

# Report on the International Workshop on Long-Wave Run-up

By PHILIP L.-F. LIU<sup>1</sup>, COSTAS E. SYNOLAKIS<sup>2†</sup>  
AND HARRY H. YEH<sup>3</sup>

<sup>1</sup>School of Civil and Environmental Engineering, Cornell University, Ithaca, NY 14853, USA

<sup>2</sup>Department of Civil Engineering, University of Southern California,  
Los Angeles, CA 90089, USA

<sup>3</sup>Department of Civil Engineering, University of Washington, Seattle, WA 98195, USA

(Received 19 November 1990)

A workshop reviewing the current research on long-wave run-up was held in the Marine Science Center of the University of Southern California at Catalina Island, California, in August 1990. The workshop covered theoretical, experimental, and field studies of run-up phenomena. The primary application of the research results discussed was in tsunami run-up and flooding and in tsunami run-up hazard mitigation. Certain other applications of long-wave run-up related to wind waves were also discussed. This report summarizes the twenty-six papers presented and it provides one particular view of the current understanding of this run-up process.

---

## 1. Introduction

The run-up motion of water waves on a sloping solid boundary is a challenging problem in hydrodynamics involving non-trivial interactions of all three phases of matter. Flow motions near the run-up front display strong nonlinearity in comparison to the motions away from the front. Waves near the front often break, the flows become turbulent and intrinsically three-dimensional. Effects of the bottom friction can become important near the front as the water depth vanishes along the shoreline. In the laboratory, the surface tension effects also become important in the run-up front dynamics. The fluid dynamics of the run-up processes is complex and many aspects are still not well-understood. Nevertheless, an accurate method for estimating run-up motions is crucial for the prediction of forces on man-made structures exposed to ocean environments and of the coastal effects of tsunamis and storm surges.

A workshop to review the current understanding of long-wave run-up was held in the Marine Science Center of the University of Southern California on Catalina Island from 15-18 August 1990. Although topics discussed were focused on 'long' wave run-up, certain other related water-wave problems were also included. The workshop was designed specifically to foster close interactions among a wide spectrum of experts, including fluid mechanics, tsunami specialists, coastal engineers, oceanographers, and applied mathematicians. Four workshop participants came from Japan, seven from the Soviet Union, one from England, one from Canada, one from Puerto Rico, and twenty-nine from the United States. The secluded location, the diversity of the contributors' backgrounds and the range of their research interests contributed to

† Author to whom correspondence should be addressed.