# TABLE OF CONTENTS OF PROCEEDINGS

## ICE PHYSICS AND MECHANICAL PROPERTIES

### Saline ice

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-15</td>
<td>Multiyear Sea Ice near an Ice Shelf: Mechanical Properties and Brine Migration in Snow Ice</td>
<td>Alexander J. Gough, Andrew Mahoney, Pat Langhorne, Mike Williams, and Tim Haskell</td>
</tr>
<tr>
<td>16-23</td>
<td>Discrete Element Simulation of Sea Ice Flexural Strength</td>
<td>Shunying Ji, Zheng Li, and Shewen Liu</td>
</tr>
<tr>
<td>24-29</td>
<td>A Constitutive Model for Strain-rate Dependent Ductile-to-brittle Transition</td>
<td>Hartikainen Juha, Kolari Kari, and Kouhia Reijo</td>
</tr>
<tr>
<td>30-41</td>
<td>Consolidated Layer Bending Test with and without Underlying Ice Rubble: Experiments and Numerical Simulations</td>
<td>Jaakko Heinonen, and Kari Kolari</td>
</tr>
<tr>
<td>42-52</td>
<td>Laboratory Scale Punch through Tests on Non Cohesive Rubble: Experiments and Simulations</td>
<td>Arttu Polojärvi, Jukka Tuhkuri, and Otto Korkalo</td>
</tr>
<tr>
<td>53-64</td>
<td>An Experimental Study of the Dynamic Friction Coefficient between Freshwater Ice and Structural Materials</td>
<td>Xuxiang Qin, Zhijun Li, Qing Zhou, Qing Jia, Hongwei Han, and Jingrui Yu</td>
</tr>
<tr>
<td>65-77</td>
<td>Field Experiments on the Friction Coefficient of Sea Ice on Sea Ice</td>
<td>Sergiy Sukhorukov, Mauri Määttänen, and Sveinung Løset</td>
</tr>
</tbody>
</table>

### Fresh water ice

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>78-88</td>
<td>Experimental Study on the Fracture Toughness of Ice Layer</td>
<td>Xiaozhou Liu, Qiao Sun, Jingjing Li, and Huiren Bai</td>
</tr>
<tr>
<td>89-95</td>
<td>Research on the Optimal Identification of Thermal Diffusivity of Fresh Ice in Reservoirs of Cold Regions</td>
<td>Yila Bai, Hui Xu, and Liqiong Shi</td>
</tr>
</tbody>
</table>

## RIVER ICE

### River ice processes

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>96-104</td>
<td>Ice Phenomena in River Mouths</td>
<td>Tomasz Kolerski</td>
</tr>
<tr>
<td>105-116</td>
<td>Field Observation of a River Ice Jam in the Shokotsu River in February 2010</td>
<td>Yasuhiro Yoshikawa, Yasuharu Watanabe, Hiroshi Hayakawa, and Yasuyuki Hirai</td>
</tr>
</tbody>
</table>
117-127  Tsunami Run-up to the Ice Covered Ohoro River in the 2011 Great East Japan Earthquake  
Asako Takahashi, Yasuhiro Watanabe, and Yasuhiro Yoshikawa

128-138  The Evolution and Analysis of Ice Regime in front of the Dam of Fengman Reservoir  
Youcai Tuo, Jia Li, Yun Deng, Kefeng Li, and Zhiguo Liu

139-149  Modeling Border Ice Formation and Cover Progression in Rivers  
Fengbin Huang, Hung Tao Shen, and Ian Knack

150-159  Ice Erosion of the Amur River Banks  
V. I. Kim, and A. N. Makhinov

Remote sensing and data collection techniques

160-167  The Multipoint Monitoring System for River Ice Thickness Based on Zigbee  
Xiaohui Huang, and Jianmin Qin

168-180  Measuring the River Ice Floe Sizes Broken by 2011 Tohoku Pacific-Coast Earthquake Tsunami  
Takaaki Abe, Yasuhiro Yoshikawa, and Yasuyuki Hirai

181-189  Design of an Instrumentation Board with Multi-electrode Capacitance Type Ice Thickness Sensor  
Jinhua Fan, Jianmin Qin, and Yinke Dou

190-201  Experimental Observation and Assessment of Yellow River Ice Conditions with UAV Remote Sensing System  
Jiayuan Lin, Hang Zuo, Wenhian Zang, and Baosen Zhang

Water quality and ecology

202-211  River Ice Modeling for Fish Habitat Analysis  
Ian M. Knack, and Hung Tao Shen

212-217  Specifics of Chemical Composition of Amur and Songhua River Ice  
V. P. Shesterkin

218-229  Accumulation and Transformation of Organic Substances in the Amur River Ice  
Liubov Kondratyeva, and O. V. Zhukova

230-237  Research on the Construction Mode of Dahuofang Reservoir Water Quality Forecast System  
Rui Huang, and Fangxiu Zhang

Ice engineering and management

238-249  Winter Time Flow Management for a Long Distance Water Diversion Canal System  
Xiangpeng Mu, Wenxue Chen, Wei Cui, Baiyinbaoligao, and Xiaochen Guo

250-261  Numerical Simulation of Ice Processes for the Middle Route of the South-to-north Water Diversion Project  
Xinlei Guo, Kailin Yang, Hui Fu, Tao Wang, and Yongxin Guo

262-269  Operation Method of Long Distance Canal System with Floating Ice Cover  
Mengkai Liu, Xiaobo Feng, and Changde Wang
A Numerical Model Study on St. Marys River Ice Conditions  
*Ian M. Knack, Fengbin Huang, and Hung Tao Shen*

Situation Surveys and Analysis on Preventing Ice Hazards before Sluice Gate in Liaoning Areas  
*Liyuan Song, Kuifeng Wang, Desheng Sun, Lixin Chen, and Yan Li*

Experimental Research on Prevention of Floating Ice at Water Intake of Power Plant  
*Qiang Zhang, Xiaoli Chen, Yijun Zhao, and Xiaohui Wang*

Surface Ice Boom Design for Water Diversion from a Channel Bend  
*Chao Li, Hung Tao Shen, and Fengbin Huang*

Study of Thermal and Ice Regimes of Hydroelectric Power Plant Up- and Downstream during Reservoir Impounding  
*N. S. Bakanovichus, and I. N. Shatalina*

Estimation of Snow Water Equivalents in Dam Basins during the Peak Snow Season in Consideration of Slope Aspect  
*Terumasa Nishihara, and Makoto Nakatsugawa*

**Laboratory and physical model studies**

Research on Ice Mechanics Similarity Scale Model Test  
*Enliang Wang, Hua Zhong, Bin Zhang, and Junde Chang*

Research on Ice Mechanics Model Test of Elastocoast® Revetments  
*Xiangmin Qu, Junde Chang, Bin Zhang, and Hua Zhong*

Flow Velocity Distributions in Ice-covered Rivers  
*S. Samuel Li*

Simulation of Frazil Ice Concentration under Ice Cover in the Vicinity of Bridge Pier  
*Pangpang Chen, Jueyi Sui, Zheng Cao, and Jun Wang*

The Influence of Ice Apron Shape on the Collision Force of Drift Ice  
*Tianlai Yu, Sufeng Zhang, and Yongfeng Jia*

Water Ability Research of Flat Sluice under the Condition of the Ice Cover  
*Yongpeng Zheng, Xianyou Mou, and Heng Wen*

**Yellow River – Impacts of climate change and engineering**

Effect Analysis of Air Temperature Variation on the Ice Regime of the Yellow River in the Last 50 Years  
*Chunqing Wang, Arthur E. Mynett, and Jian Yang*

Characteristics of Ice Regime in the Upper Yellow River in the Last Ten Years  
*Suqiu Rao, Tequn Yang, Jifeng Liu, and Donglin Chen*

Climate Change and the Characteristics of the Air Temperature in the Upper Yellow River Region during Ice Season  
*Tequn Yang, Yiqi Yan, Suqiu Rao, and Minhaon Fan*

Winter Low Discharge Process of Toudaoguai Section of Yellow River  
*Jifeng Liu, Shiqing Huo, Suqiu Rao, and Dongling Chen*
411-418 Impact of River Crossing Bridges on Ice Run of the Yellow River
Puqing Wang, and Shuhui Qiu
419-426 Characteristics of Ice Conditions in the Lower Yellow River after the Operation of Xiaolangdi Reservoir
Shiqing Huo, Dongling Chen, and Suqiu Rao
427-436 A Field Study of Flow Capacity under Ice in the Toudaoguai Section of the Yellow River in Inner Mongolia
Baosen Zhang, Lukai Xu, and Xuandong Yang
437-442 A Field Study of the Inner Mongolia Section of Yellow River during the Ice Flood Season
Chaoyu Duan, Sheng Zhang, Xiaohong Shi, and Yong Wu

Yellow River – Ice condition forecast
443-454 Application of Statistical Forecast Models on Ice Conditions in the Ningxia-Inner Mongolia Reach of the Yellow River
Dongling Chen, Jifeng Liu, and Lina Zhang
455-466 Water Temperature in Winter Using ANFIS
Tao Wang, Kailin Yang, Xinlei Guo, Hui Fu, and Yongxin Guo
467-474 Ice Forecasting Model Based on the Variable Fuzzy Synthetic Analysis
Baosen Zhang, Honglan Ji, Jing Xu, Aoda Zhang, and Xuejun Bian
475-482 Advances in Break-up Date Forecasting Model Research in the Ningxia-Inner Mongolia Reach of the Yellow River
Guoming Gao, Guoqing Yu, Zili Wang, and Shuxia Li

SEA ICE

Sea ice characteristics
483-492 Thermodynamic Sea Ice Growth in Arctic Fjords
Caixin Wang, Keguang Wang, Sebastian Gerland, Liqiong Shi, Olga Pavlova, and Mats A. Granskog
493-504 Morphology and Physical Properties of Old Sea Ice in the Fram Strait 2006-2011
A. S. Shestov, K. V. Hoyland, and O. C. Ekeberg
505-515 Analysis of Spatial-temporal Distribution Characteristics of Sea Ice on the South Shore of Bohai Bay
Ge Li, Huaming Yu, Chongbo Jiang, Conghua Cao, Kecai Guo, Shan Zhong, Rui Huang, Xiangyu Wang, Jie Shang, and Qingrong Liu
516-522 An International Research and Mobility Exchange Project: Advance Modeling and Observing Solar Radiation of Sea Ice (AMORA)
Caixin Wang, Sebastian Gerland, Na Li, Zhijun Li, Bin Cheng, Marcel Nicolaus, Don Perovich, Mats A. Granskog, Liqiong Shi, Ruibo Lei, Qun Li, Peng Lu, and Jari Haapala
523-531 Estimation of Local Ice Conditions in the Baltic Sea for Offshore Wind Turbine Design
Maria Tikannäki, Jaakko Heinonen, and Lasse Makkonen

532-541 Environmental Impacts of Land-ice Interaction in the Northern Baltic Sea
Matti Leppärinta

542-554 Method for Human Error Quantification in Ice Management Systems
Marat Kashafutdinov, Ove Tobias Gudmestad, and Sveinung Løset

555-567 Study of Spatial Distribution Characteristics of Sea-ice-hazard Risk in Bohai
Wei Gu, Chengyu Liu, Shuai Yuan, Ning Li, Jinlong Chao, Lantao Li, and Yingjun Xu

Ice-waves interactions
568-578 Parametric Excitation of Flexural-gravity Waves by Periodic In-plane Ice Stresses
Aleksey Marchenko

579-585 Effect of Roll Period on the Drift of Large Ice Floes in Regular Waves
Guoxing Huang, and Adrian Wing-Keung Law

586-595 Is the Wave-induced Impact Load from Pancake Ice Important for Offshore Structures
Shanshan Sun, and Hayley H. Shen

596-602 Study on the Mechanisms in Generating Pancake ice by Using Two Particles Model of Frazil ice
Takanori Ito, and Shigeki Sakai

Ice ridges and icebergs
603-615 Ice Ridge Identification Methods and Analysis of Upward Looking Sonar Data from Fram Strait 2006-2010
Ole-Christian Ekeberg, Knut V. Høyland, and Edmond Hansen

616-622 Form Drag of Ice Ridges in the Northwestern Weddell Sea
Bing Tan, Peng Lu, Zhijun Li, Christian Haas, and Marcel Nicolaus

623-638 Constitutive Models for Sea Ice Rubble in First Year Ridges: a Literature Review
Aniket Patil, Bjørnar Sand, Lennart Fransson, and Hamid Daiyan

639-650 Characteristics of Sea Ice and Iceberg Drift Simulations in the Northwestern Barents Sea
Renat Yulmetov, Aleksey Marchenko, and Sveinung Løset

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

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

Baltic Sea Experiences in Mechanical Oil Recovery in Ice
Kari Lampela, and Jorma Rytkönen

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 Guezl R. Shamsudinova

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, Sveimung Loset, and Knut Høyland

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. Loset, A. Metrikine, K.-U. Evers, H. Hendrikse, C. Lønøy, I. Metrikine, 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

X
1023-1034  Reanalysis of Ice Induced Steady State Vibration from an Engineering Perspective
Fengwei Guo

1035-1045  A Spectral Model for Simulating Continuous Crushing Ice Load
Fengwei Guo

**Ships dynamics in ice**

1046-1057  Ice Model Tests in Compressive Ice
Mikko Suominen, and Pentti Kujala

1058-1068  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

1069-1079  Station Keeping Capacity of a Moored Structure with Heading Control in Level Ice
Li Zhou, Kaj Riska, and Torgeir Moan

1080-1093  The Effect of Heave, Pitch and Roll Motions to Ice Performance of Ships
Xiang Tan, Biao Su, Kaj Riska, and Torgeir Moan

1094-1106  Comprehensive Numerical Simulations of a Tanker Collision with a Bergy Bit Incorporating Damage to the Vessel
R. E. Gagnon, and J. Wang

1107-1115  Ships in Compressive Ice-hazard Forecast by Means of Fuzzy Logic Modeling
Madis-Jaak Lilover, Tarmo Köüts, and Kaimo Vahter

1116-1128  Numerical Investigation of Ice Bending Failure and Ice Submerging Force for Ship Maneuvering in Level Ice
Junji Sawamura

1129-1141  Full-scale 3D CFD Simulation of Spray Impingement on a Vessel Produced by Ship-wave Interaction
Anton Kulyakhtin, Olga Shipilova, Bradd Libby, and Sveinung Løset

1142-1153  Small-scale Simulation of Seawater Icing in Natural Field Conditions
Anton Kulyakhtin, Sveinung Løset, and Laszlo Kollar

1154-1167  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 Løset, and Masoud Farzaneh

**LAKE ICE**

**Physical environments under lake ice**

1168-1179  Hypoxia and Turnover in a Small Ice-covered Temperate Lake
Leon Boegman, Igor Shkvoretz, and Frank Johnson

1180-1189  Conductivity of a Cyclonic Eddy in an Ice-covered Lake
A. L. Forrest, B. E. Laval, R. Pieters, and S. G. Schladow

1190-1200  Field Investigation of the Geostrophic Motions in the Ice-covered Lake Pääjärvi
William Rizk, Georgiy Kirillin, and Matti Leppäranta
1201-1211  Convective Mixing by Solar Radiation under Lake Ice
  Georgiy Kirillin, William Rizk, and Matti Leppäranta

1212-1222  Optical Study of Ice Cover on Estonian Lakes
  Ants Erm, Ove Pärn, and Fred Buschmann

1223-1232  Ice Season on Lake Kilpisjärvi in Arctic Tundra
  Matti Leppäranta, Kunio Shirawawa, and Toru Takatsuka

1233-1242  Hydrography and Circulation in a Coastal Site of the Gulf of Finland during the Ice Season
  Ioanna Merkouriadi, and Matti Leppäranta

**Ecology and water quality in ice-covered lakes**

1243-1247  Seasonal Variability of Antarctic Ice-covered Lakes Ecosystems, Eastern Antarctica
  Alexey Tolstikov, and Andrey Sharov

1248-1259  Water Quality Characteristics of Ice-covered, Stagnant, Eutrophic Water Bodies as Influenced by Climate Change
  Kouki Sugihara, and Makoto Nakatsugawa

1260-1267  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

1268-1279  Temperature and Oxygen Regime of the Shallow Ice-covered Lake in Winter and Spring
  G. Zdorovennova, R. Zdorovennov, N. Palshin, and A. Terzhevik

1280-1287  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

1288-1294  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