US Army Corps of Engineers®

Coastal Field Data Collection Program

Surge & Wave Island Modeling Studies (SWIMS)

Issue

Island coasts and populations are extremely vulnerable to tropical storms, but existing methodologies for analyzing hurricane/typhoon waves were developed for mainland coasts. Islands have special concerns such as adjacent deep water, very large incident storm waves, and fringing coral reefs. Coastal inundation calculation methodologies for island coasts have not received attention commensurate with the importance and complexity of the processes.

Research Approach

Develop, improve, link, and validate the next generation models to realistically represent island wave and inundation processes. The models include a range of fidelities to meet needs ranging from emergency planning to project design. Perform physical model studies on wave transformation, setup, and runup on steep bathymetry and fringing reefs to improve understanding of the processes. Apply Pacific Islands Land-Ocean Typhoon Experiment (PILOT) field measurements and SWIMS laboratory data to validate models and modeling system. Package models for practical application by Districts and local entities.

Partners

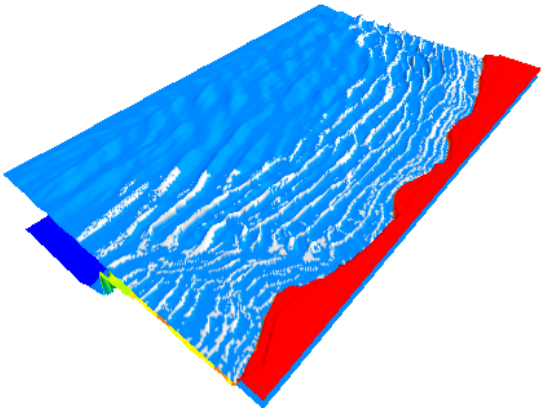
USACE, Honolulu District (POH); USACE, Jacksonville District; University of Hawaii; University of Michigan; Texas A&M University; University of Notre Dame; University of Florida; Central Pacific Hurricane Center; Hawaii Civil Defense; City and County of Honolulu; PILOT; POH Hurricane Evacuation Studies.

Products

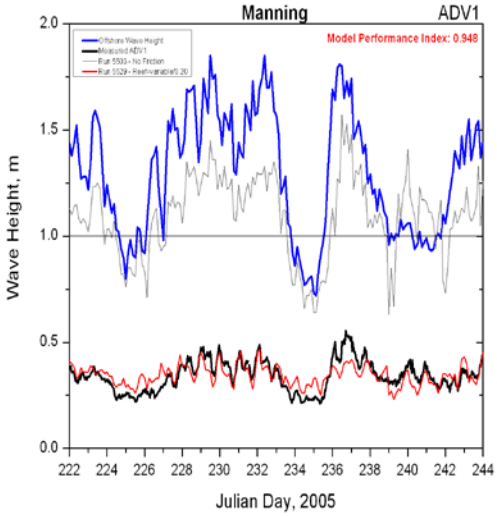
Final products include: a modeling package for hurricane/typhoon wave and inundation modeling, documented data sets, user's guides, and research reports and papers. http://chl.erdc.usace.army.mil/swims

Point of Contact

Jane McKee Smith, Coastal and Hydraulics Laboratory, U.S. Army Engineer Research and Development Center, Vicksburg, MS, 601-634-2079, Email: Jane.M.Smith@usace.army.mil



BOUSS-2D modeling of wave transformation on Oahu North Shore



STWAVE modeling of wave dissipation, southeast Oahu reef