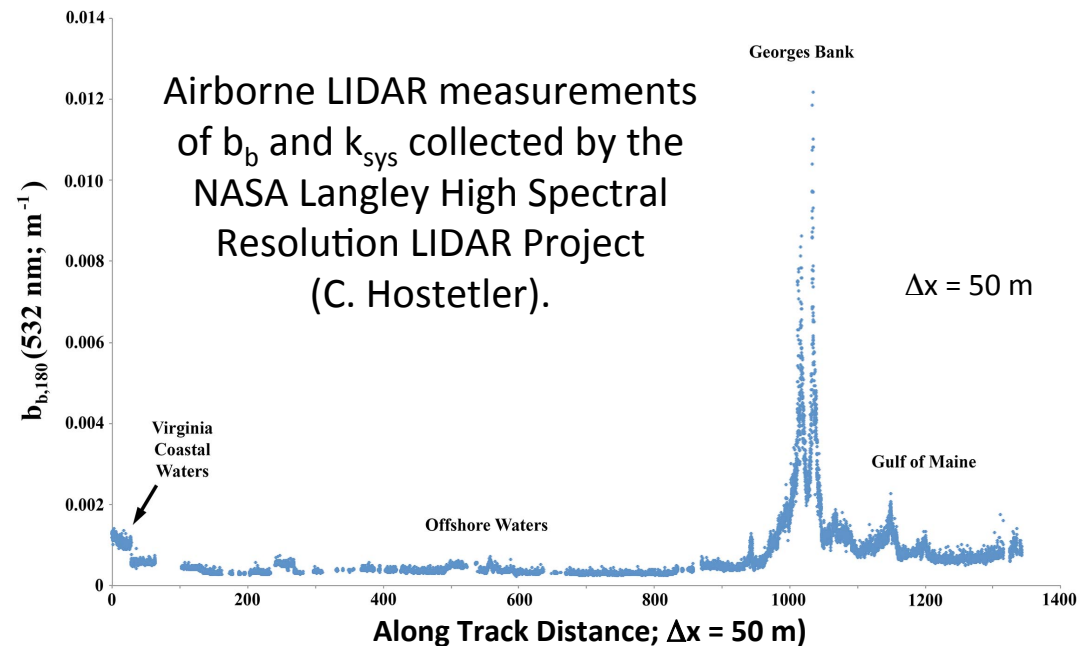
Sub-Pixel Variability



Along-Track IOP observations collected in LIS with an instrumented Acrobat towed platform, May 2005 (M. Twardowsky).



Airborne LIDAR measurements of b_b and k_{sys} collected by the NASA Langley High Spectral Resolution LIDAR Project (C. Hostetler).



EXPECTED COLLABORATIONS

PRIMARY (*Projects that directly address uncertainty associated with IOP measurement*)

Collin R. Quantifying Uncertainties in Phytoplankton Absorption Coefficients ...
Emmanuel B. A Global Database of High Horizontal Resolution IOPs ...
Dariusz S. Quantifying the Spectral Absorption Coefficients ...
James S. Improving IOP Measurement Uncertainties ...
Xiaodong Z. Understanding Natural Variability of VSFs ...

SUB-GROUP: *Environmental Methodologies*

S. Ackleson (lead), E. Boss, M. Ondrusek, C. Roesler, W. Slade, J. Sullivan

POTENTIAL (*Projects that are impacted by uncertainty associated with IOP measurement*)

Susanne C. Derivation of Inherent Optical Properties ...
Robert F. Bayesian Methodology for Atmospheric Correction ...
ZhongPing L. Development of Datasets and Algorithms ...
Greg M. Improved Satellite Ocean Color Retrievals of Ocean IOPs ...
Michael T. Improving Retrieval of IOPs from Ocean Color ...