Proceedings of 21st IAHR International Symposium on Ice
Dalian University of Technology, Dalian, China, June 11 – 15, 2012

ICE RESEARCH FOR A SUSTAINABLE ENVIRONMENT

Edited by Zhijun LI and Peng LU
Dalian University of Technology, Dalian, China

VOLUME II

DALIAN UNIVERSITY OF TECHNOLOGY PRESS
Remote sensing and measurement technology

651-659 Measurements of Thermally Induced Deformations in Saline Ice with Fiber Bragg Grating Sensors
Aleksey Marchenko, Torsten Thiel, and Sergiy Sukhorukov

660-673 Advances in Beacon Technology to Track Drift of Sea Ice and Icebergs
Scott Tiffin, Ian Turnbull, Tyler Sylvestre, and Juan Acevedo

674-684 Remote Sensing of Arctic Ocean by Compact Raman LIDAR
A Remote Ice Detection System Suitable for Marine and Aerospace Applications
R. E. Gagnon, J. Groves, and W. Pearson

Radar Image Processing System for Sea Ice Field Observation
Zongxun Liu, Yuxin Wang, Yu Liu, Shunying Ji, and He Guo

Digital Terrain Mapping of Petermann Ice Island Fragments in the Canadian High Arctic

A Review of Sea Ice Observations Using Digital Photography
Peng Lu, Hui Sun, Zhijun Li, and Wenfeng Huang

Ice resources and climate changes
Evaluating the Accuracy of ASTER GDEM for Glaciological Application: an Example from the Irtysh Basin, China
Junfeng Wei, Shiyin Liu, Junli Xu, and Wanqin Guo

Characteristics of Sea Ice in the NCEP Climate Forecast System Reanalysis
Xingren Wu, and Robert Grumbine

Study of Temporal-spatial Characteristics of Sea-ice-resource Amount of the Bohai Sea in China in the Winter of 2009-2010
Chengyu Liu, Wei Gu, Jinlong Chao, Lantao Li, Shuai Yuan, and Yingjun Xu

Study on Location Suitability along the Bohai Sea Coast for Sea Ice Resource Exploitation
Lantao Li, Wei Gu, Chengyu Liu, and Yingjun Xu

Combating methods of oil spills in ice
Baltic Sea Experiences in Mechanical Oil Recovery in Ice
Kari Lampela, and Jorma Rytönen

A Laboratory Study on the Sorption Capacity of Oil Absorbent Mats for the Bohai Crude Oils
Zhijun Li, Runling Li, Jingrui Yu, Yu Chen, and Peng Lu

ICE FORCES ON STRUCTURES

On Characteristics of High Pressure Zone in Compressive Ice Failure
T. Takeuchi, and S. Kioka

Numerical Simulation for Ice-truss Offshore Structure Interactions with Cohesive Zone Model
Meng-Lung Liu, and Jer-Fang Wu

Ventilation and Backfill Effect during Ice-sloping Structure Interactions
Wenjun Lu, Sveinung Løset, and Raed Lubbad
842-852 Ice Loads on Sloping Structures: Influence of Parameters in Virtual Experiments
Jani Paavilainen, and Jukka Tuhkuri

853-863 Ice Loads on Conical Offshore Structures Based on Discrete Element Simulation
Shaocheng Di, Shunying Ji, Qianjin Yue, and Shewen Liu

864-874 The Nonsimultaneous Failure of Ice before Wide Conical Structures
Yan Huang, and Yufeng Tian

875-884 Measurements of Deformations and Displacements of Stationary Quays in Svalbard with 3D Laser Scanner Riegl VZ-1000
Anatoly Sinitsyn, David Wrangborg, Renat Yulmetov, Arnt Tore Sund, and Aleksey Marchenko

885-896 Tests on Wear of Various Metals due to Ice Friction
S. Kioka, and T. Takeuchi

897-906 Numerical Simulation of Ice Abrasion on Offshore Structures
Alexander T. Bekker, Tatiana E. Uvarova, Egor E. Pomnikov, and Guzel R. Shamsutdinova

907-919 Influence of Ice Parameters on Managed Ice Interaction with Multi-legged Structure
Evgeny Karulin, Marina Karulina, Evgeny Toropov, and Dmitry Yemelyanov

920-938 Cohesive Zone Method Based Simulations of Ice Wedge Bending: a Comparative Study of Element Erosion, CEM, DEM and XFEM
Wenjun Lu, Raed Lubbad, Sveinung Loset, and Knut Hoyland

939-945 The Angle of Ice Ride-up for the Hummocks from Ice Rind and Finger Ice in Liaohe Estuary
Xiangpeng Kong, and Naxin Chen

Ice induced vibrations

946-958 Novel Ice Induced Vibration Testing in a Large-scale Facility: Deciphering Ice Induced Vibrations, Part 1
M. Määttänen, S. Laset, A. Metrikine, K.-U. Evers, H. Hendrikse, C. Lonay, I. Metrikin, T. Nord, and S. Sukhorukov

959-971 Modal Analysis in Ice-structure Interaction: Deciphering Ice Induced Vibrations, Part 2
T. S. Nord, and M. Määttänen

972-984 A Method to Measure the Added Mass and Added Damping in Dynamic Ice-structure Interaction: Deciphering Ice Induced Vibrations, Part 3
H. Hendrikse, A. Metrikine, and K.-U. Evers

985-997 An Explanation of Ice-crushing Induced Vibrational Lock-in Using the Molikpaq May 12, 1986 Event as a Test Case
R. E. Gagnon

998-1013 Comparison of Ice-induced Vibrations on a Conical and a Cylindrical Offshore Wind Turbine Substructure
Vilho Jussila, and Jaakko Heinonen

1014-1022 Model Tests of Ice Induced Vibrations on Four-leg Jacket Platforms
Yufeng Tian, and Yan Huang
Reanalysis of Ice Induced Steady State Vibration from an Engineering Perspective
Fengwei Guo

A Spectral Model for Simulating Continuous Crushing Ice Load
Fengwei Guo

Ships dynamics in ice

Ice Model Tests in Compressive Ice
Mikko Suominen, and Pentti Kujala

Full-scale and Model-scale Simulations of a Double Acting Intervention Vessel Operating in Level Ice
Biao Su, Kaj Riska, Torgeir Moan, and Tor Einar Berg

Station Keeping Capacity of a Moored Structure with Heading Control in Level Ice
Li Zhou, Kaj Riska, and Torgeir Moan

The Effect of Heave, Pitch and Roll Motions to Ice Performance of Ships
Xiang Tan, Biao Su, Kaj Riska, and Torgeir Moan

Comprehensive Numerical Simulations of a Tanker Collision with a Bergy Bit Incorporating Damage to the Vessel
R. E. Gagnon, and J. Wang

Ships in Compressive Ice-hazard Forecast by Means of Fuzzy Logic Modeling
Madis-Jaak Lilover, Tarmo Kouts, and Kaimo Vahter

Numerical Investigation of Ice Bending Failure and Ice Submerging Force for Ship Maneuvering in Level Ice
Junji Sawamura

Full-scale 3D CFD Simulation of Spray Impingement on a Vessel Produced by Ship-wave Interaction
Anton Kulyakhtin, Olga Shipilova, Bradd Libby, and Sveinung Loset

Small-scale Simulation of Seawater Icing in Natural Field Conditions
Anton Kulyakhtin, Sveinung Loset, and Laszlo Kollar

Numerical Simulations of 3D Spray Flow in a Wind Tunnel with Application of O’Rourke’s Interaction Algorithm and Its Validation
Anton Kulyakhtin, Laszlo Kollar, Sveinung Loset, and Masoud Farzaneh

LAKE ICE

Physical environments under lake ice

Hypoxia and Turnover in a Small Ice-covered Temperate Lake
Leon Boegman, Igor Shkvorets, and Frank Johnson

Conductivity of a Cyclonic Eddy in an Ice-covered Lake
A. L. Forrest, B. E. Laval, R. Pieters, and S. G. Schladow

Field Investigation of the Geostrophic Motions in the Ice-covered Lake Pääjärvi
William Rizk, Georgiy Kirillin, and Matti Leppäranta
Convective Mixing by Solar Radiation under Lake Ice
Georgiy Kirillin, William Rizk, and Matti Leppärinta

Optical Study of Ice Cover on Estonian Lakes
Ants Erm, Ove Pärn, and Fred Buschmann

Ice Season on Lake Kilpisjärvi in Arctic Tundra
Matti Leppärinta, Kunio Shirawawa, and Toru Takatsuka

Hydrography and Circulation in a Coastal Site of the Gulf of Finland during the Ice Season
Ioanna Merkouriadi, and Matti Leppärinta

Ecology and water quality in ice-covered lakes

Seasonal Variability of Antarctic Ice-covered Lakes Ecosystems, Eastern Antarctica
Alexey Tolstikov, and Andrey Sharov

Water Quality Characteristics of Ice-covered, Stagnant, Eutrophic Water Bodies as Influenced by Climate Change
Kouki Sugihara, and Makoto Nakatsugawa

Spatial Distribution and Potential Ecological Risk of Heavy Metals in Sediments of Ulansuhai Lake during Ice-on Period
Shengnan Zhao, Changyou Li, Xiaohong Shi, Yun Wu, Suzhen Feng, and Xujin Fu

Temperature and Oxygen Regime of the Shallow Ice-covered Lake in Winter and Spring
G. Zdorovennova, R. Zdorovennov, N. Palshin, and A. Terzhevik

Contribution of New Endogenous Pollutants and Their Treatment during the Icebound Period of a Shallow Lake
Xiaohong Shi, Changyou Li, Fang Yang, Wenbao Li, and Cairui Fan

Experiment and Application of Freeze Purification Process in Pastoral Area for Drinking Water Safety
Changyou Li, Yan Zhang, Zhilei Zhen, Xiaohong Shi, and Weiping Li