



CLIM Program Transition Workshop

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Lecture: *Estimating Extreme Storm Surge Levels: A Statistical Perspective*

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Abstract:

Storm surge is an abnormal rise of water, largely induced by the strong winds of a hurricane that could cause tremendous damage in coastal areas. Therefore, it is critically important to estimate the surge levels especially those extreme ones. However, the estimation of surge levels poses a unique statistical challenge due to the rareness of hurricanes in space and time. To overcome this difficulty, the joint probability modeling of hurricane characteristics combined with hydrodynamic simulations is currently the recommended method by the Federal Emergency Management Agency (FEMA) for calculating the extreme surges in terms of 10-, 50-, 100-, and 500-year return levels.

In this talk, I will present the FEMA's approach from a statistical perspective starting from the estimation of the distributions of hurricane characteristics to the design and analysis of the hydrodynamic simulations. I will highlight the challenges and how we might improve the current practice in terms of estimation and uncertainty qualification.