



EPA HICO Pathfinder Innovation Project

Ocean Optics XXI Conference
HICO Users Team Meeting
October 10, 2012

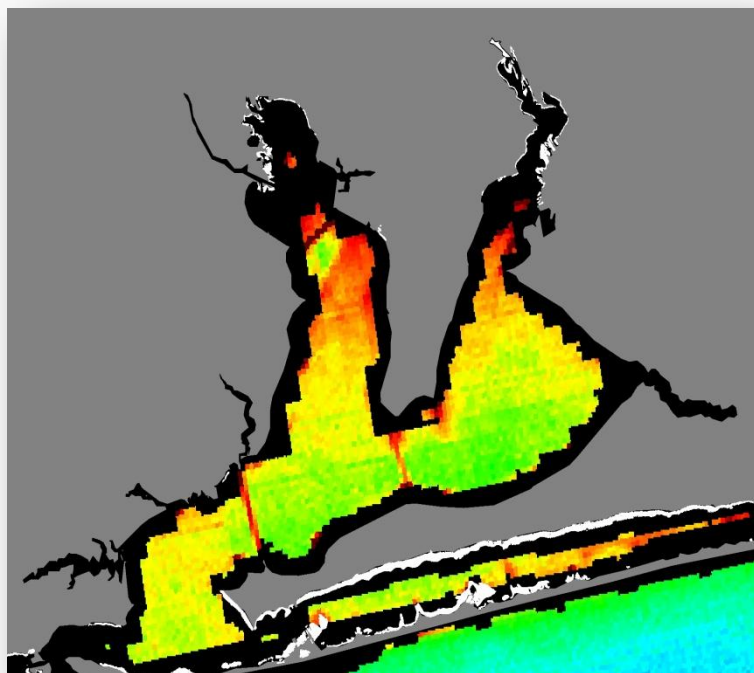
Blake Schaeffer
Darryl Keith
Ross Lunetta
Richard Gould
Robyn Conmy
Jessica Aukamp
George Craven
Diane Yates
Curt Davis



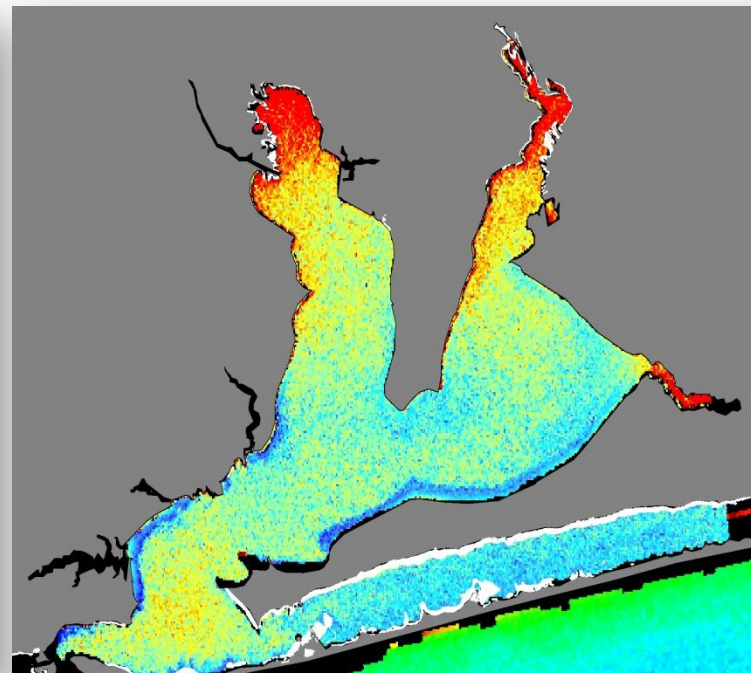
Introduction

- EPA
 - Satellite remote sensing technology
 - Measure water quality parameters
- Ocean color community has primarily focused beyond the jurisdictional boundary of the Clean Water Act.
- Objectives
 - EPA proof-of-concept
 - Demonstrate importance of improving satellite retrievals of coastal and inland waters.

HICO vs MODIS Coverage/Resolution

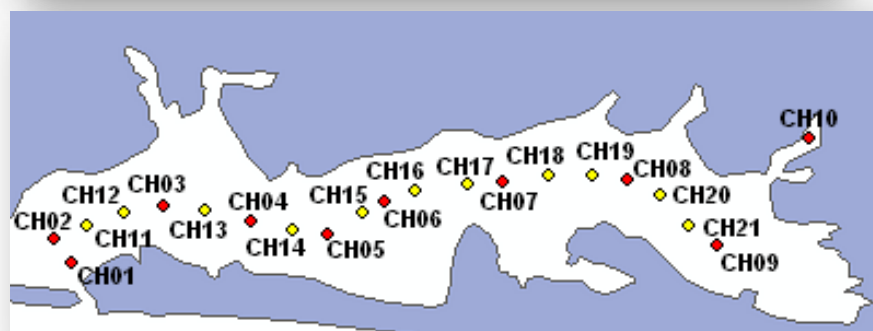
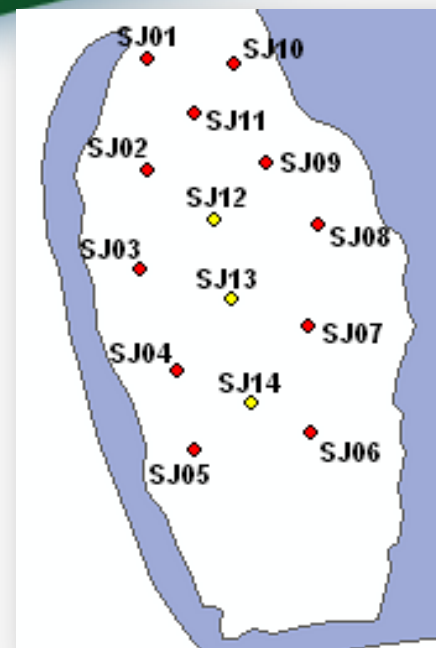
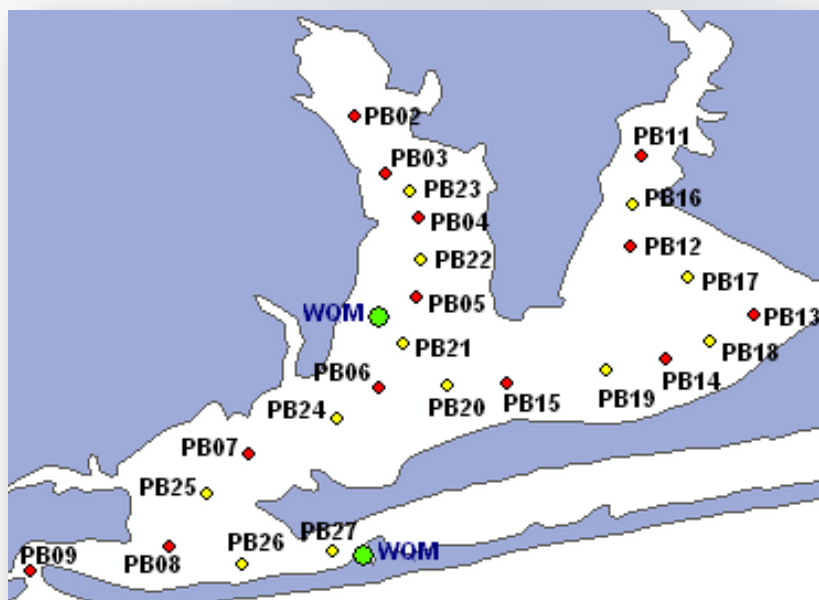


MODIS Rrs_645nm Oct. 28, 2011



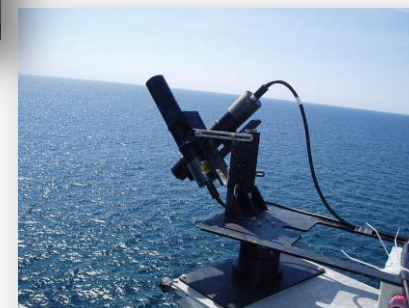
HICO Chl-a May 11, 2012

Methods

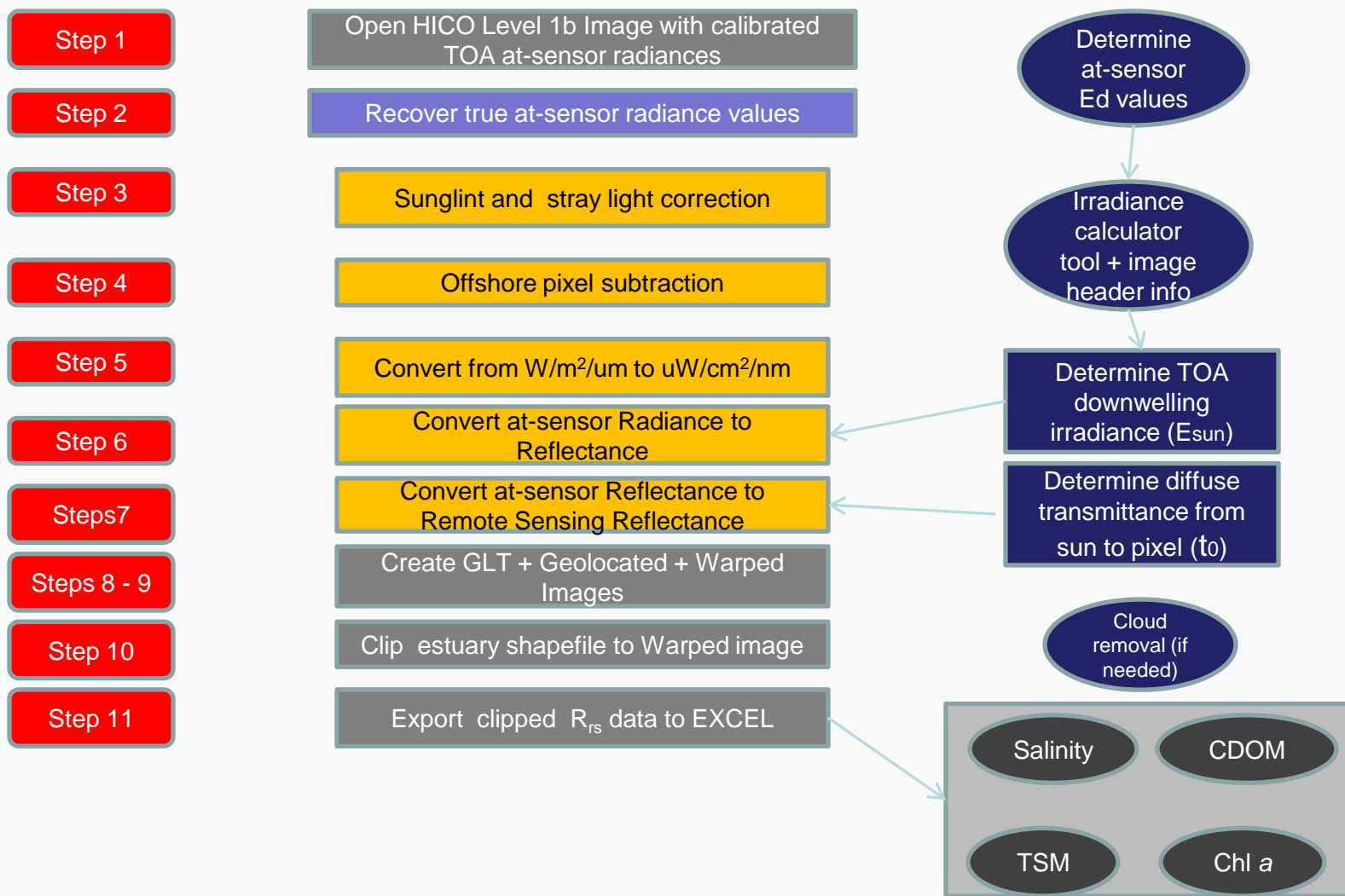


Methods

- In-water constituents
 - Chl-*a*
 - TSS
 - a_{NAP} , a_{CDOM} , a_{PHI}
- Hyperspectral ACs
- CTD, CDOM-FL, NTU, PAR
- HyperSAS & HyperPRO
 - Remote sensing reflectance (R_{rs})
- Secchi Depth
 - Light attenuation

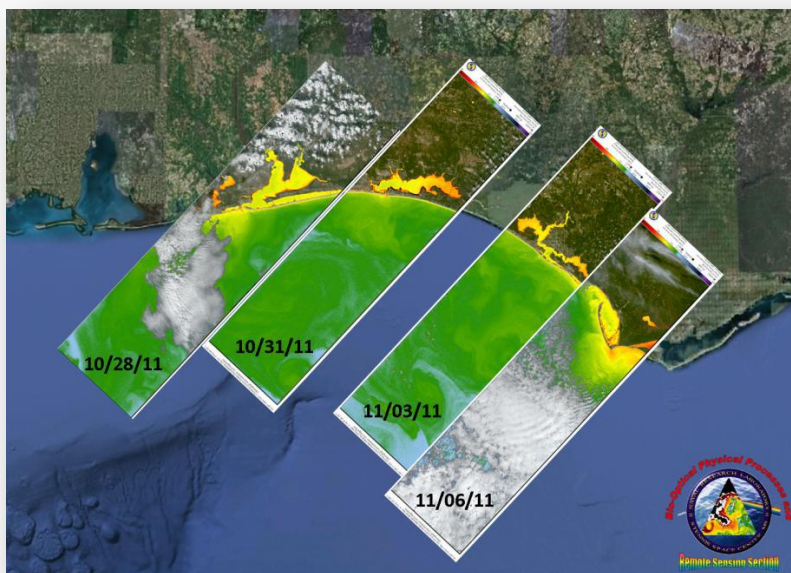


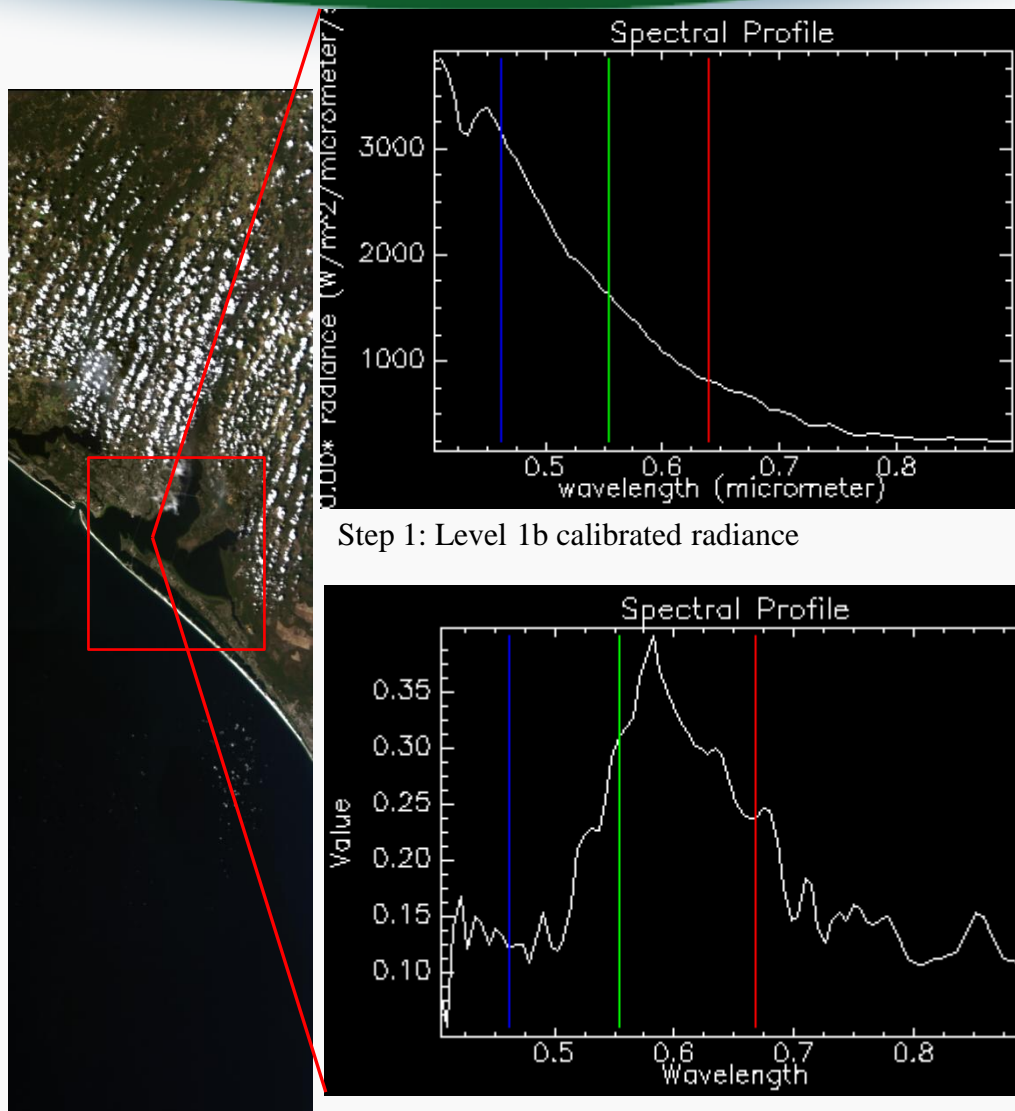
2nd HICO Reprocessing Protocol



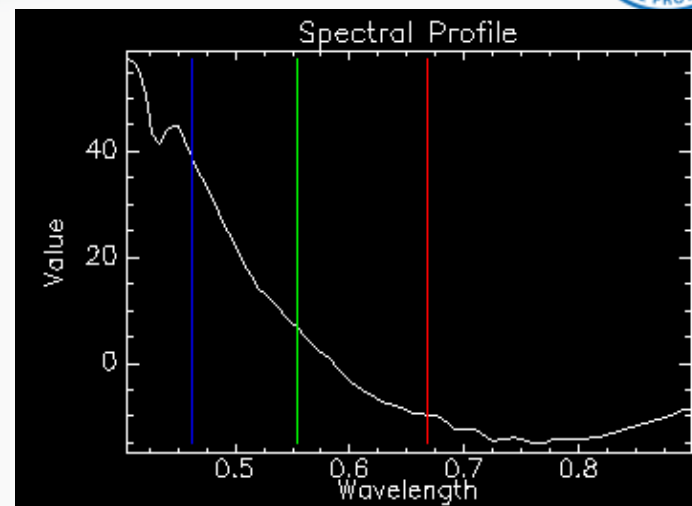
2nd HICO Reprocessing Protocol

- April 2010 - May 2012,
 - Choctawhatchee Bay
 - Pensacola Bay
 - Panama City
 - St. Joseph's Bay
- 52 total scenes acquired
 - 39 % cloud covered
 - 61% usable

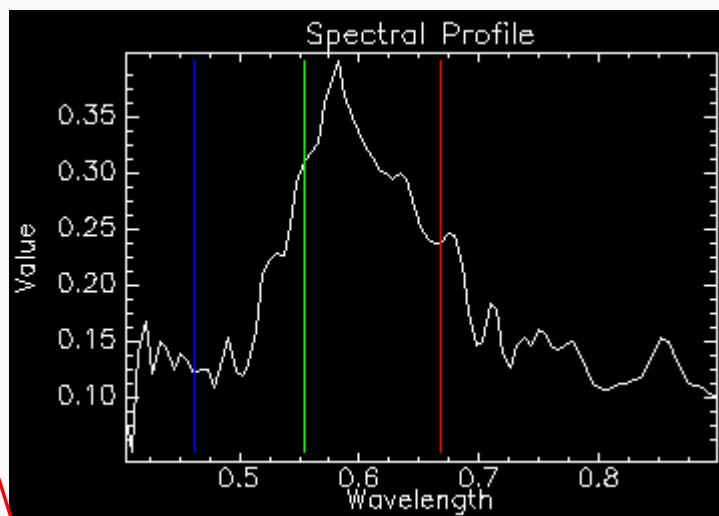




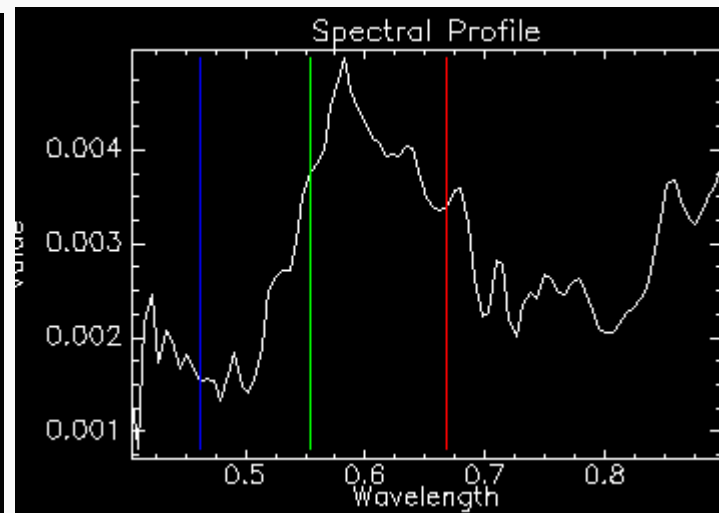
Step 1: Level 1b calibrated radiance



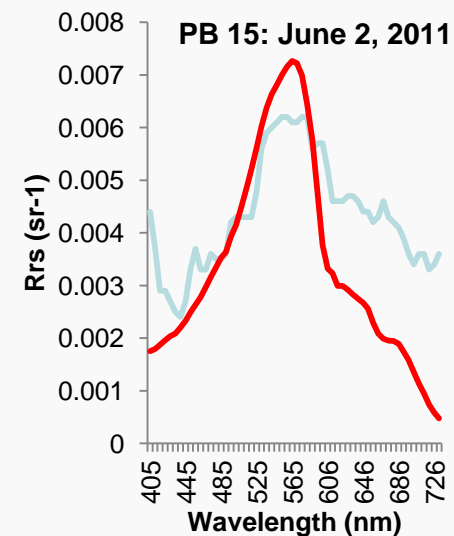
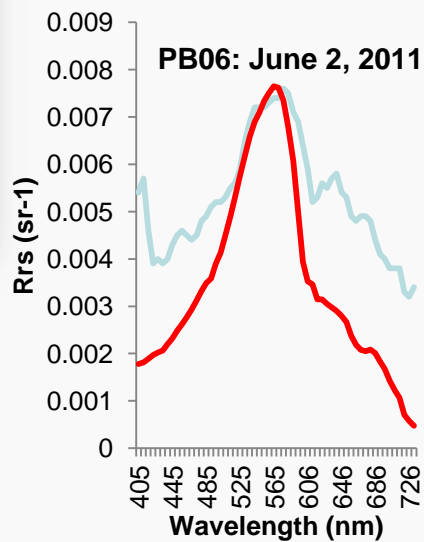
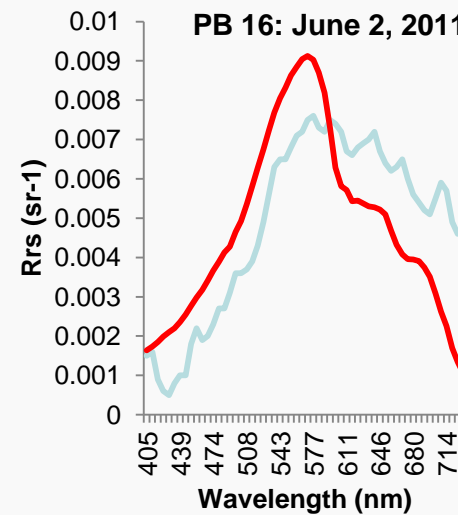
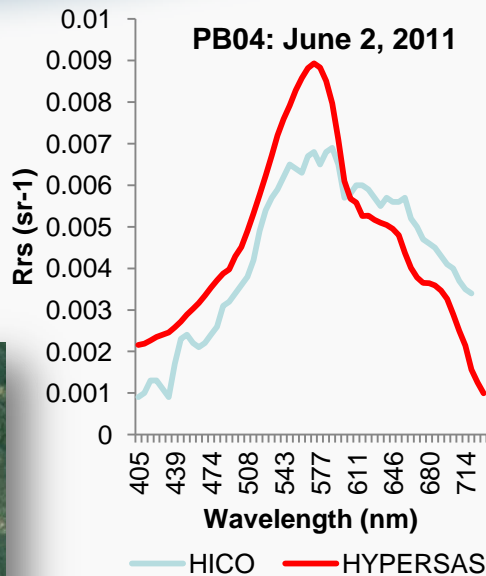
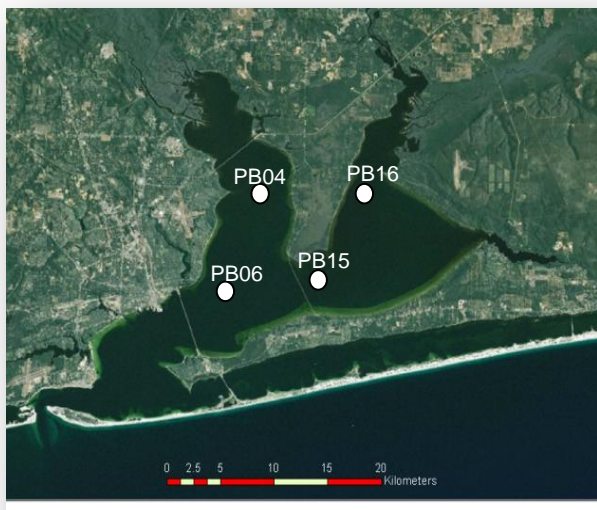
Step 3: Sunlint and stray light correction (W/m²/um/sr)



Step 4: Offshore pixel subtraction (W/m²/um/sr)

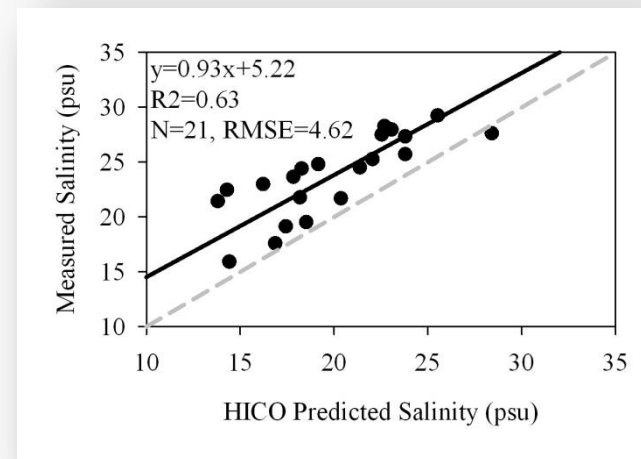
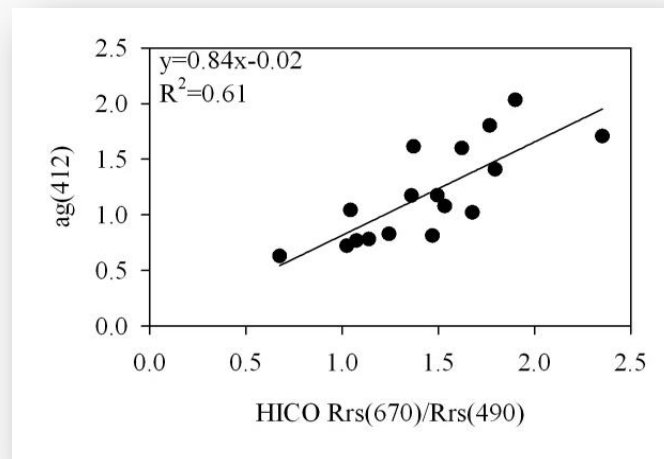
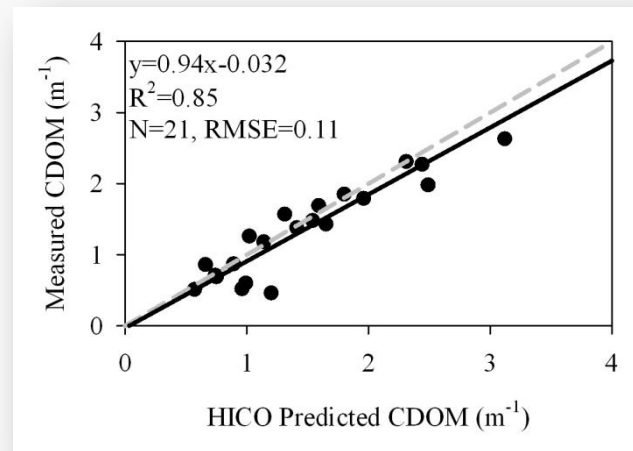


Step 7: Remotely sensed Reflectance (1/sr)



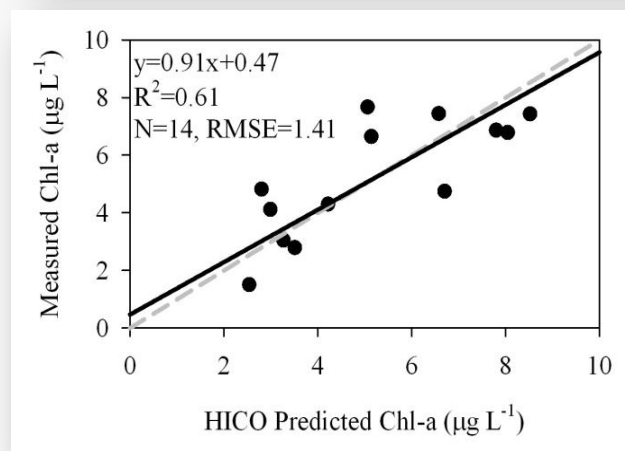
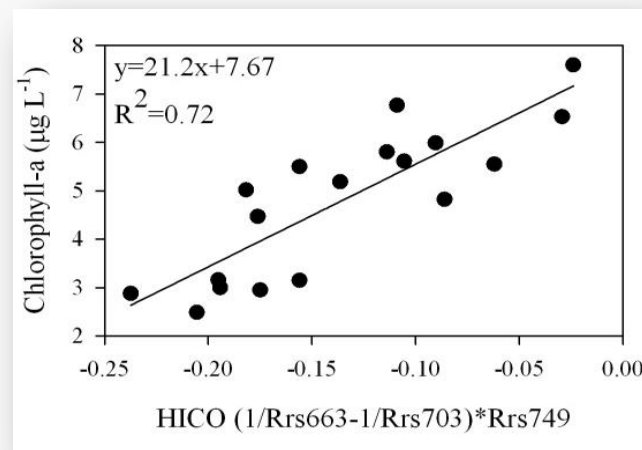
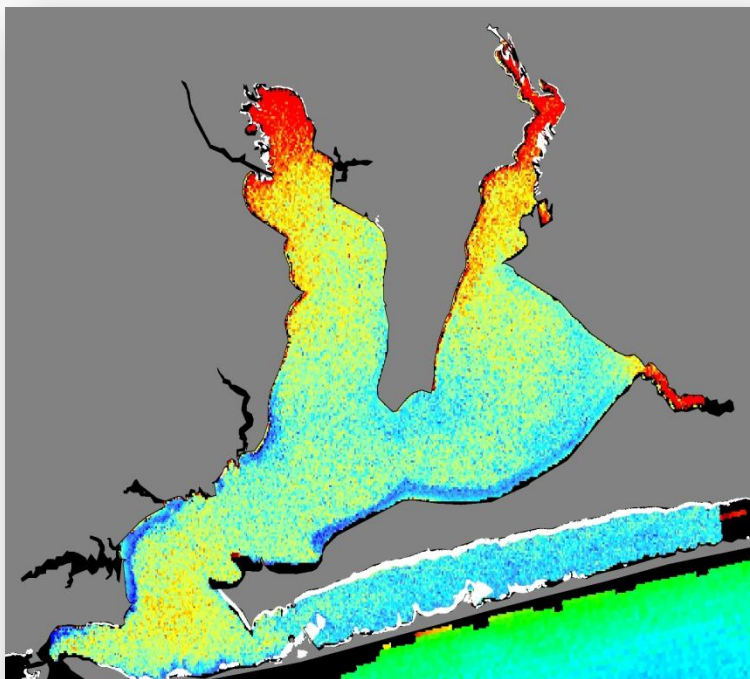
HICO CDOM and Salinity

- Tiwari & Shanmugam. 2011.
Estuarine, Coastal & Shelf Science
- Band ratio

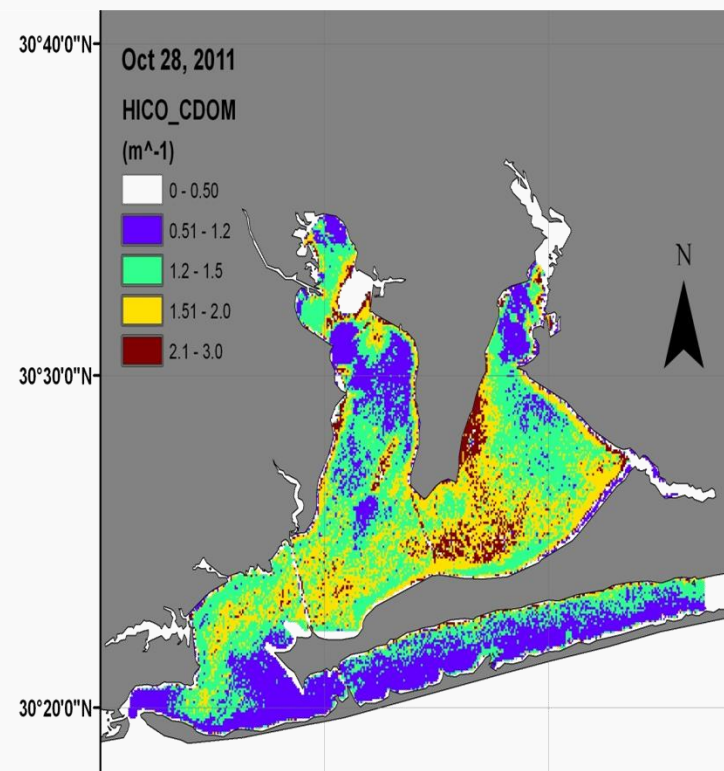
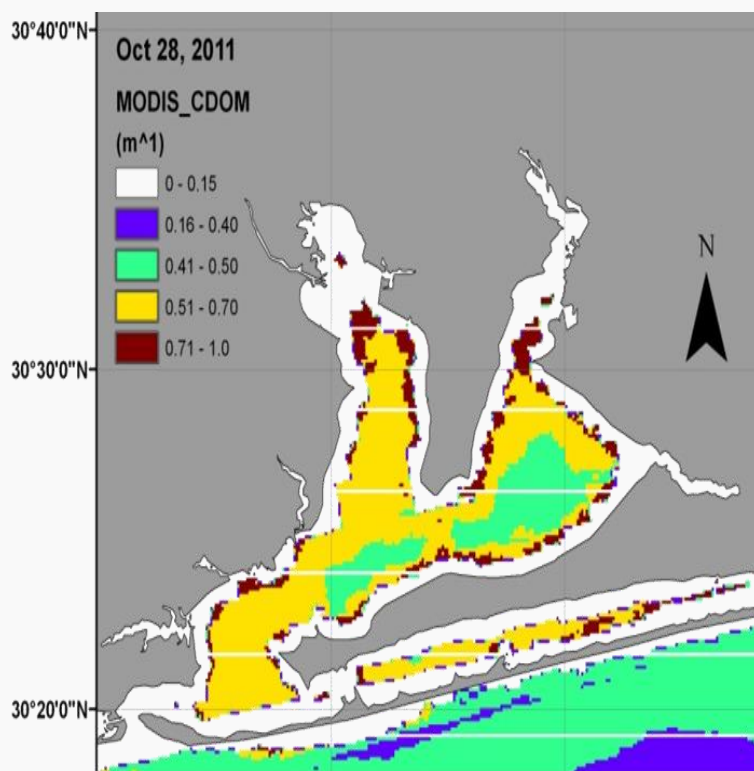


HICO Chlorophyll-*a*

- Gitelson et al. 2009. ERL
- 3-band algorithm

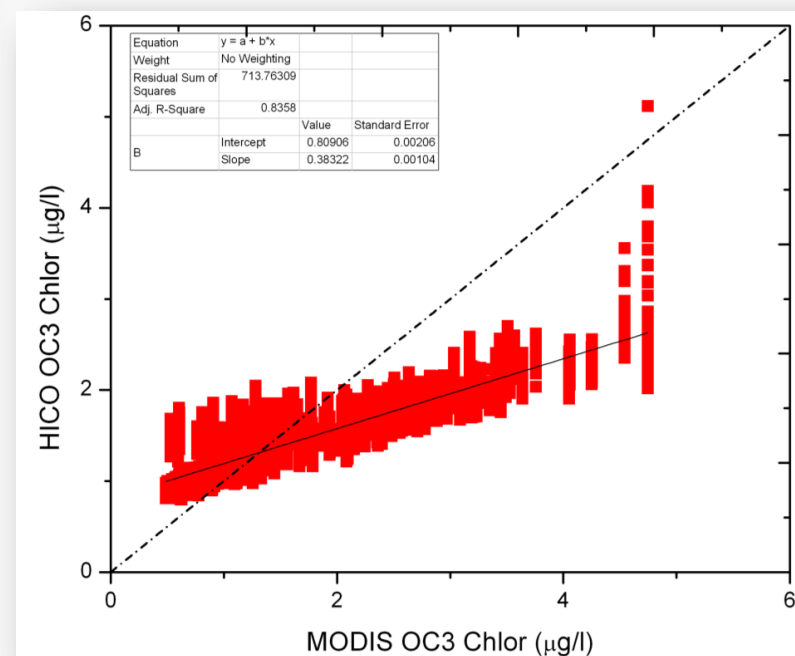
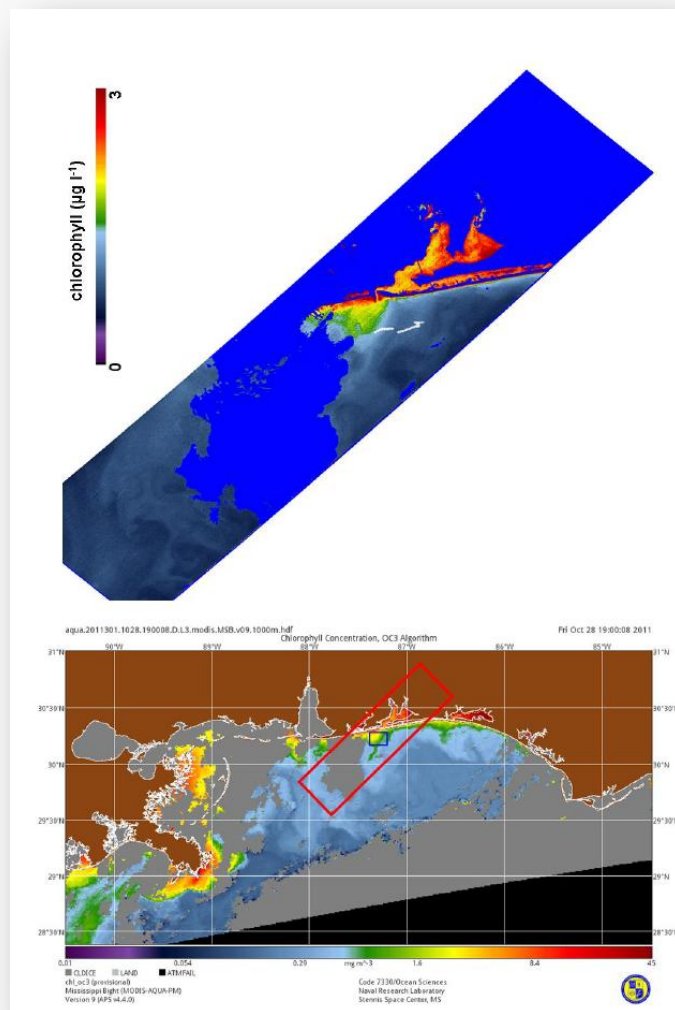


HICO/MODIS Comparison

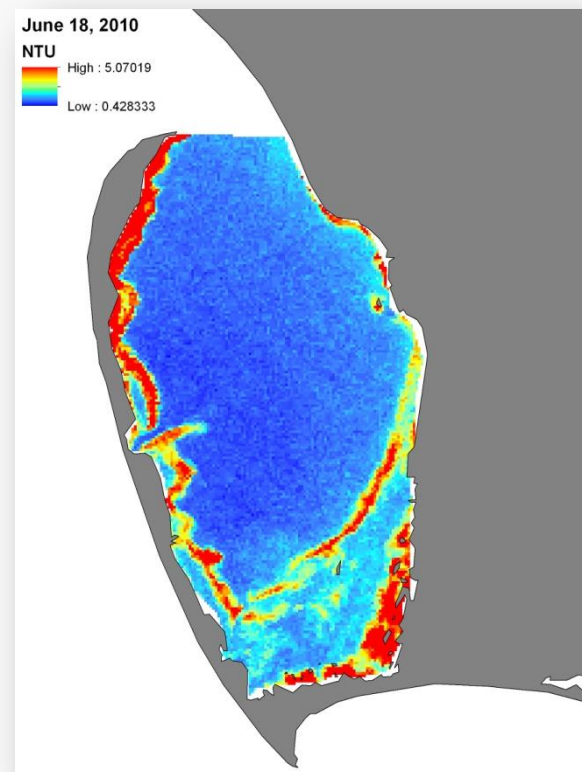
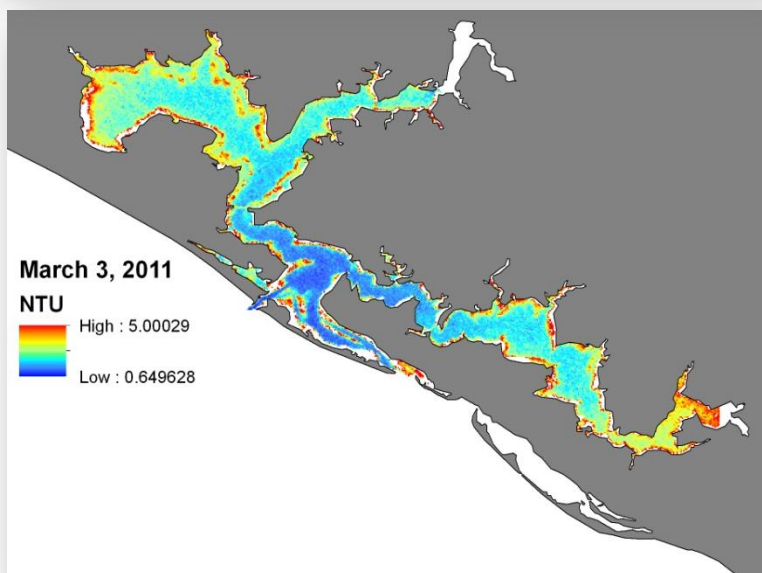
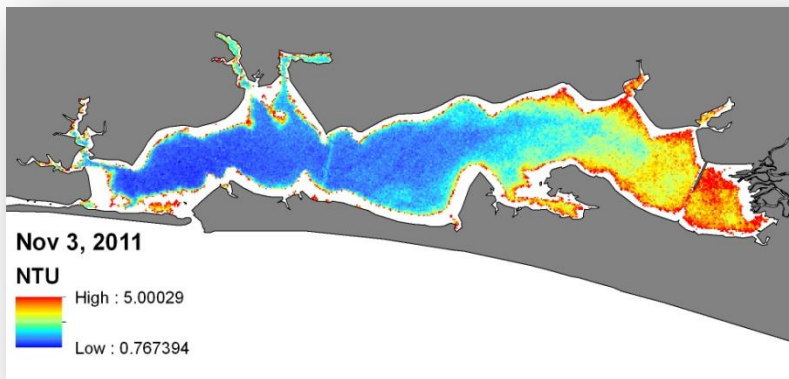


MODIS scene 19:00 GMT, 7 minutes before HICO overpass

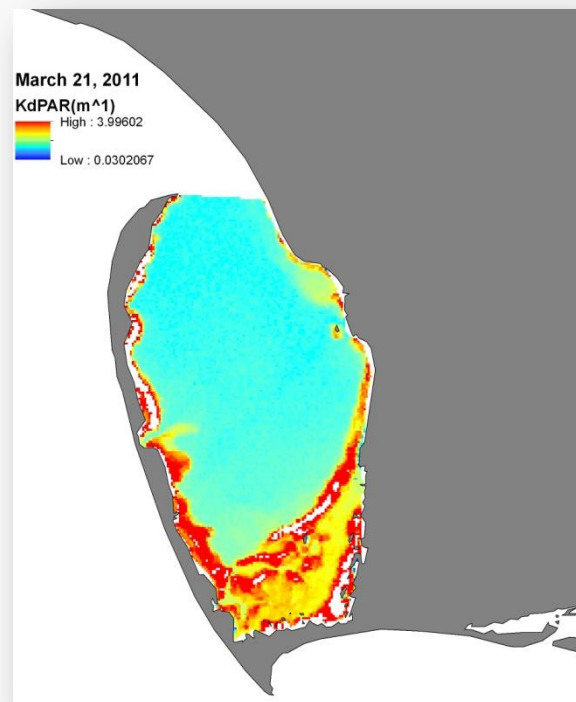
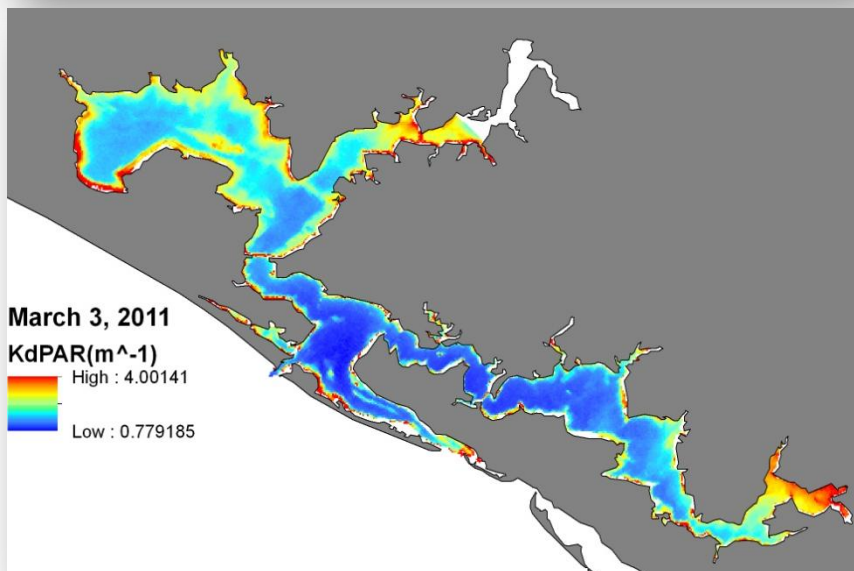
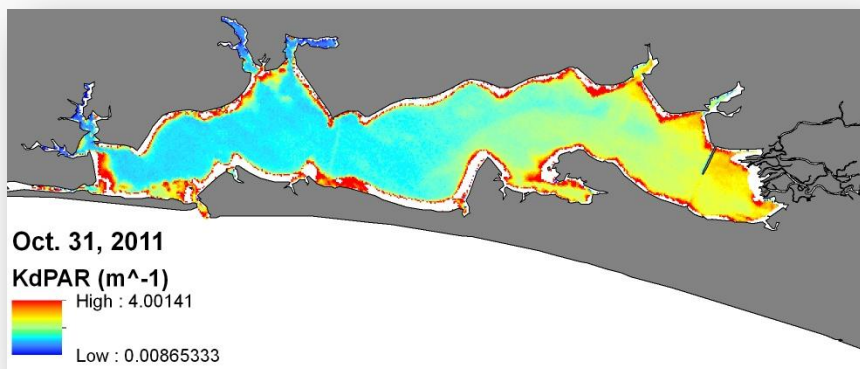
HICO/MODIS Comparison



Other estuaries: NTU



Other estuaries: K_d_{PAR}





EPA HICO Pathfinder Innovation Project



Funding:

**EPA Pathfinder Innovation Grant 2011
EPA Office of Research and Development**