



BERLIN • GERMANY UNDERWATER MINING CONFERENCE

FINAL PROGRAM

24 SEPTEMBER 2017 (SUNDAY)

WELCOMING "GET TOGETHER" & REGISTRATION
(SALON CORINTH AND HUMBOLDT)

Hilton Berlin

Mohrenstrasse 30, 10117 Berlin

Tel: +49-30-202300

19:00 – 22:00

UMC participants and guests are welcome

25 SEPTEMBER 2017 (MONDAY)

TECHNICAL SESSION I

Federation of German Industries (BDI)

Breite Strasse 29

08:30 – 18:00

*Participants staying at the Hilton Berlin should enjoy breakfast first.
Bring your bar code and photo ID in order to enter the BDI venue.*

08:30 INTRODUCTION AND WELCOME

Call to Order

*Robert Goodden, IMMS President and UMC Program Chair
Subsea Minerals, UK*

Hosts' Welcome (08:40)

*Prof. Dr. Ralf Watzel
President of the BGR - Federal Institute for Geosciences and Natural
Resources, Hannover, Germany*

*Mr. Matthias Wachter
Head of the Department for Security and Raw Materials
Federation of Germany Industries, BDI
Berlin, Germany*

09:00 PRESENTATIONS

Moderator

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

Presentations

09:00 Comparative analysis of deep-sea minerals

Georgy Cherkashov, VNIIOkeangeologia (Institute for Geology and Mineral Resources of the Ocean), Russia

09:20 First map and catalogue of submarine mineral deposits from Spain: EMODnet-Geology project

Javier Gonzalez, Geological Survey of Spain, Spain

09:40 A multidisciplinary field study of cobalt-rich crusts, Tropic Seamount, NE Atlantic: MarineE-Tech

Bramley Murton, National Oceanography Centre, University of Southampton, United Kingdom

10:00 Arctic Ocean Fe-Mn crusts and nodules: A genetic model and final analyses

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

10:20 Break (30 minutes)

10:50 Hydrogenetic growth of ferromanganese crusts: Which processes cause the heteroepitaxial intergrowth of the Fe- and Mn-phases?

Peter Halbach, Free University, Berlin, Germany

11:10 AUV-based small scale quantitative predictive mapping of Mn-nodules: Precondition for ideal mining path planning

Jens Greinert, GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany

11:30 Dynamic mineral recrystallization - Implications for sustainable trace metal recovery from deep-sea ferromanganese deposits

Tobias Hens, Monash University, Australia

11:50 POSTER SESSION

Introduction

Thomas Kuhn, Federal Institute for Geosciences and Natural Resources (BGR)

11:55 Poster Presentations

Poster Presentations

The effect of SMS composition on their density properties for resources estimation

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

Relationships between variations in internal textures and sedimentary history of Fe-Mn nodules from Campbell Plateau

Chang Se Won, KIGAM (Korea Institute of Geoscience and Mineral Resources), Korea

Metal mobilization in hydrothermal sediments

Adeline Dutrieux, National Oceanography Centre, University of Southampton, United Kingdom

Geochemical variations of SMS deposits from mid-ocean ridge and arc and back-arc settings

Anna Firstova, VNIIOkeangeologia, Saint Petersburg, Russia

Green minerals from the seabed

John Halkyard, Ocean Minerals LLC, USA

S-XRF imaging of Fe-Mn nodules and crusts – A cutting-edge technique to decipher trace metal speciation and distribution

Tobias Hens, Monash University, Australia

Free-standing riser for deep-seabed mining?

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

Seamount-scale controls on ferromanganese crust geochemistry: Tropic Seamount, NE Atlantic

Sarah Howarth, National Oceanography Centre, University of Southampton, United Kingdom

Resource estimation of Co-rich ferromanganese crust deposits: bathymetric and economic considerations

Andreas Jahn, Free University, Berlin, Germany

Paleomagnetic recorder in the West Pacific ferromanganese crust

*Kim Wonnyon, KIOST (Korea Institute of Ocean Science & Technology),
Korea*

Sources and temporal changes of detritus in ferromanganese crusts from the Amer-Asian basin of the Arctic Ocean based on isotopic signatures

Natalia Konstantinova, VNIIOkeangeologia, Russia

Geochemical and mineralogical investigations of fine growth structures of ferromanganese nodules from the Atlantic Ocean

Thomas Kuhn, Leibniz University, BGR, Hannover, Germany

Thrown in at the deep end: modelling sediment plumes 1,000 m under water

Mark Lee, HR Wallingford, United Kingdom

Extinct seafloor massive sulphide mounds from the TAG hydrothermal area, Mid-Atlantic Ridge - Insights into geological processes after cease of hydrothermal venting

*Berit Lehrmann, National Oceanography Centre, University of Southampton,
United Kingdom*

The 'Tongguan' hydrothermal field and associated SMS deposit on the South Mid-Atlantic ridge"

Chuanshun Li, The First Institute of Oceanography, Qingdao, China

Design and analysis of a deepwater seabed mining vertical transport system

Frank Lim, 2H Offshore, United Kingdom

Structuring a successful underwater mining project

Eleanor Martin, Norton Rose, United Kingdom

Mineralogical and geochemical characterization of deep-sea metalliferous sediments of the TAG area

Sofia Martins, Lisbon University, Portugal

High resolution seafloor imaging in the southern Indian Ocean: insights to economic mineral distribution and seafloor ecology from data acquired in the search for MH370

Daniel McConnell, Fugro, USA

Ecosystem-based management of the deep ocean: DOSI (Deep-Ocean Stewardship Initiative) guidance for seabed mining

Lenaick Menot, Ifremer, France

Halogens geochemistry in ferromanganese crusts – does the electrochemical model apply?

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

How to design efficient and environmental friendly drives and controls systems for subsea mining

Alexandre Orth, Bosch Rexroth AG, Germany

Nodule types and genetic controls from the TOML Areas in the CCZ

John Parianos, Nautilus Minerals, Brisbane, Australia

Modeling and field studies of nodule dewatering plumes generated by surface processing vessels

Thomas Peacock, Massachusetts Institute of Technology, Boston, USA

Physical and mechanical properties of Fe-Mn crusts and their underlying rock substrates

Irina Pulyaeva, Yuzhmorgeologia, Gelendzhik, Russia

Market analysis for deep-sea mining equipment

Mirjam Rahn, RWTH, Aachen University, Germany

Initial assessment of mineralogical properties of a seafloor massive sulphide deposit at the Arctic Mid-Ocean Ridge

Ben Snook, Norwegian University of Science and Technology (NTNU), Norway

Generic mechanisms affecting the post-formation preservation of seafloor massive sulphide deposits: preliminary results from the TAG field

Iain Stobbs, National Oceanography Centre, University of Southampton, United Kingdom

Geochemical and microbial characteristics of ferro-manganese crusts in the Northwestern Pacific seamounts

Katsuhiko Suzuki, JAMSTEC (Japan Agency for Marine-Earth Science and Technology), Kanagawa, Japan

Self-potential surveys using multiple platforms for exploration of submarine hydrothermal ore deposits

Katsuhiko Suzuki, JAMSTEC (Japan Agency for Marine-Earth Science and Technology), Kanagawa, Japan

Recent progress of geological study of ferromanganese deposits in the Northwestern Pacific Seamounts: Updated geological maps and seabed ROV observations

Akira Usui, Kochi University, Kochi, Japan

Mineralogy and the incorporation mechanism of economically relevant metals such as Ni, Cu, Co and Mo in Mn-nodules from the German license area within the Clarion-Clipperton Zone

Anna Wegorzewski, Federal Institute for Geosciences and Resources (BGR), Hannover, Germany

The role of bimodal magmatism and its products in volcanogenic massive sulfide ore-forming systems: a case study from the middle Okinawa Trough, Japan

Toru Yamasaki, Geological Survey of Japan, Japan

Research and development on an ultraviolet laser raman spectrometer for deep-sea application

Yang Ning, Institute of Deep Sea Science and Engineering (IDSSE), China Academy of Science, Hainan, China

Finding FeMn crusts: growth, structure, texture and geophysical detection

Isobel Yeo, National Oceanography Centre, University of Southampton, United Kingdom

Model of CCZ geological evolution and nodules potential formation

Valery Yubko, Yuzhmorgeologia, Gelendzhik, Russia

The characteristics of plagioclase-hosted melt inclusions in MORB from hydrothermal anomaly field, South Mid-Atlantic ridge 19.5°S

Zhang Haitao, The First Institute of Oceanography, Qingdao, China

13:10 Lunch Break

14:20 PRESENTATIONS

Moderator

Peter Halbach, Free University, Berlin, Germany

Oral Presentations - continued

14:20 ANNOUNCEMENTS and INVITATION TO UMC 2018 - BERGEN

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

Professor Rolf B. Pedersen, Director of the K.G. Jebsen Centre for Deep Sea Research, University of Bergen

14:40 Evaluating grade and tonnage estimates of seafloor massive sulfide deposits

John Jamieson, Memorial University of Newfoundland, Canada

15:00 The resource potential of the slow-spreading TAG segment at 26°N, Mid-Atlantic Ridge: evidence from AUV-based exploration

Sven Petersen, GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany

15:20 How to identify extinct seafloor massive sulphides by using OBS seismic data - A case study from the Blue Mining project at the TAG hydrothermal field
Alba Gil, National Oceanography Centre, University of Southampton, United Kingdom

15:40 Controlled source electromagnetic mapping of massive sulfide deposits with an AUV
Matthew Kowalczyk, Ocean Floor Geophysics, Burnaby, BC, Canada

16:00 Break (30 minutes)

Moderator

Andrea Koschinsky, Jacobs University, Bremen, Germany

16:30 The Atlantis II sea floor massive sulphide deposit, Red Sea - current status and future programme
R. Dan Hamer, Manafai, Saudi Arabia

16:50 Particle geochemistry at hydrothermal vents and implications for mining seafloor massive sulfides
Amy Gartman, U.S. Geological Survey, USA

17:10 Optimized, zero waste pyrometallurgical processing of polymetallic nodules from the German CCZ license area
David Friedmann, RWTH Aachen University, Germany

17:30 Can recycling and the circular economy render seafloor mining unnecessary?
Fernando Barriga, University of Lisbon, Portugal

17:50 End of Technical Session I - Closing Remarks
Robert Goodden, Technical Chair

25 SEPTEMBER 2017 (MONDAY)

EXHIBITORS' EVENT – BEER AND CURRY WURST WITHIN THE ATRIUM

18:00 – 20:00 (6:00 PM – 8:00 PM)

We encourage you to visit with our Exhibitors in the Atrium. They will be providing introductions to their products and services, including a barrel of German beer and diverse soft drinks, along with a variety of pretzels and currywurst. It won't be dinner, but it will be enlightening and enjoyable. Please join us!

FREE EVENING

You are free to explore the surrounding Berlin-Mitte area and to dine at your leisure.

26 SEPTEMBER 2017 (TUESDAY)

TECHNICAL SESSION II

Federation of German Industries (BDI)

Breite Straße 29

Session 08:30 – 18:00; Banquet 19:00 at the Hilton Berlin

Participants staying at the Hilton Berlin should enjoy breakfast first.

Bring your bar code and photo ID in order to enter the BDI venue.

Spouses Boat Tour and Visit to Charlottenburg Palace (concurrent with Technical Session II).
Meet at 09:15 in the Lobby of the Hilton Berlin. Participants: Beatrice Goodden, Shona Lynch, Beth McConnell, Karynne Chong Morgan, Kathleen Moore, Nicola Parianos, Kirti Sarangdhar, Joan Scott, and Takako Yamazaki.

08:00 International Marine Minerals Society: Annual General Membership Meeting

Robert Goodden, IMMS President

08:30 PRESENTATIONS

Moderators

Thomas Kuhn, BGR and Peter Halbach, Free University

Presentations

08:30 Designing ships for deep sea mining

Dilip Sarangdhar, SeaTech Solutions, Singapore

08:50 MUM - Large Modifiable Underwater Mother Ship

Andreas Kaschube, Thyssenkrupp, Germany

09:10 Design of a subsea vehicle propulsion system for soft sediments

Wiebe Boomsma, IHC Mining, Netherlands

and

Hydraulic collector for harvesting polymetallic nodules in deep-sea mining

Siemen Daaselaar, IHC Mining, Netherlands

09:30 Low cost drilling for deep sea minerals exploration

Fredrik Soreide, Norwegian University of Science and Technology (NTNU), Norway

09:50 Acoustic and inertial positioning solutions for underwater mining applications

Pierre-Yves Morvan, iXblue, France

10:10 Break (30 minutes)

Moderator

Charles L. Morgan, Moana Hohonu LLC, Hawaii, USA

10:40 DCNS' solutions for deep sea mining environmentally friendly activities

Damien Demoor, DCNS, France

11:00 Adaptation of environmental monitoring methods from the oil and gas sector for seabed mining

Jens Laugesen, DNV GL, Norway

11:20 Marine Protected Areas in the Clarion-Clipperton Zone

Charles Morgan, Moana Hohonu Consulting, Hawai'i, USA

11:40 Geochemical assessment of heavy metals in nodule mining disturbance sites: Implications for standard development and monitoring

Sophie Paul, Jacobs University of Bremen, Germany

12:00 Challenges associated with suspended sediment concentration and current measurements for deep sea mining projects - recent experience from Marine E-tech

Mark Lee, HR Wallingford, United Kingdom

12:20 Lunch (1.0 hr)

Moderator

Samantha Smith, Blue Globe Solutions, Toronto, Canada

13:20 Expected TTR licence approval and New Zealand law changes ensure Chatham marine phosphate project has more permitting confidence

Ray Wood, Chatham Rock Phosphate, Wellington, New Zealand

13:40 Inter-industry collaboration for deep sea mining projects: Moving past the "Us and Them"

Renee Grogan, Gro Sustainability Pty Ltd, Queensland, Australia

14:00 Uncertainty management and project commerciality evaluation in deep-sea mining

Steinar Ellefmo, Norwegian University of Science and Technology (NTNU), Norway

14:20 JPI Oceans pilot action ‘MiningImpact’: Assessment of potential impacts of manganese nodule extraction on deep-sea biota and ecosystem for policy recommendations

Kristen Hamann, GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany

14:40 Assessing the sustainability of manganese nodule mining: a life-cycle based comparison of commercial mining scenarios in the German license areas in the CCZ

Luise Heinrich, Jacobs University of Bremen, Germany

15:00 Requirements and Implications of Nodule Mining on Deep-Sea Deposits and Environment

Sebastian Volkmann, RWTH, Aachen University, Germany

15:20 Break (30 minutes)

Moderator

James R. Hein, U.S. Geological Survey, California, USA

15:50 Options to increase the economy of deep-sea mining

Tetsuo Yamazaki, Osaka Prefecture University, Japan

16:10 Forging Ahead: Update on Nautilus Minerals Solwara 1 Project

John Parianos, Nautilus Minerals, Brisbane, Australia

16:30 Deepsea mining feasibility: the Norwegian Case

Maxime Lesage, Norwegian University of Science and Technology (NTNU), Norway

16:50 Deep sea monitoring and data collecting – Regulating a new scientific-commercial service

Uwe Jenisch, University of Kiel, Germany

17:10 Back to basics: contract law and the ISA exploitation regime

Elizabeth McIsaac, McInnes Cooper, Canada

17:30 The ISA's revised draft exploitation regulations – have key Stakeholders' concerns been addressed adequately?

Steve Potter, Pinsent Masons, Singapore

17:50 Closing Remarks

Robert Goodden, Technical Chair

26 SEPTEMBER 2017 (TUESDAY EVENING)
UMC 2017 BANQUET BUFFET
HILTON BERLIN - 19:00 – 22:00
RESTAURANT BELETAGE
Mohrenstrasse 30, 10117 Berlin

Cocktails

Welcome – Robert Goodden, IMMS President

Dinner

Host's Presentation – “The UMC 2017 – Behind and Beside the Conference!” by Leonhard Weixler, President, DeepSea Mining Alliance

Banquet Address – “From Deep Foundation to the Deep Sea – How Bauer Discovered the Ocean” by Mr. Dieter Stetter, CEO, Bauer Maschinen Group



We are honored to have this year's UMC banquet address be given by Mr. Dieter Stetter. He studied Civil Engineering at the University of Applied Science in Biberach, Germany. In 1982, he joined Bauer Spezialtiefbau GmbH and served as Project Engineer for the piling works at the National Museum, Tripoli, Libya. Then as a Project Manager served in Algeria and Libya. He led Bauer's first Asian foundation construction project in Kuala Lumpur, Malaysia and through this project, Bauer Construction developed their current well-known presence in Asia. He went on to head the Asia Region in Taiwan and other entities in Singapore, Malaysia, Hong Kong, and China. In 2008, after 26 years of overseas assignments Dieter Stetter was appointed CEO of the mother company, Bauer Maschinen GmbH, Germany. The Bauer Maschinen Group currently has an annual turnover of 700 million USD and employs 2500 staff members. Mr. Stetter lives with his wife Kerry and has two grown daughters.

Closing Remarks and Adjournment of UMC 2017 – Robert Goodden, IMMS President

UMC GEOTECHNICAL FIELD TOURS I AND II

27, 28 AND 29 SEPTEMBER 2017

(DEPARTING 2:30 PM, SEPT 27 FROM AND RETURNING 4:00 PM, SEPT 29 TO THE HILTON BERLIN HOTEL)

FIELD TOUR I – GOSLAR/HARZ MOUNTAINS

LEADER: DR. PETER HALBACH, FREE UNIVERSITY

Barriga, Fernando	Kalyan, Bharath	POST, Johannes
Cherkashov, Georgy	Lehrmann, Berit	Pulyaeva, Daria
Fordeyn, Jan	Monballieu, Jef	Pulyaeva, Irina
Gartman, Amy	McConnell, Dan & Helen	Rahn, Mirjam
Gil, Alba	McIsaac, Elizabeth	Stobbs, Iain
HALBACH, Peter	Mizell, Kira	Yamasaki, Toru
Hong, Sup	Morgan, Charles & Karynne	Yamazaki, Takako
Jamieson, John	Murton, Bramley	Yamazaki, Tetsuo
		Bus Driver
		TOTAL: 27

FIELD TOUR II – ORE MOUNTAINS

LEADER: DR. THOMAS KUHN, BGR

Babeva, Svetlana	Hens, Tobias	Sukhanova, Anna
Chou, Kuo-Tung	Knorr, Paul	Wiltshire, John & Kathleen Moore
Firstova, Anna	KUHN, THOMAS	Wyatt, Christopher
Goodden, Robert & Beatrice	Paasch, Brita	Tao, Chunhui
Hagemann, Randi	Parianos, Nicola	Schmidt, Katja
		Bus driver
		TOTAL: 19

NOTE: Participants on both tours should be prepared for rather fresh, windy, and possibly rainy weather. Suitable clothes (warm and watertight) and footwear (shoes or boots) are highly recommended. For Field Tour II, the walk is about 1.5 hours and while at the underground mine "Reiche Zeche" special shoes and a helmet will be provided. Field Tour II participants should bring their own gloves.

29 September 2017

CONCLUSION OF UMC 2017

UMC Colleagues and Friends:

Thank you for your contributions and camaraderie at the 46th Underwater Mining Conference here in Berlin. We are deeply grateful to our host, DeepSea Mining Alliance (Michael Jarowinsky, Leonhard Weixler, Peter Halbach, and Johannes Post), technical program co-chairs, Andrea Koschinsky of Jacobs University and Thomas Kuhn of BGR, and their team of volunteers from Bauer, Evologics, BMWi, Bosch Rexworth and Free University. We are especially appreciative of Ms. Maria Pleskach of Evologics, for her excellent work on design, printing and the organization of the conference bags and several other give aways. We are also very thankful to our many Sponsors for their generous support. They have all done a wonderful job of planning for and executing this event. We hope your experience with all of us has been, professionally and personally, rewarding and that you will join us again next year in Bergen.

Robert Goodden

IMMS President and UMC Chair
2017 thru 2018
rgoodden@btinternet.com

www.underwatermining.org

www.IMMSoc.org