



COVER PHOTOGRAPH AND FRONT MATTER: MAN O'WAR BAY ALONG THE JURASSIC COAST OF DORSETT, SOUTHERN ENGLAND

Source: Journal of Coastal Research, 32(5)

Published By: Coastal Education and Research Foundation

URL: <https://doi.org/10.2112/1551-5036-32.5.ii>

Journal of

Coastal Research

VOL. 32, NO. 5 • CERF • September 2016

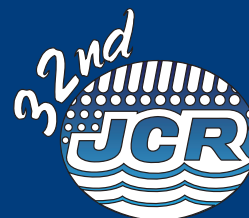


Published by



An International Forum for the Littoral Sciences

Charles W. Finkl
Editor-in-Chief



Year of Service

JOURNAL OF COASTAL RESEARCH

An International Forum for the Littoral Sciences

CHEF-HERAUSGEBER

25 Jake Ridge Trail
Fletcher, NC
28732, U.S.A.

BOOK REVIEW EDITOR

J. Andrew G. Cooper
School of Environmental Sciences
University of Ulster
Coleraine, N. Ireland
jag.cooper@ulster.ac.uk

EDITOR-IN-CHIEF

Charles W. Finkl

Coastal Education and Research Foundation, Inc. [CERF]

Editorial Offices:
5130 NW 54th Street
Coconut Creek, FL 33073, U.S.A.

(Editorial Office, Coconut Creek)

CERF/JCR Website: <http://www.CERF-JCR.org>
e-mail: cfinkl@cerf-jcr.com

RÉDACTEUR-EN-CHEF

DEPUTY EDITOR-IN-CHIEF

Christopher Makowski
Coastal Education and Research
Foundation, Inc. [CERF]
5130 NW 54th Street
Coconut Creek, FL 33073, U.S.A.
cmakowski@cerf-jcr.com

EDITORIAL ASSISTANT

Barbara Russell
Coastal Education and Research
Foundation, Inc. [CERF]
5130 NW 54th Street
Coconut Creek, FL 33073, U.S.A.
barbara@cerf-jcr.com

WEB DESIGN & DEVELOPMENT

Jon Finkl
Media Mine
17600 River Ford Drive
Davidson, NC 28036, U.S.A.
jon@mediamine.net

MITHERAUSGEBER

Edward J. Anthony
Coastal Geomorphology
Dunkerque, France
Kenneth Banks
Coral Reef Geomorphology
Plantation, Florida
Patrick Barnard
Coastal Geomorphology
Santa Cruz, California
Lindino Benedet
Oceanography, Modeling
Florianopolis, SC, Brazil
David M. Bush
Coastal Geology & Hazards
Carrollton, Georgia
Ilya V. Buynovich
Coastal Geology
Philadelphia, Pennsylvania
Javier A. Carrió
Sediment Processes
Valencia, Spain
Mark Crowell
Coastal Zone Management
McLean, Virginia
Omar Defeo
Sandy Beach Ecology
Montevideo, Uruguay
J. Javier Diez
Coastal Geomorphology
Madrid, Spain
Joseph F. Donoghue
Coastal Morphology & Hazards
Orlando, Florida
Jean Ellis
Aeolian Sediment Transport
Columbia, South Carolina
Luciana Esteves
Coastal Flooding & Erosion
Bournemouth, England, UK
Oscar Manuel Ferreira
Storm Impacts
Faro, Portugal
Duncan M. FitzGerald
Sediment Transport
Boston, Massachusetts
Chip Fletcher
Coastal Geology
Honolulu, Hawaii

Kazimierz K. Furmańczyk
Marine Cartography
Szczecin, Poland
Allen Gontz
Geophysics, Stratigraphy
San Diego, California
Gary B. Griggs
Coastal Engineering & Hazards
Santa Cruz, California
Pramod Hanamgond
Coastal Geomorphology
Belgaum, India
Hans Hanson
Coastal Protection
Lund, Sweden
Simon Haslett
Paleoceanography
Swansea, Wales, UK
David Hill
Nearshore Hydrodynamics
Corvallis, Oregon
Michael Hilton
Dune Geomorphology & Ecology
Dunedin, New Zealand
Carl H. Hobbs, III
Coastal Geology, Sand Mining
Gloucester Point, Virginia
James R. Houston
Sea-Level Change
Vicksburg, Mississippi
Wenrui Huang
Coastal Hydrodynamics
Tallahassee, Florida
Michael G. Hughes
Coastal Morphodynamics
Canberra, ACT, Australia
Federico I. Isla
Sea-Level Change
Mar Del Plata, Argentina
Nancy L. Jackson
Coastal Geomorphology
Newark, New Jersey
Markes E. Johnson
Paleoshores, Coastal Sand Dunes
Williamstown, Massachusetts
Timothy R. Keen
Waves & Circulation
Stennis Space Center, Mississippi
Dieter H. Kelleter
Coastal Geomorphology
Essen / Cologne, Germany

ASSOCIATE EDITORS

Joseph T. Kelley
Sea-Level Change
Orono, Maine
Vic Klemas
Remote Sensing
Newark, Delaware
Nobuhisa Kobayashi
Coastal Engineering
Newark, Delaware
Vladimir N. Kosmynin
Coral Reefs, Coastal Ecology
Tallahassee, Florida
Joseph L. Kowalski
Estuarine Plant Ecology
Edinburg, Texas
Michael J. Lace
Coastal Landforms & Processes
West Branch, Iowa
Stephen P. Leatherman
Barrier Islands, Beach Erosion
Miami, Florida
Charles Lemckert
Environmental Fluid Dynamics
Southport, Qld, Australia
Ioannis Liritzis
Geophysical Proxy Data
Rhodes, Greece
Jeffrey H. List
Shoreline Change Processes
Woods Hole, Massachusetts
Michel M. de Mahiques
Sediment Processes
São Paulo, Brazil
Gonzalo C. Malvárez-García
Beach Morphodynamics
Seville, Spain
Ashish J. Mehta
Coastal Engineering
Gainesville, Florida
Nobuo Mimura
Environmental Engineering
Ibaraki, Japan
Fatima Navas
Coastal Morphodynamics
Seville, Spain
Robert Nicholls
Global Climate Change
Southampton, England, UK

Karl F. Nordstrom
Coastal Geomorphology
New Brunswick, New Jersey
Julian Orford
Gravel Beaches, Storm Events
Belfast, Northern Ireland, UK
Phil D. Osborne
Sediment Dynamics
Shoreline, Washington
Hugh Parker
Airborne Lidar Bathymetry
Adelaide, SA, Australia
Charitha B. Pattiaratchi
Physical Oceanography
Crawley, WA, Australia
Carlos Pereira da Silva
Coastal Zone Management
Lisbon, Portugal
Michael Phillips
Coastal Geomorphology
Swansea, Wales, UK
Orrin H. Pilkey, Jr.
Coastal Geology
Durham, North Carolina
Paolo A. Pirazzoli
Sea-Level Changes
Paris, France
Nobert P. Psuty
Coastal Geomorphology
New Brunswick, New Jersey
Ulrich Radtke
Coastal Geomorphology
Duisburg-Essen, Germany
Elijah W. Ramsey, III
Coastal Image Processing
Lafayette, Louisiana
Kirt Rusenko
Sea Turtles, Dune Restoration
Boca Raton, Florida
Anja Scheffers
Coastal Evolution
Lismore, NSW, Australia
Vic Semeniuk
Mangroves
Perth, WA, Australia

Andrew D. Short
Coastal Geomorphology
Sydney, NSW, Australia
Pravi Shrestha
Coastal Engineering
Irvine, California
Alejandro J. Souza
Coastal & Sediment Processes
Liverpool, England, UK
Tom Spencer
Biogeomorphology
Cambridge, England, UK
Marcel Stive
Coastal Hydrodynamics
Delft, The Netherlands
Vallam Sundar
Coastal Engineering
Chennai, India
Adam D. Switzer
Coastal Hazards, Sea-Level
Change
NTU, Singapore
E. Robert Thieler
Marine Geology
Woods Hole, Massachusetts
Arthur C. Trembanis
Coastal Morphodynamics
Newark, Delaware
Frank Van Der Meulen
Coastal Zone Management
Delft, The Netherlands
Ian J. Walker
Coastal Dunes & Sediments
Tempe, Arizona
Ping Wang
Beach Morphodynamics
Tampa, Florida
Allan Williams
Coastal Geology
Swansea, Wales, UK
Harry F. Williams
Paleotempestology
Denton, Texas
Colin D. Woodroffe
Coastal Geomorphology
Wollongong, NSW, Australia
Robert S. Young
Coastal Processes
Cullowhee, North Carolina
Guoliang Yu
Sediment Transport
Shanghai, China

COMITÉ DE REDACTION



THE JOURNAL OF COASTAL RESEARCH (JCR) (ISSN 0749-0208) IS PUBLISHED BIMONTHLY FOR \$115.00 FOR INDIVIDUAL US CERF MEMBERS, \$125.00 FOR INDIVIDUAL INTERNATIONAL CERF MEMBERS, \$519.00 FOR US INSTITUTIONS, AND \$541.00 FOR INTERNATIONAL INSTITUTIONS BY THE COASTAL EDUCATION AND RESEARCH FOUNDATION, INC. (CERF), 5130 NW 54TH STREET, COCONUT CREEK, FL 33073-8713. PERIODICALS POSTAGE PAID AT FORT LAUDERDALE, FL AND ADDITIONAL MAILING OFFICES. **POSTMASTER:** SEND ADDRESS CHANGES TO JOURNAL OF COASTAL RESEARCH, ALLEN PRESS ASSOCIATION MANAGEMENT, P.O. BOX 1897, LAWRENCE, KS 66044-3018.

© 2016 Coastal Education and Research Foundation, Inc. [CERF].

© This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).



JOURNAL OF COASTAL RESEARCH

An International Forum for the Littoral Sciences

Supporting Scientific Institutions



- Consorzio Nazionale Interuniversitario per le Scienze del Mare (Co.N.I.S.Ma.) [Rome, Italy; www.conisma.it/]
- Delft University of Technology [Department of Hydraulic Engineering, Delft, The Netherlands; <http://www.citg.tudelft.nl/over-faculteit/afdelingen/hydraulic-engineering/>]
- Duke University [Earth and Ocean Sciences Division, Durham, North Carolina, U.S.A.; <https://nicholas.duke.edu/marinelab>]
- Griffith University [Center for Infrastructure Engineering and Management, Southport, Queensland, Australia; <https://www.griffith.edu.au/>]
- Ibaraki University [Center for Water Environmental Studies, Mito, Japan; <http://www.cwes.ibaraki.ac.jp/>]
- International Geographical Union (IGU) [Commission on Coastal System (CCS); <http://www.igu-ccs.org/>]
- Royal Belgian Institute of Natural Sciences [Management Unit of the North Sea Mathematical Models (MUMM), Brussels, Belgium; <http://www.mumm.ac.be/EN/index.php>]
- Rutgers University [Institute of Marine and Coastal Sciences (IMCS), New Brunswick, New Jersey, U.S.A.; <http://marine.rutgers.edu/main/>]
- Universidad de la República [Marine Science Unit, Montevideo, Uruguay; <http://www.imber.info/Science/National-Network/URUGUAY>]
- Universidade Nova de Lisboa [e-Geo Center for Geographical and Regional Planning Studies, Lisbon, Portugal; <http://e-geo.fcsh.unl.pt/>]
- University of California, Santa Cruz [Institute of Marine Sciences, Santa Cruz, California, U.S.A.; <http://ims.ucsc.edu/>]
- University of Delaware [School of Marine Science and Policy, Newark, Delaware, U.S.A.; <http://www.ocean.udel.edu>]
- University of Maine [Climate Change Institute, Orono, Maine, U.S.A.; <http://climatechange.umaine.edu/>]
- University of Sydney [Coastal Studies Unit, Sydney, New South Wales, Australia; <http://sydney.edu.au/>]
- University of Szczecin [Institute of Marine and Coastal Science, Szczecin, Poland; <http://www.wnoz.zti.km.szczecin.pl/en/1/inom/structure/>]
- University of Ulster [Environmental Sciences Research Institute, Coleraine, Northern Ireland; <http://www.ulster.ac.uk/es/research/>]
- University of Wales, Trinity Saint David [Swansea Metropolitan University, Mount Pleasant, Swansea, South Wales, U.K.; <http://www.uwtsd.ac.uk/>]
- U.S. Army Corps of Engineers [Coastal and Hydraulics Laboratory (CHL), Vicksburg, Mississippi, U.S.A.; <http://chl.erdc.usace.army.mil/>]
- U.S. Geological Survey [National Wetlands Research Center, Lafayette, Louisiana, U.S.A.; <http://www.nwrc.usgs.gov/>]

Aims and Scope of the Journal

Journal of Coastal Research, an International Forum for the Littoral Sciences, is dedicated to all aspects of coastal research. These include geology, biology, geomorphology (physical geography), climate, littoral oceanography, hydrography, coastal hydraulics, environmental (resource) management, engineering, and remote sensing. Although each field functions effectively within its own purview, the cross-disciplinary nature of coastal studies requires familiarity with other fields as well. Hence, the scope of topics is necessarily broad in order to address the complexity of coastal biophysical and socio-economic interactions. Because of the wide range of interrelated topics, the journal invites original contributions and manuscripts dealing with theory, methodology, techniques, and field or applied topic studies on interdisciplinary coastal issues.

The journal encourages the dissemination of knowledge and understanding of the coastal zone by promoting cooperation and communication between specialists in different disciplines. Natural scientists, for example, are encouraged to collaborate with professionals in other fields to prepare contributions relating to the coastal zone that foster increased appreciation of coastal environments and processes. By means of this journal, with its scholarly and professional papers, systematic review articles, book and symposia reviews, communications and news, and special topical issues, an international forum for the development of integrated coastal research is provided.

Advertising, Editorial, and Subscription Information

Advertising and Editorial Office: All advertising and editorial correspondence should be sent to Dr. Charles W. Finkl, Editor-in-Chief, Journal of Coastal Research, 5130 NW 54th Street, Coconut Creek, FL 33073, U.S.A. PHONE: 828-333-2300. E-MAIL: cfinkl@cerf-jcr.com

Subscription Information: The *Journal of Coastal Research* is a bimonthly publication. Calendar-year (2016) print and online subscription prices for the JCR are: \$115.00 for US CERF members / \$125.00 for International CERF members (\$95.00 for online only), and \$519.00 for US institutions / \$541.00 for International institutions (\$437.00 for online only). Additional surface charges may apply to subscribers located outside of the USA. For additional membership and subscription forms and information, please go to www.CERF-JCR.org. To obtain a membership or subscription form by mail, please send request to Journal of Coastal Research, P.O. Box 7065, Lawrence, KS 66044. Back Issues and Special Issues of the JCR, when available, can be directly purchased at www.CERF-JCR.org.

The *Journal of Coastal Research* is currently surveyed in *Applied Science & Technology Abstracts*; *Applied Science & Technology Index* (H.W. Wilson); *Aquatic Sciences & Fisheries Abstracts*; *BIOBASE*; *Biological Abstracts*; *BIOSIS Previews* (Thomson); *CAB International Abstracts* (CABI); *CSA Civil Engineering Abstracts* (ProQuest); *Current Awareness in Biological Sciences* (Elsevier); *Current Contents/Agriculture, Biology, & Environmental Sciences* (Thomson); *Ecology Abstracts* (ProQuest); *Environmental Sciences & Pollution Management*; *GeoAbstracts* [Geographical Abstracts: Physical Geography; Ecological Abstracts; Geological Abstracts; *GEOBASE*] (Elsevier); *GeoRef*; *Meteorological & Geostrophysical Abstracts* (ProQuest); *Oceanic Abstracts* (ProQuest); *Oceanographic Literature Review* (Elsevier); *Physical Sciences Digest* (CSA, Ebsco); *Pollution Abstracts* (ProQuest); *Referativnyi Zhurnal*; *Science Citation Index*; *SciSearch* (Thomson); *SCOPUS*; *Water Resources Abstracts* (Bethesda); *Zoological Record* (Thomson).



Man O'War Bay along the Jurassic Coast of Dorset, southern England. The Jurassic Coast is a designated World Heritage Site along the English Channel coast of southern England. Stretching a distance of nearly 155 km, this segment of coastline provides over 180 million years of coastal geologic history through the presence of Triassic, Jurassic, and Cretaceous cliffs. The coast is also unique in that stretches of both concordant and discordant shorelines can be found, along with a plethora of coastal landforms. For example, in Man O'War Bay, as shown above, the limestone has been tilted up so forcefully by regional folding and faulting that a nearly vertical orientation now exists at this location. Of particular interest is that this resistant bed of limestone results in forming an offshore barrier, partially protecting the Bay from wave attack and erosion. (Photograph taken 30 September 2015 by Gary Griggs, University of California, Santa Cruz [UCSC], Santa Cruz, California, U.S.A.)

COASTAL EDUCATION AND RESEARCH FOUNDATION

5130 NW 54th Street
Coconut Creek, FL 33073, U.S.A.

Officers of the Foundation

Founded in 1983 by: Charles W. Finkl, Sr. (Deceased),
Charles W. Finkl, Jr., Rhodes W. Fairbridge (Deceased),
and Maurice L. Schwartz (Deceased)



**President &
Executive Director:**
Charles W. Finkl

**Senior Vice President &
Assistant Director:**
Christopher Makowski

Secretary:
Heather M. Vollmer

Executive Assistant:
Barbara Russell

Regional Vice Presidents

North America
James R. Houston
Victor V. Klemas
Orrin H. Pilkey, Jr.

Western Europe
Carlos Pereira da Silva
Michael Phillips
Marcel J.F. Stive

South America
Omar Defeo

Eastern Europe
Kazimierz K. Furmanczyk

Southeast Asia
Nobuo Mimura

Oceania
Charles Lemckert
Vic Semeniuk
Andrew D. Short

Board of Directors (Trustees)

J. Andrew G. Cooper	Victor V. Klemas	Elijah W. Ramsey, III
Charles W. Finkl	Charles Lemckert	Vic Semeniuk
Erlend J. Frederickson	Chris Makowski	Andrew D. Short
Gary B. Griggs	Carlos Pereira da Silva	Daniel J. Stanley
James R. Houston	Michael Phillips	Marcel J.F. Stive
Robert Huff	Orrin H. Pilkey, Jr.	Allan Williams
Joseph T. Kelley	Norbert P. Psuty	

Lifetime Members

Frédéric Bouchette	Björn Kjerfve	Erik van Wellen
Yong-Sik Cho	Charles Lemckert	Ya Ping Wang
Nicholas K. Coch	Charles Thibault	Wei Zhang
Hany Elwany		

Patron Members

Luis Antonio	Carl H. Hobbs, III	Norbert P. Psuty
Buenfil-Lopez	Timothy W. Kana	Robert S. Young
Georges Chapalain		

CERF Society Information

The Coastal Education and Research Foundation [CERF] is a nonprofit society dedicated to the advancement of the coastal sciences. The Foundation is devoted to the multi-disciplinary study of the complex problems of the coastal zone. The purpose of CERF is to help translate and interpret coastal issues for the public and to assist professional research and public information programs. The Foundation specifically supports and encourages field and laboratory studies on a local, national, and international basis. Through the medium of scientific publications, television, and radio CERF brings accurate information to the public and coastal specialists on all aspects of coastal issues in an effort to maintain or improve the quality of shoreline resources.

Because CERF is concerned with broad environmental issues, our efforts concentrate on significant problems such as maintenance of good quality (potable) water with adequate supply, and hazards associated with potential beach erosion, flooding, and susceptibility of developed shorelines to storm surge and wave attack. By focusing attention on these potential man-made and natural hazards, it is hoped that our research efforts will help others improve the quality of life in diverse coastal areas. CERF thus aims to stimulate awareness of coastal (marine and freshwater shorelines) land and water problems; initiate and foster research and innovation to promote long-term coastal productivity; establish an educational forum for the debate of contentious coastal issues; and develop new principles and approaches for enlightened coastal management, and encourage their adoption and use.

☐ CERF MEMBERSHIP ☐

Members are individuals that support the aims of the foundation through personal and group efforts or by donations. Memberships are available in different categories with privileges.

Subscription information is available online at www.cerf-jcr.org. Subscriptions office: Allen Press, Inc., P.O. Box 1897, Lawrence, KS 66044, U.S.A. CERF@allenpress.com

Editor-in-Chief

Charles W. Finkl Ph.D., CSci, CMarSci, FIMarEST, CPGS, CPSSc, PWS, M.ASCE

Dr. Charles W. Finkl is President and Executive Director of the Coastal Education and Research Foundation [CERF], publisher of the JCR. Charlie, a founding editor of the *Journal of Coastal Research*, has served as Editor-in-Chief for the past 30 years. He is a Research Professor in the Department of Geosciences at Florida Atlantic University in Boca Raton, Florida. He received his Bachelor and Master of Science degrees from Oregon State University and the Ph.D. from the University of Western Australia. He is a member of more than 20 professional societies and has published more than 200 professional papers, books, and reports. He is a Chartered Marine Scientist (CMarSci) [Institute of Marine Engineering, Science and Technology], Certified Professional Geological Scientist (CPGS) [American Institute of Professional Geologists (AIPG)], Certified Professional Soil Scientist (CPSSc) [American Registry of Certified Professionals in Agronomy, Crops, and Soils], and a Professional Wetland Scientist (PWS) [Society of Wetland Scientists]. Charlie has field experience in parts of the USA, Caribbean area, Brazil, Honduras, Russia, South Africa, Western Europe, Australasia, and South Pacific islands. He is also the Series Editor of the Encyclopedia of Earth Sciences Series that is published by Springer (Germany). There are more than twenty-eight volumes in the Series and about twenty-five are available online. Charlie also serves on the Editorial Board of the *International Journal of Environmental Studies* (Routledge) and is an occasional peer reviewer for many other professional journals.

Charlie has interests and expertise in the general areas of surficial geology, coastal and marine geomorphology (including coastal classification), coastal/marine biophysical environments, exploration geochemistry, soils and weathering (regolith geology), coastal zone management and engineering applications or impacts on natural systems (including erosion control and shore protection), coastal hydrology including submarine freshwater and mineralized seeps, subaerial and marine structural geology, natural hazard mitigation in coastal zones, marine environments and coastal wetland protection and restoration, and remote sensing (e.g., land cover classification in coastal wetlands, advection-diffusion turbidity plumes in coastal waters, delineation of bottom types and sand resources), effluent disposal and pollution of wetlands and estuaries, water resources mapping and conservation, time series studies of wetland hydroperiod and soil moisture.

Official Meeting of CERF International Coastal Symposium (ICS)

The International Coastal Symposium (ICS) was originally set up by Per Bruun (deceased) and Charlie Finkl as the official meeting of the Coastal Education and Research Foundation (CERF), with one of the first meetings being held in Hilton Head, South Carolina, in 1993. After the repeated success of these meetings, CERF moved the ICS to the international scene holding these conferences in conjunction with local sponsors in Australia, Brazil, Iceland, New Zealand, Northern Ireland, Poland, and Portugal. The ICS brings together delegates from all over the world to collaborate and discuss the most current coastal research studies and projects. During the ICS 2014, which was held in Durban, South Africa, a grand celebration took place to mark the 30th Anniversary of CERF and the JCR. Our next ICS meeting is scheduled for May of 2018 in Busan, South Korea. For more information, please visit www.cerf-jcr.org.

Journal of Coastal Research

VOL. 32, NO. 5 (pages 1005–1246)

September 2016

ISSN 0749-0208

CONTENTS

RESEARCH ARTICLES

- Using Wind Direction and Shoreline Morphology to Model Sand Dune Mobilization **Alexandre Medeiros Carvalho, Jean T. Ellis, Michel Lamothe, and Luís Parente Maia** 1005
- Needs Assessment of Coastal Land Managers for Drought Onset Indicators in the Southeastern United States **Casey B. Nolan, Daniel L. Tufford, and David R. Chalcraft** 1016
- Coastal Geomorphology and Ground Thermal Regime of the Varandey Area, Northern Russia **Emilie Guégan, Anatoly Sinitsyn, Osip Kokin, and Stanislav Ogorodov** 1025
- Assessing the Resilience of Coastal Systems: A Probabilistic Approach **Martin T. Schultz and Ernest R. Smith** 1032
- Seasonal and Tidal Dynamics of Water Temperature, Salinity, Chlorophyll-*a*, Suspended Particulate Matter, Particulate Organic Matter, and Zooplankton Abundance in a Shallow, Mixed Estuary (Bahía Blanca, Argentina) **María C. Menéndez, Ana L. Delgado, Anabela A. Berasategui, María C. Piccolo, and Mónica S. Hoffmeyer** 1051
- Importance of Microtopography in Determining Plant Community Distribution in Baltic Coastal Wetlands **Raymond D. Ward, Niall G. Burnside, Chris B. Joyce, and Kalev Sepp** 1062
- The Perceived Value of a Scuba Diving Experience **Kiera Schoeman, Peet Van der Merwe, and Elmarie Slabbert** 1071
- Contribution of Outer-Shelf Deep Water to the Nutrient Inventories in the Euphotic Zone of the Changjiang River Plume during Summer **De-wang Li, Jian-fang Chen, Kui Wang, Hong-liang Li, Sheng-quan Gao, Hai-yan Jin, Jie Xu, Da-ji Huang, and Huan-xin Weng** 1081
- Numerical Modelling of Pore Pressure Accumulations in Marine Sediments around Submerged Breakwaters under Combined Wave and Current Loadings **Y. Zhang, D.-S. Jeng, H.Y. Zhao, and J.-S. Zhang** 1092
- Geochemical Characteristics and Provenance of Holocene Sediments (Core STAT22) in the Beibu Gulf, South China Sea **Zhenang Cui, Detlef E. Schulz-Bull, Yueming Hou, Zhen Xia, and Joanna J. Waniek** 1105
- Modeling Salt Pannes Land-Cover Suitability under Sea-Level Rise **Anna C. Linhoss and William V. Underwood** 1116
- Application of a Hybrid Approach for Tide-Surge Modeling in the Persian Gulf **Naghme Afshar Kaveh, Abbas Ghaheri, Vahid Chegini, and Mostafa Nazarali** 1126
- Underwater Man-Made Object Recognition on the Basis of Color and Shape Features **Guo-Jia Hou, Xin Luan, Da-Lei Song, and Xue-Yan Ma** 1135
- Evaluation of Elemental Composition of *Avicennia marina* and Associated Soil, Karachi Coast, Pakistan **Noreen Noor, Syed Shahid Shaukat, and Shahid Naseem** 1142
- Observations of Cyclone-Induced Storm Surge in Coastal Bangladesh **Soyee Chiu and Christopher Small** 1149
- Analysis of a 10-Year Record of Nearshore Directional Wave Spectra and Implications to Littoral Processes Research and Engineering Practice **Luis H. Montoya and William R. Dally** 1162
- Determination of Geometry and Measurement of Maritime–Terrestrial Lines by Means of Fractals: Application to the Coast of Cantabria (Spain) **Felipe Piña-García, Raúl Pereda-García, Julio Manuel de Luis-Ruiz, Rubén Pérez-Álvarez, and Raúl Husillos-Rodríguez** 1174
- Hydrodynamic Performance of Ichthyoid Rudder at Different Rudder Angle Settings **Dagang Zhao, Chunyu Guo, and Yumin Su** 1184

REVIEW ARTICLES

- Canons of Coastal Engineering in the United Kingdom: Seawalls/Groynes, a Century of Change? **Allan T. Williams, Alessio Giardino, and Enzo Pranzini** 1196
- Evolution of the Bengal Delta and Its Prevailing Processes **Jakia Akter, Maminul Haque Sarker, Ioana Popescu, and Dano Roelvink** 1212

TECHNICAL COMMUNICATIONS

- Simple Techniques for Retrieval of Wind Wave Periods and Directions from Optical Images Sequences in Wave Tanks **Henrique Rapizo, Victor d'Avila, Nelson Violante-Carvalho, Uggo Pinho, Carlos Eduardo Parente, and Fabio Nascimento** 1227
- A Multisource Information System for Monitoring and Improving Ship Energy Efficiency **Ailong Fan, Xinpeng Yan, and Qizhi Yin** 1235

BOOK REVIEWS

- Oil Spill Impacts: Taxonomic and Ontological Approaches* by Y. Wu **Charles W. Finkl** 1246



VOL. 32, NO. 5, September 2016

Journal of Coastal Research

CERF