

NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING
SEMINAR

*Statistical Data Assimilation for Hurricane Storm Surge
Modeling*

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Abstract: Coastal ocean models are used for a variety of applications, including the simulation of tides and hurricane storm surges. As is true for many numerical models, coastal ocean models are plagued with uncertainty, due to factors including but not limited to the approximation of meteorological conditions and hydrodynamics, the numerical discretization of continuous processes, uncertainties in specified boundary and initial conditions, and unknown model parameters. Quantifying and reducing these uncertainties is essential for developing reliable and robust storm surge models.

Statistical data assimilation methods are often used to estimate uncertain model states (e.g. storm surge heights) by combining model output with uncertain observations. We have used these methods in storm surge modeling applications to reduce uncertainties resulting from coarse spatial resolution. While state estimation is beneficial for accurately simulating the surge resulting from a single, observed storm, larger contributions can be made with the estimation of uncertain model parameters. In this talk, I will discuss applications of statistical data assimilation methods for both state and parameter estimation in coastal ocean modeling.

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