

www.isopec.org; www.isopec2011.org

June 19–24, Maui, Hawaii, USA

The Twenty-first (2011) International
**Offshore (Ocean) and Polar
Engineering Conference**

Including ISOPE symposia:

- 1st Arctic Science & Technology
- 1st Arctic Materials
- 2nd Renewable Energy & Environment
- 3rd Sloshing Dynamics & Design
- 3rd Nanotechnology
- 3rd Frontier & Clean Energy Tech
- 9th High-Performance Materials
- 5th Strain-Based Design
- 9th (Deep) Ocean Mining (& Gas Hydrates)

ISOPE-2011

Hyatt Regency Maui Hotel, Hawaii, USA, June 19–24

Technical Program

Refereed papers from **51** countries in **149** technical general
and keynote presentations

General Information, Reservations, Publications and Program Updates on
www.isopec.org www.isopec2011.org

Forms for Advance Registration and Venue Hotel:
Inside this program and on www.isopec.org

Organized by:

Technical Program Committee, ISOPE

Sponsored by:

International Society of Offshore and Polar Engineers (ISOPE)
with cooperating organizations (listed inside)



ISOPE, P.O. Box 189
Cupertino, CA 95015-0189, USA
Fax: +1-650-254-2038 : meetings@isopec.org; www.isopec.org

ISOPE-2011 Maui Conference

This 21st annual conference features **149** technical and opening general sessions, and **6** keynote presentations with top experts from industry, academia and government. After peer review of the manuscripts selected from 1,350 abstracts, some **750** papers will be presented and discussed by researchers, engineers and managers from more than **51** countries.

The conference proceedings of peer-reviewed papers in PDF files will be available in a set of 4 volumes on CD-ROM (4,200 pp. est.) — paginated within each volume — during the conference and later for worldwide post-conference mail order from ISOPE: **ISBN 978-1-880653-96-8; ISSN 1098-6189** and separately (deep) ocean mining symposium proceedings **ISBN 978-1-880653-95-1; ISSN 1946-0066**.

All indexed by Engineering Index (EI).

* Continue to next session.

To view the **full ISOPE-2011 Maui conference and symposia program**, click on www.isopec.org >meetings or www.isopec2011.org

ISOPE ARCTIC SCIENCE & TECHNOLOGY SYMPOSIUM

78. ARCTIC I: Ice Observation & Model (V. 2)

Wednesday June 22 08:00 Room 10

Chair: J Su, Ocean Univ of China, China

Measurement of Sea Ice Thickness in the Arctic Ocean, July-August 2010

SY Jeong, Maritime & Ocean Engineering Research Inst, Korea

Snow and Ice Thickness Properties of Canadian Fjord, Lake Melville Located Along the Labrador Coast

SJ Prinsenbergh, IK Peterson, JS Holladay, L Lalumiere, Bedford Inst of Oceanography, Canada

Thermodynamic Modeling of Hummocks Evolution

B Ivanov, L Andreev, Arctic & Antarctic Research Inst, Russia

Seasonal Simulations of a Coupled Ice-Ocean Model in the Bohai Sea

Y Liu, QZ Liu, National Marine Environmental Forecasting Center; J Su, Ocean Univ of China; S Bai, MN Tang, National Marine Environmental Forecasting Center, China

Fundamental Study about the Initial Pancake Ice Formation

Y Matsubayashi, T Ito, S Sakai, Iwate Univ, Japan

Seasonal Sea-Ice Prediction in the NCEP Climate Forecast System

XR Wu, R Grumbin, S Saha, HL Pan, S Lord, NOAA, USA

Aerial Observations of Melt Pond Distributions in Arctic Summer 2008

P Lu, ZJ Li, RB Lei, R Zhang, Dalian Univ of Tech, China

Discussion on the Simulation of Arctic Intermediate Water under NEMO Frame

Z Li, J Su, Ocean Univ of China, China

The Arctic Sea Ice Surface Roughness Estimation and Application

XY Wen, CJ Xue, Q Dong, Center for Earth Obs & Digital Earth, CAS, China

87. ARCTIC II: Ice and Ocean Environments (V. 2)

Wednesday June 22 10:30 Room 10

Chair: DB Fissel, ASL Environmental Sciences, Canada

Analysis of Deepwater Horizon Accident in Relation to Arctic Waters

CA Willemse, PHAJM van Gelder, Delft Univ of Tech, Netherlands

The Thermal Feedback Mechanism of Near Surface Temperature Maximum
Y Cao, JP Zhao, Ocean Univ of China; ZH Chen, Bengbu Muyuan School, China

Semi-monthly Oscillation of the Bottom Current through Bering Strait
L Du, JP Zhao, Ocean Univ of China; JC Zuo, Hohai Univ, China

Polar Lows and Their Implications on Marine Operations
M Pakkan, D Heng, Acergy Norway AS, Norway

Decadal Change of Annual Range for the Arctic Sea Ice in Recent 30 Years
F Huang, XL Shan, TT Fan, Ocean Univ of China, China

Study on Sea Ice Area Interannual Variation in the Pacific Sector of the Arctic and the Correlative Ocean & Atmosphere Main Pattern
J Su, JF Wei, D Zu, X Li, Y Zhang, Ocean Univ of China, China

Sea Ice Dynamic Monitoring Using RADARSAT-2 SAR in Polar Region
CJ Wue, XY Wen, Q Dong, XX Wang, Center for Earth Obs & Digital Earth, CAS, China

Long-Term Trends for Multi-year Ice in the Western Arctic Ocean: Implications for Shipping and Offshore Oil and Gas Activities
DB Fissel, M Martinez de Saavedra Alvarez, N Kulan, TD Mudge, JR Marko, ASL Environmental Sciences, Canada

Observing Polar Ocean with XCTD Launched from Helicopter
JX Shi, JQ Hou, YT Jiao, Ocean Univ of China, China

97. ARCTIC III: Ice-Structure Interactions 1

(V. 2)

Wednesday June 22 14:00 Room 10

Chair: AT Bekker, Far Eastern State Tech. Univ., Russia
Co-Chair: K. Braun, PND Engineers, USA

A Study on the Density Control of EG/AD Model Ice
EJ Chun, CJ Lee, SR Cho, Maritime & Ocean Engineering Research Inst, Korea

Effect of Water Depth on Ice Plate Deflections for Moving Submarine
AV Pogorelova, VM Kozin, Inst of Machine Sci & Metallurgy, FEB-RAS, Russia

Numerical Modeling of Evolution of Ice Cover Destruction Process under Dynamic Load
VI Odinokov, AN Prokudin, Inst of Machine Sci & Metallurgy, FEB-RAS, Russia

Effect of Pack Ice Size and Channel Width in Ice Model Test
SR Cho, CJ Lee, SH Kim, KORDI, Korea

Two-dimensional Generalised Solitary Waves and Periodic Waves under an Ice Sheet
EI Parau, Univ of East Anglia, UK

A Hydrodynamic Ice Friction Theory Including Premelting, Pressure Melting and Frictional Melting
EP Lozowski, Univ of Alberta; K Szilder, National Research Council, Canada

107. ARCTIC IV: Ice-Structure Interactions 2 (V. 2)

Wednesday June 22 16:20 Room 10

Chair: RMW Frederking, National Research Council, Canada

Direct Ice Force Measurement of Cylindrical Structure
YL Wang, QJ Yue, XJ Bi, Dalian Univ of Tech, China

The Effects of Non-simultaneous Failure, Pressure Correlation, and Probabilistic Averaging on Global Ice Load Estimates
RS Taylor, IJ Jordaan, C-CORE, Canada

Concept of Ice Abrasion Calculation
AT Bekker, TE Uvarova, EE Pomnikov, Far-Eastern National Tech Univ, Russia

Experimental Research of Concrete Resistance to Ice Abrasion
AT Bekker, TE Uvarova, EE Pomnikov, Far-Eastern National Tech Univ, Russia

Comparison of Pressure-Area Effects for Various Ice and Steel Indenters

CA Ulan-Kvitberg, CG Daley, HW Kim, Memorial Univ of Newfoundland, Canada

Crushing Characteristics of Dry, Wetted and Submerged Ice

HW Kim, CG Daley, CA Ulan-Kvitberg, Memorial Univ of Newfoundland, Canada

Response of Confederation Bridge to Ice Forces: Winter 2008-2010

R Frederking, National Research Council; LF Li, Memorial Univ of Newfoundland; I Kubat, National Research Council, Canada

The Arctic Sea Ice Surface Roughness Estimation and Application

XY Wen, CJ Xue, Q Dong, Center for Earth Observation & Digital Earth, CAS, China

Getting a Grip on Ice Friction

L Poirier, RI Thompson, Univ of Calgary; EP Lozowski, Univ of Alberta; S Maw, Mount Royal Univ; DJ Stefanyshyn, Univ of Calgary, Canada

117. ARCTIC V: Ice-Ocean-Ship Interaction & Performance (V

Thursday June 23 08:00 Room 10

Chair: JM Hamilton, ExxonMobil Upstream Research Co, USA

Co-Chair: Y Gudoshnikov, AARI, Russia

Experimental Study on Ice-Breaking Capacity of Flexural-Gravity Waves Caused by Motion of Submarine Vessel

VM Kozin, Inst of Machine Sci & Metallurgy, FEB-RAS; VL Zemlyak, Amur State Univ of Humanities & Pedagogy, Russia

Safety Assessment of Cargo Containment Systems in LNG Carriers under the Impact of Iceberg-Ship Collision

JH Kim, HK Oh, DH Kim, WS Kim, Hyundai Heavy Industries, Korea

Fatigue Design Assessment of Ship Structures Induced by Ice Loading—An Introduction to the ShipRight FDA ICE Procedure

SM Zhang, R Bridges, J Tong, Lloyd's Register, UK

Forces on Ships Transiting Pressured Ice Covers

M Sayed, I Kubat, National Research Council, Canada

Experimental Investigation of Local Ice Loads Onboard Nuclear Icebreaker "Yamal" During Expedition "Arctica-2009"

NA Krupina, AV Chernov, AV Savitskaya, Arctic & Antarctic Research Inst, Russia

The Icebreaking Performance of SHIRASE in the Maiden Arctic Voyage

Y Yamaguchi, S Mizuno, H Tsukuda, Universal Shipbuilding, Japan

Marine Icing: Sea Spray Measurements on Board a Supply Vessel; Instrumentation and Data Results

G Eidnes, SINTEF, O-C Ekeberg, Det Norske Veritas; A Kulyakhtin, NTNU, Norway

127. ARCTIC VI: Navigation and Ice Management (V. 2)

Thursday June 23 10:30 Room 10

Chair: H Kitagawa, Ocean Policy Research Foundation, Japan

Simulation of Ice Management Fleet Operations Using Two Decades of Beaufort Sea Ice Drift and Thickness Time Histories

JM Hamilton, C Holub, J Blunt, ExxonMobil Upstream Research, USA

Arctic Trafficability Studies by AIS-Satellite

N Kjerstad, Aalesund Univ College, Norway

Comparison of Passage Time with Climate Index -Great Circle Route on the North Pacific-

Y Shimada, Kobe Univ; K Takahashi, JAMSTEC; S Shiotani, Kobe Univ, Japan

Ice Management Supported by Models Using Unmanned Aerial Vehicles

J Haugen, L Imsland, S Løset, R Skjetne, NTNU, Norway

Numerical Experiments of Arctic Sea Ice Forecasting During CHINARE 2010

QH Yang, National Marine Environmental Forecasting Center; LP Liu, Inst of Atmospheric Physics, CAS; ZH Zhang, Q Li, Polar Research Inst of China; CJ Sui, CH Li, HD Wu, National Marine Environmental Forecasting Center, China

Ice Management of FLNG in Shtokman Gas Field

MC Ryu, JH Choi, IS Yoo, Daewoo Shipbuilding & Marine Engineering; Y Gudoshnikov, Zubakin, GK, Arctic & Antarctic Research Inst, Russia

LNGC Collision with Iceberg Considering Surrounding Sea Water

SG Lee, BHA Nguyen, Korea Maritime Univ, Korea

Prospects of the Russian Arctic Transport System Development

VI Pavlenko, Arctic Research Center; EK Glukhareva, SY Kutsenko, Oil & Gas Research Inst, RAS, Russia

Lightweight Structures under Extreme Conditions: Case Studies from Antarctica

J Fernandez, Univ of Bath, UK/Univ of Magallanes, Chile; P Shepherd, P Richens, Univ of Bath, UK

137. ARCTIC VII: Exploration and New Instrumentation (V. 2)

Thursday June 23 14:00 Room 10

Chair: SJ Prinsenber, Bedford Inst of Oceanography, Canada

Co-Chair: V Pavlenko, Arctic Research Centre, RAS, Russia

Actual Problems of the Environment Protection and Natural Resources Development on the Arctic Shelf

VI Pavlenko, Arctic Research Center; EK Glukhareva, SY Kutsenko, Oil & Gas Inst, RAS, Russia

Reconstruction of Under Water Images from Data Acquired by the REEMUS AUV in the Arctic

ZJ Wood, W Hamilton, C Clark, M Moline, Cal Poly San Luis Obispo, USA; G Johnsen, NTNU, Norway; J Berge, UNIS, Norway

Influence of Carbonation Reaction to Nondestructive Tests for Frost Damage Diagnosis

M Suto, H Ogata, Tottori Univ; D Yamazaki, Sho-Bond Corp; Panganayi, Tottori Univ; R Takata, Matsue College of Tech; K Hattori, Tottori Univ, Japan

Investigation of Hybrid Solar-Wind Power Generation Systems for the Polar Expedition Robot

JH Liang, QL Zhong, TM Wang, MM Sun, Beihang Univ, China

Optimization Analysis of Propulsion System for a Polar Scientific Icebreaker

Y Yong, M Jie, TW Yong, Shanghai Jiao Tong Univ, China

The Challenges of Arctic Oil and Gas Pipelines, and the use of Advanced Finite Element Analysis

P Jukes, A Eltaher, JF Xu, MCS Kenny; B Singh, Wood Group Integrity Management, USA

The Latest Developments in the Materials, Corrosion and Cathodic Protection of Arctic Pipelines

P Jukes, MCS Kenny; B Singh, B Jamrok, Wood Group Integrity Management; A Eltaher, MCS Kenny, USA

144. ARCTIC VIII: Ship Design & Navigation Requirement (V. 2)

Thursday June 23 16:20 Room 10

Chair: KA Willemsse, Delft Univ. of Technology, Netherlands

Co-Chair: VM Kozin, Inst of Machine Sci & Metallurgy, Russia

The Arctic Sea Ice Surface Roughness Estimation and Application

XY Wen, CJ Xue, Q Dong, Center for Earth Obs & Digital Earth, CAS, China

Ice Detection for Under Ice AUV Navigation

CM Clark, M Maxson, S Layton, M Moline, Cal Poly San Luis Obispo, USA; J Geir, NTNU, Norway; B Jorgen, Univ Center in Svalbard, Norway

Fuzzy Power Management for Automatic Monitoring Stations in the Arctic

P Musilek, D Pimentel, Univ of Alberta, Canada

A Study on Freezing Characteristics of Terra Nova Bay Soil in East Antarctica

YS Kim, SS Hong, GJ Bae, JG Lee, Korea Inst of Construction & Tech, Korea

Design and Application of Slots Used for Marginal Field Development in Heavy Ice Conditions in Bohai

Y Wang, ML Duan, China Univ of Petroleum; JL Hou, X Jia, XZ Li, CNOOC, China

Permafrost Characteristics of Northern Alaska

M Kanevskiy, Y Shur, Univ of Alaska Fairbanks; MT Jorgenson, Alaska Ecoscience/Univ of Alaska Fairbanks; C-L Ping, Univ of Alaska Fairbanks, USA

Numerical Model of Ship Propagation through Ice Field

P Kujala, J Kajaste-Rudnitski, Aalto Univ, Finland

Some Aspects of Gate-ports in Asia to Arctic Shipping

H Kitagawa, Ocean Policy Research Foundation, Japan

Stability Analysis of an Artificial Island Structure Designed for Developing the Gas Field
EN Bellendir, OM Finagenov, VB Glogovsky, JSC VNIIG, Russia

Evaluation of Methods for Estimating Thermal Conductivity of Saturated Unfrozen Clay
GJ Bae, JG Lee, YS Kim, JM Kang, HS Kim, Korea Inst of Construction & Tech, Korea

