



I N C H E O N · K O R E A U N D E R W A T E R M I N I N G C O N F E R E N C E

FINAL PROGRAM

9 OCTOBER 2016 (SUNDAY)

WELCOMING RECEPTION & REGISTRATION

(LILY ROOM)

Orakai Songdo Park Hotel

151, Techno Park-ro, Yeonsu-gu

Incheon · Korea · Tel: +82-32-210-7000

19:00 – 21:30

UMC participants and guests are welcome

10 OCTOBER 2016 (MONDAY)

TECHNICAL SESSION I

(LILY ROOM)

Orakai Songdo Park Hotel

08:30 – 17:45

Participants staying at the Orakai should enjoy breakfast before coming to the conference room.

08:30 INTRODUCTION AND WELCOME

Call to Order

Samantha Smith, IMMS President and UMC Program Chair, Ontario, Canada

Hosts' Welcome (08:40)

Mr. Joon-Wook Choi

Director, Marine Industry Policy Bureau

Ministry of Oceans and Fisheries, Korea

Dr. Gi-Hoon Hong

President

Korea Institute of Ocean Science and Technology (KIOST)

Presentations

- 09:00 Marine Environmental Baseline Surveys - Overcoming the Deep Water Hurdle**
Andrew Campbell, Gardline Marine Sciences Ltd, Singapore
- 09:20 A Recommended Practice for Managing Environmental Aspects and Impacts of Seabed Mining**
Tom Gorski, DNV GL, Environmental Monitoring, Høvik, Norway
- 09:40 Toxic Trace Elements in Sulfides of Modern and Ancient Black Smokers: Possible Influence on Ecosystems**
Valery Maslennikov, Institute of Mineralogy, South Urals University, Miass Chelyabinsk, Russia
- 10:00 A Geographical Information System for Exploration and Management of a Hydrothermal Vent Marine Protected Area**
Kim Juniper, Ocean Networks Canada, Victoria, British Columbia, Canada
-
- 10:20 Break (30 minutes)**
-
- 10:50 Trace Elements in Sulfides from the Semenov-2 Hydrothermal Field, 13°31.13' N, Mid-Atlantic Ridge: Isomorphism or Inclusions?**
Irina Melekestseva, Russian Academy of Sciences, Urals, Miass Chelyabinsk, Russia
- 11:10 Effect of Reworked Barite on Radiometric Dating Using ^{228}Ra , ^{228}Th and $^{226}\text{Ra}/\text{Ba}$ Values: Implications for Seafloor Volcanogenic Massive Sulfide Deposits**
Robert Ditchburn, GNS Science, Lower Hutt, New Zealand
- 11:30 Key SMS Parameters for Potential Mining Operations: Case of Mid-Atlantic Ridge Deposits**
Georgy Cherkashov, VNIIOkeangeologia, Saint Petersburg, Russia
- 11:50 Nautilus Minerals Project Update**
John Parianos, Nautilus Minerals, Brisbane, Queensland, Australia
-
- 12:10 Break (2 hrs): Lunch (1 hr) followed by Poster Session (50 min), break (15 min)**
-

13:10 Poster Presentations (50 minutes)

Poster Presentations

Overview of Gold Main Features in Seafloor Massive Sulfides

Svetlana Babaeva, VNIIOkeangeologia (Institute for Geology and Mineral Resources of the Ocean), Russia

Geodynamic Features and Distribution of the Hydrothermal Vent Fields in Some Oceanic Regions

Svetlana Babaeva, VNIIOkeangeologia (Institute for Geology and Mineral Resources of the Ocean), Russia

Serious Business in the Deep Seas for Mining Polymetallic Nodules

Laurens de Jonge, Royal IHC, IHC Mining, Kinderdijk, The Netherlands

Composition and formation of Gabbro-Peridotite Hosted Seafloor Massive Sulfide Deposits from the Ashadze-1 Hydrothermal Field, Mid-Atlantic Ridge

Anna Firstova, St. Petersburg University, VNIIOkeangeologia, Saint Petersburg, Russia

Fish Reef Project and Deep Sea Mining Offsets

Chris Goldblatt, Fish Reef Project, California, USA

Estimation of Manganese Crust Coverage by Seafloor Image Binarization

Jong Min Joo, KIOST, Ansan, Korea

Probabilistic Estimates of Seafloor Massive Sulphide Deposits along an Arctic Mid-Ocean Ridge: A Multivariate Approach for Permissive Tracts

Cyril Juliani, Norwegian University of Science and Technology, Trondheim, Norway

MarMine – Exploitation Technologies for Marine Minerals on the Extended Norwegian Continental Shelf

Cyril Juliani, Norwegian University of Science and Technology, Trondheim, Norway

Survey Plan for Mining Manganese Nodules in the Korea Contract Area, Northeastern Pacific

Youngtak Ko, Deep-sea & Seabed Mineral Resources Research Center, KIOST, Ansan, Korea

Ferromanganese Crusts from Shaka Ridge (South Atlantic)

Natalia Konstantinova, Saint Petersburg U and VNIIO, Saint Petersburg, Russia

A Self-Compensating Magnetometer (SCM) System for High-Resolution Mapping on AUVs

Matthew Kowalczyk, Ocean Floor Geophysics. Inc., British Columbia, Canada

Initial Tests of an AUV-borne Controlled Source Electromagnetic (CSEM) System

Matthew Kowalczyk, Ocean Floor Geophysics. Inc., British Columbia, Canada

Global Perspectives of Gas Hydrates Research and Development

Sung-Rock Lee, Korea Institute of Geoscience and Mineral Resources (KIGAM), Daejeon, Korea

What's in a Deepsea Mining Riser System?

Frank Lim, 2H Offshore, Surrey, United Kingdom

Integration of Modeling for Enhanced Marine Mineral Resource Project Outcomes

Campbell McKenzie, Kenex Limited, Wellington, New Zealand

Understanding Element Accumulation in FeMn Crusts through the Lens of Chlorine

Kira Mizell, U.S. Geological Survey, Santa Cruz, California, USA

The US National Ocean Exploration Program

Amanda Netburn, NOAA Office of Ocean Exploration and Research, University of California, San Diego, San Diego, California, USA

Small-scale Occurrence, Growth Rate, and Mineral-chemical Composition of Hydrogenetic Ferromanganese Crusts from Two Typical Seamounts within the Japanese EEZ

Keisuke Nishi, Kochi University, Kochi, Japan

Platinum Group Element Geochemistry of Submarine Arc Lavas Associated with Cu-Au Mineralization: Implications for Modern VMS Deposit Exploration

Jung-Woo Park, Seoul National University, Seoul, Korea

Evaluating Deep-Sea Megabenthos after the Deepwater Horizon Oil Spill: Lessons Learned and Applications to the Deep-Sea Mining Industry

Stephanie Sharuga, U.S. Fish and Wildlife Service, USA

Utility of Industrial Submersibles and Opportunistic Surveys for Environmental Monitoring of the Marine Benthic Environment

Stephanie Sharuga, U.S. Fish and Wildlife Service, USA

Identifying Geochemical Signatures Associated with Subseafloor Massive Sulfide Mineralization at Iheya North Knoll, Middle Okinawa Trough

Toru Yamasaki, Geological Survey of Japan (AIST), Japan

Oral Presentations - continued

- 14:15 ANNOUNCEMENT and INVITATION TO UMC 2017 - BERLIN**
Leonhard Weixler, DeepSea Mining Alliance (DSMA), Hamburg, Germany
- 14:35 Hydrothermal Clay Minerals Recognized in Subseafloor of Active Hydrothermal Fields in the Okinawa Trough**
Jun-ichiro Ishibashi, Kyushu University, Kyushu, Japan
- 14:55 Gravity and Magnetics of the Central Indian Ridge: Preliminary findings for the Vicinity of 18° S to 7° S**
Michael Chandler, KIOST, Ansan, Korea
- 15:15 The Morpho-tectonic Features of Non-transform Discontinuity at 11°S and its Hydrothermal activity, Central Indian Ridge**
Sang Joon Pak, KIOST, Ansan, Korea
- 15:35 Denudation of Mantle Harzburgites and Mantle Heterogeneity Observed in MORB from the Central Indian Ridge, Latitude 8°–17° S**
Sang Bong Yi, Chonbuk National University, Jeonju, Korea

15:55 Break (30 minutes)

- 16:25 A Complex Hydrothermal System Around Dragon Horn Area (49.7°E) on Ultra-Slow Spreading Southwest Indian Ridge (SWIR)**
Chunhui Tao, Second Institution of Oceanography, Hangzhou, China
- 16:45 Nodule Occurrence, Metal Content and Nodule Grain Size at Different Bathymetry Horizons in the IOM Exploration Area**
Ivo Dreiseitl, Interoceanmetal (IOM), Szczecin, Poland
- 17:05 Integrated Phosphate Supply Models for Sustainable Development**
Tetsuo Yamazaki, Osaka Prefecture University, Osaka, Japan
- 17:25 Chatham Marine Phosphate Project will Rise Again**
Chris Castle, Chatham Rock Phosphate Ltd., Wellington, New Zealand
- 17:40 End of Technical Session I, Closing Remarks**
Samantha Smith

10 OCTOBER 2016 (MONDAY)

FREE EVENING

You are free to explore the surrounding Songdo area and to dine at your leisure. See separate handouts with maps and a list of suggested restaurants, bars and pubs.

11 OCTOBER 2016 (TUESDAY)

TECHNICAL SESSION II

(LILY ROOM)

Orakai Songdo Park Hotel

Session 08:30 – 17:45; Banquet 19:00

Participants staying at the Orakai Songdo Park Hotel should enjoy breakfast prior to coming to the conference room.

Spouses Tour: *Concurrent with Technical Session II. Meet at 09:00 in the Lobby of the Orakai Hotel. Ms. Ji-Young Shin of KIOST will escort the group (Sue Atwood, Beatrice Goodden, Shona Lynch, Svetlana Maslennikova, John Mizell, Nicola Parianos, and Laurie Stemm).*

08:30 International Marine Minerals Society: Annual General Membership Meeting

Samantha Smith, IMMS President

Presentations

09:00 ISA's Zero Draft Exploitation Regularions - What Contractors Should Be Concerned About

Steve Potter, Pinsent Masons LLP, Singapore

09:20 Developing National Regulatory Frameworks and Standards for Resource and Environmental Assessments for Deep Sea Mineral Activities

Paul Lynch, Seabed Minerals Authority, Rarotonga, Cook Islands

Introduction to Ocean Minerals LLC

John Halkyard (replaces Ron Rose), Ocean Minerals LLC, Houston, TX USA

09:40 Seabed Mining Exploitation Code: Review of Code and Commentary

Wylie Spicer, McInnes Cooper, Calgary Alberta, Canada

10:00 Investigating the Mining Potential of Marine Ferromanganese Deposits, A Major Resource of E-tech Elements

Jeremy Spearman, HR Wallingford, Oxfordshire, United Kingdom

10:20 Break (30 minutes)

10:50 Osmium Isotope Stratigraphy and Chemical Speciation of Elements of Ferromanganese Crusts in the Western Pacific Seamounts

Katsuhiko Suzuki, R&D for Submarine Resources, JAMSTEC, Yokosuka, Japan

11:10 An Explanation for the Unique Composition of Arctic Ocean Ferromanganese-Oxide Mineral Deposits

James Hein, U.S. Geological Survey, Santa Cruz, California, USA

11:30 Electron Microscopic Observation on Microbe-like Structures in the Ferromanganese Crust from the Western Pacific Magellan Seamount

Jinwook Kim, Yonsei University, Seoul, Korea

11:50 The Gas Hydrates of the Indian Offshore – A Prospective and Retrospective

Subramonian Rajendran, Kerala University of Fisheries and Ocean Studies, Cochiin, India

12:10 Lunch (1.0 hr)

13:10 Designing Geological Investigations for Commercial Success in the Transition from an Exploration Project to Marine Mining

John Youngson, Marine Minerals Group, Dunedin, New Zealand

13:30 Classification of Manganese Nodule Resource Estimates: Can We Reach the “Measured Resource” Level?

Thomas Kuhn, Federal Institute for Geosciences and Mineral Resources (BGR), Hannover, Germany

13:50 Fit for Purpose Design for Deep Sea Mining Vessel

Govinda Singh Chopra, SeaTech Solutions, Singapore

14:10 On-board Support System and Operation S/W for Offshore Operation of Pilot Lifting System

Tae Kyeong Yeu, KRISO (Korea Research Institute of Ships and Ocean Engineering), Daejeon, Korea

14:30 Technology Achievements through 3rd Pre-Pilot Mining Test: Lifting System

Sup Hong, KRISO (Korea Research Institute of Ships and Ocean Engineering), Daejeon, Korea

14:50 Break (30 minutes)

15:20 The Development of Technology for the Mining of Polymetallic Nodules from the Deep Sea

Rodney Norman, Royal IHC - IHC Mining, Kinderdijk, The Netherlands

15:40 A potential of Logging-while-Drilling (LWD) for Deciphering Subseafloor Mineralization Processes

Hidenori Kumagai, JAMSTEC, Yokusuka, Japan

16:00 HUGIN AUV Configured for Underwater Mining Applications

Richard Mills, Kongsberg Maritime, Horton, Norway

16:20 Sea Trial Report of the Seafloor Drill UNICORN-1

Koji Ochi, Fukada Salvage and Marine Works, Tokyo, Japan

17:00 Potential Usage of Flexible Riser in Deep Sea Mining

Ning Yang, Institute of Deep-Sea Science and Engineering, Chinese Academy of Science, Hainan, China

17:20 Preliminary Design of a Cutting Tool for SMS Deposits

Leonhard Weixler, DeepSea Mining Alliance (DSMA), Hamburg, Germany

17:40 Closing Remarks

Samantha Smith

11 OCTOBER 2016 (TUESDAY EVENING)
UMC 2016 BANQUET
ORAKAI LILY HALL - 19:00 (7 PM)

Cocktails

Welcome and Dinner

*Banquet Address – **President Emeritus Jung-Keuk Kang, KIOST***

We are honored to have this year's UMC banquet address be given by Dr. Jung-Keuk Kang, President-emeritus of the Korea Institute of Ocean Science and Technology (KIOST) and its predecessor, the Korea Ocean Research and Development Institute (KORDI). His vision contributed greatly to a vibrant and world-class research marine mineral program for which he received specific commendation from the President of Korea. He also received *The Moore Award* in 2003 for distinction in the development of marine minerals and has gained the highest respect and admiration from an extensive network of international friends and colleagues—many of whom are here today.

*Banquet Address – **Dr. Sup Hong, KRISO***

We are also honored to have Dr. Sup Hong address the conference. He received B.Sc. and M.Sc. degrees in the department of Naval Architect and Ocean Engineering of Seoul National University in 1983 and 1985, respectively, and in 1992, he received a PhD in Offshore Engineering at the Technical University of Aachen, Germany. Since 1993, he has dedicated his work at KRISO (Korea Research Institute of Ships and Ocean Engineering) to the research field of mining technology of deep-seabed mineral resources. He is a leader and Project Manager of the national project, *Development of Mining Technology for Deep-seabed Mineral Resources in Pacific Ocean*. For nearly a decade now, Dr. Hong continues to be a contributing participant at the Underwater Mining Conference.

UMC GEOTECHNICAL FIELD TOUR

12 AND 13 OCTOBER 2016

(DEPARTING 8:00 FROM AND RETURNING TO THE ORAKAI HOTEL EACH DAY)

One two-day field tour to: Sihwa Tidal Power Plant, Gahak Silver Mine, and or Mn Nodule Miner (MineRo), Gangwha DMZ, Dolmen Park, Tidal Flat, and or Jeondeung Sa Temple (subject to change). Transport by Top Class Tours and escorted by KIOST representatives. Two lunches (Oct 12 and 13) and one dinner (Oct 12 only) provided. Please dress comfortably; no special gear is necessary. Tour ends Oct 13 by 17:00 (5 PM).

Babaeva, Svetlana	Knapp, Rodin	Ruhlemann, Carsten
Bleyenbergh, Mick	Konstantinova, Natalia	Shimoda, Hitoshi
Castle, Chris	Kuhn, Thomas	Spicer, Wylie
Cherkashov, Georgy	Kurras, Greg	Stemm, Greg, Laurie & Adam
Chopra, Govinder	Li, Chuanshun	Sukhanova, Anna
De Bruyne, Kris	Lynch, Paul	Van Nijen, Kris
De Jonge, Laurens	Machin, Jon	Wang, Xiumei
Ditchburn, Robert	Maslennikov, Valerii & Svetlana	Weixler, Leo
Firstova, Anna	McConnell, Dan	Wyatt, Christopher
Goldblatt, Chris	McKenzie, Campbell	Yamasaki, Toru & Kiku
Goodden, Robert & Beatrice	Meikle, Reuben	Yamazaki, Tetsuo
He, Zongyu	Melekestseva, Irina	Yan, Yun
Hein, James	Mizell, Kira & John	Buitendijk, Olan
Henry, Michael	Mizuochi, Yoichi	Halkyard, John
Huber, David	Morgan, Charles & Karynne	Yang, Ning
Hughes, Billy	Nagao, Takaaki	Xiao, Jianyu
Ishiyama, Tadayuki	Neale, Peter	Chen, Yuxiang
Juliani, Cyril	Netburn, Amanda	KIOST (Yang, Seung-Jin)
Kalyan, Bharath & Anjali	Norman, Rodney	
Kapusniak, Stef	Okamura, Brian & Deb	TOTAL: 72
KIOST (Choi, Sun-Ki)	Paddington, Scott	
KIOST (Hyunjn YOON)	Parianos, John & Nicola	

13 October 2016

CONCLUSION OF UMC 2016

UMC Colleagues and Friends:

We hope that you have benefitted professionally and personally from your time with us at the 45th Underwater Mining Conference in Incheon, Korea. We are very grateful to our hosts, the Ministry of Oceans and Fisheries (MOF) and the Korea Institute of Ocean Science & Technology (KIOST), as well as our Sponsors whose contributions greatly enhance our conference experience. If you have any comments or concerns, please feel free to contact us.

We look forward to seeing you at the 46th UMC 2017 in Berlin.

Samantha Smith

IMMS President and UMC
2015 thru 2016
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Robert Goodden

IMMS President and UMC Chair
2017 thru 2018
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