A Coastal Flood Climatology for the Lowcountry

Coz, Joseph[1], Lee Lindner[1], Frank Alsheimer[2], Samantha[3], Dana Warheit[1], and Hannah Lipinski[1]

[1]*College of Charleston,* [2]*National Weather Service,* [3]*UNC Charlotte*

The frequency of minor coastal flooding events in the Lowcountry has increased by an order of magnitude over the past half century. Such events are largely defined as observed tide cycles that exceed 7.0 ft. MLLW in Charleston, SC, and 9.2 ft. MLLW in Fort Pulaski, GA. It is important to recognize that observed tide levels frequently exceed predicted tide levels, creating demand for more accurate predictive models. Despite the large number of meteorological and atmospheric numerical models National Weather Service (NWS) forecasters can use as guidance for atmospheric predictions, there are only limited tide prediction and inundation models available. The objective of this study is to create a climatological-based statistical tool to estimate total tide levels with each cycle, specifically related to levels that begin to cause impact and necessitate the issuance of coastal flood advisories. Historic tide data and NCEP/NCAR analyses will be used to create statistical tools for forecasting flood events. Specific objectives for this study include: (1) Determining the frequency of observed water levels reaching advisory levels at both Charleston, SC, and the mouth of the Savannah River, GA. (2) Create scatter plots and trend lines of historical data to show tendencies of tidal anomalies compared with anomalies of the previous tide cycle that cause minor coastal flooding. (3) Identify outliers from the trends and examine the potential causes of the outliers. (4) Separate the events in to synoptic categories (anticyclonic-based, cyclonic-based, frontal-based, neutral, and tropical-based). (5) Complete an atmospheric synoptic climatology for dates of flood events to increase forecaster awareness of weather patterns that can lead to such events, including a breakdown of patterns discovered in objective 4. (6) Equip public administrators with a tool for the implementation of new policies and procedures that could serve to improve hazard mitigation planning and implementation for the Lowcountry. While the benefits of such a model to NWS forecasters are more immediately understood, attention most also be focused on how this model will help city officials protect the public and prepare their municipalities for the age of resiliency. Meteorologists and city officials can use this tool as way to better predict and prepare for disruptions and enhance programs to mitigate the negative environmental, social, and economic impacts that such events have on the community. The presentation will examine the need for the model/ tool, conceptual design, process to date, and opportunities for integration with public managers.