CONTENTS

VOLUME ONE

Keynote 1

Coasts – The Riskiest Places on Earth
Wolfgang Kron 3

Waves 23

Random Wave Breaking Models — History and Discussion
Jurjen A.Battjes and Tim T. Janssen 25

Highly Accurate Free Surface Capturing Technique for Wave Breaking
Hidemi Mutsuda Yasuaki Doi 38

Laser Induced Fluorescence Measurements of Carbon Dioxide Dissolution in Wave-Breaking Turbulence
Yasunori Watanabe, Junichi Otsuka and Ayumi Saruwatari 51

Surf Zone Wave Breaking Identification Using Marine Radar
Patricio Catalán, Merrick Haller, Rob Holman and William Plant 60

Transition from Splashing Jets to Fragmented Fingers and Sprays
Ayumi Saruwatari and Yasunori Watanabe 73

Air Bubble Characteristics of Surf Zone Breaking Waves
Hiroaki Kashima, Nobuhito Mori, Shohachi Kakuno and Satoshi Nakagawa 81

On the Influence of Wave Groups on Shoaling and Breaking Waves
Tom D. Shand, William L. Peirson and Ronald J. Cox 94

Numerical Tracking of Driftwood and Floating Trash Accumulated in Sakata Port
Yoshiyuki Uno, Hidenori Shibaki and Yasuhiro Sega 107

Comparison of Wave Fields in a Numerical Model and a Small Scale Physical Model
Dimitris Stagonas, Gerald Müller and Theophanis Karambas 119

Corrected SPH for Incompressible Fluid for Accurate Water-Surface Tracking in Plunging Breaker
Abbas Khayyer, Hitoshi Gotoh and Songdong Shao 132

A 2 Phase Numerical Model for Incompressible Fluids: Air Influence in Wave Propagation and Applications
Maria Gabriella Gaeta, Alberto Lamberti and Philip L.-F. Liu 144

A Modeling of Surf Zone Bubbles Using a Multiphase VOF Model
Fengyan Shi, James T. Kirby, Merrick Haller and Patricio Catalán 157

Turbulent Steady Streaming under Sea Waves
E. Quevedo, P. Blondeaux, M. Losada and G. Vittori 170

Toward A Fast Convolution-Type Wave Model in Non-Rectangular Domains
Hemming A. Schäffer 181

Improved Velocity Potential Formulations of Highly Accurate Boussinesq-Type Models
Harry B. Bingham, Allan P. Engsig-Karup, David R. Fuhrman and Per A. Madsen 191

SPH Modelling of Floating Bodies in the Surf Zone
Benedict D. Rogers, Robert A. Dalrymple and Peter K. Stansby 204

Comprehensive Numerical Calculation Method of Generation and Transportation of Sea Salt Spray
Fuminori Yamada and Tokuzou Hosoyamada 216

A 2DH Post-Boussinesq Model for Weakly Nonlinear Fully Dispersive Water Waves
Th. V. Karambas and C. D. Memos 229

Nonlinear Wave Transformation and Runup over Fringing Coral Reefs
Okey Nwogu and Zeki Demirbilek 242

An Artificial Surfing Reef in São Pedro do Estoril Beach, Portugal. Numerical and Physical Modeling Studies
Conceição Fortes, Maria da Graça Neves, Ana Mendonça, Liliana Pinheiro, Luís Leite, Loureníço Mendes, Pedro Monteiro, Artur Palha, Pedro Bicudo and Nuno Cardoso 255

Numerical Modelling of Wave Propagation and Wave Breaking
Eric Didier, Maria Graça Neves, Luis Gil and Conceição Fortes 268

Modelling Low-Frequency Waves Transformation Using COBRAS-UC
A. Torres-Freyermuth, J. L. Lara, I. J. Losada and T.-J. Hsu 281

Spatial Evolution of the Frequency Distribution of Dissipation and Implications on Frequency Domain Modeling
James M. Kaihatu, Jayaram Veeramony and Kacey L. Edwards 293

Coupling of a Phase-Averaging Model and a Phase-Resolving Model by Using Double Connection Boundaries
Kazuya Oki and Tetsuo Sakai 302

Water Waves Propagating over Mud
Robert A. Dalrymple, Younes Nouri and Zeynab Sabouri-Shargh 314

Laboratory Measurements of Wave Attenuation and Wave Setup by Vegetation
Lauren Augustin, Jennifer Irish, Gregery Balsmeier and James Kaihatu 324

Wave Dissipation on a Vegetated Salt Marsh
Tomohiro Suzuki, Jasper Dijkstra and Marcel J. F. Stive 331

An Evolution Equation of Mild-Slope Equation for Water Waves Propagating over Porous Media with Large Angle Incidence
Tai-Wen Hsu, Jen-Yi Chang and Ta-Yuan Lin 344

Nonlinear Mechanisms of Formation of Wave Irregularity on Deep and Shallow Water
Yana Saprykina and Sergey Kuznetsov 357

Freak Waves in a Focal Zone
T. T. Janssen and T. H. C. Herbers 370

Assessing the Effect of Finite Water Depth on the Occurrence of Extreme Waves Using a Direct Numerical Simulation Method
A. Toffoli, M. Benoit, M. Onorato and E. M. Bitner-Gregersen 382

Directional Effects on Freak Wave Prediction
Nobuhito Mori, Miguel Onorato and Peter A. E. M. Janssen 392

Measurement Programme Dutch Wadden Sea
Annette Zijderveld and Herman Peters 404

Wave Modelling in a Tidal Inlet: Performance of SWAN in the Wadden Sea
Jacco Groeneweg, André van der Westhuysen, Gerbrant van Vledder, Sjaak Jacobse, Joost Lansen and Ap van Dongeren 411

Numerical and Physical Aspects of Wave Modelling in a Tidal Inlet
Gerbrant van Vledder, Jacco Groeneweg and André van der Westhuysen 424

Wave Physics in a Tidal Inlet
Leo H. Holthuijsen, Marcel Zijlema and Paul J. van der Ham 437

Speeding Up Stationary SWAN Computations by Dynamic Grid Point Deactivation
André van der Westhuysen and Gerbrant van Vledder 449

Uncertainty Analysis of Hydraulic Boundary Conditions for the Wadden Sea
Joost Beckers, Hanneke van der Klis and Pieter van Geer 462

Parallel, Unstructured Mesh Implementation for SWAN
Marcel Zijlema 470

Attempt for Accuracy Improvement of Wave Hindcasting/Forecasting in Coastal Sea and Inner Sea by Data Assimilation
Noriaki Hashimoto, Kuniaki Matsuura and Hiroyasu Kawai 483

Modeling Waves in Fetch-Limited and Slanting Fetch Conditions Using a Quasi-Exact Method for Nonlinear Four-Wave Interactions
Elodie Gagnaire-Renou, Michel Benoit and Philippe Forget 496

SWIVT, an Instrument for Validation and Testing of SWAN
Ivo Wenneker, Pieter Dekker, Annette Kieftenburg, André van der Westhuysen and Lou Verhage 509

Comparison of Wave-Current Interaction Formulation Using the POLCOMS-WAM Wave-Current Model
Rodolfo Bolaños, Judith Wolf, Jennifer Brown, Pedro Osuna, Jaak Monbaliu and Agustin Sanchez-Arcilla 521

Wave Physics in Large-Scale Ocean Currents
A. J. Lansen, L. H. Holthuijsen, G. Ph. van Vledder and D. W. Dusseljee 534

Past and Future Changes in the North Sea Extreme Waves
Sofia Caires, Jacco Groeneweg and Andreas Sterl 547

Short-Term Statistics of 10,000,000 Waves Observed by Buoys
Mercè Casas Prat, Leo H. Holthuijsen and P. H. A. J. M. van Gelder 560

Extreme Conditions Induced by Hurricane Wilma in Intermediate Water Depth in Puerto Morelos, Quintana Roo, Mexico
I. Mariño Tapia, R. Silva Casarín, C. Enriquez Ortiz, E. Mendoza Baldwin, E. Escalante-Mancera and F. Ruiz Rentería 573

Decadal Changes in Very Large Wave Occurrence on the US Pacific Coast
Richard J. Seymour 584

Analysis of a Medium Term Wave Climate in a Tidal Basin
Ralf Kaiser, Agnieszka Herman and Hanz D. Niemeyer 595

Nearshore Wave Climate of the English Channel -- Evidence for Bi-Modal Seas
Travis Mason, Andrew Bradbury, Timothy Poate and Robin Newman 605

Wave Propagation on a Sand Bar and in the Sea Area Behind
Stefan Drägerdt, Dirk Carstensen and Hans-B. Horlacher 617

Evaluating the Effects of Dredge Pit Design Parameters on Erosion and Accretion of Adjacent Beaches
L. Benedet and J. H. List 629

Deepening of the Lower and Outer Elbe Estuary
J. Osterwald, J. Oellerich and D. Wittmüß 638

Experiences with Ultrasonic Wave Gauges Applied in the Hamburg Harbour Area and Comparison of Wave Data with Numerical Models
Thomas Strotmann, Nino Ohle and Michael Berendt 649

Wave Celerity from Video Imaging: A New Method
Rafael Almar, Philippe Bonneton, Nadia Senechal and Dano Roelvink 661

Prototype Wave Measurements on the Beach of Ostend
Hadewych Verhaeghe, Julien De Rouck, Lies Missinne, Stefaan Gysens and Peter De Wolf 674

Application of Radar Gauges to Measure the Water Level and the State of the Sea
Jens Wilhelmi and Ulrich Barjenbruch 687

Propagation of Ship Waves on a Sloping Bottom
Maria Francisca do Nascimento, Claudio Freitas Neves and Geraldo de Freitas Maciel 696

Simulating Moored and Passing Ship Interaction for Harbour and Navigation Channel Design
John Spencer, Mark McBride and David Shennan 709

Moored Ship Motions due to Passing Vessels in a Narrow Inland Waterway
Andrew Cornett, Paul Tschirky, Paul Knox and Sarah Rollings 722

Estimation of Wave Exciting Forces on Moored Ships in Harbors through Wave Field Calculations with Boussinesq Model
Akinori Yoshida, Yasuhiro Nishii, Masaru Yamashiro and Kazuyuki Ota 735

Practical Analysis Methodology for Ship-Induced Waves in Estuaries
T. Baur, K. Peters and U. Teschke 748

Surfing Waves Generated by a Hull
M. A. de Schipper, S. de Vries, M. Henriquez, A. J. H. M. Reniers, H. J. de Koning Gans, R. J. Labeur and M. J. F. Stive 761

Ship-Induced Tide Gate Load on the Lower River Weser and Lower River Elbe
Klemens Uliczka, Karsten Peters and Thomas Fittschen 774

Swash, Nearshore Currents, and Long Waves 787

Analytic Solution for the Forced Mean Cross-Shore Flow in the Surf Zone
Thomas C. Lippmann 789

Effects of Beach Roughness and Permeability on Swash Hydrodynamics
Gustaaf Kikkert, Tom O'Donoghue, Dubravka Pokrajac and Kate Steenhauer .. 798

Tracking the Wetting/Drying Front in Coastal Flows
Rodney J. Sobey 810

Describing Vortical Nearshore Flows by means of a Dissipative Point Vortex model
E. Terrile and M. Brocchini 823

Water Exchange across the Beach Face for Swash on Coarse-Grained Beaches
Kate Steenhauer, Dubravka Pokrajac, Tom O'Donoghue and Gustaaf Kikkert .. 832

Experiments on Bottom Roughness Experienced by Currents Perpendicular to Waves
O. S. Madsen, K. A. S. R. Kularatne and H. F. Cheong 845

Measuring Storm Run-Up on Intermediate Beaches Using Video
K. R. Bryan, S. A. Salmon and Giovanni Coco 854

Rotation and Oscillation of an Embayed Beach
Mitchell D. Harley, Ian L. Turner, Andrew D. Short and Roshanka Ranasinghe 865

Long-Term Predictions of Offshore Controlled Rip Currents
Joseph W. Long and H. Tuba Özkan-Haller 876

Rip Currents: Mechanisms and Observations
Varjola Nelko and Robert A. Dalrymple 888

Modeling of a High Energy Rip Current During Biscarosse 2007 Field Experiment
Nicolas Bruneau, Philippe Bonneton, Bruno Castelle, Rodrigo Pedreros, Jean-Paul Parisot and Nadia Sénéchal 901

Field Measurements of Rip Currents in the Vicinity of Coastal Structures
Dale Olsson and Charitha Pattiaratchi 914

Evolution of Nearshore Currents Around Submerged Breakwaters
Roshan Suminda Ranasinghe, Shinji Sato, Yoshimitsu Tajima and Made Jaya Muliawan 927

Modeling Undertow over a Barred Laboratory Beach
Gregory Guannel, H. Tuba Özkan-Haller and Merrick C. Haller 940

The Role of Wave Set-Up During Extreme Storms
A. Niedoroda, H. Das, D. Slinn, R. Dean, R. Weaver, C. Reed and J. Smith 950

Wave Setup in U. S. Flood Insurance Studies
R. G. Dean, T. L. Walton and D. Hatheway 962

VOLUME TWO

Wave Setup at Different River Entrance Morphologies
Hitoshi Tanaka, Xuan-Tinh Nguyen and Hisao Nagabayashi 975

Surge and Wave Modeling for the Louisiana Coastal Protection and Restoration Study (LACPR)
Ty V. Wamsley, Vann Stutts, Joannes Westerink and Bruce A. Ebersole 986

Mississippi Coastal Improvements Program (MSCIP): Statistical Evaluation of Lines of Defense
Mary Cialone, Alison Sleath, Ty Wamsley and Tate McAlpin 999

Numerical Simulation of the Effects of Louisiana Coastal Marshes on Nearshore Waves
Christopher J. Bender, John Atkinson, Mary A. Cialone, Alison Grzegorzewski and Jane McKee Smith 1012

Reducing Storm Impacts through Marsh Restoration: Idealized Evaluation of Wave Condition Sensitivity to Marsh Parameters
Nicholas Loder, Mary Cialone, Jennifer Irish and Alison Sleath 1024

The Influence of Barrier Islands on Hurricane-Generated Storm Surge and Waves in Louisiana and Mississippi
Alison Sleath Grzegorzewski, Mary Cialone, A. Joost Lansen, Mathijs van Ledden, Jane Smith and Ty Wamsley 1037

Predicting the Influence of Climate Change on Hurricane Flooding
Jennifer L. Irish, Ashley Frey, Mir Emad Mousavi, Francisco Olivera, Billy L. Edge, James Kaihatu, Lauren M. Dunkin and Youn Kyung Song 1050

Potential Impacts of Sea Level Rise on Storm Surge and Waves in Southeast Louisiana
Jane McKee Smith, Ty V. Wamsley, Mary A. Cialone and John Atkinson 1060

An Integrated Surge and Wave Modeling System for North Gulf of Mexico: Simulations of Hurricanes Katrina and Ivan
Qin Chen, Lixia Wang and Haihong Zhao 1072

North Carolina Storm Surge Study
John Dorman, Brian O. Blanton, Elena Drei-Horgan, Kenneth Galluppi, Jeffrey W. Gangai, Jeffrey L. Hanson, Rick Luettich and Peter Vickery 1085

Storm Surge Disaster Caused by Ekman Transportation along Pacific Ocean Side of Northern Part of Japan in 2006
Hisamichi Nobuoka and Fuminori Kato 1098

Numerical Simulation of Storm Surge Inundation Induced by Overflow and Overtopping on the Coast of Central Port
Hidenori Shibaki, Katsuyuki Suzuyama and Tatsuo Ezaki 1110

Estimation of Occurrence Probabilities of Extreme Water Levels at the German Baltic Sea Coastline
Jürgen Jensen and Christoph Mudersbach 1123

Dynamic Meteorological Downscaling of Meteorological Fields for the Hydrodynamic Simulation of Extreme Events
Christian Winter, Ming-Da Chiou, Chia Chuen Kao and Beng Chun Lee 1135

A New Simulation Model of Storm Surges in Inland Sea Affected by Inflow from Offshore and Complicated Winds
Tomokazu Murakami, Jun Yoshino and Takashi Yasuda 1147

Analysis of Coastal Flooding Hazard in a Low-Lying Area of the Northern Adriatic Sea, Italy
Luca Martinelli, Barbara Zanuttigh and Alberto Lamberti 1160

Numerical Experiments on Typhoon and Ocean Interaction by Atmosphere-Ocean Coupled Model
Soo Lee and Takao Yamashita 1173

Sea Level Variability in South-West Australia: From Hours to Decades
Charitha Pattiaratchi and Matthew Eliot 1186

Twentieth-Century Changes in Extreme Still Sea Levels in the English Channel
Ivan Haigh, Robert Nicholls and Neil Wells 1199

Uncovering the Basin Resonance at Crescent City Harbor Region
Jiin-Jen Lee, Xiuying Xing and Orville T. Magoon 1210

Comparison of Computed Basin Response at San Pedro Bay with Long Period Wave Records
Xiuying Xing, Jiin-Jen Lee and Fredric Raichlen 1223

Improving Harbor Resonance Induced by Typhoon Waves for Hualien Harbor
Li-Hung Tsai, Xiuying Xing and Jiin-Jen Lee 1236

Numerical Simulation of Landslide-Induced Water Wave Kinematics by LVOF
T. Q. Li, P. Troch and J. De Rouck 1249

A Critical Discussion of the Solitary Wave Paradigm for Tsunamis
Per A. Madsen, David R. Fuhrman and Hemming A. Schäffer 1262

Numerical Study of Dispersion and Nonlinearity Effects on Tsunami Propagation
Alwafi Pujiraharjo and Tokuzo Hosoyamada 1275

Numerical Modelling of Landslide Generated Tsunamis Around a Conical Island
P. De-Girolamo, C. Cecioni, F. Montagna, G. Bellotti and M. Di-Risio 1287

Tsunami Damage in Solomon Islands in April 2007
Takashi Tomita, Taro Arikawa, Daisuke Tatsumi and Kazuhiko Honda 1300

Landslide Generated Impulse Waves — Experimental Results
Valentin Heller 1313

Experimental Investigation into Three-Dimensional Long Wave Breaking
Patrick Lynett, Khairil Irfan Sitanggang, Ernesto J. Rodríguez Fernández, Xiaoming Wang, Hongqiang (John) Zhou, Philip L.-F. Liu, Aurelio Mercado, Michelle Teng and Christa G. von Hillebrandt-Andrade 1326

Full Frequency Dispersive Numerical Modelling of Tsunamis. Large Scale Application to the South Tyrrhenian Sea
C. Cecioni, G. Bellotti, P. De Girolamo and L. Franco 1337

Boundary Layer Flow and Bed Shear Stress under a Solitary Wave
Giovanna Vittori and Paolo Blondeaux 1348

Characteristics of the Observed Pre-Tsunami Seabed Pressure Records Obtained by the Nationwide Wave Gauge Network
Toshihiko Nagai, Atsushi Nozu, Jae Hyeng Lee, Masanobu Kudaka, Shigeaki Adachi and Tatsuo Ohmachi 1360

Tsunami Propagation in the Chesapeake Bay, USA
Mustafa Samad, Sung-Myeon Yi and Yifan Zheng 1371

3D Numerical Simulations of Waves Generated by Subaerial Mass Failures. Application to La Palma Case
Stéphane Abadie, Clément Gandon, Stephan Grilli, Richard Fabre, Joëlle Riss, Emmanuel Tric, Denis Morichon and Stéphane Glockner 1384

Tsunamis Generated by Landslide along the Coast of a Conical Island: New Three-Dimensional Experiments
M. Di-Risio, G. Bellotti, A. Panizzo, M.-G. Molfetta, F. Aristodemo, P. De-Girolamo, L. Pratola and A.-F. Petrillo 1396

Improvement of Real-Time Tsunami Prediction Based on Inversion Method by Using Earthquake Information
Daisuke Tatsumi and Takashi Tomita 1409

Tsunami Inundation with Macro-Roughness in the Constructed Environment
Daniel Cox, Takashi Tomita, Patrick Lynett and Rob Holman 1421

Tsunami Inundation Simulation by Three-Dimensional Model
Kazuhiko Honda and Takashi Tomita 1433

Evaluation of Tsunami Attenuation Performance of Coastal Forests Based on Tree Morphology
Toshiyuki Asano 1446

Experiments and Development of a Model on the Inundated Flow with Floating Bodies
Hideo Matsutomi, Midori Fujii and Takeshi Yamaguchi 1458

Sediment Transport and Morphology 1471

Morphodynamics Shoreline Boundary Conditions: A Preliminary Evaluation at Prototype Scale
Silvia Falchetti, Maurizio Brocchini and Daniel C. Conley 1473

Analysis of Uncoupled Beachface Evolution in the Swash Zone
D. M. Kelly and N. Dodd 1486

A Laboratory Study of Overtopping and Breaching of Shingle Barrier Beaches
Charlotte Obhra, Keith Powell and Andrew Bradbury 1497

Lagrangian Modelling and Direct Bed Shear Stress Measurement in the Swash Zone
Mathew Barnes, Jose M. Alsina and Tom E. Baldock 1509

Unsteady Flow Effects on Bed Shear Stress and Sheet Flow Sediment Transport
Paul A. Guard and Peter Nielsen 1521

Field Investigations of Wave Ripple Dynamics in the Shallow Nearshore of Two Sandy Beaches
Gerd Masselink, Martin Austin, Paul Russell and Tim O'Hare 1533

Morphology of Rippled Beds Induced by Waves for Size Homogeneous or Heterogeneous Sediments
Julie Lebunetel-Levaslot, Armelle Jarno-Druaux and François Marin 1546

New High-Resolution Measurements of Wave Boundary Layer Flow under Full-Scale Surface Waves
Jolanthe J. L. M. Schretlen, Jebbe J. van der Werf, Jan S. Ribberink, Maarten Kleinhans, W. Michel Zuijderwijk and Tom O'Donoghue 1559

Turbulence Modeling of a Wave Boundary Layer on a Rough Bottom
Ahmad Sana, Hitoshi Tanaka and Suntoyo 1572

Effects of Acceleration Skewness on Rough Bed Oscillatory Boundary Layer Flow
Dominic A. van der A, Tom O'Donoghue, Alan G. Davies and Jan S. Ribberink 1583

Bedload Transport due to Asymmetric and Skewed Waves Plus a Current
David Gonzalez-Rodriguez and Ole Secher Madsen 1596

Instantaneous and Integrated Measurements of Sediment Transport Rate in the Swash Zone
Tetsuya Kakinoki and Gozo Tsujimoto 1606

Application of the EEMD Method to Investigate Pore Pressure Build-Ups in a Wave-Fluidized Sandbed
Yung-Lung Chen, Shiaw-Yih Tzang and Shan-Hwei Ou 1614

Granular Properties from Digital Images of Sediment: Implications for Coastal Sediment Transport Modelling
Buscombe, Gerhard Masselink and David M. Rubin 1625

Modeling of Wave-Induced Sediment Transport around Obstacles
Stéphan Grilli, Jeffrey Harris and Nathanael Greene 1638

Suspended Sediment Transport Inside and Outside Surf Zones
Andres Payo, Nobuhisa Kobayashi, Fumihiko Yamada and Juan J. Muñoz-Pérez 1651

Multiple Time Scale Analysis of Suspended Sediment Concentration in the Wadden Sea
Jan-Moritz Müller, Rolf Riethmüller and Reiner Onken 1664

A Two-Scale Approach to Nearshore Sediment Transport Modeling
Bradley D. Johnson and Jane M. Smith 1671

Modeling Storm Impacts on Beaches, Dunes and Barrier Islands
Dano Roelvink, Ad Reniers, Ap van Dongeren, Jaap van Thiel de Vries, Jamie Lescinski and Robert McCall 1684

Beach Profile Evolution and Dune Erosion due to the Impact of Hurricane Isabel
R. Gencarelli, G. R. Tomasicchio, N. Kobayashi and B. D. Johnson 1697

Phase-Resolving Sediment Transport and Morphology Model
Bret M. Webb and Donald N. Slinn 1710

Wave-Current Flow over a Rippled Bed: An Experimental and Numerical Investigation
Carla Faraci, Enrico Foti and Rosaria E. Musumeci 1723

A New Empirical Formula for Coastal Washover Sediment Volume
Xuan-Tinh Nguyen, Chantal Donnelly, Hitoshi Tanaka and Magnus Larson 1736

Berm and Dune Erosion
Mitchell Buck, Nobuhisa Kobayashi, Andres Payo and Brad Johnson 1749

Simple Model of Cross-Shore Sediment Transport Rate for Berm Formation and Erosion
Takayuki Suzuki and Yoshiaki Kuriyama 1762

Development of a Numerical Breach Model of Inhomogeneous Sea-Dikes: Part I. Breach Hydrodynamics
Thieu Quang Tuan and Hocine Oumeraci 1774

Detailed Computational Model for the Breaching of Sea Dikes Initiated by Breaking Wave Impacts
Grzegorz Stanczak, Hocine Oumeraci and Andreas Kortenhaus 1787

Large-Scale Experiments on Dike Breaching and Breach Growth
Peter Geisenhainer and Hocine Oumeraci 1800

Reducing Uncertainty in Prediction of Dune Erosion During Extreme Conditions
C. (Kees) den Heijer, Ad J. H. M. Reniers, Jan van de Graaff and Pieter H. A. J. M. van Gelder 1813

The Role of Cross-Shore Profile Dynamics on Shoreline Instability due to High-Angle Waves
A. Falqués, N. van den Berg and D. Calvete 1826

Model for Predicting Short-Term Variation of Foreshore Slope and Shoreline Applying Concept of Equilibrium Slope
Masaya Fukuhama, Takaaki Uda, Koji Yamada, Masumi Serizawa and Toshinori Ishikawa 1839

Longshore Sand Transport Gradient and Bluff Erosion in the Vicinity of St. Joseph Harbor, Michigan
Mohammad Dibajnia, Rob Nairn and Jim Selegean 1851

Understanding Differences between Delft3D and Empirical Predictions of Alongshore Sediment Transport Gradients
Jeffrey H. List, Lindino Benedet, Daniel M. Hanes and Peter Ruggiero 1864

Study of Sediment Bypass at Coastal Structures by Composite Modelling
Nicholas Grunnet, Sabine Lohier and Rolf Deigaard 1876

Evaluation of Stabilization Effect by Artifical Headlands Built on Kashimanada Coast Using Model for Predicting Changes in Contour Lines and Grain Sizes
Takeo Matsu-ura, Takaaki Uda, Takayuki Kumada and Hideki Nagayama 1888

Short-Term Sand Coarsening Process in a Backshore between Headlands
Keiko Udo, Hironori Tanabe and Akira Mano 1901

Evaluation of Shoreline Response Downdrift of a Nearshore Breakwater Field
Peter Elkan, Paul Tschirky, Nicole VanderBeke, Francisco Nicolau del Roure, James D. White and Lee Rosenberg 1914

VOLUME THREE

Long-Term Beach Response to Groin Shortening, Westhampton Beach, Long Island, New York
Hans Hanson, Lynn Bocamazo, Magnus Larson and Nicholas C. Kraus 1927

Study of Coastal Morphology Resulting from Low Crested Breakwaters
Sam Kularatne, J. William Kamphuis and Mohamed A. Dabees 1940

Chances and Risks of Coastal Defences on the West Coast of the Island of Sylt
Arfst M. Hinrichsen 1952

Study of Structures for Surfability Improvement in Spanish Beaches
José M. de la Peña, Virginia Sánchez and Antonio Lechuga 1964

Storm-Driven Shore Changes of a Beach Protected by a Low Crested Structure
Renata Archetti and Alberto Lamberti 1977

Suspended Sediment Fluxes due to Tides and Waves on Meso-Tidal Flat
Fumihiko Yamada, Nobuhisa Kobayashi, Yoshihiro Sakanishi, Yuichiro Shirakawa and Andres Payo 1990

Modeling of Coupled and Noncoupled Behavior of a Double Sandbar System: Self-Organization and Morphological Forcing
Bruno Castelle, B. G. Ruessink, Philippe Bonneton, Nicolas Bruneau and Vincent Marieu 2003

Field Studies on Wave-Induced Shallow Water Morphological Features
Zbigniew Pruszak, Rafal Ostrowski, Piotr Szmytkiewicz and Jan Schönhofer .. 2015

Stability of the Beach Nourishment of Taparura Project (SFAX-TUNISIA): A Comparison of the Computation Using Sediment Compatibility and Coastal Process Modeling Approaches
Samir Medhioub, Ridha Chaabouni and Riadh Hentati 2028

Monitoring of Sand Waves in the Outer Part of the Coastal Profile as an Offshoot of an Ordinary Bathymetric Survey Programme
S. Bjerre Knudsen, H. Toxvig Madsen and P. Soerensen 2039

Field Investigation and Numerical Simulation of Movement of Sand Body
Takaaki Uda, Masumi Serizawa, Makoto Nishitani and Toshinori Ishikawa 2051

Field Study on the Nearshore Sediment Process around the Tenryu Estuary Using Image Analysis
Haijiang Liu, Yoshimitsu Tajima and Shinji Sato 2064

Sea Level Variability and Coastal Evolution
Miguel A. Losada, Asunción Baquerizo, Juan M. Santiago, Alberto Ávila, Isabel Moreno and Miguel Ortega-Sánchez 2077

Sediment Transport Modeling to Investigate the Links between the Movements of Sandbanks and Local Beach Variability
Clare Coughlan, Chris Vincent and Tony Dolphin 2086

Geospatial Time Series Analysis of Volumetric Change
M. Overton, H. Mitasova and J. J. Recalde 2099

Prediction of Bathymetric and Grain Size Changes Around Port Subject to Active Supply of Sand from Large River
Hideki Nagayama, Takaaki Uda, Takeo Matsu-ura and Takayuki Kumada 2110

Model of Barrier Island Evolution at Decadal Scale
Julie Dean Rosati and Nicholas C. Kraus 2123

Local Sand Deposition due to Asymmetric Characteristics of Tidal Current Velocity Observed Around Imagire-Guchi Inlet
Yoshimitsu Tajima and Shinji Sato 2136

Vertical and Horizontal Morphological Characteristics of Giant Cusps
Yoshiaki Kuriyama and Naoki Tomoda 2149

Spit Island Formation and Development
Sebastian Dan, Marcel J.F. Stive and Dirk Jan R. Walstra 2162

Monitoring and Modelling of Entrance Sedimentation at an Intermittently Open-Closed Lagoon
Bradley D. Morris, Ian L. Turner and Mark A. Davidson 2173

Morphological Stability of Tidal Inlets Using Process-Based Modelling
Tran Thanh Tung, Marcel J.F. Stive, Jan van de Graaff and Dirk-Jan R. Walstra 2182

Morphodynamics due to Storms Surges in a Tidally-Dominated Coastal Environment
Talal Etri and Roberto Mayerle 2195

Simulation of Morphological Changes in an Estuary with a Decreasing Riverine Sediment Supply: Jiuduansha Shoals, Yangtze Estuary, China
Kelin Hu, Pingxing Ding, Shilun Yang and Yazhen Kong 2208

Applicability of Coastal Area Model to Morphodynamics Around River Mouth
Masamitsu Kuroiwa, Takayuki Kuchiishi, Kenichi Kato, Shintaro Sunagawa and Yuhei Matsubara 2218

Long-Term Process-Based Morphological Modeling of Tidal Basins and Estuaries in the Netherlands
Dastgheib, Mick van der Wegen, D. M. P. K. Dissanayake and Dano Roelvink 2231

Observation of Bed Form Dynamics in a Tidal River
Wolf Plöger 2244

Short Term Morphological Changes of Suang-Si Estuary
Kao-Shu Hwang, Chien-Ji Lai, Yin-Jih Wu and Hwung-Hweng Hwung 2255

Morphodynamics at River Mouth; Mu River Mouth, Japan
Kentaro Hayashi, Takehito Horie, Yugo Imazu, Hideo Hiramori, Takashi Kikuchi and Hitoshi Tanaka 2268

Stability of River Mouths: The Case of the Russian River, California
Dane K. Behrens, Fabián A. Bombardelli and John L. Largier 2281

Model for Predicting Formation of Dynamically Stable Ebb Tidal Delta Off Tidal Inlet
Masumi Serizawa, Takaaki Uda, Toshiro San-nami, Kou Furuike and Toshinori Ishikawa 2291

Cumulative Effects of Channel and Ebb Shoal Dredging on Inlet Evolution in Southwest Florida, USA
Mohamed A. Dabees and Nicholas C. Kraus 2303

Hydrodynamics and Sediment Transport Modelling in Estuarine Environment with SLON Model
Oleksandr Nesterov and Eng Soon Chan 2316

Modeling Suspended Sediment Transport in the German Bight — A Case Study for the Mouths of the German Estuaries
Andreas Plüß 2329

Regional Beach Volume Changes at Decadal to Century Time Scales — Central South Carolina USA
Timothy W. Kana and Daniel J. Gaudiano 2340

Beach Erosion and Storm Parameters. Uncertainties for the Spanish Mediterranean
Agustín Sánchez-Arcilla, E. Tonatiuh Mendoza, José A. Jiménez, Carlos Peña, Jordi Galofré and Manuel Novoa 2352

Beach Response Derived from Automated Bathymetry Measurements
Kathelijne M. Wijnberg, Laura Uunk, Robin Morelissen, Anna B. Cohen and Suzanne J. M. H. Hulscher 2363

Beach Wizard: Application of a Nearshore Bathymetric Data-Assimilation Model for Dutch Coastal Management
Anna Cohen, Ap van Dongeren and Nathaniel Plant 2373

Data Assimilation for Morphodynamic Prediction and Predictability
T. R. Scott, P. J. Smith, S. L. Dance, D. C. Mason, M. J. Baines, N. K. Nichols, K. J. Horsburgh, P. K. Sweby and A. S. Lawless 2386

Morphological Changes of Shoreline and Offshore Bars along Tottori Coast
Akira Kimura and Kenichi Ohno 2399

Modeling Shoreline Changes for a Bay Beach Nourishment Project with Fill Input from a Corner
F.-C. Lee, John R.-C. Hsu, C.-S. Chang, N.-J. Wu and M.-J. Yu 2412

Long-Term Simulations of Subaerial Beach Erosion and Overwash during Storms
Magnus Larson and Nicholas C. Kraus 2424

Morphodynamic Modelling of Up-State and Down-State Transitions at Palm Beach, NSW, Australia
M. W. J. Smit, A. J. H. M. Reniers, G. Symonds and B. G. Ruessink 2437

Large Scale Morphodynamic Numerical Simulations for Local Harbour Sediment Entrainment and Deposition Patterns
Andreas Wurpts and Ulrich Zanke 2446

Shoreline Protection Scheme at Conceição da Barra, Brasil
Berry Elfrink, Domenico Accetta and Karsten Mangor 2458

Sediment Transport at the Baltic Sea Coast of Mecklenburg-Vorpommern, Germany
Steffi Dimke and Peter Froehle 2471

Sediment Budget Analysis of the Dutch Coastal System: A Focus on the Wadden Sea
Mark van Koningsveld, Ben de Sonneville, Zheng Bing Wang and Leo van Rijn 2481

Sedimentation of a Pacific Coast Bay on the San Andreas Fault
Ronald M. Noble, Wenkai Qin and Donald D. Treadwell 2494

Probabilistic Performance of Beach Nourishment Projects
David L. Kriebel 2507

On the Predictability of Nourishment Performance by Numerical Models: A Prototype Case in Emilia Romagna, Italy
Alberto Lamberti, Barbara Zanuttigh and Luca Martinelli 2519

Factors Controlling the First Year Performance of Eight Adjacent Beach Nourishment Projects, West-Central Florida, USA
Ping Wang, Tiffany M. Roberts, Nicole A. Elko and Tanya M. Beck 2532

Two-Line Model for Inverse Estimation of Cross-Shore and Longshore Transport Rates on Nourished Beaches
Jens Figlus and Nobuhisa Kobayashi 2545

The Behavior of Gravel Nourishment in Presence of a Protective Structure. Laboratory Tests
Claudia D'Eliso, Lorenzo Cappietti and Pier Luigi Aminti 2557

Measurement and Prediction of Deformation of Conveyer Belts Carrying Gravel and Fine Sand Off Shimizu Coast
Makoto Nishitani, Takaaki Uda, Masumi Serizawa and Toshinori Ishikawa 2570

Large-Scale Tests to Analyse the Influence of Collapsed Dune Revetments on Dune Erosion
M. R. A. van Gent 2583

Morphodynamics of Submarine Sand Pit: Experimental Investigation by Means of a Structured Light Measurement System
Luca Cavallaro, Carla Faraci, Enrico Foti, Alberto Marini and Rosaria E. Musumeci 2596

Interpretation of Large-Scale Morphodynamic Laboratory Experiments: Spoil Heaps and Sandbanks
M. I. García-Hermosa, A. G. L. Borthwick, R. L. Soulsby, P. K. Stansby, P. H. Taylor, J. Huang and J. G. Zhou 2609

Mobile-Bed Tests. The SANDS Project
Iván Cáceres, Joachim Grüne, Leo Van Rijn, Agustín Sánchez-Arcilla, Alireza Ahmari and Jan Ribberink 2622

Monitoring Storm Impacts on a Gravel Beach Using the Argus Video System
Amaia Ruiz de Alegria, Gerhard Masselink, Kenneth Kingston, Jon Williams and Daniel Buscombe 2633

Beach Drainage as a Form of Shoreline Stabilization: Case Studies in Italy
Paolo Ciavola, Diego Vicinanza and Elisa Fontana 2646

Surface Density Variations along a Sand Ripple under Stationary Flow Measured by CT-Scanning
Stephane Montreuil, Bernard Long and J. William Kamphuis 2659

Acoustic Analysis of Sediment Transport on Gravel and Mixed Beaches
A. D. Priestley, T. E. Mason and R. H. C. Thain 2672

Measurement of Suspended Sediments in Tidal Rivers Using Underwater Acoustics
Christian Maushake 2681

Field Experiment of Beach Nourishment Considering Change in Grain Size and Prediction of Beach Changes
Atsushi Yoshioka, Takaaki Uda, Genji Aoshima, Kou Furuike and Toshinori Ishikawa 2694

Large-Scale Model Study on Scour Around Slender Monopiles Induced by Irregular Waves
Ulrike Prepernau, Joachim Grüne, Uwe Sparboom, Reinold Schmidt-Koppenhagen, Zeya Wang and Hocine Oumeraci 2707

Three-Dimensional Numerical Model for Wave-Induced Scour Around a Vertical Cylinder
Shinya Umeda, Masatoshi Yuhi and Hajime Ishida 2717

Numerical Simulation of Flow Around a Marine Pipeline Close to the Seabed
Muk Chen Ong, Torbjørn Utnes, Lars Erik Holmedal, Dag Myrhaug and Bjørnar Pettersen 2730

Morphodynamic Impacts of a Tidal Barrage in the Mersey Estuary
B. Carroll, M. Li, S. Pan, J. Wolf and R. Burrows 2743

Sediment Dynamics and the Improvement of Dredging Strategies in the Elbe Estuary
Günther Eichweber 2756

Dredging of Tidal Dunes
Horst Nasner, Rainer Pieper and Patrick Torn 2761

Estimation of Shoaling for Proposed Channel Deepening in an Estuary, Matagorda Ship Channel, Texas, USA
Christopher W. Reed, Nicholas C. Kraus, Lihwa Lin, Neil J. MacDonald and Michael H. Davies 2774

Surface Gravity Wave Interactions with Deep-Draft Navigation Channels — Physical and Numerical Modeling Case Studies
Shubhra K. Misra, Andrew M. Driscoll, James T. Kirby, Andrew Cornett, Pedro Lomonaco, Otavio Sayao and Majid Yavary 2786

Zeebrugge Outer Harbor: The Evolution of Scouring over the Past 20 Years
Luc Van Damme, Julien De Rouck and Pieter Mathys 2799

Scour Monitoring at Indian River Inlet, Delaware, USA
Jesse T. Hayden, Jack A. Puleo and Jamie H. MacMahan 2810

How to Account for Flexible Aquatic Vegetation in Large-Scale Morophodynamic Models
Jasper T. Dijkstra 2820

Morphodynamic Coupling of Bottom Roughness and Fluid Mud for Modelling Tidal Propagation in the Loire Estuary (France)
Luc Hamm and Régis Walther 2832

Modeling Cohesive Sediment Siltation in a Storm Event Using an Integrated Three-Dimensional Model
Qun Zhao 2842

An Integrated Wave-Mud-Current Interaction Model
Mohsen Soltanpour, S. Abbas Haghshenas and Tomoya Shibayama 2852

Model for Wave and Current-Induced Sediment Concentration for Cohesive Sediments
Soroush Sorourian, Ioan Nistor and Ronald Townsend 2862

Wave-Induced Liquefaction and Densification in Muddy Sand
Takahiro Kumagai, Katsuya Ikeno and Takashi Tsuchida 2875

Re-Suspension Mechanism of Sea Bottom Sediment in Hiroshima Bay
Kyung-hoi Kim, Masataka Imagawa, Tadashi Hibino, Katusaki Komai and Yasushi Matsunaga 2886

VOLUME FOUR

Coastal Structures 2897

Safety Analysis Model and Procedure for a Coast Protection Master Plan of North Sea Coast of Schleswig-Holstein
Joachim Grüne 2899

A Practical Method for Design of Coastal Structures in Shallow Water
Henk Jan Verhagen, Gerbrant van Vledder and Sepehr Eslami Arab 2912

Hydraulic Model Tests on Wave Overtopping at the Historical Sea Wall at Baltrum
Holger Blum, Andreas Kortenhaus and Frank Thorenz 2923

Innovative Overtopping Reduction Elements at the Reconstructed Historical Seawall of Norderney
Frank Thorenz 2934

Individual Overtopping Events at Dikes
Gijs Bosman, Jentsje van der Meer, Gijs Hoffmans, Holger Schüttrumpf and Henk Jan Verhagen 2944

Further Developments on the Wave Overtopping Simulator
Jentsje W. van der Meer, Gosse Jan Steendam, Govertine de Raat Patricia Bernardini 2957

Wave Overtopping on Innovative Crest Drainage Dike – Model Test Results
Darshana Dassanayake, Andreas Kortenhaus, Hocine Oumeraci, Kevyn Bollinger and Randa Hassen 2970

Individual Violent Overtopping Events: New Insights
Ravindra Jayaratne, Alison Hunt-Raby, Geoffrey Bullock and Henrik Bredmose 2983

Wave Overtopping and Overflow on Inclined Structures
Ali Farhadzadeh, Nobuhisa Kobayashi and Jeffrey A. Melby 2996

Prototype Overtopping Measurements and Model Verification
Cordula Berkenbrink, Ralf Kaiser and Hanz D. Niemeyer 3009

Use of Field Measurements to Improve Probabilistic Wave Overtopping Forecasts
Tim Pullen, Nigel Tozer, Paul Sayers, Peter Hawkes, Andrew Saulter, Jonathan Flowerdew and Kevin Horsburgh 3020

Influence of Oblique Wave Attack on Stability of Placed Block Revetments
Mark Klein Breteler, Adam Bezuijen and Yvo Provoost 3032

Numerical Prediction of Inundation Risk and Effect of Countermeasure for Wave Overtopping
Tetsuya Hiraishi, Kyoichi Nagase and Yoshihito Oshimura 3045

Getting More from Physical Modelling — Measuring Extreme Responses Using Importance Sampling
Thomas Davey, Tom Bruce and William Allsop 3058

Particle Method for Simulating Wave Overtopping on Stepped Seawall with Drainage
Hitoshi Gotoh, Hiroyuki Ikari, Tsunehito Yasuoka, Shigenori Muramoto and Kazuhide Takahashi 3071

Effect of Wind on Landward Transportation of Spray Generated by Wave Overtopping at Vertical Breakwater
Masaru Yamashiro, Akinori Yoshida and Kazuyasu Murakami 3084

Numerical Modelling of Breakwater Overtopping Using a NLSW Equation Model with a Porous Layer
M. T. Reis, K. Hu, M. G. Neves and T. S. Hedges 3097

Integrated Prediction Tools for Wave Overtopping at Vertical Structures
Tom Bruce and Jentsje van der Meer 3110

Numerical Simulation of Wave Overtopping Breakwaters
Yanliang Du, Shunqi Pan and Yongping Chen 3120

Planning, Design, Physical Modeling and Field Performance of Environmentally Friendly Solutions Against Wave Overtopping
E. N. Anastasaki and C. I. Moutzouris 3131

Post-Overtopping Loads Behind Vertical Structures
David Ingram, Tom Bruce and William Allsop 3144

Reduction of Wave Overtopping at Seadikes: Stilling Wave Basin — 3D Research
J. Geeraerts and J. De Rouck 3157

Wave Force and Stability of Upright Section of High Mound Composite Seawall
Masaya Mori, Yasuji Yamamoto and Katsutoshi Kimura 3164

A Numerical Model for Aerated-Water Wave Impact on a Coastal Structure
L.-R. Plumerault, D. Astruc, P. Villedieu, P. Maron and M. Mory 3173

Impact Pressures Due to Breaking Solitary Wave Exerted on a Vertical Wall
Nguyen Danh Thao, Miguel Esteban, Hiroshi Takagi and Tomoya Shibayama.. 3186

Development of 3-D Multiphase Flow Numerical Model "DOLPHIN-3D" and Its Application to Wave-Rigid Body Interaction Problems
Koji Kawasaki and Keisuke Ogiso 3199

Theories of Wave-Impact Pressures on Coastal Structures
Mark J. Cooker 3212

The Erodibility of Grassed Inner Dike Slopes Against Wave Overtopping
Gijs Hoffmans, Gertjan Akkerman, Henk Verheij and Andre van Hoven..... 3224

Temporal Development of a Sea Dike Breach
Laurits Bernitt and Holger Toxvig Madsen 3237

Coastal Structure Performance during Hurricane Isabel: Design Implications and Opportunities for "Green" Structures
John Headland, Paul Tschirky, Peter Kotulak and Wilbert van den Bos 3250

Large Scale Tests of Boulder Clay Erosion at the Wieringermeer Dike (Ijsselmeer)
Guido Wolters, Jan-Willem Nieuwenhuis, Jentsje van der Meer and Mark Klein Breteler 3263

Application and Experience with Iron-Silicate Armour Stones in Hydraulic and Coastal Engineering Works
Manfred Hamann, Marc Waltemathe and Karsten Peters 3276

Analysis of Wave Reflection from Structures with Berms through an Extensive Database and 2DV Numerical Modelling
Barbara Zanuttigh, Jentsje W. van der Meer, Thomas Lykke Andersen, Javier L. Lara and Inigo J. Losada 3285

Comparison of Homogenous and Multi-Layered Berm Breakwaters with Respect to Overtopping and Front Slope Stability
T. Lykke Andersen, K. T. Skals and H. F. Burcharth 3298

Berm Recession of the Icelandic-Type Berm Breakwater
Sigurdur Sigurdarson, Jentsje W. van der Meer, Alf Tørum and Roberto Tomasicchio 3311

Experimental Investigation of the Impact of a Tsunami-Induced Bore on Structures
Ioan Nistor, Younes Nouri, Dan Palermo and Andrew Cornett 3324

Placement Methods for Antifer Armour Units
Arjan B. Frens, Marcel R. A. van Gent and Jelle Olthof 3337

Reanalysis of Breakwater Stability with Steep Foreshore
Markus Muttray and Bas Reedijk 3346

Effect of Core Permeability on Armour Layer Stability
Bas Reedijk, Markus Muttray, Arnoud van den Berge and Richard de Rover ... .3358

Breakwater Stability with Damaged Single Layer Armour Units
Richard de Rover, Henk Jan Verhagen, Arnoud van den Berge and Bas Reedijk 3368

New Guidance to Address the Challenges of Using Concrete in Maritime Engineering
Sébastien Dupray, Gareth Robertshaw, Jonathan Simm, William Allsop and Kristina Gamst 3381

Improved Longevity of Coastal Structures
Donald D. Treadwell, Brian J. Van Weele, Orville T. Magoon and Yair Eisenberg 3393

Advanced System for Visualising Placement of Armour Units Underwater
Michel Denechere and Michel Fons 3403

3D Lagrangian Simulation of Compaction Process of Wave Dissipating Blocks due to High Waves
Tetsuo Sakai, Eiji Harada and Hitoshi Gotoh 3412

Wave Force and Stability of New Flat Type Concrete Block with Large Openings for Submerged Breakwaters
Shin-ichi Kubota, Masashi Hamaguchi, Akira Matsumoto, Minoru Hanzawa and Masato Yamamoto 3423

Structural Performance Evaluation of New -Type Wave Dissipating Concrete Block
Satoshi Noboru, Mitsuyasu Iwanami, Masato Yamamoto and Ichiro Nishiwaki 3436

Spatial Damage Distribution over Cube Armoured Roundheads
Enrique Maciñeira and Hans F. Burcharth 3449

Erosion of Cube and Cubipod Armor Layers under Wave Attack
M. Esther Gómez-Martín and Josep R. Medina 3461

Hermanus Breakwater Repair Using Toskane Armour Units
Kishan Tulsi, Dave Phelp, Masupha Letsie, Marius Rossouw, Joop Zwamborn, George Goodey and Stoffel Smith 3474

Lost Jetty of California's Russian River
Orville T. Magoon, Donald D. Treadwell, Paul S. Atwood and Billy L. Edge ... 3487

Non-Conventional Wave Damping Structures: Hydraulic Performance
Hocine Oumeraci 3496

Mass Transport Induced Flow in Seawater Exchange Structures with Perforated Wall
Yoshihiro Ohmura 3509

Transformation of Wave Skewness and Asymmetry over Low-Crested Breakwaters
Zhong Peng, Qingping Zou, Baoxing Wang and Dominic Reeve 3522

New Formulation of Wave Transmission over and Through Low Crested Structures
Yoshimi Goda and John P. Ahrens 3530

Bore Propagation over a Submerged Horizontal Plate by Physical and Numerical Simulation
Daniel B. Bung, Arndt Hildebrandt, Mario Oertel, Andreas Schlenkhoff and Torsten Schlurmann 3542

Large-Scale Laboratory Measurements of Wave Forces on Highway Bridge Superstructures
Christopher Bradner, Thomas Schumacher, Daniel Cox and Christopher Higgins 3554

Experimental Study of Wave Forces on Bridge Decks
Billy L. Edge, Ronald McPherson and Oscar Cruz-Castro 3567

An Integrated Approach to the Analysis of Coastal Structures at Prototype Scale Using COBRAS-UC
R. Guanche, I. J. Losada, J. L. Lara and C. Vidal 3580

Design Scenarios for Coastal Protection Structures on the German Baltic Sea Coast
Gerd Bruss, Nestor Jimenez, Hartmut Eiben, Michael Heinrichs, Jens Riemer and Roberto Mayerle 3593

Analyses of Stability of Caisson Breakwaters on Rubble Foundation Exposed to Impulsive Loads
H. F. Burcharth, L. Andersen and T. Lykke Andersen 3606

Experimental and Numerical Study of the Response of a Sandbed beneath a Caisson Breakwater Subject to Cyclic Wave Load
M. Kudella and H. Oumeraci 3619

Resonance of Fluid in Narrow Joint Gaps of Caisson-Type Breakwater
Takehisa Saitoh, Hiroyuki Hosonuma, Guoping Miao and Hajime Ishida 3632

Estimation of Expected Sliding Distance of a Caisson Affected by Damage of Armor Concrete Blocks
Tomotsuka Takayama, Daiki Tsujio and Tomohiro Yasuda 3645

Proposed Methodology for Evaluating the Potential Failure Risk for Existing Caisson-Breakwaters in a Storm Event Using a Level III Reliability-Based Approach
Hiroshi Takagi, Miguel Esteban and Tomoya Shibayama 3655

Numerical Analysis of Flat Plate Breakwater
Francesco Lalli, Antonello Bruschi, Luca Liberti, Stefania Mandrone, Valeria Pesarino and Piero Bassanini 3668

Three-Dimensional Nonlinear Wave Groups Interacting with an Upright Breakwater
Alessandra Romolo and Felice Arena 3681

Seawave Slot-Cone Generator: An Innovative Caisson Breakwater for Energy Production
Diego Vicinanza, Lucia Margheritini, Pasquale Contestabile, Jens Peter Kofoed and Peter Frigaard 3694

Indonesia - Japan Joint Survey on 2006 Java Earthquake Tsunami Disaster
Shigeo Takahashi, Subandono Diposaptono, Koji Fujima, Daisuke Tatsumi and Takashi Tomita 3706

Stability Analysis of a Shelter Tower at Exertion of Tsunami
Tomohiro Yasuda, Tomotsuka Takayama and Hajime Mase 3719

Behavior of Drifting Containers Due to Tsunami and Collision Forces
Gyeong-Seon Yeom, Norimi Mizutani, Kazutomo Shiraishi, Atsuhiro Usami, Shogo Miyajima and Takashi Tomita 3731

Hydrodynamic Loadings of Buildings in Floods
Giovanni Cuomo, Gholamreza Shams, Sebastian Jonkman and Pieter van Gelder 3744

Experimental Analysis of Scale Effects of the Wave Induced Flow Field Around a Monopile Using Particle Image Velocimetry
Leen De Vos, Peter Troch and Julien De Rouck 3757

Wave Forces on Groups of Slender Cylinders in Comparison to an Isolated Cylinder Due to Non-Breaking Waves
Arndt Hildebrandt, Uwe Sparboom and Hocine Oumeraci 3770

Wave Run-up Height on Cylindrical Foundations for Offshore Wind Turbines in Nonlinear Random Waves
Dag Myrhaug and Lars Erik Holmedal 3782

Hydraulic Permeability of Structures Made of Geotextile Sand Containers (GSC-Structures) -- Laboratory Tests and Results
Katja Werth, Juan Recio, Hocine Oumeraci and Georg Heerten 3793

Hydraulic Stability of Geotextile Sand Containers for Coastal Structures — Effect of Deformations and Stability Formulae
Juan Recio and Hocine Oumeraci 3805

Temporary Bund of Geosynthetics and Tubes for Bridge Piers in the River Dougava, Riga
Newenka M. Alexiew 3818

Crown Wall with Extended Base Slab
Ineke Vos-Rovers, Bas Reedijk and Sjaak Ekelmans 3830

Maasvlakte 2: Laboratory Investigation on Behalf of the Design of the Armour Layer and the Crest Level of the Main Breakwater
J. De Rouck, J. Geeraerts, L. Van der Keere, M. De Man and V. Meirschaert ... 3842

Construction of New Port at Punta Langosteira (A Coruña, Spain)
Fernando Noya Arquero, Victoria Bajo González, Enrique Maciñeira Alonso and José Enrique Pérez Noguer 3854

On Mooring Force of Very Large Floating Structures Induced by Tsunami
Toru Abe and Shigeki Sakai 3865

VOLUME FIVE

Loads on Floating Breakwaters: Effects of Layout under Irregular Waves
Piero Ruol, Luca Martinelli and Barbara Zanuttigh 3875

Modelling Breaking Waves on a Wharf
Gildas Colleter and Alessio Mariani 3888

A Hybrid Quay Wall Proposed for a Very Large Container Ship in the West Terminal of Busan New Port
Jang-Won Chae, Woo-Sun Park and Gongil Jeong 3899

Preservation of Evidence for the New Deep-Sea Container Terminal Jade WeserPort (JWP) Wilhelmshaven - Design and Stage 1
Helmut Manzenrieder, Frank Spingat and Volker Weiss 3912

Planning and Construction of a Port Related Turning Basin in Bremerhaven
Jan Janssen 3925

Brighton Marina – Extending the Life of a Coastal Harbour from 30 to 150 Years
Amanda Chapman, William Allsop, John Scatchard and John Davey 3933

Caisson Constructions an Innovative Approach
Arun D. Joshi 3945

Physical Model Tests of the Breakwater for the Enlargement of the Port of Valencia, Spain
José F. Sánchez González, Marcelo Burgos Teruel and Inmaculada Martín Ávila 3957

Development and Design of the WaveCat™ Energy Converter
Gregorio Iglesias, Rodrigo Carballo, Alberte Castro and Bruño Fraga 3970

The Renovation of the Old "Nesserland Sea-Lock" at Emden-Port
Hans-Dieter Clasmeier 3983

Computer Simulation of Pohang New Harbor for Seiche Reduction
Moonsu Kwak, Wonmu Jeong, Chongkun Pyun, Xiuying Xing and Jiin-Jen Lee 3996

Digital Image Monitoring to Optimise Safe Port Operations
David Phelp and Gavin Hough 4002

Coastal Management, Environment, and Risk 4015

An Integrated Master Plan for Flanders Future Coastal Safety
T. Mertens, P. DeWolf, T. Verwaest, K. Trouw, L. De Nocker and K. Couderé 4017

Integrated Planning for a Sustainable Coastal Louisiana
Adam Hosking, Jon Porthouse, Jean Cowan, Michele Deshotels and Ben Hamer 4029

Coastal Management Measures in Lithuanian Baltic Coast (South Eastern Baltic)
Saulius Gulbinskas, Rosita Mileriene and Rimas Zaromskis 4042

Coastal Zones and Climate Change: A Sediment Perspective Perception on Adaptation
Jan P. M. Mulder, Ad J. F. van der Spek and Michiel J. van der Meulen 4053

The Role of Regional Sediment Management in Coastal Zone Management
Lesley Ewing, Costas Synolakis, Nikos Kalligeris, Spyros Foteinis and Voukouvalas Evangelos 4065

Sharing Coastal Knowledge within Europe: ENCORA and the Coastal Wiki
J. Dronkers, A. J. Chadwick, J. E. Jackson and N. Villars 4078

Geographical Information Systems as Tools for the Elaboration of ICZM Policies
B. Martí, L. Moreno, J. Fernández, J. Mey, C. Peña, J. I. Gil and O. Tamayo 4090

Extreme Value Analysis of Coastal Levels, With and Without Convolution of Astronomic and Storm Surge Components
Patrick Willems and Toon Verwaest 4099

Non-Stationarities in Time Series and Its Integration in Extreme Value Statistics for Risk Management Issues
Christoph Mudersbach and Jürgen Jensen 4109

Bivariate Analysis and Joint Exceedance Probabilities of Extreme Wave Heights and Periods
Galiatsatou Panagiota and Panagiotis Prinos 4121

Statistical Analysis of the Coastal Storm Impulse (COSI) Scale at the Corps of Engineers, FRF, DUCK NC
David R. Basco, Nadar Mahmoudpour and Chris A. Klentzman 4134

A Predictive Index for Wave and Storm Surge Induced Erosion
Jon K. Miller and Elizabeth Livermont 4143

Vulnerability Assessment to Coastal Storms at a Regional Scale
E. Tonatiuh Mendoza and José A. Jiménez 4154

Regression Models and Uncertainty Analysis of Coastal State Indicators
Christophe Brière and Henk F. P. van den Boogaard 4167

Probabilistic Approach for Safety Assessment of Water Defences along the Dutch coast; Model and Verification
Frank den Heijer, Robert J. Vos and Caroline Gautier 4180

Coastal Flooding Risk Calculations for the Belgian Coast
T. Verwaest, K. Van der Biest, P. Vanpoucke, J. Reyns, P. Vanderkimpen, L. De Vos, J. De Rouck and T. Mertens 4193

Appraising Spit Dynamics and Estuary Responses: A Coastal Management Study from the Exe Estuary, UK
Harshinie Karunarathna, Dominic E. Reeve, Dan Fox, Sam Box, Nigel Pontee, Andrew Chadwick and John Lawrence 4202

Flood Risk Analysis and Management in Europe – The Way Ahead
Andreas Kortenhaus and Hocine Oumeraci 4214

Process-Determined Coastal Erosion Hazards
Dave Callaghan, Roshanka Ranasinghe, Peter Nielsen, Magnus Larson and Andrew Short 4227

National Coastal Erosion Risk Mapping - The First National Run
Jonathan Rogers, Frances Loran and Geoff Astle 4237

High Volume Sediment Transport and Its Implications for Recreational Beach Risk
Tim Scott, Paul Russell, Gerhard Masselink, Adam Wooler and Andrew Short 4250

Mississippi to Medway: Climate Change and Strategic Risk Management
N. Pontee, A. Hosking, B. Hamer and K. Burgess 4263

Reliability- and Risk-Based Design of Coastal Flood Defences
Cong V. Mai, Pieter van Gelder, Han Vrijling and Marcel Stive 4276

Rational Risk Based Design Method for Flood Protection, Maasvlakte 2, Port of Rotterdam
Sander Boer, Jan Konter and Anne Kirsten Meijer 4289

Coastal System Resilience
J. William Kamphuis 4302

Risk-Based Maintenance Planning for Flood Protection Walls
Jeff Marengwa and Johan Retief 4315

Application of the Economic Optimization to the Flood Defence System of the New Orleans Metropolitan Area
S. N. Jonkman, M. Kok, M. van Ledden and J. K. Vrijling 4328

The Tyndall Coastal Simulator and Interface
Robert Nicholls, Susan Hanson, Mustafa Mokrech, Peter Stansby, Nicolas Chini, Mike Walkden, Richard Dawson, Nicolas Roche, Jim Hall, Sophie Nicholson-Cole, Andrew Watkinson, Simon Jude, Jason Lowe, Judith Wolf, James Leake, Mark Rounsevell, Corentin Fontaine and Lilibeth Acosta-Michlik 4341

Response of Marine Climate to Future Climate Change: Application to Coastal Regions
James Leake, Judith Wolf, Jason Lowe, Jim Hall and Robert Nicholls 4354

Probablistic Simulation of Long-Term Shore Morphology of North Northfolk, UK
Mike Walkden, Mark Dickson, James Thomas and Jim Hall 4365

Projected Long Term Changes in Flood Risk on the East Anglia Coast of the UK
Nicolas Roche, Richard Dawson, Jim Hall and Mike Walkden 4378

Ensemble Prediction of Inundation Risk and Uncertainty Arising from Scour (EPIRUS)
Qingping Zou, Dominic Reeve, Ian Cluckie, Shunqi Pan, Miguel Angel Rico-Ramirez, Dawei Han, Xin Lv, Adrián Pedrozo-Acuña and Yongping Chen 4390

Development of a Nowcasting Modelling System for a Study Area on the German North Sea Coast
J. M. Fernández and R. Mayerle 4401

A 3-D Experimental Study of the Beneficial Role of Flushing Culverts in Sea Water Quality
V. K. Tsoukala and C. I. Moutzouris 4414

Modeling Bio-Geomorphological Influences for Offshore Sandwaves
Bas W. Borsje, Mindert B. de Vries, Tjeerd J. Bouma, Giovanni Besio, Suzanne J. M. H. Hulscher and Peter M. J. Herman 4423

Innovative Highlights in the Environmental Impact Assessment Maasvlakte 2
Mathijs van Ledden, Loes Bolle, Johan Boon, Wil Borst, Bram van Prooijen and John de Ronde 4436

Solute Dispersion in the Nearshore: Laboratory and Numerical Results
J. M. Pearson, Q. Zou, I. Guymer and Z. Peng 4449

A Meso-Scale Study of a Storm Water Plume Impact on Beaches Adjacent to an Estuary (Adour River, Bay of Biscay)
Damien Dailloux, Denis Morichon and Stéphane Abadie 4459

Low-Salinity Plume in the Changjiang and Adjacent Coastal Regions: A Model-Data Comparison
Jianzhong Ge, Pingxing Ding, Changsheng Chen and Pengfei Xue 4471

Impact of Cooling Water Intrusion on the Tidal River Elbe
Oliver Stoschek, Michael Potthoff, Ole Svenstrup Petersen and Ole Larsen 4482

Volume and Surface Area Changes in Estuaries and Tidal Inlets
Ian Townend, Zheng Bing Wang, Jeremy Spearman and Adrian Wright 4495

Assessing the Physical Impacts of Managed Realignment in an Estuarine and Coastal Environment
Andrew M. Symonds, Colin R. Scott and Michael B. Collins 4508

The Long-Term Impacts of Managed Realignments
Adrian Wright and Adam Fulford 4521

Concepts of the Ecological Improvement of the Elbe Estuary
H. Liebenstein, M. Fiedler and G. Eichweber 4532

Predicting the Recovery of Biological Communities on the Seabed after Marine Aggregate Dredging
Stefania Schinaia, Hiroshi Momiji, Steven R. Bishop, Richard R. Simons and Justine Saunders 4537

Model for Predicting the Extension of Habitat of Japanese Hard Clam MERETRIX LAMARCKII
Takayuki Kumada, Takaaki Uda and Masumi Serizawa 4549

Influence of Coastal Groundwater on Brackish Water Environment in a Tidal Estuary
Katsuaki Komai, Tadashi Hibino and Shinya Nakashita 4562

Groundwater Seepage Between a Gravel Barrier Beach and a Freshwater Lagoon
Martin Austin, Gerd Masselink, Ian Turner, Daniel Buscombe and Jon Williams 4572

Numerical Analysis of Floating Boom Performance in Open Waters
A. Castro, G. Iglesias, J. A. Fraguela and R. Carballo 4585

Hydraulic Boundary Conditions for a Major Discharge Facility – the IJsselmeer Project, The Netherlands
H. G. Voortman, N. van Veen, A. Vrijburcht and J. Tigchelaar 4594

Conflicts between a Recreational Resort and a Power Plant
Karim Rakha and Khaled Al-Banaa 4607

Assessment Criteria for the Identification of Human Impacts on Water Bodies by Morphodynamic Investigations
Gerald Herrling and Johanna Elsebach 4620

Coastal Scenarios Documented with Digital Atlases - Computational Modeling and Metadata
Rainer Lehfeldt, Peter Milbradt and Mario Höcker 4633

Relating Spatial Scale to Benthoscape Patterns with a High-Resolution Bathymetric LiDAR
Antoine Collin, Bernard Long and Philippe Archambault 4645

Baroclinic Model Study of the Marine Current Energy Potential in the Ría de Muros (NW Spain)
R. Carballo, G. Iglesias and A. Castro 4658

Real-Time Current Forecast for Tunnel Immersion Work of Bosphorus Rail Tube Crossing Project, Turkey
Yukinobu Oda, Takahide Honda, Kazunori Ito, Seizo Ueno, Fumio Koyama, Hideki Sakaeda, Clause Iversen and Steen Likke 4665

Saint Petersburg Flood Protection Barrier Challenging
Lechoslaw Bierawski and Gerald Giegerich 4678

Comprehensive Approach for Beach Erosion Mitigation in Korea
Kyu-Han Kim, Agnes Y. W. Widayati and Seong-Jin Yoon 4687

Study on the Long-Term Effects of New-Type Offshore Breakwaters and Sand Bypassing along Suruga Coast, Japan
Kazunori Wada 4699

Environmentally Friendly Coastal Protection Based on Vertical Drains
Poul Jakobsen and Claus Brøgger 4712

Beach Nourishment Combined with SIC Vertical Drain in Malaysia
Claus Brøgger and Poul Jakobsen 4725

An Experimental Study on Turbulence Induced by Porous Media
Sota Nakajo, Takaaki Shigematsu, Gozo Tsujimoto, and Kosei Takehara 4738

Effectiveness of a Resonator under Breaking and Non-Breaking Wave Conditions
Takayuki Nakamura and Nyein Zin Latt 4751