

Oceanography Seminar

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“Perspectives on Forecasting the Generation, Propagation, and Impact of Swell Energy for the West Maui Coastline”

Wave-driven runup along the West Maui coastline is producing severe shoreline erosion, damaged infrastructure, and compromised private residences. A better understanding of the phenomena contributing to this runup is needed to enhance both restoration efforts and future resilience of the West Maui coastal region. The complex bathymetric geomorphology in the basin surrounded by Maui, Lāna‘i, Moloka‘i and Kaho‘olawe leads to unique swell shoaling and refraction dynamics. These unique patterns of swell energy have a component that directs significant amplitude into the West Maui coastline for both northern (winter) and southern (summer) swells (the seasonal pattern of swell in Hawai‘i). The conversion of this pattern of swell energy into the components that drive runup is further complicated by the regions distribution of fringing reef and sloping beaches in the nearshore. The runup components setup, swash, and infragravity (IG) exhibit significant spatial variability as revealed in runs of the Boussinesq Ocean and Surf Zone (BOSZ) phase resolving model.

Under a NOAA Coastal Resilience award, we have brought together all the necessary pieces to implement a real time two dimensional runup forecast for the community of West Maui. In place we have NOAA Global WAVEWATCH III feeding a high resolution SWAN model which provides directional wave spectra at the offshore boundaries of two large BOSZ model domains. Sea level comes from a new high resolution forecast for Lahaina in the center of the domain. The operational runup forecast has been built and is in the process of threshold validation before its live release on the PacIOOS website. This presentation explores a broad viewpoint of all the tools and technologies plus scientific discoveries that we have used and encountered while creating the West Maui Runup Forecast.

Thursday November 21st, 2019 3:00p.m. MSB 114