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Numerical Prediction of Wave Forces on a Breakwater under Tsunami Loading KYLE A. BRUCKER, SAIC, MARY BETH OSHNACK, Oregon State University, THOMAS T. O'SHEA, SAIC, DAN COX, Oregon State University, DOUGLAS G. DOMMERMUTH, SAIC — Numerical Flow Analysis (NFA) predictions of wave propagation and wave- impact loading are compared to the Oregon State University (OSU) O.H. Hinsdale Wave Research Laboratories Tsunami experiments (Oshnack, et al. 2009). The simulations were designed to replicate the experiments such that a soliton is sent down a wave flume, runs up a small beach, and impacts with a breakwater. The soliton is 1.2m high in a water depth of 2.29m and travels over 61m before hitting the breakwater. The NFA predictions are compared to laboratory measurements of a) free-surface elevation at several locations down the flume and b) impact pressure at the base of the breakwater. The free-surface elevations as predicted by NFA are in excellent agreement with the experimental measurements. This shows that NFA can simulate the propagation of waves over long distances with minimal amplitude and dispersion errors. Pressures that are induced by the jet are important because in certain coastal areas buildings must be designed to sustain Tsunami loads. The pressure predictions over the duration of breaking agree very well with laboratory measurements. The peak pressures predicted by NFA are in excellent agreement with experiments.

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