Historical Development of Using Benchmark Problems for validating tsunami models

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Recent history

National Tsunami Hazard Mitigation Program (NTHMP)
Inundation Modeling Benchmark Validation Workshop
Galveston, TX, March 31 –April 1, 2011

Proceedings and results of the 2011 NTHMP Model Benchmarking Workshop
http://nws.weather.gov/nthmp/publications.html

(Tohoku EQ/tsunami occurred on March 11, 2011; Mw = ~ 9.1)

NTHMP Mapping and Modeling Subcommittee (MMS)
Tsunami Current Model Benchmark Workshop
Portland, Oregon, February 9-10, 2015

Presentations and information from this workshop can be found at
http://Nws.weather.gov/nthmp/2015annualmeeting/mms/index.html
http://coastal.usc.edu/currents_workshop/agenda.html

(Chile Iquique EQ/tsunami on April 1, 2014, Mw ~ 8.2; Chile Illapel EQ/tsunami on September 16, 2015, Mw ~ 8.3)

OLDER HISTORY ….

First International workshop on long-wave run-up Catalina Island, California, in August 15-17 1990.

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

Philip L-F. Liu, Costas E. Synolakis, and Harry H. Yeh

Journal of Fluid Mechanics,
DOI: https://doi.org/10.1017/S0022112091003221

Abstract

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.

Second International Workshop on Long-Wave Runup Models Friday Harbor, San Juan Island, Washington, 12 – 17 September 1995

Long-Wave Runup Models

Edited by Harry Yeh, Philip Liu, and Costas Synolakis

Published by World Scientific

(Flores Island EQ/tsunami, December 11 1992, Mw ~7.8; Hokkaido EQ/tsunami, July 12 1993, Mw ~7.7)

Benchmark problems for (double blind) model testing:

Four benchmark problems were selected before the workshop so that numerical models can be compared, both qualitatively and quantitatively, evaluated and discussed among the participants during the workshop. All of the benchmark-problem descriptions and necessary data were provided to the participants nine months prior to the workshop. Based on the benchmark problems, each participant was asked to submit his/her written discussion 50 days prior to the workshop, and the written discussions were distributed to each participant 30 days prior to the workshop. The actual laboratory or physical measurements were only presented during the workshop in the same format, allowing the comparisons of predictions with measurements. The four-benchmark problems were the following:

1) **The prediction of an edge-wave packet propagation along a uniformly slope,**

2) **The interaction and runup of incident solitary waves with a conical island ,**

3) **The runup of solitary waves on a vertical wall, and**

4) **The tsunami runup around Okushiri Island, Japan**

Third International Workshop on Long-Wave Runup Models
Catalina Island, California, June 17-18 2004

Advanced Numerical Models for Simulating Tsunami Waves and Runup
Edited by: Philip L-F Liu, Harry Yeh, Costas Synolakis
Published by World Scientific

(Indian Ocean EQ/tsunami, December 26 2004, Mw ~9.1 -9.3)

The primary objectives of the workshop are to discuss several critical issues concerning the accuracy of long-wave runup models.

1. **Calculations of the moving shoreline.**
2. **Modeling of bathymetry and topography.**
3. **Landslide generated tsunami.**
4. **Tsunami forces on a nearshore structure.**

Benchmark Problems

#1 - Tsunami runup onto a plane beach
#2 - Tsunami runup onto a complex 3-dimensional beach
#3 - Tsunami generation and runup due to a 2-D landslide
#4 - Tsunami generation and runup due to a 3-D landslide

Other related workshops …..

The Workshop on Seafloor Deformation Models, Santa Monica, CA, May 16-17, 1997. (Sponsored by National Science Foundation) (Co-organized with C. Synolakis)

The Workshop on Tsunami Research Facilities, Baltimore, MD, May 8-9, 1998. (NSF)

The Okushiri Tsunami/UNJR Workshop, July 9-14, 1998. (NSF)

The Workshop on Modeling Validation and Benchmarking for Tsunami Generation by Submarine Mass Failure, Honolulu, Hawaii, May 30-31, 2003 (Sponsored by National Science Foundation) (Co-organized with S. Grilli)

The Long Wave Symposium, Thessaloniki, Greece, August 25-27, 2003 (IAHR/ASCE) (Co-organized with M. Briggs)

Caribbean Tsunami Hazard Workshop, March 30 – 31, 2004 (NSF) (Co-organized with Aurellio Mercelo)

Workshop on Future Tsunami Science/Engineering Research, October 19 -20, 2009. Renaissance Computing Institute, Chapel Hill, NC. (Sponsored by the Department of Homeland Securities)

Long Wave and Run-up Workshop**,** Santander, Spain June 29-30, 2012 (ASCE/ICCE)