Education

M.S. Physics, 2010 University of Massachusetts Dartmouth
B.S. Physics, 2008 University of Massachusetts Dartmouth

Professional Affiliations

Member, American Geophysical Union (AGU)

Member, American Physical Society (APS)

Publications and Presentations:

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Eric Holmes, M.S., B.S.
Coastal Scientist

Expertise

Expertise in numerical modeling of hydrodynamics in open-ocean and coastal regions with both structured and unstructured grid models. Coupling of wave and hydrodynamic models for a variety of purposes including, risk assessment, resiliency, sediment transport or restoration efforts. Ability to calibrate and validate models based on observational data, experience in interpreting model output. Using MATLAB and other tools to analyze and visualize data and model results.

Qualification Summary

- Numerical model experience with ADCIRC, SWAN, EFDC, CMS Wave and Flow, STWAVE, FVCOM and FVCOM-SWAVE
- Programming expertise in MATLAB-scripting experienced with FORTRAN, PYTHON, BASH-scripting and LATEX
- Strong skills in data evaluation and analysis
- Well versed in various software packages including SMS and Microsoft Office
- Strong written and verbal communication skills
- Strong data processing and analysis skills
- Strong skills in parallel computing, cluster computer setup and use.

Work Experience

2011-Present	Coastal Modeler, Woods Hole Group
2010-2011	Research Associate, UMass School for Marine Science and Technology (SMAST)
2008-2010	Research Assistant, University of Massachusetts Dartmouth

Key Projects

MassDOT-FHWA Pilot Project – Coastal Scientist/ Modeler
Worked on the development of the coupled wave-flow hydrodynamic model. Final product was the Boston Harbor Flood Risk Model (BH-FRM). Developed a suite of storm scenarios to be run to create a probabilistic risk map for the Boston Area. The model used was ADCIRC coupled with SWAN. Scenarios evaluated were present day conditions, 2030 conditions and 2070 conditions.

Ballard Street Estuary Marsh Restoration Project – Coastal Scientist/ Modeler
Numerical modeling to develop potential configurations for a restored Ballard Street Marsh, a site on the south side of the Saugus River in Saugus, MA. The site was modeled using Environmental Fluid Dynamic Code (EFDC) to assess restored marsh area, flood storage capacity during extreme rain events, and storm surge protection. The model is calibrated and validated using separate sets of field data.

Industrial Economic Sea Level Rise Study – Coastal Scientist/ Modeler
Developed large scale coastal ocean model of Grays Harbor, Washington using ADCIRC model. The numerical model was calibrated and validated using a variety of data. Study involved modeling of sea level rise and storm events to assess areas of potential flooding.

Weirs Beach Sand Migration Study – Coastal Scientist/ Modeler
STWAVE Model analysis of along- and cross-shore sediment transport due to wave action and analysis of Aeolian sediment transport in effort to assess erosion of beach.

Tsunami Super Computer – Developer/ Modeler
Created a multi-node super computer built from twelve nodes, each with two processors containing four cores for a total of 96 compute nodes. Helped to develop software and management plan.

Broad Cove Estuary Marsh Restoration Project – Coastal Scientist/ Modeler
Numerical modeling to assess feasibility, restoration potential and associated flooding risks for the Broad Cove Estuary in Hingham Harbor, Hingham Massachusetts. Use of Environmental Fluid Dynamic Code (EFDC) to assess potential control structure replacement below Route-3A which would allow increased exchange between the harbor and cove. The model is calibrated and validated using separate sets of field data.

North Haven Dock Study – Coastal Scientist/ Modeler
Wind-Wave analysis of waters surrounding the Village of North Haven, New York. Long term wind analysis done using meteorological data from a nearby airport was first completed. Results of the wind analysis were used as input for the Simulating WAves Nearshore (SWAN) wind-wave generation model. SWAN simulations were then used to create a map to show areas of high wave activity around the Village.

Morton Salt Mixing Zone Study – Coastal Scientist
Analyzed field data collected at an effluent outflow on the Grand River in Fairport Harbor, Ohio. Data analyzed came from various instruments and sources including bottom mounted a riverbed mounted Acoustic Doppler Current Profiler (ADCP), boat based ADCP survey data, Conductivity Temperature Depth (CTD) cast data. ADCP data was analyzed to approximate river flow rates, CTD profiles were used to approximate the shape of the effluent plume in the river. All analysis output was documented in figures and put into standardized output format.

Bride Brook Estuary Marsh Restoration Project – Coastal Scientist/ Modeler
Numerical modeling to assess the impact of a recently installed box culvert connecting the Bride Brook Marsh system of East Lyme Connecticut to Long Island Sound. Building on an earlier numerical modeling study and now using the Environmental Fluid Dynamic Code (EFDC), a two-dimensional simulation of the system was set up and validated using field data to examine scour at key locations, including an AMTRAK bridge crossing the river.

Key Projects (continued)

Sediment Transport Study of Skagit Bay, Washington – Research Technician
(Work done as a Research Technician at the UMASS-Dartmouth's SMAST) The study was an examination of sediment transport on the tidal flats in Skagit Bay, at the mouth of the Skagit River in Washington State. In this multi-University study, our job was modeling sediment transport on the flats and the entire region of the bay. Coupling of the wave models SWAN and FVCOM-SWAVE with the FVCOM hydrodynamic model was preformed to assess the wind-wave-sediment interaction occurring on the flat.

Modeling Open Ocean Fronts – Research Assistant
(Work was conducted as a Research Assistant at UMASS-Dartmouth Department of Physics) Using the PSOM model I examined mixing at ocean submesoscales (1-10 km), specifically looking into buoyancy fluxes and the transport of nutrients from below the pycnocline into the mixed layer. Many cases were examined to find circumstances of highest mixing and which physical factors contributed to vertical fluxes, special interest was paid to the depth of the front and horizontal front gradients.

Publications and Presentations

Holmes, Eric. 2011. "Coupling of Mixed Layer Eddies with a Baroclinic Interior" Master's Thesis, University of Massachusetts: Dartmouth, North Dartmouth, MA.

Holmes, Eric, Amit Tandon, Amala Mahadevan. 2010. "Coupling of Mixed Layer Eddies with a Baroclinic Interior" Poster-Ocean Sciences Meeting 2010, Portland Oregon.