COPYRIGHT

NUMERICAL MODELING OF WATER WAVES DVD

MADER CONSULTING CO.
1049 Kamehame Drive
Honolulu, Hawaii 96825
WWW.MCCOHI.COM

This DVD is an extensive update of the CD-ROM that comes with *Numerical Modeling of Water Waves - Second Edition* published in 2004 by CRC Press.

The update became necessary after the VISTA operating system was released in 2007 which does not support DOS full screen programs such as those on the CD-ROM that came with the 2004 book.

Water wave modeling programs described in the book have been developed for the IMAC computer and the OS X operating system and are included on the DVD.

The 2004 book and CD-ROM was published before the December 26, 2004 Indian Ocean tsunami which has resulted in major changes the understanding of tsunami waves and their hazards. The Indian Ocean tsunami and the resulting changes in evaluation of tsunami hazards are described on the DVD.

PowerPoint programs have been developed for each chapter of the book which include the associated computer animations that are used in Mader Consulting Co. short courses. They are included on the DVD for those using the book as a classroom textbook.

Consulting and numerical modeling is available from Mader Consulting Co. The web site is WWW.MCCOHI.COM.

NUMERICAL MODELING OF WATER WAVES

DVD CONTENTS

TSUMANI ANIMATIONS

TSUNAMIV.MVE Directory

A collection of tsunami animations performed using the SWAN code described in the *Numerical Modeling of Water Waves - Second Edition,* by Dr. Charles L. Mader. A few calculations were performed using the full Navier-Stokes ZUNI or SOLA codes.

The animations are AVI files generated using Cinepak Codec by Radius that may be viewed using QuickTime or Windows Media Player. The AVI files may be viewed in Windows, Vista, or the IMAC OS X operating systems.

1960.MVE - May 23, 1960 tsunami generation in Chile, propagation across the Pacific Ocean, and indundation of Hilo, Hawaii. Described in "Modeling Hilo, Hawaii Tsunami Inundation," Science of Tsunami Hazards, Vol. 9, pp. 85-94 (1991), and Scientific Computing and Automation, June issue, pp. 19-23 (1993).

1964.MVE - Tsunami of April 1, 1964 generation in Gulf of Alaska, propagation across the Pacific Ocean, and inundation of Crescent City, California. See "Tsunami Inundation Model Study of Eureka and Crescent City, California," NOAA Tech. Memo. ERL PMEL-105 (1994).

60THEAT.MVE - The interaction of the tsunami of May 23, 1960 with the Hilo, Hawaii theater. Described in PACON 1993.

90HILO.MVE - 1990 Hilo topography and buildings inundated by a 1960 tsunami wave. See also HOTEL.MVE.

2ATAST.MVE - The inundation of the U.S. East Coast by a 100 meter, 2000 second tsunami wave that could be generated by an asteroid.

10NYAST.MVE - The inundation of the U.S. East Coast by a wave from the incompressible collapse of a 10 kilometer radius cavity, 3000 meter deep and a 100 kilometer radius cavity in the Atlantic Ocean off New York city.

AIMPACT.MVE - An impact cavity collapse and tsunami generation study using shallow water and full Navier-Stokes models. Described in "Modeling Asteroid Impact and Tsunami," Science of Tsunami Hazards, Vol. 16, pp. 21-30 (1998).

ATLAST.MVE - A tsunami in the Atlantic Ocean generated by the incompressible collapse of a cavity 150 kilometer wide and 3500 meter deep.

AUSAST.MVE - Interaction of a tsunami with Australia from a Hawaii landslide generated tsunami and from a cavity collapse generated tsunami. Described in "Modeling of Tsunami Propagation Directed at Wave Erosion on Southeastern Australia Coast 105,000 Years Ago," Science of Tsunami Hazards, Vol. 13, pp. 45-52 (1995).

BBAY.MVE - A study of the vulnerability of Berau Bay, Indonesia to tsunamis.

CASCAD.MVE - Inundation of U.S. west coast by a tsunami from the Cascadia fault.

ECAST.MVE - The inundation of the U.S. East Coast by a tsunami generated by the incompressible collapse of a 150 kilometer wide, 3000 meter deep cavity. See also NYAST.MVE

ELTAST.MVE - Described in "Modeling the Eltanin Asteroid Tsunami," Science of Tsunami Hazards, Vol. 16, pp. 17-20 (1998).

EURAST.MVE - The inundation of Europe by a 100 meter high and 2000 sec period tsunami.

EUREKA.MVE - The Eureka, California tsunami of April 25, 1992. See "Tsunami Inundation Model Study of Eureka and Crescent City, California," NOAA Tech. Memo. ERL PMEL-105 (1994).

GUS.MVE - The Furumoto sources for the Hawaiian tsunamis of 1946, 1957, 1964 and 1965. Part of a source modeling project for Dr. A. Furumoto, Hawaii Civil Defense Tsunami Advisor.

HIAST.MVE - The inundation of the Hawaiian Islands by a 100 meter high, 2000 second period tsunami wave. Described in "Asteroid Tsunami Inundation of Hawaii," Science of Tsunami Hazards, Vol. 14, pp. 85-88 (1996).

HILAND.MVE - The tsunami generated by a landslide off the Kona coast of the island of Hawaii about 105 Ka years ago. Described in "Modeling the 105 Ka Landslide Lanai Tsunami," Science of Tsunami Hazards, Vol. 12, pp. 33-38 (1994).

HKAI.MVE - Inundation of Hawaii Kai, Hawaii by a typical off shore 3 meter high, 1500 second tsunami wave.

HOTEL.MVE - The interaction of a May 23, 1960 tsunami wave with current Hilo, Hawaii tourist hotels. See also 90HILO.MVE.

HUMBOL.MVE - Tsunami inundation of Humboldt Bay, California by an offshore maximum expectable 10 meter high, 2000 second tsunami wave. See "Tsunami Inundation Model Study of Eureka and Crescent City, California," NOAA Tech. Memo. ERL PMEL-105 (1994).

ICEAST.MVE - The inundation of Iceland by a 100 meter high and 2000 sec period tsunami.

INDIA.MVE - Tsunami in the Indian Ocean generated by the incompressible collapse of a cavity 38 kilometer wide and 4000 meter deep.

INDONES.MVE - Indonesia tsunami of December 12, 1992.

JAPAST.MVE - The inundation of Tokyo, Japan by a tsunami generated by a incompressible cavity collapse. Described in "Asteroid Tsunami Inundation of Japan," Science of Tsunami Hazards, Vol. 16, pp.11-16 (1998).

KAIAKA.MVE - Tsunami inundation of Kaiaka Bay, Oahu, HI by the 1952 tsunami.

KBAY.MVE - Tsunami inundation of Kaneohe Bay, Hawaii by a typical offshore 3 meter high, 2000 second tsunami and by a maximum expectable offshore 10 meter high, 2000 second tsunami wave.

KONA.MVE - Tsunami inundation of Kona, Hawaii by a typical offshore 3 meter high, 2000 second tsunami wave.

KURIL.MVE - The tsunami of October 1994 generated off the Kuril islands of Japan.

LAAST.MVE - Inundation of Los Angeles, California by a 100 meter high, 2000 second period tsunami wave.

LAPALMA.MVE - Modeling the proposed La Palma landslide tsunami. Published in "Modeling the La Palma Landslide Tsunami," Science of Tsunami Hazards, Vol. 19, pp. 160-180 (2001).

LAUP.MVE - The April 1, 1946 tsunami inundation of Laupahoehoe, Hawaii.

TSUNAMI ANIMATIONS

LITUYA.MVE - The July 8, 1958 mega-tsunami at Lituya Bay, Alaska with inundations up to 520 meters. Described in “Modeling the 1958 Lituya Bay Mega-Tsunami,” Science of Tsunami Hazards, Vol. 17, pp. 57-67 (1999). The Lituya Bay impact landslide generation of the tsunami is described in Chapter 6 and in Science of Tsunami Hazards, Vol. 20, pp. 241-250 (2002).

LISBON.MVE - Modeling the 1755 Lisbon tsunami generation and propagation across the Atlantic Ocean to the Caribbean. Science of Tsunami Hazards, Vol. 19, pp. 93-98 (2001).

LOIHI.MVE - A study using the ZUNI full Navier-Stokes code of the tsunami wave generation and propagation from the collapse of the Loihi, Hawaii summit in August, 1996.

M9CALIF.MVE - An M9 earthquake generated tsunami interacting with Oregon and California coast.

NIC.MVE - The tsunami generated off the coast of Nicaragua in 1992. Described in “Modeling the 1992 Nicaragua Tsunami,” Science of Tsunami Hazards, Vol. 11, pp. 107-110 (1993).

NYAST.MVE - The inundation of the U.S. Coast by the incompressible collapse of a 100 kilometer radius 3000 meter deep cavity. Another tsunami wave had a height of 100 meters and a 2000 second period. See also 10NYAST.MVE.

ORAST.MVE - A 100 meter high, 2000 sec period tsunami interacting with the Oregon coast.

OREGM9.MVE - An M9 earthquake generated tsunami interacting with the Oregon coast.

PACAST.MVE - Tsunami in the middle of the Pacific formed from the incompressible collapse of a cavity 150 kilometer wide and 4500 meter deep.

PROP.MVE - Described in the publication “Numerical Tsunami Propagation Study,” Science of Tsunami Hazards, Vol. 11, pp. 93-106 (1993) and in Chapter 5 of *Numerical Modeling of Water Waves - Second Edition*.

SANDY.MVE - Tsunami inundation of Sandy Beach region of Oahu, Hawaii by a typical offshore 3 meter high, 2000 second tsunami and by a maximum expectable offshore 10 meter high, 2000 second tsunami wave.

SANFAST.MVE - Inundation of San Francisco, California by a 100 meter high, 2000 second tsunami wave.

SKAGWAY.MVE - The landslide generated tsunami of November 3, 1994 at Skagway, Alaska. The Skagway modeling is described in “Modeling the 1994 Skagway Tsunami,” Science of Tsunami Hazards, Vol. 15, pp. 41-48 (1997). See also SOLA.MVE.

SMSFAST.MVE - Inundation of San Francisco by a tsunami wave generated by the incompressible collapse of a 20 kilometer wide, 3000 meter deep cavity.

SOLA.MVE - Three-dimensional, full Navier-Stokes modeling using the MCC SOLA code of the November 3, 1994 Skagway, Alaska tsunami. See also SKAGWAY.MVE.

SOURCE.MVE - Described in “Numerical Tsunami Source Study,” Science of Tsunami Hazards, Vol. 11, pp.81-92 (1993) and in Chapter 5 of *Numerical Modeling of Water Waves - Second Edition*.

VSLIDE.MVE - A landslide generated tsunami from Chain of Craters road region of the island of Hawaii.

WAIANAE.MVE - The inundation of the leeward side of Oahu, Hawaii by a maximum expectable offshore 10 meter high, 2000 second tsunami wave.

WAIPIO.MVE - The interaction of the May 23, 1960 tsunami with the Waipio, Hawaii region. The 50 foot inundation is the largest recorded in Hawaii.

WALKER.MVE - An evaluation of the vulnerability of Hawaii to tsunamis generated south of Honolulu, either along the Kona Coast or in the Tonga trench. Modeling requested by Dr. D. Walker, Oahu Civil Defence Tsunami Advisor.

WINDWARD.MVE - Tsunami inundation of the Windward side of Oahu, Hawaii by a typical offshore 3 meter high, 2000 second tsunami and by a maximum expectable offshore 10 meter high, 2000 second tsunami wave.

NOBEL POWERPOINT PRESENTATIONS

NOBEL Directory

A collection of PowerPoint presentations describing water wave studies performed using the compressible hydrodynamic code *NOBEL*. The studies are described in Chapter 6 of *Numerical Modeling of Water Waves - Second Edition*.

For Windows operating systems the PowerPoint presentations may be viewed using PPVIEW in /NOBEL/PPRESENT/ or for Windows and VISTA operating systems using PPTVIEW in /CLASSPPT/PPTVIEW.

LITUYA - The July 8, 1958 Lituya Bay, Alaska impact landslide tsunami generation. A mega-tsunami was generated that reached an altitude of 520 meters. Laboratory experiments and numerical modeling results are presented. Described in "Modeling the 1958 Lituya Bay Mega-Tsunami, II," Science of Tsunami Hazards, Vol. 20, pp. 241-250 (2002).

CAVITY - The generation of cavities in water by projectile impacts and by explosives is described both experimentally and using compressible hydrodynamic models. Described in "Dynamics of Water Cavity Generation," Science of Tsunami Hazards, Vol. 21, pp. 91-118 (2003).

ASTWAVE - The generation of tsunamis by the impact of a 0.25 to 1 kilometer diameter asteroid at 20 kilometer/sec with 5 kilometer of ocean and 5 kilometer of basalt is modeled using compressible hydrodynamics in two and three dimensions. Described in "Two- and Three-Dimensional Simulations of Asteroid Ocean Impacts, " Science of Tsunami Hazards, Vol. 21, pp. 119-134 (2003).

KTIMPACT - The KT Chicxulub asteroid impact event is modeled using the three-dimensional compressible Navier Stokes model. Described in "Two- and Three-Dimensional Asteroid Impact Simulations," Computers in Science and Engineering (2004).

KRAKATOA - The August 27, 1883 hydrovolcanic explosion of Krakatoa is modeled using the full Navier-Stokes code NOBEL making use of the high pressure physics of explosions included in the code. Described in "Numerical Model for the Krakatoa Hydrovolcanic Explosiion and Tsunami," Science of Tsunami Hazards, Vol. 24, pp. 174-182 (2006).

DVD CODE DIRECTORIES

The PLPLOT subdirectory contains versions of the codes using ABSOFT FORTRAN with PLPLOT graphics for Windows 95, 98, ME, XP and VISTA.

The IMAC directory contains versions of the codes using ABSOFT FORTRAN with PLPLOT graphics for Apple IMAC System OS X.

WAVE - The *WAVE* code described in Chapter 1 solves the equations for Airy, third-order Stokes and Laitone solitary gravity waves. The directory contains the FORTRAN source code, the executable code for DOS or Windows and WAVE.PDF which describes the code.

SWAN - The shallow-water *SWAN* code described in Chapter 2 solves the long wave, shallow water, nonlinear equations of fluid flow. The directory contains the FORTRAN source and executable codes which generate a graphics file that may be processed using the programs included. It also includes a description of the input to the code in the file SWAN.PDF. Examples and topographic files are furnished.

ZUNI - The incompressible Navier-Stokes *ZUNI* code described in Chapter 3 solves the incompressible, viscous fluid flows with a free surface using the Navier-Stokes equations. A detailed description of the computer program and its input file is included in the file ZUNI.PDF. The FORTRAN source and the executable codes are included.

SOLA - The incompressible three-dimensional Navier-Stokes *ZUNI* code described in Chapter 4 solves the incompressible viscous fluid flows with a free surface using the Navier-Stokes equations. The FORTRAN source and the executable codes are included. The Skagway 1994 tsunami is used as an example.

LGW - The Carrier linear gravity wave *LGW* code described in Chapter 5 uses analytical methods for solving the linear gravity model. The FORTRAN source and executable codes are included. Examples of Gaussian tsunamis described in Chapter 5 are furnished.

TIDE - A classic computer program for calculating tides with the FORTRAN source and executable codes furnished.

SHORT COURSE POWERPOINTS

- **CLASSPPT\CHAPT1** - Chapter 1 - Water Wave Theory
- **CLASSPPT\CHAPT2** - Chapter 2 - The Shallow Water Model
- **CLASSPPT\CHAPT34** - Chapters 3 and 4 - Incompressible Navier-Stokes
- **CLASSPPT\CHAPT5** - Chapter 5 - Evaluation of Incompressible Models
- **CLASSPPT\CHAPT6** - Chapter 6 - Compressible Model and NOBEL Code
- **CLASSPPT\12-26-2004** - The 12-26-2004 Indian Ocean Tsunami
- **CLASSPPT\LAPALMA** - The LaPalma Landslide Cold Fusion Tsunami
- **CLASSPPT\LISBON** - The 1755 Lisbon Tsunami
- **CLASSPPT\SAWG** - Hawaii Tsunami Scientific Working Group Studies

  CLASSPPT\SAWG\HAWAIIKAI - The Hawaii Kai, HI Tsunami Hazard

  CLASSPPT\SAWG\M9MODELS - Tsunamis from M9+ Earthquakes in the Tonga, Marainas and Japan Trenches

  CLASSPPT\SAWG\MEADOWS - Hawaii Tsunami Hazard from Indian Ocean Type Tsunami

CNMWW.PDF is a searchable PDF file of the book *Numerical Modeling of Water Waves - Second Edition* with many figures in color.

SCIENCE OF TSUNAMI HAZARDS

STH.PDF Directory

All the *Science of Tsunami Hazards* journals thru 2006 in PDF format may be searched using Adobe Acrobat 4.0 or higher. Issues of the journal are archived at
http://epubs.lanl.gov/tsunami .

Dir = TS251.PDF, TS252.PDF, TS253.PDF
* Volume 25 (No. 1), (No. 2), (No. 3) 2006
Dir = TS241.PDF, TS242.PDF, TS243.PDF, TS244.PDF, TS245.PDF
* Volume 24 (No. 1), (No. 2), (No. 3), (No. 4), (No. 5) 2006
Dir = TS231.PDF, TS232.PDF, TS233.PDF
* Volume 23 (No. 1), (No. 2), (No. 3) 2005
Dir = TS221.PDF, TS222.PDF, TS223.PDF
* Volume 22 (No. 1), (No. 2), (No. 3) 2004
Dir = TS211.PDF, TS212.PDF, TS213.PDF, TS214.PDF
* Volume 21 (No. 1), (No. 2), (No. 3), (No. 4) 2003
Dir = TS201.PDF, TS202.PDF, TS203,PDF, TS204.PDF, TS205.PDF
* Volume 20 (No. 1), (No. 2), (No. 3), (No. 4), (No. 5), 2002
DIR = TS191.PDF, TS192.PDF, TS193.PDF
* Volume 19 (No. 1) (No. 2) (No. 3) , 2001
DIR = TS181.PDF, TS182.PDF
* Volume 18 (No. 1) (No. 2) , 2000
DIR = TS171.PDF, TS172.PDF, TS173.PDF
* Volume 17 (No. 1) (No. 2) (No. 3), 1999
DIR = TS161.PDF
* Volume 16 (No. 1), 1998
DIR = TS151.PDF, TS152.PDF
* Volume 15 (No. 1) (No. 2), 1997
DIR = TS143.PDF, TS142.PDF, TS141.PDF
* Volume 14 (No. 3) (No. 2) (No. 1), 1996
DIR = TS131.PDF
* Volume 13 (No. 1), 1995
DIR = TS122.PDF, TS121.PDF
* Volume 12 (No. 2) (No. 1), 1994
DIRECTORY = TS112.PDF, TS111.PDF
* Volume 11 (No. 2) (No. 1), 1993
DIRECTORY = TS101.PDF
* Volume 10 (No. 1), 1992
DIRECTORY = TS092.PDF, TS091.PDF
* Volume 9 (No. 2) (No. 1), 1991
DIRECTORY = TS082.PDF, TS081.PDF
* Volume 8 (No. 2) (No. 1), 1990