

Development and validation of the Nearshore Wave Prediction System

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The National Weather Service's (NWS) National Centers for Environmental Prediction (NCEP) currently produces coastal wave guidance products at resolutions of down to 4 arc-min. However, the demand for high-resolution nearshore forecast products has been steadily increasing over the past decade. The Nearshore Wave Prediction System (NWPS) is currently being developed to address this need. This system will provide on-demand, high-resolution nearshore wave model guidance to forecasters throughout the United States. It is designed to run locally at NWS's Weather Forecast Offices, and is driven by forecaster-developed wind grids and offshore wave boundary conditions from NCEP's operational WAVEWATCH III[®]. The nested nearshore wave model used is SWAN, and alternatively a new nearshore version of WAVEWATCH III. Current fields are taken from NCEP's Real-Time Ocean Forecast System (RTOFS). Coastal water levels are provided by the Extratropical Surge and Tide Operational Forecast System (ESTOFS), supplemented by probabilistic output from the P-Surge model during tropical cyclone events. NWPS produces various types of output, including fields of integral wave parameters, spectra and individual partitioned and tracked wave systems. The proposed forecast system has been calibrated and subsequently validated for a number of extratropical and tropical storms, including hurricanes Ike (2008) and Isaac (2012). This paper presents a description of the system and its functionality, along with a selection of calibration and validation results.