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|     | Takeshi Ohki <sup>1</sup> , Takashi Yokobiki <sup>1</sup> , Hiroyuki Matsumoto <sup>1</sup> , Shuhei Nishida <sup>1</sup> , Tohru Kodera <sup>2</sup> , Masayuki Toizumi <sup>2</sup> , Katsuyoshi Kawaguchi <sup>1</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology, <sup>2</sup> NIPPON MARINE ENTERPRISES, LTD.  |
| 325 | Power Distribution System for Multidisciplinary Seafloor Observatory Junction Box   |
|     | Kenji Hishiki <sup>1</sup> , Noriyuki Fujiwara <sup>1</sup> , Takeshi Katayama <sup>1</sup> , Tatsuya Mizukawa <sup>1</sup> , Katsuyoshi Kawaguchi <sup>2</sup> , Takashi Yokobiki <sup>2</sup><br><sup>1</sup> NEC Networks & System Integration Corporation, <sup>2</sup> Japan Agency for Marine-Earth Science and Technology  |

## Marine Environmental Monitoring and Impact Assessment 1

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| 329 | <p>Underwater Acoustic Observatories to Reduce Ship Noise Footprint<br/>A Risk Assessment Model to Mitigate the Impact of Shipping Noise on Marine Fauna</p> <p>Michel André<sup>1</sup>, Mike van der Schaar<sup>1</sup>, Antonio M. Sánchez<sup>1</sup>, Eric Baudin<sup>1</sup>, Thomas Folegot<sup>1</sup>, Céline Rousset<sup>1</sup>, Christian Audoly<sup>1</sup></p> <p><sup>1</sup>Technical University of Catalonia</p>   |
| 333 | <p>Underwater Observatory Lander for the Seafloor Ecosystem Monitoring using a Video System</p> <p>Tetsuya Miwa<sup>1</sup>, Yukari Iino<sup>1</sup>, Toshio Tsuchiya<sup>1</sup>, Masami Matsuura<sup>2</sup>, Hiroshi Takahashi<sup>3</sup>, Masami Katsuragawa<sup>3</sup>, Tatsuhiro Fukuba<sup>1</sup>, Yasuo Furushima<sup>1</sup>, Tatsuo Fukuhara<sup>1</sup>, Tomohiko Fukushima<sup>1</sup>, Hiroyuki Yamamoto<sup>1</sup></p> <p><sup>1</sup>Japan Agency for Marine-Earth Science and Technology, <sup>2</sup>Nagasaki Marine Industry Cluster Promotion Association, <sup>3</sup>Okamoto Glass Co., Ltd.</p> |
| 337 | <p>Soundscape Characteristics of the Eastern Taiwan Strait Indo-Pacific Humpback Dolphin Habitat</p> <p>Shane Guan<sup>1</sup>, Joseph F. Vignola<sup>1</sup>, Tzu-Hao Lin<sup>2</sup>, Lien-Siang Chou<sup>3</sup></p> <p><sup>1</sup>The Catholic University of America, <sup>2</sup>Soundscape Association of Taiwan, <sup>3</sup>National Taiwan University</p>   |
| 342 | <p>Acoustic Presence of Finless Porpoises around the Kansai International Airport</p> <p>Kiyomi Nakamura<sup>1</sup>, Yuji Hirakawa<sup>1</sup>, Naoki Kamezaki<sup>1</sup>, Takashi Nakata<sup>2</sup>, Yusuke Ono<sup>3</sup>, Masaki Hatano<sup>4</sup>, Tomonari Akamatsu<sup>5</sup></p> <p><sup>1</sup>Suma Aqualife Park, <sup>2</sup>Ministry of Land, Infrastructure and Transport Kinki Regional Development Bureau, <sup>3</sup>Kansai Airport, <sup>4</sup>Kaizuka City Office, <sup>5</sup>National Research Institute of Fisheries Science</p>  |

## Oceanography and Education 1

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| 346 | <p>Using Lagrangian Coherent Structures to Identify Surface Oil Pathways in the Northern Gulf of Mexico</p> <p>Laura Hode<sup>1</sup>, Stephan Howden<sup>1</sup></p> <p><sup>1</sup>University of Southern Mississippi</p>  |
| 350 | <p>Research on Filtration Methodology for Suspended Particulate in Marine Construction</p> <p>Makoto Abe<sup>1</sup>, Takeshi Shinoda<sup>1</sup>, Yuki Sakata<sup>1</sup>, Yuichiro Tanaka<sup>2</sup></p> <p><sup>1</sup>Kyushu University, <sup>2</sup>Penta-Ocean Construction Institute of Technology</p> |
| 354 | <p>Bubble Curtain for Blocking Spilled Oil on Water Surface</p> <p>Isamu Fujita<sup>1</sup></p> <p><sup>1</sup>Port and Airport Research Institute</p>   |
| 360 | <p>Development of High Ability Removal Method to Radioactive Cesium Adsorped on</p>  |

Ocean Sludge by Using Micro Bubbles and Activating Microorganisms

Kyoichi Okamoto<sup>1</sup>, Tomoe Komoriya<sup>1</sup>, Takeshi Toyama<sup>1</sup>  
<sup>1</sup>Nihon University

## Numerical Modeling and Simulation 1

|     |   |
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| 366 | Tracking-Positioning of Sound Speed Profiles and Moving Acoustic Source in Shallow Water  |
|     | Xiaole Guo <sup>1</sup> , Kunde Yang <sup>1</sup> , Qiulong Yang <sup>1</sup> , Shaohao Zhu <sup>1</sup> , Ran Cao <sup>1</sup> , Yuanliang Ma <sup>1</sup><br><sup>1</sup> Northwestern Polytechnical University                               |
| 370 | Underwater Sensors Localization with Matched Multipath Time Delay in the Deep Ocean   |
|     | Qiulong Yang <sup>1</sup> , Kunde Yang <sup>1</sup> , Jia Han <sup>2</sup> , Xiaole Guo <sup>1</sup> , Shaohao Zhu <sup>1</sup> , Ran Cao <sup>1</sup><br><sup>1</sup> Northwestern Polytechnical University, <sup>2</sup> Mailbox 2433 Beijing |
| 375 | Downscaled Prediction of Extreme Seasonal Climate over Southeast Asia Using a Regional Climate Model  |
|     | Satyaban B. Ratna <sup>1</sup> , J. V. Ratnam <sup>1</sup> , Swadhin. K. Behera <sup>1</sup> , Takeshi Doi <sup>1</sup> , Toshio Yamagata <sup>1</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology                     |
| 381 | Impact of Ocean Coupling on Typhoon Prediction in High-Resolution Nonhydrostatic Global Model   |
|     | Wataru Sasaki <sup>1</sup> , Ryo Onishi <sup>1</sup> , Keiko Takahashi <sup>1</sup> , Hiromitsu Fuchigami <sup>2</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology, <sup>2</sup> NEC Informatec Systems, Ltd.          |

## Ocean Energy Development 2

|     |  |
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| 385 | Heave Motion and Electric Power of Multiple Cylinders for Wave Energy Converter Considering the Controlling Force  |
|     | Qiao Li <sup>1</sup> , Motohiko Murai <sup>1</sup> , Syu Kuwada <sup>1</sup><br><sup>1</sup> Yokohama National University  |
| 392 | Development of the Coastal Wave Power Generation Device  |
|     | Shogo Miyajima <sup>1</sup> , Kunio Nakano <sup>2</sup> , Toshihiko Maemura <sup>2</sup> , Takashi Kawaguchi <sup>3</sup><br><sup>1</sup> AKISIMA LABORATORIES (MITSU ZOSEN) INC., <sup>2</sup> Mitsui Engineering and Shipbuilding Co., Ltd., <sup>3</sup> AQUSYS CORPORATION |
| 399 | Direct Wave Power Transfer to Transmission Line under Varing Magnetic Field along Vibration Manipulation Function  |
|     | Shigeo Kotake <sup>1</sup> , Hiroyuki Douchi <sup>1</sup> , Yasuyuki Suzuki <sup>1</sup><br><sup>1</sup> Mie University  |

## Sensor and Observing Instruments 2

|     |  |
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| 406 | Cabled Underwater Observatory for Long-Term Ecosystem Monitoring at Hydrothermal Site  |
|     | Tatsuhiko Fukuba <sup>1</sup> , Tetsuya Miwa <sup>1</sup> , Yasuo Furushima <sup>1</sup> , Tatsuo Fukuhara <sup>1</sup> , Hiroyuki Yamamoto <sup>1</sup><br><sup>1</sup> JAMSETC         |
| 410 | Improvement of in situ Glass Electrode pH Sensor for Seawater by Rapid Response Glass Electrode and Removable Ag/AgCl Electrode with Solid Reference Junction Using Vycor Glass          |
|     | Kei Okamura <sup>1</sup> , Takuroh Noguchi <sup>1</sup> , Mayumi Hatta <sup>1</sup> , Jun-ichiro Ishibashi <sup>2</sup><br><sup>1</sup> Kochi University, <sup>2</sup> Kyushu University |
| 415 | Integration of <i>in-situ</i> Chemical Sensors and Ocean Observing Platforms   |
|     | Kiminori Shitashima <sup>1</sup><br><sup>1</sup> Tokyo University of Marine Science and Technology   |

## Ocean Observing Platforms 3

|     |  |
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| 419 | Development of Underwater Glider for Long-Term Virtual Mooring<br>- Aiming 6,000 m Depth with Ceramic Housing -  |
|     | Kenichi Asakawa <sup>1</sup> , Masahiko Nakamura <sup>2</sup> , Yosaku Maeda <sup>1</sup> , Tadahiro Hyakudome <sup>1</sup> , Yasuhisa Ishihara <sup>1</sup><br><sup>1</sup> JAMSTEC, <sup>2</sup> Kyushu University   |
| 425 | Ocean Acoustic Observing Platforms for Marine Creatures around Japan   |
|     | Tomonari Akamatsu <sup>1</sup> , Ryuzo Takahasi <sup>1</sup> , Tomohito Imaizumi <sup>1</sup> , Katsuyoshi Kawaguchi <sup>2</sup> , Ryoichi Iwase <sup>2</sup> , Shuhei Nishida <sup>2</sup><br><sup>1</sup> National Research Institute of Fisheries Science, <sup>2</sup> Japan Agency for Marine-Earth Science and Technology |
| 429 | A Cabled Observatory System for Integrated Long Term, High-Frequency Biological, Chemical, Physical Measurement for Understanding Planktonic Ecosystem   |
|     | Hidekatsu Yamazaki <sup>1</sup> , Scott Gallager <sup>2</sup> , Mamoru Tanaka <sup>1</sup> , Kuniyoshi Yamaguchi <sup>3</sup><br><sup>1</sup> Tokyo University of Marine Science and Technology, <sup>2</sup> Woods Hole Oceanography Institute, <sup>3</sup> Tokyo Metropolitan Government                                      |
| 435 | Construction of DONET2   |
|     | Takashi Yokobiki <sup>1</sup> , Jin-Kyu Choi <sup>1</sup> , Shuhei Nishida <sup>1</sup> , Hiroyuki Matsumoto <sup>1</sup> , Eiichiro Araki <sup>1</sup> , Katsuyoshi Kawaguchi <sup>1</sup> , Narumi Takahashi <sup>1</sup> , Shuichi Kodaira <sup>1</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology  |

## Marine Environmental Monitoring and Impact Assessment 2

|     |  |
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| 439 | Remediation of Polycyclic Aromatic Hydrocarbons (PAH)-Contaminated Marine Sediment with Surfactants<br><br>Po-Chang Wu <sup>1</sup> , Chih-Feng Chen <sup>1</sup> , Cheng-Di Dong <sup>1</sup><br><sup>1</sup> National Kaohsiung Marine University  |
| 444 | Metal Accumulation in Aquaculture Organisms of Southwest Coast of Taiwan<br><br>XiangYing Chuang <sup>1</sup> , ChiuWen Chen <sup>1</sup> , YunRu Ju <sup>1</sup><br><sup>1</sup> National Kaohsiung Marine University   |
| 449 | Habitat Suitability Index Model for Neon Flying Squid Adding Its Stock Effect<br><br>Hiromichi Igarashi <sup>1</sup> , Yoichi Ishikawa <sup>1</sup> , Haruka Nishikawa <sup>2</sup> , Norihisa Usui <sup>3</sup> , Mitsuo Sakai <sup>4</sup> , Sei-ichi Saitoh <sup>5</sup> , Yutaka Imamura <sup>6</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology, <sup>2</sup> Japan Society for the Promotion of Science, <sup>3</sup> Meteorological Research Institute, Japan Meteorological Agency, <sup>4</sup> Tohoku National Fisheries Research Institute, <sup>5</sup> Hokkaido University, <sup>6</sup> Aomori Prefectural Industrial Technology Research Center |
| 454 | Environmental Impact Assessment Technologies for Sub-Sea Geological CCS - Perspective of Prediction Models -<br><br>Toru Sato <sup>1</sup> , Yuki Kano <sup>1</sup> , Kentaro Kamada <sup>1</sup> , Ayako Fukumoto <sup>1</sup> , Takuya Nakashima <sup>1</sup> , Yu Tao <sup>1</sup> , Hiroyuki Oyama <sup>1</sup><br><sup>1</sup> University of Tokyo  |

## Oceanography and Education 2

|     |  |
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| 460 | A Proposal for Extreme Statistics Using Annual Maximum Data with Trend of Increasing or Decreasing<br><br>Keiji Nakai <sup>1</sup> , Noriaki Hashimoto <sup>2</sup> , Koji Kawaguchi <sup>3</sup> , Kyoshi Nukada <sup>1</sup> , Ryoichi Inoue <sup>1</sup><br><sup>1</sup> ECOH Corporation, <sup>2</sup> Kyushu University, <sup>3</sup> Port and Airport Research Institute |
| 465 | Recognizing Fishing Activities via VMS Trace Analysis Based on Mathematical Morphology<br><br>Yuan Zong <sup>1</sup> , Haiguang Huang <sup>1,2</sup> , Feng Hong <sup>1</sup> , Yong Zhen <sup>1</sup> , Zhongwen Guo <sup>1</sup><br><sup>1</sup> Ocean University of China, <sup>2</sup> Wenzhou Ocean and Fishery Vessel Safety Rescue Information Center                   |
| 471 | Evaluating the Data Visualization for Demanding Marine Operations<br><br>Xu Zhuge <sup>1</sup> , Hao Wang <sup>1</sup> , Girts Strazdins <sup>1</sup><br><sup>1</sup> Norwegian University of Science and Technology   |
| 478 | A Novel Method for Long-Term Time Series Analysis of Significant Wave Height<br><br>Byung Ho Kang <sup>1</sup> , Tae Ho Kim <sup>2</sup> , Gil Young Kong <sup>2</sup><br><sup>1</sup> Underwater Vehicle Research Center, <sup>2</sup> Korea Maritime and Ocean University  |

## Numerical Modeling and Simulation 2

|     |   |
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| 485 | Submarine Liquefied Flow Dynamics: Impacts, Modeling and Validations  |
|     | Shinji Sassa <sup>1</sup><br><sup>1</sup> Port and Airport Research Institute   |
| 489 | A Numerical Simulation of Drainage of Influent Water Caused by Tsunami at Kawauchi, Tokushima   |
|     | Junichi Taniguchi <sup>1</sup> , Toshitaka Baba <sup>1</sup> , Manabu Miyoshi <sup>2</sup> , Hiroshi Aki <sup>2</sup><br><sup>1</sup> Tokushima University, <sup>2</sup> Nita Consultant Co., Ltd.  |
| 493 | Generation Mechanism of the Rip Current at the Semi-Enclosed Beach by the Groin   |
|     | Naoyuki Inukai <sup>1</sup> , Takeshi Ootake <sup>2</sup> , Yoshifumi Ejiri <sup>3</sup> , Hiroshi Yamamoto <sup>1</sup><br><sup>1</sup> Nagaoka University of Technology, <sup>2</sup> Ecoh Corporation, <sup>3</sup> Penta-Ocean Construction Co., LTD. |
| 499 | Study on Subsea-Type Gas Production System for Extraction of Methane Hydrate under the Seabed   |
|     | Ryusei Kajiyama <sup>1</sup> , Takeshi Shinoda <sup>1</sup> , Ryosuke Koike <sup>1</sup><br><sup>1</sup> Kyushu University  |

## Ocean Energy Development 3

|     |   |
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| 504 | A Basic Study on the MPS Method Simulation for the Caisson OWC Type WEC in Regular Waves  |
|     | Yutaro Sasahara <sup>1</sup> , Mitsuhiro Masuda <sup>1</sup> , Kiyokazu Minami <sup>1</sup><br><sup>1</sup> Tokyo University of Marine Science and Technology   |
| 510 | A Model Test of an OWC Type WEC Using Wave Dissipating Double-Caissons in a Wave Tank   |
|     | Tomoki Ikoma <sup>1</sup> , Koichi Masuda <sup>1</sup> , Kazuyoshi Kihara <sup>2</sup> , Hiroaki Eto <sup>1</sup> , Shogo Shibuya <sup>1</sup><br><sup>1</sup> Nihon University, <sup>2</sup> M. M. Bridge Co. Ltd. |
| 515 | Design of a Hydraulic Power Take-Off Test Rig for Wave Energy Converters  |
|     | Yasutaka Imai <sup>1</sup> , Shuichi Nagata <sup>1</sup> , Tengen Murakami <sup>1</sup> , Da-Wei Chen <sup>1</sup><br><sup>1</sup> Saga University  |

## Sensor and Observing Instruments 3

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| 519 | Performance Analyses and Optimization of Real-Time Multi-Step GA for Visual-Servoing |
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|     | Based Underwater Vehicle  |
|     | Khin Nwe Lwin <sup>1</sup> , Kenta Yonemori <sup>1</sup> , Myo Myint <sup>1</sup> , Naoki Mukada <sup>1</sup> , Mamoru Minami <sup>1</sup> , Akira Yanou <sup>1</sup> , Takayuki Matsuno <sup>1</sup><br><sup>1</sup> Okayama University  |
| 527 | FishDrop: Estimation of Reef Fish Population Density and Biomass Using Stereo Cameras   |
|     | Prospero C. Naval, Jr. <sup>1</sup> , Laura T. David <sup>1</sup><br><sup>1</sup> University of the Philippines   |
| 532 | Tidal Flat Observation and Monitoring Using Still Video and Network Cameras   |
|     | Naoaki Tezuka <sup>1</sup> , Motoharu Uchida <sup>1</sup> , Toshihiro Shigeta <sup>1</sup> , Tokihiro Fukatsu <sup>2</sup><br><sup>1</sup> National Research Institute of Fisheries and Environment of Inland Sea, <sup>2</sup> National Agriculture and Food Research Organization |
| 536 | Underwater Atomic Force Microscope: Instrumentation, Operation, and Measurements  |
|     | Shuhei Nishida <sup>1</sup> , Naoki Matsubara <sup>1</sup> , Tatsuhiko Fukuba <sup>2</sup> , Masanori Kyo <sup>2</sup> , Teruo Fujii <sup>1</sup><br><sup>1</sup> The University of Tokyo, <sup>2</sup> Japan Agency for Marine-Earth Science                                       |

#### Ocean Observing Platforms 4

|     |   |
|-----|---|
| 540 | Distribution of Ambient Noise at Offshore Kii Peninsula by Using DONET  |
|     | Ikuo Matsuo <sup>1</sup> , Shuhei Nishida <sup>2</sup> , Katsuyoshi Kawaguchi <sup>2</sup><br><sup>1</sup> Tohoku Gakuin University, <sup>2</sup> Japan Agency for Marine-Earth Science and Technology  |
| 544 | Real Time Detection and Localization System for Underwater Acoustic Signal with Cable Observatories in the West Pacific Ocean   |
|     | Shuhei Nishida <sup>1</sup> , Ryoichi Iwase <sup>1</sup> , Katsuyoshi Kawaguchi <sup>1</sup> , Ikuo Matsuo <sup>2</sup> , Tomonari Akamatsu <sup>3</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology, <sup>2</sup> Tohoku Gakuin University, <sup>3</sup> National Research Institute of Fisheries Science |
| 548 | Localization of Fin Whale Calls with a Cabled Ocean Bottom Seismometer off East Japan Pacific Ocean   |
|     | Ryoichi Iwase <sup>1</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology   |
| 552 | Visualization of Fish Movement and Size Estimation of the Fish by Using Broadband Split-Beam Echo Sounder   |
|     | Tomohito Imaizumi <sup>1</sup> , Koki Abe <sup>1</sup> , Ryuzo Takahashi <sup>1</sup> , Ikuo Matsuo <sup>2</sup> , Tomonari Akamatsu <sup>3</sup><br><sup>1</sup> National Research Institute of Fisheries Engineering, <sup>2</sup> Tohoku Gakuin University, <sup>3</sup> National Research Institute of Fisheries Science        |



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| 556 | Localization Method of Fish by Using Fish Call Sounds Recorded by Two Stereo Underwater Sound Recorders   |
|     | Kazuki Yamato <sup>1</sup> , Ikuo Matsuo <sup>1</sup> , Ryuzo Takahashi <sup>2</sup> , Naoto Matsubara <sup>3</sup> , Hiroki Yasuma <sup>3</sup><br><sup>1</sup> Tohoku Gakuin University, <sup>2</sup> Japan Fisheries Research and Education Agency, <sup>3</sup> Hokkaido University |

### Offshore Structure and Naval Architecture 1

|     |   |
|-----|---|
| 562 | A Feasibility Study of Accurate 3D Measurement of Ships Using Dense Stereo Vision System  |
|     | Yasuhiro Nomura <sup>1</sup> , Shigehiro Yamamoto <sup>1</sup> , Kotaro Yoshihara <sup>2</sup> , Takeshi Hashimoto <sup>3</sup><br><sup>1</sup> Kobe University, <sup>2</sup> Marine Technical College, <sup>3</sup> Shizuoka University  |
| 566 | Effective Energy-Saving Device of Eco-Ship by Using Wave Propulsion   |
|     | Sheng-Wei Huang <sup>1</sup> , Tsung-Lin Wu <sup>1</sup> , Yu-Ting Hsu <sup>1</sup> , Jen-Hwa Guo <sup>1</sup> , Jing-Fa Tsai <sup>1</sup> , Forng-Chen Chiu <sup>1</sup><br><sup>1</sup> National Taiwan University  |
| 571 | An Experimental System for Measurement of Dynamics of Damaged Ships   |
|     | Akihiko Matsuda <sup>1</sup> , Koki Kawamura <sup>2</sup> , Hirotada Hashimoto <sup>3</sup> , Daisuke Terada <sup>1</sup><br><sup>1</sup> National Research Institute of Fisheries Engineering, <sup>2</sup> National Maritime Research Institute, <sup>3</sup> Kobe University |
| 575 | Estimation of the Random Exciting Force Causing Parametric Roll Resonance Verification Based on Numerical Simulation  |
|     | Daisuke Terada <sup>1</sup> , Akihiko Matsuda <sup>1</sup> , Hirotada Hashimoto <sup>2</sup><br><sup>1</sup> National Research Institute of Fisheries Engineering, <sup>2</sup> Kobe University   |

### Oceanography and Education 3

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| 582 | Underwater Archaeology and Museums as Transdisciplinary Platforms for Formal and Informal Maritime Education in Universities |
|     | Jeng-Horng Chen <sup>1</sup><br><sup>1</sup> National Cheng Kung University  |
| 586 | A Ten-Year Review on Building Marine Aspired Generations through Ship Model and Marine Vehicle Competitions                  |
|     | Wen-Ling Hong <sup>1</sup> , Jr-Ping Wang <sup>1</sup><br><sup>1</sup> National Kaohsiung Marine University                  |
| 590 | Experiment and Computation on the Development of Axisymmetric Gravity Currents   |
|     | Yosuke Sawano <sup>1</sup> , Nobuhiro Baba <sup>1</sup><br><sup>1</sup> Osaka Prefecture University                          |

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| 595 | Hydrographic Observations in the Japan Sea with an Underwater Glider   |
|     | <p>Taku Wagawa<sup>1</sup>, Yosuke Igeta<sup>1</sup>, Naoto Honda<sup>1</sup>, Shoko Abe<sup>1</sup>, Masashi Ito<sup>1</sup>, Takeshi Okunishi<sup>2</sup>, Daisuke Hasegawa<sup>2</sup>, Shigeo Kakehi<sup>2</sup>, Takashi Setou<sup>3</sup>, Yugo Shimizu<sup>3</sup></p> <p><sup>1</sup>Japan Sea National Fisheries Research Institute, <sup>2</sup>Tohoku National Fisheries Research Institute, <sup>3</sup>National Research Institute of Fisheries Science</p> |

### Numerical Modeling and Simulation 3

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| 599 | <p>Modeling the Drift of Japan Tsunami Marine Debris (JTMD)<br/>An Application of High Computing Simulation and Data Assimilation</p>  |
|     | <p>Masafumi Kamachi<sup>1</sup>, Yoichi Ishikawa<sup>1</sup>, Hideyuki Kawamura<sup>2</sup>, Nikolai Maximenko<sup>3</sup>, Jan Hafner<sup>3</sup>, Amy MacFadyen<sup>4</sup></p> <p><sup>1</sup>JAMSTEC, <sup>2</sup>JAEA, <sup>3</sup>University of Hawaii, <sup>4</sup>NOAA</p>   |
| 603 | <p>Wave Run up Dynamics at Jogehama Beach</p>  |
|     | <p>Naoyuki Inukai<sup>1</sup>, Kazuki Ogawa<sup>2</sup>, Yoshifumi Ejiri<sup>3</sup>, Takeshi Ootake<sup>4</sup>, Hiroshi Yamamoto<sup>1</sup></p> <p><sup>1</sup>Nagaoka University of Technology, <sup>2</sup>East Japan Railway Company, <sup>3</sup>Penta-Ocean Construction Co., LTD., <sup>4</sup>Ecoh Corporation</p> |
| 612 | <p>Calculation of Wave Transformation Conducted by a Coupling between Boussinesq Model and Energy Balance Equation Model</p>   |
|     | <p>Katsuya Hirayama<sup>1</sup></p> <p><sup>1</sup>Port and Airport Research Institute</p>   |
| 618 | <p>Numerical Study on Wave Run-Up Height and Depression Depth around a Vertical Circular Cylinder at Various Froude Numbers</p>  |
|     | <p>Xiaoxi Xiao<sup>1</sup>, Tahsin Tezdogan<sup>1</sup>, Atilla Incecik<sup>1</sup></p> <p><sup>1</sup>University of Strathclyde</p>   |

### Numerical Modeling and Simulation 5

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| 624 | <p>Seepage Flow Analysis on Caisson-Type Breakwater Reinforced with Sheet Piles by Using the SPH Method</p>  |
|     | <p>Tetsuro Goda<sup>1</sup>, Mitsuteru Asai<sup>1</sup></p> <p><sup>1</sup>Kyushu University</p>   |
| 631 | <p>Numerical Modeling of Sound Propagation over Various Gradient Continental Slopes</p>  |
|     | <p>Ran Cao<sup>1</sup>, Kunde Yang<sup>1</sup>, Yuanliang Ma<sup>1</sup>, Qiulong Yang<sup>1</sup>, Shaohao Zhu<sup>1</sup></p> <p><sup>1</sup>Northwestern Polytechnical University</p> |
| 635 | <p>Possible Variations in Interplate Coupling Preceding the next Nankai Trough Earthquake</p>  |
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|     | Mamoru Hyodo <sup>1</sup> , Takane Hori <sup>1</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology  |
| 639 | Development of High-Performance Finite-Element Solver and Application to Seismic Ground Strain Analysis of Tokyo<br><br>Kohei Fujita <sup>1</sup> , Tsuyoshi Ichimura <sup>2</sup> , Muneo Hori <sup>1,2</sup><br><sup>1</sup> RIKEN, <sup>2</sup> The University of Tokyo |

## Sensor and Observing Instruments 4

|     |   |
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| 643 | Practical Marine TDEM Systems Using ROV for the Ocean Bottom Hydrothermal Deposits<br><br>Keiko Nakayama <sup>1</sup> , Akira Saito <sup>1</sup><br><sup>1</sup> Waseda University  |
| 648 | Method of the Side-Lobe Suppression without the Main-Lobe Widening for Linear Array Beam-Forming<br><br>Songwen Li <sup>1,2</sup><br><sup>1</sup> Science and Technology on Underwater Acoustic Antagonizing Laboratory, <sup>2</sup> Shanghai Marine Electronic Equipment Research Institute   |
| 652 | Assessments of a Quartz Pressure Sensor Characteristics for Accurate Pressure Measurements to Detect Small Seafloor Displacements<br><br>Yuya Machida <sup>1</sup> , Shuheii Nishida <sup>1</sup> , Eiichiro Araki <sup>1</sup> , Hiroyuki Matsumoto <sup>1</sup> , Toshinori Kimura <sup>1</sup> , Katsuyoshi Kawaguchi <sup>1</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology  |
| 656 | Deep Seafloor Borehole Observatories for Seismogenic Zone Monitoring<br><br>Eiichiro Araki <sup>1</sup> , Toshinori Kimura <sup>1</sup> , Yuya Machida <sup>1</sup> , Takashi Yokobiki <sup>1</sup> , Shuheii Nishida <sup>1</sup> , Katsuyoshi Kawaguchi <sup>1</sup> , Demian Saffer <sup>2</sup> , Masanori Kyo <sup>1</sup> , Tomo Saruhashi <sup>1</sup> , Sean Toczko <sup>1</sup> , Achim Kopf <sup>3</sup><br><sup>1</sup> Japan Agency for Marine-Earth Science and Technology, <sup>2</sup> The Pennsylvania State University, <sup>3</sup> Bremen University |

## Offshore Structure and Naval Architecture 2

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| 660 | Experimental Study on Flow Around an Array of Four Circular Cylinders<br><br>Rodolfo Trentin Gonçalves <sup>1</sup> , Shinichiro Hirabayashi <sup>1</sup> , Hideyuki Suzuki <sup>1</sup><br><sup>1</sup> The University of Tokyo |
| 668 | Wave Interaction with Submerged Body in Presence of Uneven Bottom<br><br>Ramnarayan Mondal <sup>1</sup> , Ken Takagi <sup>1</sup><br><sup>1</sup> The University of Tokyo  |

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| 672 | Experimental Study on Breakwater against Overflow and High Waves  |
|     | Tsukasa Kita <sup>1</sup> , Kojiro Suzuki <sup>1</sup> , Naoki Tsuruta <sup>1</sup><br><sup>1</sup> Port and Airport Research Institute |
| 676 | Subsidence Behavior of a Breakwater Subjected to Long Periods of Ground Motions from Huge Subduction Earthquakes                        |
|     | Y. Ohya <sup>1</sup> , E. Kohama <sup>1</sup> , A. Nozu <sup>1</sup><br><sup>1</sup> Port and Airport Research Institute                |

## Numerical Modeling and Simulation 4

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| 682 | Management of Empty Container Repositioning Considering Leveling Marine Container Logistics  |
|     | Heng Wang <sup>1</sup> , Kenji Tanaka <sup>1</sup><br><sup>1</sup> The University of Tokyo   |
| 687 | Ship Course Keeping Using Eigenvalue Decomposition Adaptive Sliding Mode Control   |
|     | Zhiquan Liu <sup>1</sup> , Wei Gu <sup>1</sup> , Diju Gao <sup>1</sup><br><sup>1</sup> Shanghai Maritime University  |
| 692 | Robust Minimum Variance Distortionless Response Beamforming Using Subarray Multistage Processing for Circular Hydrophone Arrays  |
|     | Shaohao Zhu <sup>1</sup> , Kunde Yang <sup>1</sup> , Yuanliang Ma <sup>1</sup> , Qiulong Yang <sup>1</sup> , Xiaole Guo <sup>1</sup><br><sup>1</sup> Northwestern Polytechnical University |