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Coastal Field Data Collection

Pacific Islands Land-Ocean Typhoon Experiment (PILOT)

Issue Studies of methods to protect U.S. populations from the effects of landfalling tropical cyclones have been confined primarily to the continental United States. These studies have emphasized evacuation of large populations from coastal areas as a primary mitigation measure against the effects of coastal storm surge and maximum cyclonic winds. The methods used to protect mainland populations from cyclone effects are not always appropriate or effective in island environments. Cyclone effects that are of little or no concern to mainland residents may pose significant hazards in island environments. These effects can include terrain enhanced winds, elevated coastal water levels caused by wave-induced ponding on reefs, and mudslides caused by heavy rains. In contrast to mainland tropical cyclone hazard scenarios which have been extensively studied, island hazard scenarios have received little attention.

Research Approach Data depicting island-specific processes (e.g., wave induced ponding, wind-forced wave uprush) are inadequate or do not exist, consequently the physics of these processes are poorly understood, so models are primitive or inadequate. A field laboratory and observing systems on the island of Guam have captured data of wind speeds, wave heights, and coastal water levels during passage of several typhoons. Shallow-water wave gages and current meters deployed in a reef-rimmed lagoon have revealed that wave dissipation over the reef is far greater than predicted using conventional dissipation mechanisms. A field laboratory in the Hawaiian Islands has acquired similar data under less extreme but more often occurring conditions. These data are used to support island inundation model development.

Partners Scripps Institution of Oceanography; University of Hawaii; National Ocean Service, National Weather Service; U.S. Air Force Weather Command; USACE, Honolulu District.

Products A comprehensive data set of coastal waves, winds, water levels, and currents are being acquired under storm conditions. These data are used to support a companion work unit (Surge & Wave Island Modeling Studies) to develop, verify, and refine appropriate models.

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Additional information can be found at: <http://frf.usace.army.mil/pilot/pilot.shtml>.



Reef at Ipan, Guam. a) Calm conditions, b) Typhoon Man-Yi (waves 11m high)