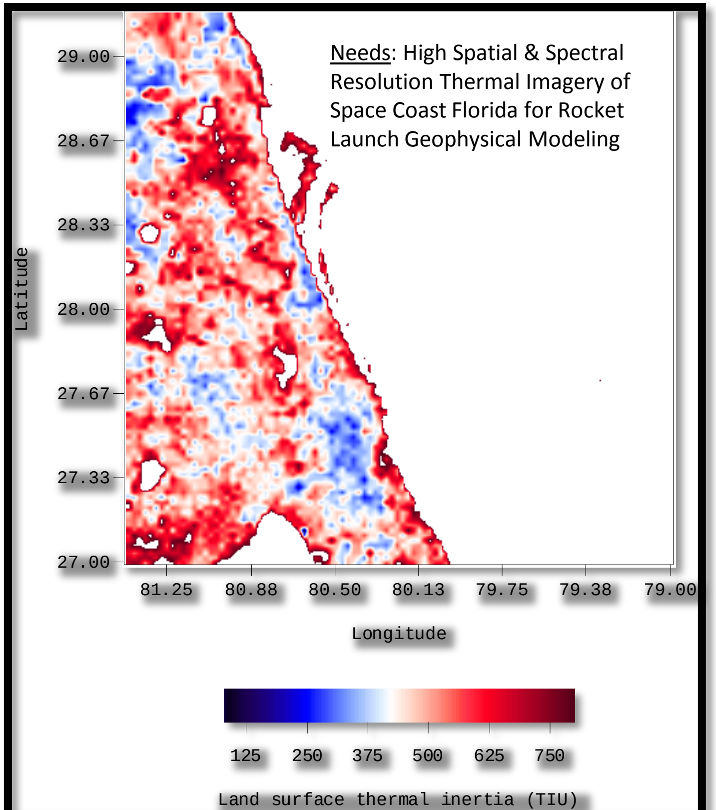
AVHRR and MODIS data for Land Base Initialization, Boundary Conditions and Data Assimilation in the UTC-M Atmospheric Boundary Layer Sea-Breeze Model 2KM Grid of Space Coast USA



Flow Chart of the Thermal Model Part III

Temperature Time Dependant Model
Thermal-Model Flow Chart (Part III)

Net Heat Budget at the Surface

Thermal Inertia

$$T^{n+1} = T^{n} + \frac{2Q^{n+1}}{P}\left(\frac{\Delta t}{\pi}\right)^{1/2}$$

C. R. Bostater, Jr.,[1] R. B. Ambrose, Jr.,[2] and Bruce Bell[3]

Modeling the Fate and Transport of Chemicals in Estuaries: Current Approaches and Future Needs

REFERENCE: Bostater, C. R., Jr., Ambrose, R. B., Jr., and Bell, Bruce, **"Modeling the Fate and Transport of Chemicals in Estuaries: Current Approaches and Future Needs,"** *Aquatic Toxicology and Hazard Assessment: Fourth Conference, ASTM STP 737,* D. R. Branson and K. L. Dickson, Eds., American Society for Testing and Materials, 1981, pp. 72-90.

ABSTRACT: A discussion of chemical modeling approaches is presented with emphasis on modeling chemicals in estuaries. An application of modeling di-*n*-octyl phthalate in a subestuary of Chesapeake Bay indicates that the most sensitive processes for an analyst to consider in estuary chemical modeling are dispersive transport, biological partitioning, boundary exchange, and sediment partitioning. Additional research is needed to evaluate the role of coagulation and sedimentation in such efforts. A framework for consideration of effects modeling is presented briefly.

KEY WORDS: water quality modeling, di-*n*-octyl phthalate, estuaries, modeling, chemical degradation, hazard assessment, aquatic toxicology

Estuaries can be the final depository for point and diffuse sources of potentially toxic chemicals released into upland waters. For this reason, estuarine chemical fate modeling—in spite of the lack of data, the mathematical complexity, and the high costs—is important and should be emphasized in any comprehensive chemical fate analysis. To date, most chemical fate models have been limited to predicting concentrations in various environmental compartments, such as water, sediment, and biota. Few applied studies have attempted to link ecosystem or population effects models with a fate model. We have coupled physical transport processes and terms with a gross biological compartment to illustrate a more meaningful fate modeling approach that describes the distribution of a potential toxic substance in an estuary.

ASTM Peer Review Research Paper

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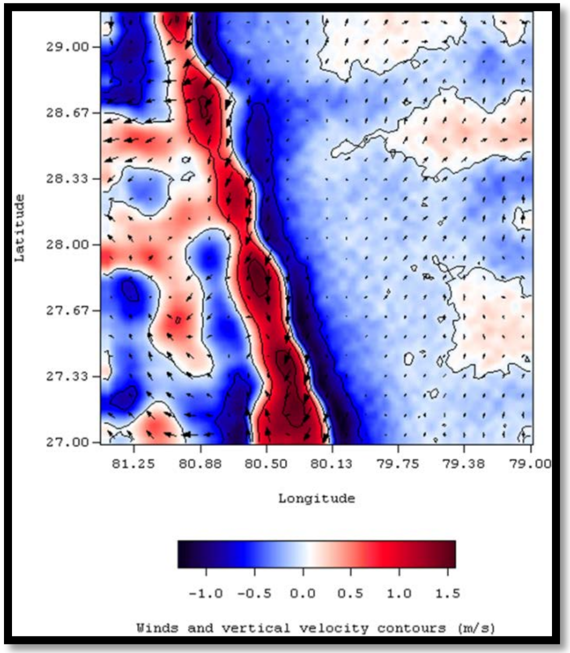
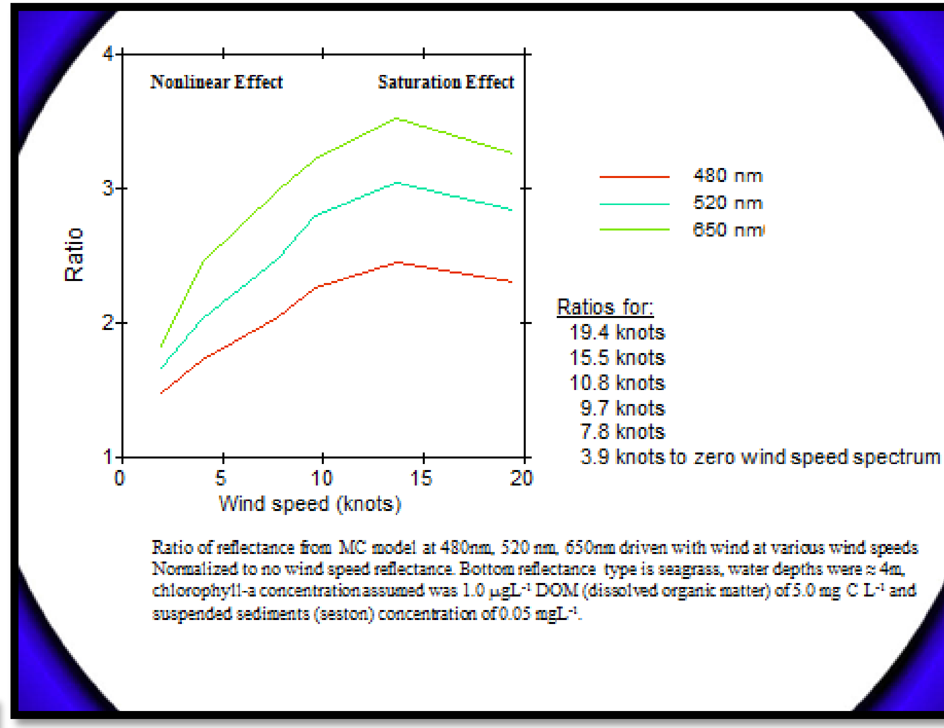
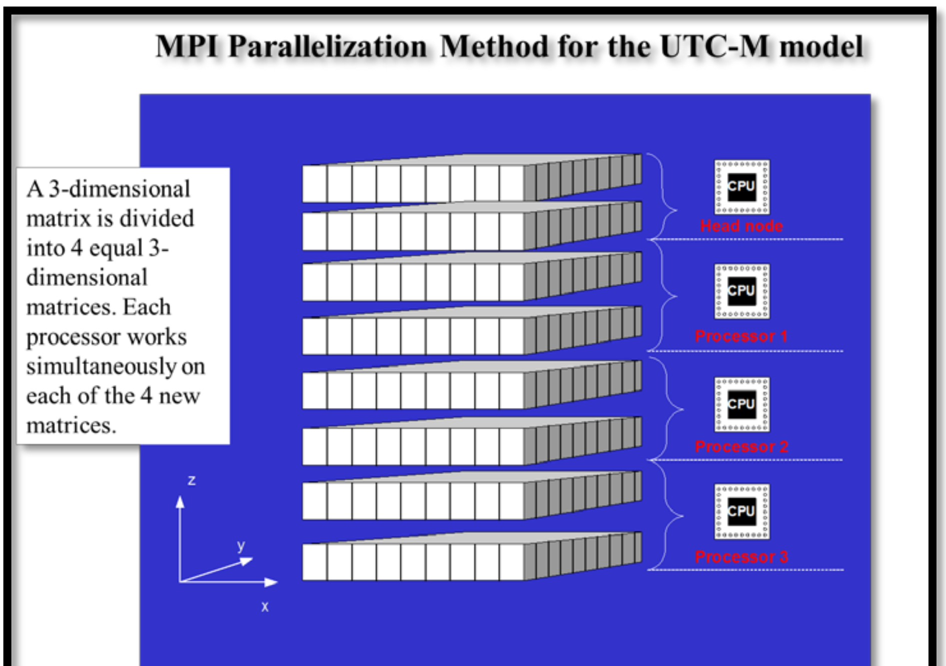
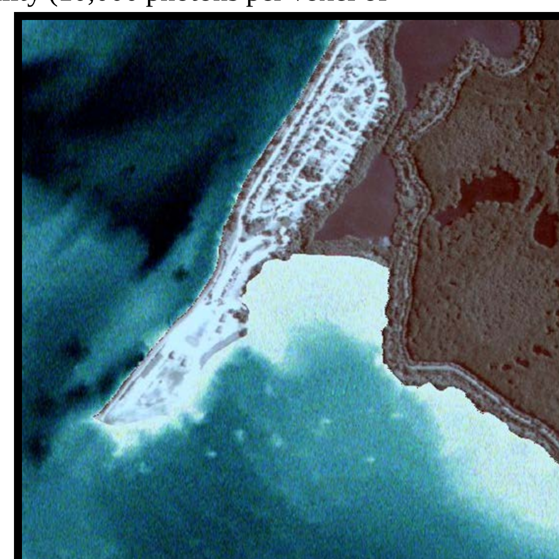
Atmospheric Boundary Layer (30m) winds and vertical velocity contours (m/s). 12 hours into the simulation. Simulation: 6:00pm October 23rd 2002, 2 km grid cell size, **Parallelized Sea Breeze Model UTC** developed by Bostater, et. al. over Cape Canaveral, Florida







Parallelization & Testing of a Monte Carlo Reflectance Model for Generating *Synthetic Hyperspectral Images* of Shallow Marine Waters & Water Quality (10,000 photons per voxel of Sebastian Inlet, Florida



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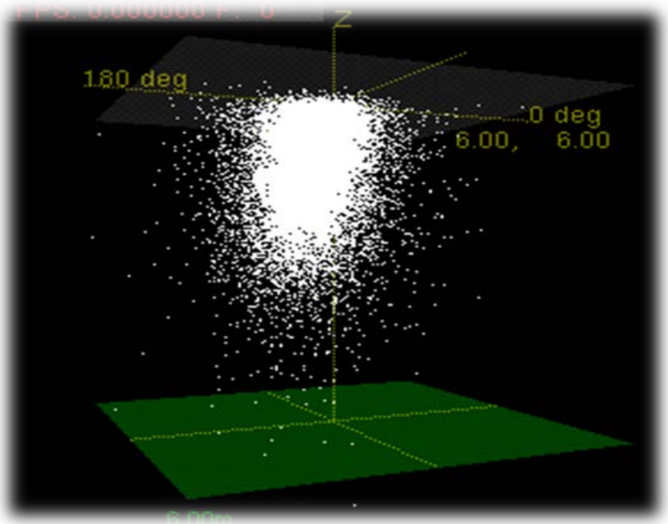
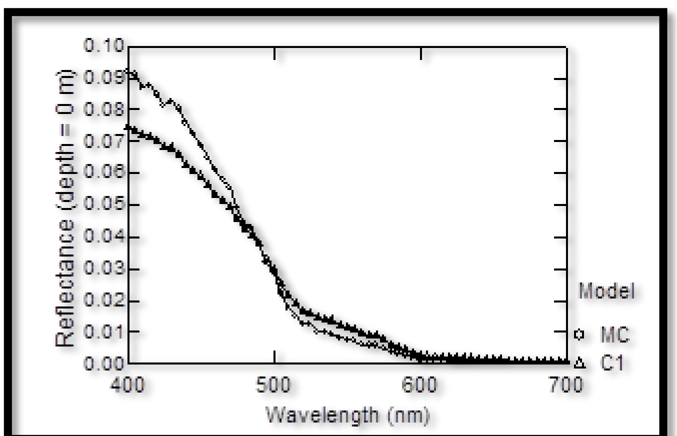
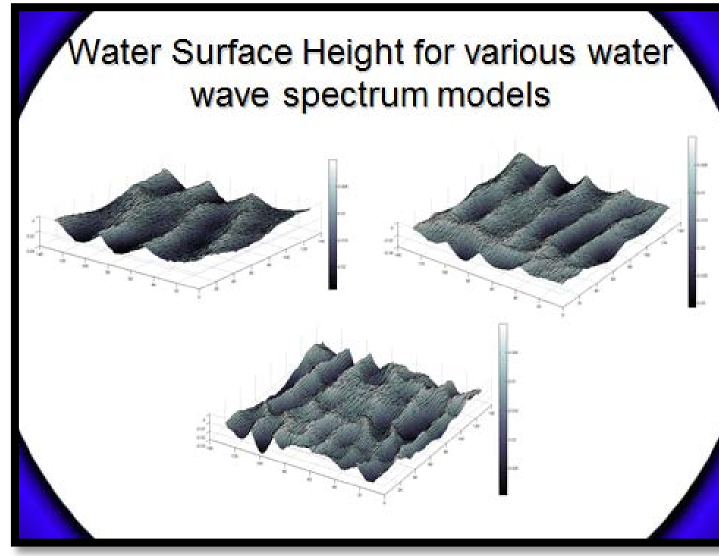


Comparison between an analytical and **Monte Carlo hyperspectral reflectance model** for water & coastal remote sensing

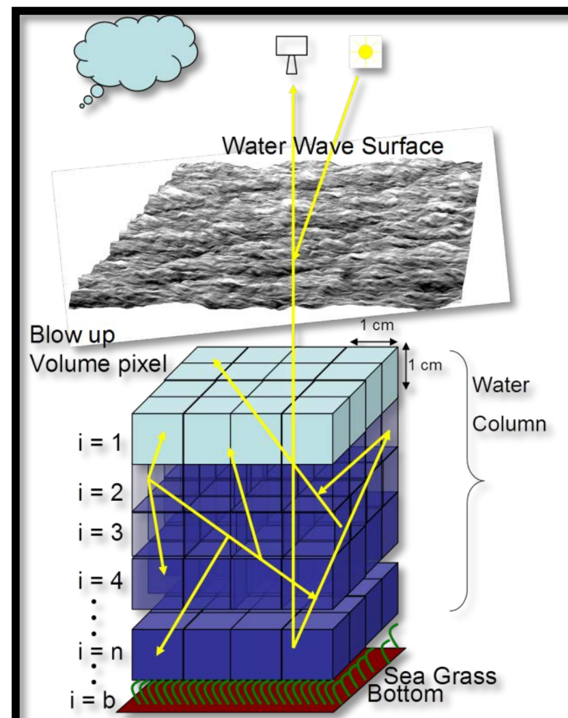


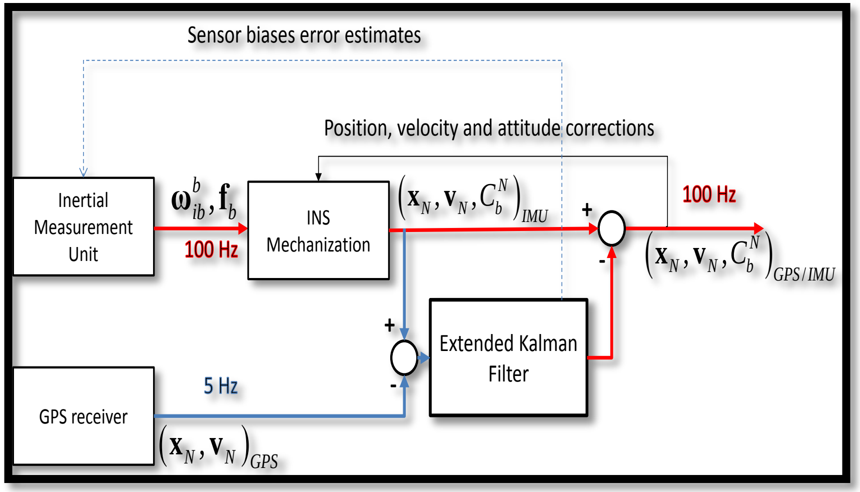
Simulated Subsurface Irradiance Reflectance just below the air/water interface for optically deep water. **Monte Carlo (MC) versus 2 Flow Analytical Model.** Pure water Backscatter & absorption coefficients.



Water surface waves influence water surface reflectance and in turn the detection of substances in water and the ability to sensors to detect subsurface targets.

Parallelized Monte Carlo Model Code of the water surface and the water column yields a method to simulate the photon interaction between the air, air-sea-interface and the water column constituents.





Kalman Filtering & Airborne Hyperspectral Water Surface Imagery & ***Radiative Transfer Modeling***

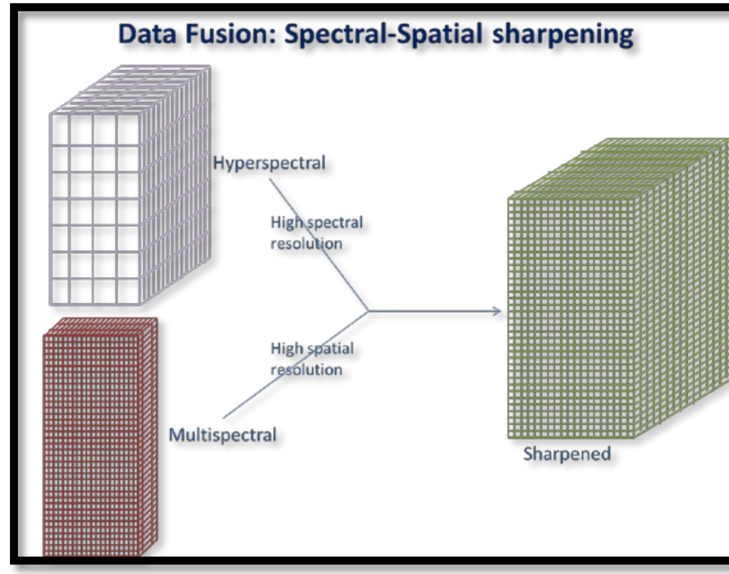
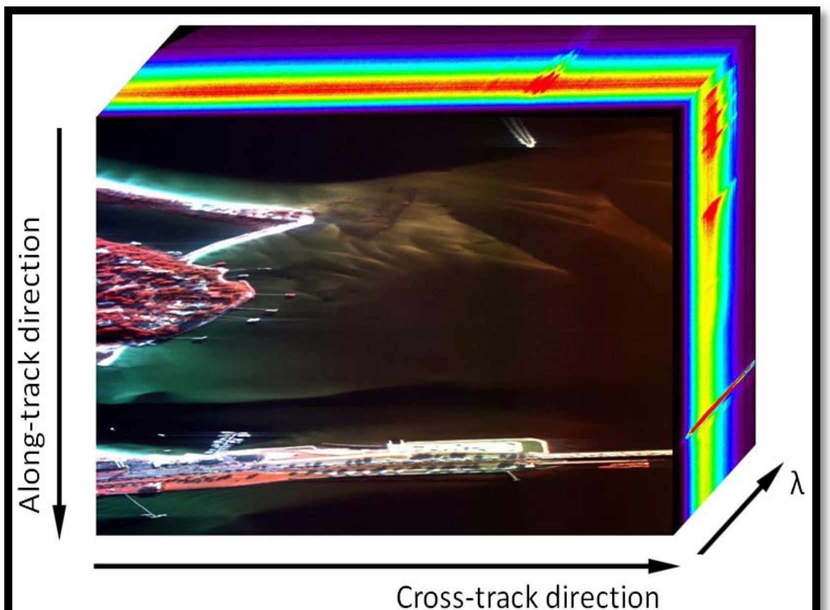


Image Fusion of Hyperspectral & Multispectral Imagery



Shallow Water Airborne Hyperspectral Image showing ***retrieved geophysical bottom features & weathered oil after Deepwater Horizon***.

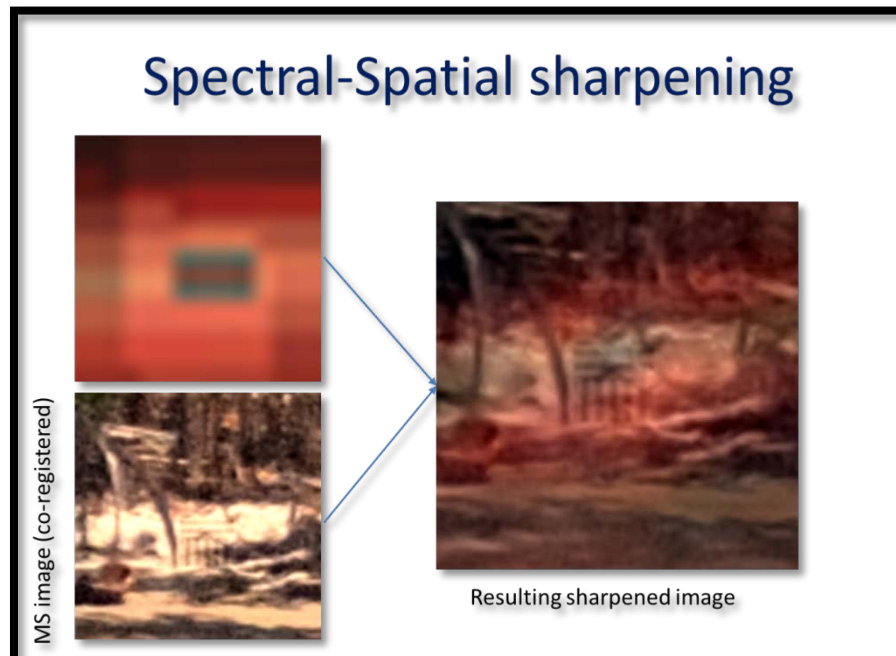


Image Data Fusion of Hyperspectral & Multispectral Imagery
For Target Detection Modeling on Shorelines

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