Region II Coastal Flood Study Data Sharing

Coastal Storm Surge Study: Technical Documentation

Overview

The Federal Emergency Management Agency (FEMA) is directed by Congress to create, and periodically update, flood hazard information. The mapped flood hazards shown on many of the Flood Insurance Rate Maps (FIRMs) for New Jersey and New York coastal communities were produced over 30 years ago. The FEMA Region II office has initiated a coastal flood study to update these FIRMs for the region. The new study utilizes current and widely accepted methodologies and information available to map flood hazards. The FIRMs provide the basis used by communities participating in the National Flood Insurance Program to carry out floodplain management standards and develop risk management strategies. In conjunction with the map update process, FEMA is implementing a comprehensive outreach initiative to share coastal flood study data and to ensure affected communities are fully engaged and informed throughout the process.

In keeping with FEMA's commitment to share coastal flood study data, a summary report titled *Region II Coastal Storm Surge Study* and eight topic-specified technical documents were produced to summarize the new storm surge modeling carried out to support the FIRM updates. The eight topic-specific technical documents provide details on the development, execution, and validation of the coastal storm surge modeling for coastal scientists, community officials, and others seeking in-depth technical information. A description of these technical documents can be found in Table 1 below.

What is Storm Surge?

Storm surge is the change in water level generated by a storm event, over and above the height of the normal tide, pushed towards shore (Figure 1). Many factors can drive the height of the storm surge, including the strength of the winds in the storm, and the angle of approach taken by the storm towards the coastline.
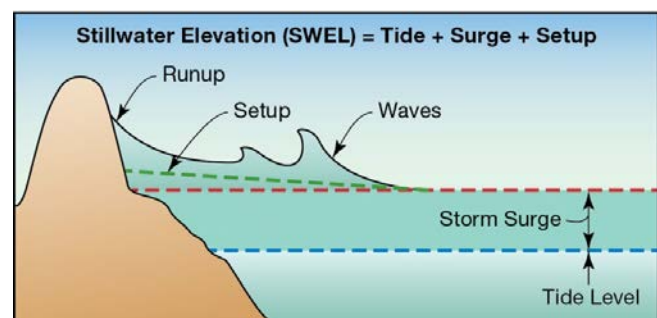

Figure 1. Storm Surge vs. Storm Tide

Why is Storm Surge Modeled?

Storm surge is an important component of the overall coastal flood hazard depicted on the FIRM. It is modeled to calculate the coastal Base Flood Elevations (BFEs) for areas of the 1%-annual-chance flood, which are the result of: 1) the storm surge stillwater elevation (SWEL), 2) the wave height above the SWEL, and 3) the wave runup above the SWEL (where present), as shown in Figure 1.

Components of a Storm Surge Model

Many data inputs are required in order to create a robust storm surge model. Some of these data inputs include elevation of land surface and depth of sea floor data, land use data that defines how easily storm surge will flow over different land features, and historical storm data capturing storm tracks and intensity in the affected study area. Refer to the *Coastal Terrain Processing Methodology* and *Spatially Varying Nodal Attribute Parameters* technical documents for further detail on the different input data of the coastal storm surge model.

Where to Find the Storm Surge Technical Documents

Click the title for the *Region II Coastal Storm Surge Study* report. Topic-specific technical documents can also be found on the FEMA Region II Coastal website at www.region2coastal.com/officials and at www.rampp-team.com/nj.htm.

Table 1 : Summary of Region II Storm Surge Project Technical Documents

Document Name	Brief Synopsis
Coastal Terrain Processing Methodology	Provides details on the data and processing efforts that contributed to development of a seamless topographic and bathymetric Digital Elevation Model (DEM) for the study area.
Spatially Varying Nodal Attribute Parameters	Provides details on the methods used to develop inputs for various storm surge model parameters that can be varied across the study domain.
Mesh Development	Details the methodology used to develop a storm surge model mesh with a consistent design throughout the study area.
Model Calibration and Validation	Summarizes the methodologies and results from the storm surge model calibration and validation process. The validation process included a tidal calibration and validation to historic storms.
Development of Wind and Pressure Forcing in Tropical and Extratropical Storms	Details the methods used to assemble a comprehensive historical meteorological dataset for the New York/New Jersey coast to provide characteristic storm parameters needed for the development of probability distributions.
Joint Probability Analysis Of Hurricane and Extratropical Flood Hazards	Provides details of the methodologies used to develop a probabilistic characterization of hurricanes that may impact the study area; to develop representative storms for numerical modeling; and to develop statistical techniques for the analysis of extratropical storms.
Production Runs	Documents the work conducted to perform storm surge model simulations for each of the hurricanes and extratropical storms that were developed as part of the Joint Probability Method analysis.
Recurrence Interval Analysis of Coastal Storm Surge Levels and Wave Characteristics	Details how results of the production simulations for the New Jersey and New York project area have been processed to develop recurrence interval stillwater elevations and wave characteristics.