

Storm surge and wave dissipation by coastal wetland vegetation in New Jersey, USA

Research objective: Restoration and preservation of coastal wetlands, and vegetated foreshores, are growing in popularity as tools to reduce the impact of storm surge and waves on coastal dikes and the hinterland. However, the effect of vegetation on surge and wave attenuation still needs to be quantified, and has been an ongoing theme of research in this department. This objective of this MSc research project is to help quantify the effects of vegetation on wave and surge attenuation, at specific sites in the USA.

Methodology: The MSc student will use the coupled ADCIRC-SWAN model to investigate the effect of spatially and temporally varying vegetation parameters on storm surge and wave attenuation, and the respective effect of this on forces to which the coastal dike is exposed. In collaboration with George Mason University (in Virginia, USA, near Washington DC), 2 sites will be assessed: one in Chesapeake Bay in Virginia, and the other in Barnegat Bay in New Jersey. The Virginia site will be used for the calibration of SWAN vegetation parameters to wave measurements taken during storms by George Mason University. The New Jersey site will be used along with measured water level and inundation extent during Hurricane Sandy (2012) to assess the sensitivity of the models to vegetation parameters. Finally, the degree of protection offered to coastal dikes by vegetation at these two sites will be quantified.

References:

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Ferreira CM, Irish JL, Olivera F. Uncertainty in hurricane surge simulation due to land cover specification. *Journal of Geophysical Research: Oceans*. 2014 Mar 1;119(3):1812-27.

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