



FEMA



Summary: Joint Probability – Optimal Sampling Method for Tropical Storm Surge Frequency Analysis

Audience

This guidance document is intended for use by all users of the current Appendix D of the *Guidelines and Specifications for Flood Hazard Mapping Partners, Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update, Final Draft*, February 2007, and *Final Draft Guidelines for Coastal Flood Hazard Analysis and Mapping for the Pacific Coast of the United States*, January 2005.

Purpose

The purpose of this guidance document is to simplify the application of, and ensure correct implementation of, the Joint Probability Method (JPM) approach.

The estimation of storm surge elevation frequencies is a central component of coastal flood hazard studies. Recently, it has been recognized that of the available methods, JPM is preferred for the tropical storm environment. FEMA and the US Army Corps of Engineers efforts independently developed new and highly efficient methods of implementing the JPM approach in such a way as to minimize the number of storms requiring simulation. It was found that the simulation effort could be reduced by about an order of magnitude while still maintaining good accuracy. The two approaches are known as Optimal Sampling methods, denoting their common intent of choosing storms for simulation in such a way as to accurately cover the entire storm parameter space through optimal parameter selection with associated weighting and interpolation methods. These guidelines focus on the Quadrature Method, which was used by FEMA for the Mississippi study, since it is more readily automated than the Response Surface Method and requires a lesser degree of expert judgment in the selection of storms.

The outcome of this guidance document is the development of two utility programs, SURGE_STAT, a console program used to compute the surge statistics at the target sites, and JPM-OSQ.XLS, an Excel spreadsheet used to select the parameters of the OS storms.

Risk MAP Guidance

This document is a component of Risk MAP Guidance. The Risk MAP program is managed by FEMA to develop flood risk information and work with communities to help them understand and act on the data to manage the risks. Risk MAP Guidance defines the product and process standards and best practices for the program:

- Standards are contained in the document “Guidelines and Standards for Flood Risk Analysis and Mapping” (G&S document) which primarily contain standards, but currently substantial best practice information are also included.
- Procedure Memos supersede portions of the G&S document or address new issues not currently covered. In most cases they will be integrated into the G&S document over time.
- Operating Guidance describes best practices that support the Risk MAP standards.

RiskMAP
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