

Coupled Modelling and Observations in the Arctic Marginal Ice Zone

Date: 10. - 12. February 2025, Oslo

Venue: [Scandic St Olavs Plass](#) Room - Solisten 1

Google Meet link: <https://meet.google.com/jrz-nskh-hnv>

Or dial: (NO) +47 23 88 30 81 PIN: 973 063 621#

Monday, 10. February 2025

Session 1: Introduction

9:00 - 9:15 Welcome address (*Jørn Kristiansen, MET Norway*)

9:15 - 10:00 SvalMIZ campaign - Overview of the campaign and model intercomparison (*Malte Müller, MET Norway*)

10:00 - 10:30 Coffee break

Session 2: Models Systems (Chair: Graig)

10:30 - 11:30: Coupled weather prediction systems

- 5 min presentations; 10 min Q&A at the end
- Central points: Simulation and coupling of sea-ice characteristics (sea-ice concentration, thickness, roughness, snow on sea-ice ...). How have the coupled aspects been evaluated? What key physical couplings play the largest roles and are implemented?
 - 1- IFS and AIFS (*Sarah Keeley, ECMWF*)
 - 2- HRDPSN and CAPS (*Jean-Philippe Paquin, ECCC*)
 - 3- ICON (*Dmitry Mironov, DWD*)
 - 4- AROME and Arpege (*Eric Bazile, Météo-France*)
 - 5- AROME Arctic (*Yurii Batrak, MET Norway*)

11:30 - 12:30 Lunch

12:30 - 13:30 Sea-ice prediction systems (Chair: Malte)

- 5 min presentations; 10 min Q&A at the end
- Central points: Coupling to the atmosphere (assumptions on roughness and drag coefficients ...). How is the system verified? What are the main drivers to consider, and how are these implemented?
 - 1 - GOFS (*David Hebert, NRL*)
 - 2 - RIOPS (*Graig Sutherland, ECCC*)
 - 3 - NeXtSIM (*Guillaume Boutin, NERSC*)
 - 4 - TOPAZ5 (*Alfatih Ali, MET Norway*)
 - 5 - BarentsROMS (*Johannes Röhrs, MET Norway*)
 - 6 - HYCOM-DMI (*Til Rasmussen, DMI*)
 - 7 - MET-AICE (*Cyril Palerme, MET Norway*)

13:30 - 14:30 Coupled wave and sea-ice model systems (Chair: Jean)

- 5 min presentations; 10 min Q&A at the end
- Central points: What are the main challenges to simulating waves-in-ice (e.g. sea-ice characteristics, atmosphere forcing, wave-attenuation parameterization)? To what extent are wave-ice breaking, floe size distribution, and wave-induced drift considered? Which physics are implemented, or currently lacking, in the models?
 - 1 - MF WAM (*Lotfi Aouf, Météo-France*)
 - 2 - NeXtSIM-WW3 (*Guillaume Boutin, NERSC*)
 - 3 - ARCMFC-WAM and MET-WAM (*Ana Carrasco, MET Norway*)
 - 4 - COAMPS (*Jie Yu, NRL*)

14:30 - 15:30 *Coffee break*

Session 3a: Evaluation of coupled processes in the MIZ (Chair: Dina)

15:30 - 16:30 Presentations:

- OpenMetBuoy: Present state and perspectives (*Jean Rabault, MET Norway*)
- First results of the evaluation of the SvalMIZ data. (*Malte Müller, MET Norway*)
- Uncertainty in sea-ice trajectory prediction (*Graig Sutherland, ECCO*)

16:30 *Instructions for the evening and the next day.*

18:00 *Dinner*

Tuesday, 11. February 2025

Session 3b: Evaluation of coupled processes in the MIZ (Chair: Dina)

8:30 - 9:30 Breakout groups:

How to evaluate coupled processes in the MIZ - the use and usefulness of campaign data

- How do we approach process evaluation and forecast accuracy?
- The usefulness of other data sources (remote sensing, land-based stations, ...)

9:30 - 10:00 In plenum group presentations and discussions

10:00 - 10:30 *Coffee break*

Session 4a: Disciplinary breakout groups *(Chair: Jean)*

10:30 - 11:30 **Breakout groups:**

Division into (1) weather prediction; (2) sea-ice prediction; (3) wave prediction and (4) one interdisciplinary group.

- What are the grant challenges to advancing forecasts in the MIZ from the disciplinary perspectives?
- Which parameters and parameterizations have the strongest impact on forecast uncertainties?
- How can we improve and which developments and observations are necessary?
- What physical quantities should be collected by field campaigns to answer the needs of modelers and remote sensing calibration and development?

11:30 - 12:30 *Lunch*

Session 4b: Disciplinary breakout groups *(Chair: Jean)*

12:30 - 13:30 **In plenum group presentations and discussions**

Session 5a: AI models, emulators, and prediction systems *(Chair: Graig)*

13:30 - 14:30 **Presentations:**

- AI-based weather forecasting system for Scandinavia and Arctic regions *(Paulina Tedesco, MET Norway)*
- AI for numerical weather prediction at *(Eric Bazile, Météo-France)*
- AI use for marine applications *(Lotfi Aouf, Météo-France)*
- AI-based sea-ice predictions *(Cyril Palerme, MET Norway)*

14:30 - 15:30 *Coffee break*

Session 5b: AI models, emulators, and prediction systems *(Chair: Graig)*

15:30 - 16:00 **Presentations:**

- AI-based sea-ice and ocean prediction at ECMWF *(Sarah Keeley, ECMWF)*
- IceCastNet: high-resolution sea ice forecasting system in the Arctic based on AI *(Laurent Bertino, NERSC)*

16:00 - 17:00 **Breakout groups:**

How do we foresee utilizing and benefiting from current ML developments?

How to verify/validate AI-based systems in a “fair” manner?

The development of hybrid or purely data-driven systems in the coming years?

Wednesday, 12. February 2025

Session 5c: AI models, emulators, and prediction systems

8:30 - 9:00 In plenum group presentations and discussions

Session 6: Presentations

9:00 - 10:00 **Session 6a** (*Chair: Jean*)

- 1993-2023 evolution of the Arctic MIZ in a wave-ice coupled model (*Guillaume Boutin, NERSC*)
- Effect of variable atmosphere-ice-ocean drag on the simulated sea ice and ocean in the Atlantic sector of the Arctic (*Hiroshi Sumata, MET Norway*)
- Impact of CFOSAT wave data during SvalbardMIZ2024 (*Lotfi Aouf, Météo-France*)
- Arctic sea-ice physics observations (*Sebastian Gerland, Norwegian Polar Institute*)

10:00 - 10:30 *Coffee break*

10:30 - 11:30 **Session 6b** (*Chair: Dina*)

- On the definition of the marginal ice zone: a case study with SAR and passive microwave data. (*Armina Soleymani, University Manitoba*)
- Wave attenuation, surface wave boundary layer and wave drift in the marginal ice zone (*Jie Yu, Naval Research Laboratory*)
- Detecting floe collisions with Open Met Buoy (*Lars W. Dreyer, University of Oslo*)

11:30 - 12:30 *Lunch*

Session 7: Future campaigns and model intercomparisons (*Chair: Malte*)

12:30 - 13:30 **Presentations:**

- Merged Data File (MDF) for future presentation (*Johanna Tjernström, Univ. of Oslo*)
- WMO - PCAPS (*Dina Abdel-Fattah, MET Norway*)
- ICARP / IPY (*Jon Børre Ørbak, Norwegian Research Council*)
- Future campaigns and observation networks (*Malte Müller, MET Norway*)

13:30 - 14:30 **Discussion:**

What are the missing parameters from buoy networks for coupled model evaluation?
How to allow for an optimized data exchange for future intercomparison projects?
Information about future projects and plans and possible collaboration?

Summing up ...

15:00 - Coffee

Breakout Groups:

Group 1	Group 2	Group 3	Group 4
Steinar Eastwood	Sebastian Gerland	Malin Johansson	Dina Abdel-Fattah
Emma Bedossa	Atle Jensen	Ana Carrasco	Alessio Canclini
Jie Yu	Jean Rabault	Guillaume Boutin	Graig Sutherland
Zhaohui Cheng	Trygve Halsne	Lotfi Aouf	Lars Dreyer
David Hebert	Cyril Palerme	Chiara de Geeter	Alfatih Ali
Nick Hughes	Johannes Röhrs	Jean-Philippe Paquin	Hiroshi Sumata
Johanna Tjernström	Eric Bazile	Til Rasmussen	Sarah Keeley
Paulina Tedesco	Marvin Kähnert	Malte Müller	Jørn Kristiansen
	Keguang Wang	Jens Debernard	Yurii Batrak

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