

AN INTERACTIVE WEBSITE DESIGNED TO ENHANCE PUBLIC UNDERSTANDING OF STORM SURGE THREATS

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1. BACKGROUND

Forecasting storm surge associated with hurricanes has improved over recent years, largely due to improved track forecasting. However, the public's understanding of storm surge and its impacts remains poor (Morrow 2007). Although Lindner et al. (2004) found that the use of pictorial references aided in public understanding of storm surge threats, the National Weather Service (NWS) tropical watch/warning product suite remains largely text-based, particularly regarding storm surge.

A study between the College of Charleston and the Charleston, South Carolina NWS office is currently underway to improve basic understanding of the storm surge associated with hurricanes as well as the effectiveness of current NWS tropical advisory products relating to storm surge. Specifically, a web-based interactive surge visualization tool is being developed.

2. METHODOLOGY

Sea, Lake and Overland Surges from Hurricanes (SLOSH) (Jelesnianski et al., 1992) output has been obtained for various hurricane scenarios (e.g., different intensities and landfall locations) along with historical tidal data and elevation data for roughly 2000 landmarks across the Charleston, South Carolina area. All of this data will be linked together using GIS with an interface developed in HTML. When completed, the online interactive tool will allow users to select a landmark on a clickable map (Fig. 1) as well as a hurricane/tide scenario (e.g., a Category 3 hurricane making landfall just south of Charleston at high tide). The result is an image of the landmark depicting the approximate height of inundation, including surge and tide (Fig. 2).

3. FUTURE WORK

Future work mainly includes completion of the website and the survey. As for the website, linking of the landmarks to the surge/tide data still needs to be completed. Wave data is also being investigated for its possible inclusion on the landmark inundation images. Once the website is finished, the URL address will initially be made available only to the survey participants. The main purpose of the survey will be to determine the effectiveness of this graphical approach

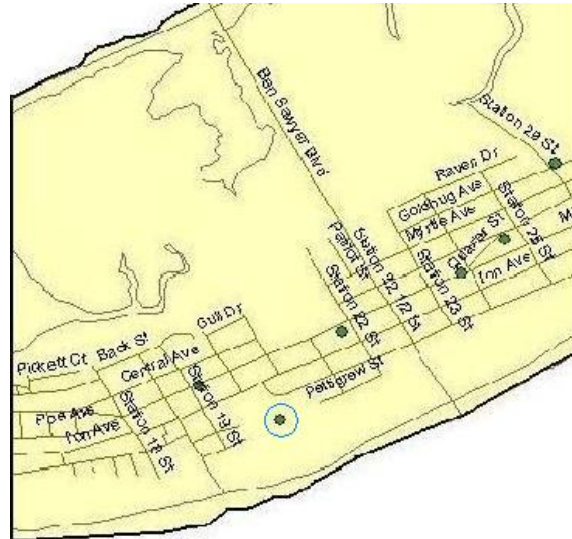


Figure 1. Example map showing the selectable landmark locations (green dots). The location outlined by the blue circle corresponds to the landmark in Figure 2.



Figure 2. Example landmark image depicting an approximate level of inundation.

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to hurricane warnings as compared to standard NWS text-based warnings. Further, our motivation is to investigate the possible improvement in the participants' understanding of and appreciation for storm surge and its associated risks. Once the survey is complete and any feedback is incorporated, the website will be made available for public use.

If a tropical cyclone affects the study area in the near future, the database predictions will be compared to inundation depths measured by the passage of the system. Also, we plan to eventually adapt the tool to incorporate real-time SLOSH data when available, and ensemble storm surge data may be incorporated as well to help users understand the uncertainty involved in tropical cyclone surge forecasts and to offer additional insight into the probabilities of reaching certain user-defined critical levels. Lastly, NWS Charleston will investigate how the output can be incorporated into their local web-based advisory products and graphics.

4. UNIQUE ASPECTS

There are several unique aspects of this project. First, SLOSH output is converted into pictorial form, which we propose will be more easily understood by the public. Secondly, the interactive nature of the website will allow users to customize NWS storm surge forecasts to their particular location (or at least very near their location). Lastly, the project is different with respect to its educational component. In particular, users can experiment with a variety of hypothetical hurricanes to determine the potential impacts in their own neighborhoods, which may lead to better evacuation route decisions.

5. CONCLUSIONS

The main goal of this project is to enhance the understanding of storm surge threats associated with hurricanes as well as the uncertainties inherent in providing such forecasts, by not only the general public but also local emergency managers, regardless of their education or income level. It is our hypothesis that a better presentation of the risks associated with surge will result in a decrease in death and injury, and perhaps improved decision making with regards to evacuation, insurance, and home building. Further, the results of this study should be applicable for all coastal areas in the United States threatened by tropical systems.

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