

**Monday, 10 June**

08:00 - 13:00	Registration			Ground floor (BG)	
08:45 - 09:15	Opening ceremony			Senaatszaal	
09:15 - 10:00	The importance of sustainability in the Arctic region <i>Keynote lecture by Carola van Rijnsoever, Liz ter Kuile &amp; Robert Blaauw</i>			Senaatszaal Chair: A. Metrikine	
10:00 - 10:20	Coffee break			Foyer	
<b>Parallel session 1</b>					
Room	Senaatszaal		Van Hasseltzaal		Commissiekamer 3
Session	Ice-induced vibrations		Ice dynamics modelling and ice forecasts		Ship hull design I/II
Chairs	<i>H. Hendrikse</i>	<i>M.M. Karulina</i>	<i>C. Petrich</i>	<i>C. Keijdener</i>	<i>P. Kujala</i> <i>P. Cambos</i>
10:20 - 10:40	Coupled simulation of ice-structure interaction of offshore wind turbines in BHawC using VANILLA <i>T. Willems, H. Hendrikse</i>		Modelling the dynamics of ice in the Antarctic marginal ice zone <i>R. Marquart, K. MacHutchon, A. Bogaers, M. Vichi, S. Skatulla</i>		Analysis of the event-maximum method for the prediction of local pressures on a ship's hull in the Antarctic ice <i>F. Shamaei, P. Kujala, F. Li, M. Bergström, M. Kotilainen</i>
10:40 - 11:00	A method to find intervals with probability of harsh ice induced vibrations <i>M. Bjerckås, E. D. Gedikli</i>		Early freeze-up scenario in the Caspian Sea <i>S. Vernyayev, Y. Kadranov, A. Sigitov</i>		Validation of the new risk based design approaches (POLARIS) for Arctic and Antarctic operations <i>P. Kujala, J. Kämäräinen, M. Suominen</i>
11:00 - 11:20	A study of the transition ice speed from intermittent crushing to frequency lock-in vibrations based on model-scale experiments <i>C.C. Owen, H. Hendrikse</i>		Analysis of pack ice deterioration due to wave action on the Grand Banks, spring 2017 <i>I. Kubat --T. Browne, C. J. Broderick, D. Watson, M. Sayed</i>		Validation of line-like nature of ice-induced loads using an inverse method <i>J.M. Adams, V. Valtonen, P. Kujala</i>
11:20 - 11:40	Consideration of ice drift in determining the contribution of ice-induced vibrations to structural fatigue <i>H. Hendrikse, J. Koot</i>		Marine operations in channels through shallow ice-covered waters <i>P. Bukharitsin, A. Sigitov, S. Vernyayev, Y. Kadranov, A. Bukharitsin</i>		The study of the Popov method for estimation of ice loads on ship's hull using full-scale data from the Antarctic sea <i>S. Idrissova, P. Kujala, R. Repin, F. Li</i>
11:40 - 12:00	Statistical analysis of ice-induced loads on the Norströmsgrund lighthouse <i>Y. Tu, T.S. Nord, K.V. Høyland, Ø.W. Petersen</i>		Observations and modelling of bergy bit drift <i>G. Crocker, H. Tran</i>		Impacts of nonlinear vs. linear finite element analysis on ice-strengthened primary structures <i>V.M. Valtonen</i>
12:00 - 12:30	Group photo shoot			In front of Aula	
12:30 - 13:30	Lunch			Foyer	
<b>Parallel session 2</b>					
Room	Senaatszaal		Van Hasseltzaal		Commissiekamer 3
Session	Ice action in ISO 19906 I/II		Ice ridges, icebergs and other extreme ice features I/III		Ship hull design II/II
Chairs	<i>R. Frederking</i>	<i>G.A.N. Thomas</i>	<i>S. Bruneau</i>	<i>R.S. Taylor</i>	<i>P. Kujala</i> <i>R. Bridges</i>
13:30 - 13:50	Design situations and limit state verification for Arctic offshore structures <i>G.A.N. Thomas, M.A. Maes</i>		Medium-scale consolidation of artificial ice ridge – Part I: surface temperature, thickness and mechanical properties <i>E. Salganik, K.V. Høyland, A. Shestov, S. Løset, A.N. Heijkoop</i>		Mathematical modeling of ice loads on ship hull in view of their stochastic nature: Concept definition & studies review <i>V.V. Yakimov, T.I. Letova</i>
13:50 - 14:10	Ice events and ice actions in ISO 19906 <i>D.G. Matskevitch, G.A.N. Thomas</i>		Medium-scale consolidation of artificial ice ridge – Part II: fracture properties investigation by a splitting test <i>W. Lu, A. Shestov, S. Løset, E. Salganik, K.V. Høyland</i>		Local ice load prediction formulas based on Arctic field measurements of the IBRV ARAON <i>S. Cho, K. Choi</i>
14:10 - 14:30	Dynamic ice actions in the revision of ISO 19906 <i>H. Hendrikse</i>		A study of drag force on an ice ridge keel in stratified fluids <i>Y. Zu, P. Lu, Z. Li, Y. Xiu, M. Yu, X. Cao</i>		Uncertainty quantification in the ice-induced local damage assessment of a hull section <i>E. Kim, Z. Yu, J. Amdahl, S. Løset</i>
14:30 - 14:50	ISO 19906 updates: Global local ice actions <i>F. Ralph</i>		Aral Sea ice conditions in the second part of the 20th century and their effect on the bottom topography <i>S.V. Maznev, S.A. Ogorodov, A.V. Baranskaya, V.V. Selyuzhenok</i>		Mathematical modeling of ice loads on ship hull in view of their stochastic nature: Method development & solution implementation <i>V.V. Yakimov, T.I. Letova</i>

## Monday, 10 June

14:50 - 15:10 Coffee break Foyer

## Parallel session 3

Room	Senaatszaal	Van Hasseltzaal
Session	Ice action in ISO 19906 II/II	Ice ridges, icebergs and other extreme ice features II/III
Chairs	<i>R. Frederking</i> <i>G.A.N. Thomas</i>	<i>S. Bruneau</i> <i>R.S. Taylor</i>
15:10 - 15:30	ISO 19906:2019 - An international standard for Arctic offshore structures <i>K.J. Muggeridge, R.F. McKenna, G.A.N. Thomas</i>	Initial results of a study into the relationship between level ice draft and ridge keel draft <i>I. Samardžija, K.V. Høyland</i>
15:30 - 15:50	Low-temperature strength of Arctic structures: finite-element analysis based on integral failure criteria <i>G.B. Kryzhevich</i>	Analysis of stamukhi distribution in the Caspian Sea <i>A. Sigitov, Y. Kadranov, S. Vernyayev</i>
15:50 - 16:10	Low temperatures: terms and their application in ISO 19906 <i>K.J. Eik, G.A.N. Thomas</i>	Machine learning for tactical iceberg drift forecasting <i>R. Yulmetov, F. Ralph</i>
16:10 - 16:30		Modelling iceberg grounding on the Grand Banks <i>R. McKenna, T. King, G. Crocker, S. Bruneau, P. German</i>

16:30 - 16:50 Coffee break Foyer

## Parallel session 4

Room	Senaatszaal	Van Hasseltzaal
Session	Ice-structure interaction modelling I/II	Ice ridges, icebergs and other extreme ice features III/III
Chairs	<i>H.S. Kim</i> <i>D.G. Matskevitch</i>	<i>S. Bruneau</i> <i>R.S. Taylor</i>
16:50 - 17:10	Preliminary FEM-DEM study on ice encroachment <i>I. Lemström, A. Polojärvi, J. Tuhkuri</i>	Route selection for a marine pipeline linking the Jeanne d'Arc Basin and the Island of Newfoundland <i>S. Bruneau, T. King, R. McKenna, P. German</i>
17:10 - 17:30	An effective fluid model for the bending failure of level ice <i>C. Keijdener, H. Hendrikse, A. Metrikine</i>	Estimating icebergs hazards in the Barents Sea using a numerical iceberg drift and deterioration model <i>E. Hansen, J. Borge, M. Arntsen, A. Olsson, M. Thomson</i>
17:30 - 17:50	Numerical simulation of broken ice interaction with offshore structures: validation exercises <i>N. Serre, S. Kerkeni, C. Peyrega, M. Rabatel, D. Sapelnikov, Å. Ervik</i>	A 3D numerical model of ice island calving due to buoyancy-driven flexure <i>M. Sazidy, G. Crocker, D. Mueller</i>
17:50 - 18:10	Glacial ice and offshore structure impacts under wave and current excitation <i>W. Lu, J. Amdahl</i>	Wave attenuation through pancake ice. Measurements from a moving vessel in the Barents Sea in 2017 <i>A. Shestov</i>

19:00 - 20:00 Canal Cruise City of Delft Center

## Tuesday, 11 June

08:00 - 13:00	Registration	Ground floor (BG)			
08:45 - 09:30	Determining design ice actions for offshore structures <i>Keynote lecture by Robert Frederking</i>	Senaatszaal <i>Chair: J.S. Hoving</i>			
09:30 - 09:50	Coffee break	Foyer			
<b>Parallel session 1</b>					
Room	Senaatszaal	Van Hasseltzaal		Commissiekamer 3	
Session	Description of ice conditions	Port design in ice covered waters		Ice mechanics I/V	
Chairs	<i>P. Verlaan</i> <i>C. Keijdener</i>	<i>J. Heinonen</i>	<i>M.T.O. Suominen</i>	<i>K.V. Høyland</i>	<i>J.S. Hoving</i>
09:50 - 10:10	An approach to establish sea ice design load cases south of the Barents Sea polar front  <i>E. Hansen, J. Borge, M. Arntsen, N. Serre, Å. Ervik, T. Lundamo, M. Thomson, A. Olsson</i>	Environmental monitoring and ice forces on the Nanisivik Wharf  <i>L. Poirier, J. Brown, R. Frederking</i>		Estimation of static and kinetic friction coefficients for ice interacting with concrete surfaces  <i>N. Nuus, S.E. Bruneau, J.S. Hoving</i>	
10:10 - 10:30	Ice on its southern limit in the Barents Sea: field investigation near Bear Island in April 2017-2018  <i>N. Marchenko</i>	Formation and dynamics of an ice bustle at the Nanisivik Wharf  <i>J. Brown, L. Poirier, R.M.W. Frederking</i>		The strength and the physical properties of glacier-ice runways  <i>M.S. Kallelid, T.S. Nord, S. Lidström</i>	
10:30 - 10:50	Ice condition parameters of the Gulf of Bothnia with relation to offshore wind turbine design  <i>M. Tikkanmäki, J. Heinonen, A. Montonen, P.B. Eriksson</i>	De-icing using linear aeration systems: laboratory test program and model development  <i>J. Thijssen, V. Talimi, P. Thodi, L. Liu, M. Fuglem, M. Abdi, M. Paris, C. Ishoj, D.B. Gauthier, S.D. Levoy</i>		Features of determining the ice flexural strength and the elastic modulus based on floating cantilever beam tests  <i>E.B. Karulin, A.V. Marchenko, A.N. Sakharov, M.M. Karulina, P.V. Chistyakov, D.A. Onishchenko</i>	
10:50 - 11:10	Probabilistic assessment of ice rose diagrams for ice drift in the Beaufort Sea  <i>S. Chana, W. Chai, B.J. Leira, K.V. Høyland, A. Naess</i>			On the influence of the hydraulic characteristics of the rig during full-scale compression and indentation tests on sea ice  <i>A. Marchenko, E. Karulin, A. Sakharov, P. Chistyakov</i>	
11:10 - 11:30	Field measurements on the behavior of brash ice  <i>V. Bonath, V. Zhaka, B. Sand</i>			Design and realization of CSSRC small ice model basin for ice-related fundamental researches  <i>Y. Tian, Y. Wang, S. Ji, Z. Chen, M. Huang</i>	
11:30 - 12:00	Collect lunch bag	Foyer			
12:00 - 18:00	Heritage tour - Maeslantkering & Kinderdijk <i>12:00 Gather at Main Entrance Aula TU Delft</i> <i>12:15 Bus departs to Maeslantkering</i> <i>13:00 Start program at Maeslantkering</i> <i>15:00 Bus departs from Maeslantkering to Kinderdijk</i> <i>16:00 Start program at Kinderdijk</i> <i>17:30 Bus departs from Kinderdijk</i> <i>18:00 Bus arrives at Main Entrance Aula TU Delft</i>				
12:15 - 19:00	Technical tour - MARIN <i>12:15 Gather at Main Entrance Aula TU Delft</i> <i>12:30 Bus departs to MARIN</i> <i>14:00 Start program at MARIN</i> <i>17:45 Bus departs from MARIN</i> <i>19:00 Bus arrives at Main Entrance Aula TU Delft</i>				

## Wednesday, 12 June

08:00 - 13:00	Registration			Ground floor (BG)
08:45 - 09:30	Modelling Structure-Ice Contact <i>Keynote Lecture by Kaj Riska</i>			Senaatszaal <i>Chair: H. Hendrikse</i>
09:30 - 09:50	Coffee break			Foyer
<b>Parallel session 1</b>				
Room	Senaatszaal			Commissiekamer 3
Session	Ice mechanics II/V			Remote sensing & data acquisition and oil in ice I/II
Chairs	<i>A. Barker</i>	<i>J.S. Hoving</i>		<i>A. Marchenko</i> <i>B. Lishman</i>
09:50 - 10:10	The effect of sample dimensions on the compressive strength of model-scale ice  <i>M.T.O. Suominen, R.U. Franz von Bock und Polach, A. Haase</i>			Use of satellite remote sensing to study wave-ice interactions in the marginal ice zone – A review <i>D. Monteban, R. Lubbad, J.O.P. Pedersen</i>
10:10 - 10:30	High pressure crushing of ice against a concrete surface under confined conditions  <i>J. Costello, Y. Liu, S. Bruneau, B. Colbourne</i>			A low-cost survey method for sea ice topography using Structure-from-Motion photogrammetry and small UAVs <i>M. St-Amant, D. Mueller, A. Tivy, A. Garbo</i>
10:30 - 10:50	Peridynamic simulations on propeller-ice impact  <i>L. Ye, C. Guo, C. Wang, C. Wang</i>			Trends in seismic data acquisition in areas with surface ice <i>A. Hussain, O.T. Gudmestad, J. Barabady</i>
10:50 - 11:10	Hydrostatic weighing method in application to model ice density measurements  <i>T. Zvyagina, P. Zvyagin</i>			MOSIDEO/CIRFA tank experiments on behavior and detection of oil in ice  <i>C. Petrich, M. O'Sadnick, C. Brekke, M. Myrnes, S. Maus, M.L. Salomon, S. Woelk, T. Grydeland, R.O. Jenssen, H. Eicken, M. Oggier, L. Ferro-Famil, L. Harkati, O. Rebane, N. Reimer</i>
11:10 - 11:30	Coffee break			Foyer
<b>Parallel session 2</b>				
Room	Senaatszaal		Van Hasseltzaal	Commissiekamer 3
Session	Ice mechanics III/V		Ship resistance in ice I/III	Remote sensing & data acquisition and oil in ice II/II
Chairs	<i>A. Barker</i>	<i>J.S. Hoving</i>	<i>G. Wilkman</i> <i>W. Lu</i>	<i>A. Marchenko</i> <i>B. Lishman</i>
11:30 - 11:50	Experimental study on the tensile strength of granular sea ice based on Brazilian tests  <i>X. Chen, S. Ji</i>		Extension of FSICR method for calculation of ship resistance in brash ice channel  <i>M.M. Karulina, E.B. Karulin, O.V. Tarovik</i>	Semi-Automatic ice floe detection for drift evaluation  <i>Y. Kadranov, S. Vernyayev, A. Sigitov</i>
11:50 - 12:10	The effect of cyclic loading on the flexural strength of columnar freshwater ice  <i>A. Murdza, E.M. Schulson, C.E. Renshaw</i>		Ice resistance calculation method for a ship sailing via brash ice channel  <i>A.A. Dobrodeev, K.E. Sazonov</i>	Noise analysis of model ice contours in images  <i>P. Zvyagin, A. Voitkunskaja, E. Maksimov</i>
12:10 - 12:30	Correlation between bow ice loads and operational responses during ice navigation in the Weddell Sea  <i>A. Bekker, L. Lu, C.M. van Zijl, J.J. Mathee, P. Kujala</i>		Simulation of a ship advancing in floating ice floes  <i>L. Huang, M. Li, B. Igrec, P. Cardiff, D. Stagonas, G.A.N. Thomas</i>	A method for crack recognition between two connected model ice floes  <i>P. Zvyagin, M. Stepanov, T. Zvyagina</i>
12:30 - 13:30	Lunch			

**Wednesday, 12 June**

**Parallel session 3**

Room Session Chairs	Senaatszaal Ice mechanics IV/V <i>A. Polojärvi</i> <i>V. Bonath</i>	Van Hasseltzaal Ship resistance in ice II/III <i>K.J. Eik</i> <i>M. Elo</i>	Commissiekamer 3 Ice and structures in ice <i>A. Kinnunen</i> <i>T.S. Nord</i>
	13:30 - 13:50	Experiments on the micromechanics of ice using scanning electron microscopy <i>M.W. Shortt, P.R. Sammonds</i>	Study on ship resistance characteristics in pack ice fields <i>S.Y. Jeong, H.S. Kim</i>
13:50 - 14:10	Experimental tests on the consolidation of broken and brash ice <i>R. Bridges, K. Riska, A. Haase</i>	A ship in compressive ice: an overview and preliminary analysis <i>F. Li, P. Kujala, J. Montewka</i>	Ice actions for hydraulic structures of primary flood defense Afsluitdijk - "Applying ISO 19906 at home" <i>F. Besseling, A. Lengkeek, H. de Waard, K. Nieuwenhuis</i>
14:10 - 14:30	Acoustic emissions as a measure of damage in ice <i>B. Lishman, A. Marchenko, M. Shortt, P.R. Sammonds</i>	The effect of ship bow shape on ridge resistance in a narrow ridge <i>H. Gong, A. Polojärvi, J. Tuhkuri</i>	Ice loads on an axi-symmetric vessel due to managed first-year ridges <i>K. Croasdale</i>
14:30 - 14:50	Adhesion of ice to concrete: Bonds and their influence on abrasion mechanisms <i>A. Barker, S. Bruneau, B. Colbourne</i>	Analysis of Oden icebreaker performance in level ice using Simulator for Arctic Marine Structures (SAMS) <i>N. Raza, M. van den Berg, W. Lu, R. Lubbad</i>	Level ice crushing pressures for estimating mooring loads <i>J. Thijssen, M. Fuglem, F. Ralph</i>
14:50 - 15:10	Mechanism of shear collapse in sea ice <i>A. Sakharov, E. Karulin, A. Marchenko, M. Karulina, P. Chistyakov</i>	Experimental-analytical study of the platform "North Pole" stability under the conditions of intensive ice pressures <i>I.A. Svistunov, P.V. Maksimova, V.A. Likhomanov, A.V. Chernov, N.A. Krupina</i>	Ice load signatures for ridge actions on wind turbines with conical collars <i>K. Croasdale, J. Thijssen, N. Allyn</i>

15:10 - 15:40 **Coffee break**

Foyer

**Parallel session 4**

Room Session Chairs	Senaatszaal Ice mechanics V/V <i>A. Polojärvi</i> <i>V. Bonath</i>	Van Hasseltzaal Ship resistance in ice III/III <i>K.J. Eik</i> <i>M. Elo</i>
	15:40 - 16:00	Peridynamic modelling of polycrystalline ice <i>W. Lu, M. Li, B. Vazic, S. Oterkus, E. Oterkus</i>
16:00 - 16:20	Investigation of mixed mode fracture of L-shaped sea ice beams <i>I.I. Gribanov, A.V. Marchenko, A. Murdza, R.S. Taylor, R. Sarracino</i>	Estimation of the fatigue damage for an ice class vessel under broken ice condition using a simplified method <i>J.H. Kim, Y. Kim</i>
16:20 - 16:40	Soil mechanics measurement methods applied in model brash ice <i>R. Matala, T. Skogström</i>	Modification of ship routing algorithms for the case of navigation in ice <i>A. Topaj, O. Tarovik, A.A. Bakharev</i>
16:40 - 17:00	Characterization of high pressure zone (hpz) failure and linkages with structural response during medium-scale indentation tests <i>R.B. Hossain, R.S. Taylor</i>	An optimal route of a vessel with presence of drifting ice feature <i>A. Voitkunskaia, T. Zvyagina, P. Zvyagin</i>

19:00 - 23:00 **Conference Dinner**

*2019 POAC Founders lifetime achievement award*

Prinsenhof Museum

## Thursday, 13 June

		Senaatszaal		Van Hasseltzaal		Commissiekamer 3	
08:00 - 13:00	Registration	Ground floor (BG)					
08:45 - 09:30	Recent Trends in Simulation of Ice-Structure Interaction <i>Keynote lecture by Jukka Tuhkuri</i>	Senaatszaal <i>Chair: K. Riska</i>					
09:30 - 09:50	Coffee break	Foyer					
Parallel session 1							
Room	Senaatszaal	Van Hasseltzaal		Commissiekamer 3			
Session	SAMCoT: The impact of eight years of research I/II	Waves in ice		Arctic operations and ice management I/II			
Chairs	<i>S. Løset</i> <i>A. Metrikine</i>	<i>N. Serre</i>	<i>A.B. Aalbers</i>	<i>J. Tuhkuri</i>	<i>J. Brown</i>		
09:50 - 10:10	Impact of eight years of research at SAMCoT <i>S. Løset</i>			Long term prediction of local Ice loads on the hull of S.A. Agulhas II <i>P. Kujala, Z. Jiang, F. Li, L. Lu</i>			
10:10 - 10:30	Minimum requirements of ice management barrier systems <i>S. Ruud</i>	Physical experiments of internal solitary waves (ISWs) under various ice conditions in a cold laboratory <i>K.U. Evers, A. Haase, M. Carr</i>		Capability of energy efficient ships for winter operations in the Bothnian Bay <i>M. Elo, T. Mattsson, I. Saisto</i>			
10:30 - 10:50	Sentinel-1 observations of peak wavelength and dominant wave direction in the marginal ice zone of the Barents Sea <i>D. Monteban, R. Lubbad, H. Johnsen</i>	An experimental study on surface wave attenuation by floating viscoelastic segments <i>D.K. Sree, A.W.K. Law, H.H. Shen</i>		Perspectives of using the drifting ice-resistant platform of the "North Pole" type, which is under construction, as a multifunctional research complex in the Arctic <i>A.S. Makarov, P.V. Maksimova, V.A. Likhomanov, V.T. Sokolov, I.Ye. Frolov, A.V. Chernov, I.A. Svistunov, A.V. Savitskaya</i>			
10:50 - 11:10	Characteristics of ice drift and waves on Spitsbergen-banken <i>A. Marchenko, N. Marchenko</i>	Identifying flexural-mode shapes of ice floes under wave actions using multivariate analysis <i>H. Li, E.D. Gedikli, R. Lubbad</i>					
11:10 - 11:30	Coffee break	Foyer					
Parallel session 2							
Room	Senaatszaal	Van Hasseltzaal		Commissiekamer 3			
Session	SAMCoT: The impact of eight years of research II/II	Climate change and the Arctic environment I/II		Arctic operations and ice management II/II			
Chairs	<i>S. Løset</i> <i>A. Metrikine</i>	<i>K. Croasdale</i>	<i>K. Riska</i>	<i>J. Tuhkuri</i>	<i>J. Brown</i>		
11:30 - 11:50	Probabilistic peak ice load model <i>J. Ranta, A. Polojärvi</i>	Using satellite observation data to estimate minimum design air temperatures distribution in Arctic <i>Y. Xiu, Z. Li, Q. Wang, Y. Zu, P. Lu</i>		Thermodynamic optimization of liferaft designed for Polar regions <i>K.E. Solberg</i>			
11:50 - 12:10	The effect of floe shape on the interaction of vertical-sided structures with broken ice <i>M. van den Berg, R. Lubbad, S. Løset</i>	Impact of climate change on design and operation of Arctic ships and offshore units <i>P. Cambos, K. Croasdale, M. Yazarov, K. Riska, R. Bridges</i>		Applying CAST to investigation of the FPSO's incident with an iceberg <i>E. Kim, I.B. Utne, H.J. Kim</i>			
12:10 - 12:30		Laser scanning as a tool for monitoring road deformations in Svalbard <i>F.D. Iurov, N.A. Marchenko</i>		Winterization and drilling operations in cold climate areas <i>E. Engtrø, O.T. Gudmestad</i>			
12:30 - 13:30	Lunch						

## Thursday, 13 June

## Parallel session 3

Room	Senaatszaal	Van Hasseltzaal	
Session	Propulsion of ships in ice	Marine icing	
Chairs	<i>G. Wilkman</i> <i>W. Lu</i>	<i>N. Serre</i> <i>A.B. Aalbers</i>	
13:30 - 13:50	Method for estimating the propulsion performance of a multi-shaft icebreaker in ice field <i>A.A. Dobrodeev, G.I. Kanevskii, A.M. Klubnichkin, K.E. Sazonov</i>	Model assumptions in rig icing and their implications <i>A. Bäckmann, O. Shipilova, O.C. Ekeberg</i>	
13:50 - 14:10	Development of propulsion technology of Arctic ships operating in ice, from MV Arctic to Norilskiy Nickel <i>G. Wilkman, S. Hänninen, T. Heideman</i>	Marine spray from wave run-up to a hull as input to icing models <i>A.B. Aalbers, J.S. Hoving</i>	
14:10 - 14:30	Research on overload method based on known ice resistance for self-propulsion test in conventional towing tank <i>S. Ji, Y. Tian</i>	Autonomous real-time sea spray measurement system for offshore structures <i>S.H. Teigen, O.C. Ekeberg, B. Myhre, H. Rustad, S. Petersen, E. Schröder-Bråtane, S. Carlsen</i>	
14:30 - 14:50	Simplified ice impact load estimate for azimuthing thrusters <i>A. Kinnunen, I. Perälä, M. Tikanmäki</i>	Risk assessment of wind farm development in ice proven area <i>A.M. Mustafa, A. Barabadi, T. Markeset</i>	
14:50 - 15:20	Coffee break		Foyer

## Parallel session 4

Room	Senaatszaal	Van Hasseltzaal	
Session	Ice-structure interaction modelling II/II	Climate change and the Arctic environment II/II	
Chairs	<i>F. Ralph</i> <i>W. Lu</i>	<i>K. Croasdale</i> <i>K. Riska</i>	
15:20 - 15:40	Non-smooth DEM simulation for interaction of conical structure and managed ice floes using breakable ice element <i>K. Hasegawa, S. Uto, H. Shimoda, D. Wako, T. Matsuzawa</i>	Long-term geothermal monitoring of the Arctic coast for assessment of their stability <i>O.V. Kokin, A.V. Kirillova, D.M. Frolov, S.V. Godetskiy</i>	
15:40 - 16:00	Bulk constitutive law and its importance in CEM simulations of ice-structure interaction <i>J. Zhang, D. Feng, S.D. Pang</i>	A low-cost coastal buoy for ice and metocean measurements <i>C. Petrich, M. O'Sadnick, Ø. Kleven, I. Sæther</i>	
16:00 - 16:20	Modeling of full scale DP in ice scenario using an advanced ice dynamics model <i>S. Islam, D. Watson, J. Brown, M. Sayed</i>	A philosophy to ensure the safety of floating structures in Arctic and cold regions <i>C. Makrygiannis, O. Dalane, P. Liferov, R. McKenna, P.O. Moslet, K. Riska, B. Wright</i>	
16:20 - 16:40	Coffee break		Foyer
16:40 - 17:30	Closing ceremony <i>Best student paper award &amp; Presentation POAC 2021</i>		Senaatszaal Chair: <i>A. Metrikine</i>