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June 10–15, Sapporo, Japan

The Twenty-eighth (2018) International
**Ocean and Polar
Engineering Conference**
(Offshore and Polar Engineering Conference)

Including *additional ISOPE symposia*:

**ISOPE OMS/OMGH-2018
13th Ocean Mining &
Gas Hydrates Symposium**

ISOPE-2018

Sapporo, Japan, June 10-15

(June 01)

*Updated
Technical Program*

Peer-reviewed papers from 50+ countries in 151 technical sessions. **3** Plenary and **5** keynote and multiple focus sessions

Full Program with General Information, Advance Registration and Venue Hotel. Paper List, Reservations, and Updates on

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ISOPE-2018 Conference proceedings

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International Society of Offshore and Polar Engineers (ISOPE)
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TECHNICAL PROGRAM

Paper List and Chair List as of June 01, 2018

ISOPE OMS/OMGH-2018 13th Ocean Mining & Gas Hydrates Symposium

together at
**The Twenty-eighth (2018) International
Ocean and Polar Engineering Conference**
Sapporo, Japan, June 10–15, 2018



This 28th annual conference features **151** technical and opening general sessions, **8** plenary presentation and keynote presentations from top experts from industry, academia and government. After peer review of the manuscripts selected from 1,440+ abstracts, **747** peer-reviewed-papers will be presented and discussed by researchers, engineers and managers from more than **50+** countries.

The ISOPE-2018 Conference Proceedings with peer-reviewed papers in PDF files will be available in a set of 4 volumes on CD-ROM (**5,094** pp.) — paginated — during the conference and later for worldwide post-conference order from ISOPE: ISBN 978-1-880653-**87-6**; ISSN 1098-6189.

The number at end of the session title indicates the tentative number of the proceedings volume. Only the changes in titles or authors the Technical Program Committee received in writing before **April 26**, 2018 are reflected in this program. Final corrections will be updated in the Conference Proceedings of peer-reviewed papers and the Final Program.

All ISOPE publications are indexed by Engineering Index , EI Compendex, Google scholar, Scopus, Thomson Scientific and Technical Proceedings (ISTP), web of science and others.

FULL CONFERENCE PROGRAM WITH SESSION / PAPER LIST: Updated at
<http://www.isopec.org/conferences/conferences.htm>
<http://www.isopec.org/publications/publications.htm>

2018 Jin S Chung Award Lecture
Tuesday 13:15
3 Plenary and 5 keynote Presentations
Monday, Tuesday, Wednesday

SUNDAY, June 10

Conference Reception

17:00

Royton Hall AB, 3F

MONDAY 08:30

1. Opening General Session:

2. OCEAN AND ENERGY INDUSTRY REVIEW—2011 (V. 1)

Monday June 11 08:30 Royton Hall, 3F

Chair: Hiromitsu Kitagawa, Ocean Policy Research Inst, Japan
Co-Chair: Jin S Chung, ISOPE, USA

Welcome to Sapporo

Naoto Ebuchi, Local Committee Chair, Hokkaido Univ, Japan

Global Energy Outlook and Its Implications [Oral presentation]

Jeffrey M. Grenda, ExxonMobil Research & Engineering, USA

Floatover Installation Technology in South China Sea [Oral presentation]

Xiaojian Jin, President, COOEC Offshore Oil Engineering, China

WEDNESDAY 10:30

90. OMGH I: DEEP OCEAN MINING 1: Minerals, Exploration, Environment 1 (V. 1)

Wednesday June 13 10:30 Emerald B, 3F

Chair: Frank Lim, 2H Offshore, China

Co-chair: Anatolii V Kondratenko, FSBI "VNIIOkeangeologia"; Russia

Deep Ocean Mining Technology (1975-2018)

Jin S Chung, ISOPE, USA

Ferromanganese Crusts in the Northwestern Pacific Seamounts - A Review: Variations in Grade and Abundance on the Regional to Microscopic Scales

Akira Usui, Kochi Univ; Katsuhiko Suzuki, JAMSTEC, Japan

A Series of Scientific Drilling at the Areas of Submarine Hydrothermal Deposits with Core-log Integration for Deciphering Mineralization Processes

Hidenori Kumagai, Tatsuo Nozaki, JAMSTEC; Jun-ichiro Ishibashi, Kyushu Univ; Saneatsu Saito, JAMSTEC; Shogo Komori, AIST; Yohei Hamada, Yoshinori Sanada, Tomokazu Saruhashi, Lena Maeda, Yu'usuke Kubo, and Ken Takai, JAMSTEC, Japan

A Preliminary Study of the Relation between Topographic Features and the Distribution of Polymetallic Nodules in Japanese License Area, Central Pacific

Keisuke Nishi, Akira Koizumi, Akira Tsune, Soichiro Tanaka, Deep Ocean Resources Development, Japan

Distributions of Megabenthic Organisms in the Areas of North-west Pacific Seamounts Where are Covered with Cobalt Rich Ferromanganese Crust

Hideki Sugishima, Takaaki Matsui, Nobuyuki Okamoto, Japan Oil, Gas & Metals National Corp; Tomohiko Fukushima, JAMSTEC, Japan

Origin of Neodymium in the Surface Layer of Ferromanganese Crusts

Hiroshi Amakawa, Yusuke Fukami, Junji Torimoto, JAMSTEC; Akira Usui, Kochi Univ; Tatsuo Nozaki, Koishi Iijima, Katsuhiko Suzuki JAMSTEC, Japan

**100. OMGH II: DEEP OCEAN MINING 2:
Minerals, Mining Systems, Tech 1 (V. 1)**

Wednesday June 13 14:00 Emerald B, 3F

Chair: Jin S. Chung, ISOPE, USA

Electro-Osmotic with Injection of Microbial for Strengthening Clay

Shao-Chi Chien, Hsuan Chuang Univ; Chang-Yu Ou, National Taiwan Univ of Sci & Tech; Pio-Go Hsieh, Hwa Hsia Univ of Tech, Taiwan China

Dynamic Response of a Deepsea Mining Riser

Ting Ting Li, Frank Lim, Yong Sha, Hui Zhang, 2H Offshore, China

Testing of Umbilical Cable for Reliable and Safe Operation

Gnanaraj. A. A, Venkatesan. K, Sasikala. T, Ramesh. N. R, Muthuvel. P, S. Muthukrishna Babu, Gopakumar. K, Ramadass. G. A, National Inst of Ocean Tech, India

Physical-Mechanical Properties of the Bottom Formations of the Hydrothermal Ore Fields on the Mid-Atlantic Ridge

Anatolii V Kondratenko, Igor V. Egorov, FSBI "VNIIOkeangeologia"; Victor N. Ivanov Polar Marine Geosurvey Expedition; Dmitrii L. Kell, Maria S. Stepanova, FSBI "VNIIOkeangeologia", Russia

**110. OMGH III: OCEAN MINING 3
- Minerals, Explorartion, Environment 2 (V. 1)**

Wednesday June 13 16:20 Emerald B, 3F

Chair: Akira Usui, Kochi Univ, Japan

Environmental Condition 17-18 Years after the Benthic Impact Experiment

Tomohiko Fukushima, JAMSTEC; Akira Tsune, Deep Ocean Resources Development Co, Japan

Periodic Behavior of Abyssal Flow in Okinawa Trough Hydrothermal Fields

Yasuo Furushima, JAMSTEC; Hironori Higashi, National Inst for Environmental Studies; Tatsuo Fukuhara, KANSO Co; Takeya Matsuda, Kokusai Kogyo Co; Hiroyuki Yamamoto, JAMSTEC; Naoki Furuichi, Japan Fisheries Resesarch & Education Agency; Tomohiko Fukushima, JAMSTEC, Japan

Lander Observatory with Non-Contact Power Supply and Communication Interfaces for Long-Term Ecosystem Monitoring at Deep-Sea

Tatsuhiro Fukuba, Jin-Kyu Choi, Yasuo Furushima, Tetsuya Miwa, Hiroyuki Yamamoto, JAMSTEC, Japan

Comparison of Components and Description for Benthic Organisms between Existing Environmental Impact Statements and Administrative Frameworks

Yoji Miyata, Tomohiko Fukushima, JAMSTEC, Japan

Confirming the Validity of ADCP Velocity Measurements for Physical Environmental Assessment in Japan's Exploration Areas for Cobalt-rich Ferromanganese Crusts

Masayuki Nagao, Yoshio Takasugi, Atsushi Suzuki, Yuichiro Tanaka, National Inst of AIST; Hideki Sugishima, Takaaki Matsui, Nobuyuki Okamoto, Japan Oil, Gas and Metals National Corp, Japan

Evaluation of Turbidity and Resedimentation through Seafloor Disturbance Experiments for Assessment of Environmental Impacts Associated with Exploitation of Seafloor Massive Sulphides Mining

Takaaki Matsui, Hideki Sugishima, Nobuyuki Okamoto, Yoshiaki Igarashi, Japan Oil, Gas & Metals National Corp, Japan



19:00

Royton Hall

The 28th Annual Conference Banquet

Cultural Event, ISOPE Best Paper, Best Student Paper, Outstanding Student Scholarships, Best Organizer(s) and ISOPE Awards

Don't forget the banquet ticket.

120. OMGH IV: OCEAN MINING 4:

Mining Systems, Tech 2 (V. 1)

Thursday June 14 08:00 Emerald B, 3F

Chair: K Gopkumar, National Inst of Ocean Tech, India

Co-Chair Akira Usui, Kochi Univ, Japan

Development and Testing of Locomotion Trials on Soft Sea Bed Soil and System Performance Checks of Experimental Undercarriage System

Janarthanan.C, Chandran.V, Sundaramoorthi.V, Viswanath.B.O, Dinesh Kumar.D, Muthuvel.P, Rajesh.S, Gnanaraj.A.A, Venkatesan.K, Muthukrishna Babu.S, Gopkumar K, Ramesh.N.R and Ramadass.G.A, National Inst of Ocean Tech, India

Investigation on Vertical Incipient Motion of Spherical Particles in Hydraulic Collecting

Guocheng Zhao, Longfei Xiao, Weijie Zhao, Yufeng Kou, Shanghai Jiao Tong Univ, China

An Analytical Model of the Effect of Internal Density Waves in Risers Subjected to Vortex Shedding

Mats Jørgen Thorsen, Svein Sævik, NTNU, Norway

Numerical Study on Settling and Floating Movements of a Sphere Particle Flowing in a Vertical Pipe

Hong Xiong, Yuxiang Chen, Ning Yang, Jianyu Xiao, Inst of Deep-sea Sci & Eng, CAS; Li Li, Central South Univ, China

125. OMGH V - GAS HYDRATES 1

Fundamental (V. 1)

Thursday June 14 10:30 Highness, 2F

Chair: Yutaek Seo, Seoul National Univ, Korea

Co-chair: Hideki Minagawa, National Inst. of AIST, Japan

Experimental Study on Mechanical Properties of Clay Sediment Containing Tetrahydroguran Hydrate

Shuyun Wang, Xiaobing Lu, Xuhui Zhang, Inst of Mechanics, CAS, China

Effect of High Molecular Weight Asphaltenes on the Phase Stability of Methane Hydrates

Siddhant K. Prasad, Deepjyoti Mech, Vishnu Chandrasekharan Nair, Pawan Gupta, Jitendra S. Sangwai, IIT Madras, India

Spectroscopic Observation and Formation Kinetics of Chlorodifluoromethane Hydrate under Salt Environments [Oral presentation]

Ji-Ho Yoon, Korea Maritime and Ocean Univ; Yesol Woo, Ocean Science & Tech School; Jeasung Park, Korea Inst of Industrial Tech, Korea

Numerical Simulation of Dissociation Behavior in Experimental Production System Depending on Gas Hydrate Saturation

Seo-Yoon Moon, Hyo-Jin Shin, Jong-Se Lim, Korea Maritime and Ocean Univ; Jaehyoung Lee, Korea Inst of Geoscience & Mineral Resources, Korea

135. OMGH VI: GAS HYDRATES 2

-Production Fundamental (V. 1)

Thursday June 14 14:00 Highness, 2F

Chair: Takeshi Komai, Tohoku Univ, Japan

Experimental Study on Acid Injection for Enhanced Gas Recovery from Gas Hydrate Reservoir

Yusuke Nakano, Fuyuki Kaneko, Kengo Nakamura, Tohoku Univ; Yasuhide Sakamoto, National Inst of AIST; Takeshi Komai, Tohoku Univ, Japan

Risk Management of Hydrate Reformation Using Synergistic Inhibition during Methane Hydrate Production

Jakyung Kim, Daejun Chang, KAIST; Ki Heum Park, Yutaek Seo, Seoul National Univ, Korea

A Concept of Adapting an Oilfield Subsea Tree for Gas Hydrates Production

Jun Kai Feng, Tian Feng Zhao, Ji Li Yang, Frank Lim, China Univ of Petroleum-Beijing, China

Particular Qualities of the Formation and Decomposition of Natural Gas Hydrates from Sakhalin 3 Offshore Fields

Iurii M Em, Alexey A Morozov, Svetlana G Gulkova, Alexander N Gulkov, Far Eastern Federal Univ, Russia

**145. OMGH VII: GAS HYDRATES 3 –
CO₂ Storage (V. 1)**

Thursday June 14 16:20 Highness, 2F

Chair: Norio Tenma, National Inst. of AIST, Japan

Calculation for Solubility of Methane and Carbon Dioxide in Water in Presence of Hydrate

Zunzhao Li, Xiaolin Wang, Qian Xue, Mingrui Liu, SINOPEC Dalian Research Inst of Petroleum and Petrochemicals, China

Pore-scale Numerical Simulation of CO₂ Hydrate Formation

Tatsuya Fuji, Toru Sato, Hiroyuki Oyama, Univ of Tokyo, Japan

Experimental Verification of CH₄ – CO₂ Replacement in Various Gas Hydrate Structures for CH₄ Production and CO₂ Sequestration

Wonjung Choi, Yohan Lee, Yongwon Seo, Ulsan National Inst of Science & Tech, Korea

Research of Improving CO₂ Hydrate Conversion from Microscopic Ice Particle in Fluidized Bed

Erii Kinoshita, Shinichiro Hirabayashi, Univ of Tokyo; Yoshitaka Yamamoto, Naoko Suzuki, Michika Otake, National Inst of AIST, Japan

Simultaneous Olivine Alteration and Carbonation in CO₂-rich Geological Condition

Jiajie Wang, Kengo Nakamura, Noriaki Watanabe, Takeshi Komai, Tohoku Univ, Japan

Experimental Study of the Effect of Intensifier Gases on the Kinetics of the Methane Replacement Process with Carbon Dioxide in Gas Hydrate

Pavel I Osmolovskiy, Yuri M Em, Ivan V Zemchenko, Anton A Pichugov, Alexander N Gulkov, Far Eastern Federal Univ, Russia