



# “International workshop on polar-lower latitude linkages and their role in weather and climate prediction”

## Breakout group (BOG) Session Agenda

	Chair	Rapporteur
<b>Ocean</b>	Michael Karcher	Johann Jungclaus
<b>Atmosphere I</b>	Rodrigo Caballero	Erko Jakobson
<b>Atmosphere II</b>	Jim Overland	Shuting Yang
<b>Prediction and services</b>	Cecilia Bitz	Carlo Buontempo

### Ocean BOG

The discussions in this BOG are intended to provide input to WCRP/MWRP on the following issues:

- Knowledge gaps
- Necessary steps in the methodology and technology development
- Observational needs
- Requirements for an effective cooperation and research funding infrastructure

We have identified six topics that should be discussed for about one hour each: 1-4 on Thursday afternoon, 5 and 6 on Friday morning. For each topic we will ask one or more participants to provide a 15-minute presentation to stir the discussion and motivate important questions from her/his point of view.

#### Thursday 13:30-14:45: Sea ice prediction

Joint with the “Prediction and services” BOG. Three 10-minute coordinated talks

- Jonathan Day
- Virginie Guemas
- François Massonnet

followed by a panel discussion with the three speakers

#### Thursday 14:45-15:30: Processes

- Discussion of open issues wrt the panel presentations (e.g. Hugues Goosse)
- 15-minute presentation by Camille Lique
- Open Discussion



#### **Thursday 16:00-17:00: Polar - lower latitude interaction**

- Discussion of open issues wrt the panel presentations (e.g. from Andrey Proshutinsky and Marika Holland)
- 15-minute presentation by Steffen Tietsche

followed by an open discussion

#### **Thursday 17:00-18:00: Decadal prediction**

- Discussion of open issues wrt the panel presentations
- 15-minute presentation by Daniela Matei or Johann Jungclaus

followed by an open discussion

#### **Friday 9:00-10:30: Sea-ice and ocean observations and data assimilation**

Joint with the "Prediction and services" BOG

- 15-minute presentation by Jean Claude Gascard (on IAOOS, IOS, etc)
- 15-minute presentation by Frank Kauker (on data assimilation and observational data needs)

followed by open discussion

#### **Friday 11:00-12:30: Coordination and Funding**

Joint with the "Prediction and services" BOG

- 10-minute presentation by Jean Claude Gascard
- 10-minute presentation by Helge Goessling (PPP)
- 10-minute presentation by Andrey Proshutinsky (FAMOS and Ocean MIPs)

followed by an open discussion

### **Atmosphere BOG I**

#### **Thursday 13:30-15:30: Arctic impacts on lower latitudes**

*What are the sources of uncertainty in predicting Arctic impacts on lower latitudes?*

Talks, each 10 minutes + 5-minute discussion:

- Holmes: Large-scale atmospheric sensitivity to sea ice in an idealised AGCM
- Blackport: The climate response to sudden sea ice loss in CCSM4
- Cattiaux: Opposite CMIP3/CMIP5 trends in the wintertime Northern Annular Mode explained by combined local sea ice and remote tropical influences

Open discussion (30 min, Screen leading)

*What are the similarities/differences between Northern and Southern Hemispheres?*

Talks, each 10 minutes + 5-minute discussion:

- Alexander: The Antarctic Clouds and Radiation Experiment
- Saurral: Sea ice concentration variability over the Southern Ocean and its impact on precipitation in southeastern South America

Open discussion (15 minutes)



## Thursday 16:00-18:00: Polar amplification and lower-latitude impacts on the Arctic

*How robust is observed polar amplification/sea ice/snow loss?*

*Through which (atmospheric) mechanisms do lower latitudes affect polar amplification/sea ice/snow loss?*

Talks, each 10 minutes + 5-minute discussion:

- Ukita: A new positive feedback from the Arctic linkages
- Fletcher: The role of tropical-extratropical teleconnections in climate change
- Magnúsdóttir: Influence of the Atlantic Multidecadal Oscillation on the Northern Hemisphere climate in winter
- Sodemann: The structures of cyclonic moisture transport into the European Arctic: Results from a water vapour tagging method

Short talks, ~7 minutes each:

- Caballero: Moist incursions and their impact on Arctic climate
- Kushner: Observations of snow cover trends and variability

Open discussion (45 minutes, Barnes leading)

## Friday 9:00-10:30: Polar weather

*How does sea ice/snow loss affect polar weather?*

*How does polar weather affect local and lower-latitude climate?*

Talks, each 10 minutes + 5-minute discussion:

- Claud: On associations between surface conditions in the Arctic and polar low developments over the North Atlantic
- Spengler: Idealised simulations of polar low development in an Arctic moist-baroclinic environment

Open discussion (~ 45 minutes)

## Friday 11:00-12:30: Wrap up

- Summary of outstanding knowledge gaps
- New observations?
- New model experiments or methodologies?
- Recommendations

## Atmosphere BOG II

### Thursday 13:30-14:30: Creative disagreements

- Barnes, Francis, Shepard, key points from their keynote talks (10 minutes each)
- Discussion (Shepard leading)

### Thursday 14:30-15:30: Case studies

- Jakobson
- Chen
- Cai



#### **Thursday 16:00-17:00: Dynamics**

- Tanaka: Dynamics of the Arctic Oscillation
- Jasier: Teleconnections
- Nakamura: Blocking highs

#### **Thursday 17:00-17:40: Asia**

- Semenov
- Ukita

#### **Thursday 17:40-18:00: Eastern North America**

- Overland

#### **Friday 9:00-12:30: Discussion**

Given the complexity of the physics and the importance of the topic, it is not unreasonable to say that we are in a pre-consensus period and that we should expect diversity, disagreements, and fragmentation of the scientific community. What are successful ways forward and obstacles?

Everyone should be ready to contribute their ideas on the state of the science on Northern Hemispheric linkages. Possible topics are:

- Are there promising methods to account for natural variability and short record issues?
- Which regions appear to have higher likelihoods of persistent Arctic influences on weather patterns?
- Can we define community modeling experiments and evaluation metrics?

The bottom line is: Can we narrow a consensus on the state of the science for linkages relative to natural variability and other forcings?

### **Prediction and Services BOG**

#### **Thursday 13:30-14:45: Sea ice prediction**

Joint with the "Prediction and services" BOG. Three 10-minute coordinated talks

- Jonathan Day
- Virginie Guemas
- François Massonnet

followed by a panel discussion with the three speakers

#### **Thursday 14:45-15:30**

Two 12-minute talks followed by a discussion

- Yvan Orsolini: Impact of snow cover and sea ice on sub-seasonal to seasonal predictions in the Arctic
- Javier Garcia-Serrano: Empirical predictions of Arctic sea-ice concentration based on the NAO



## Thursday 16:00-18:00: Arctic influence on mid-latitude prediction and services

Four 10-minute talks on prediction:

- Helge Goessling: The Polar Prediction Project
- Thomas Jung: Arctic controls on mid latitude prediction
- Drew Peterson: Evidence of mid-latitude effects of sea ice in seasonal forecasts from a multi-model ensemble: IceHFP
- Javier Garcia-Serrano: On the predictability of the winter Euro-Atlantic climate: lagged influence of autumn Arctic sea-ice

Discussion points:

- Do improved observations or forecasting systems in polar regions lead to improved prediction capabilities in lower latitudes? And how can this question be thoroughly addressed?
- Are polar-lower latitude linkages of sufficient strength to influence predictive skill in middle latitudes?
- Are polar atmospheres and oceans inherently more or less predictable than those in lower latitudes?
- How well are uncertainties in polar regions (observations and models) captured by existing prediction systems?

Four 10-minute talks on services:

- Mio Matsueda: On early warning products for severe weather
- Matthieu Chevallier: On discussions with sea ice forecasts users
- Cecilia Bitz: On the sea ice outlook
- Carlo Buontempo: ECOMS principles of climate service development

## Friday 9:00-10:30: Sea-ice and ocean observations and data assimilation

Joint with the "Ocean" BOG

- 15-minute presentation by Jean Claude Gascard (on IAOOS, IOS, etc)
- 15-minute presentation by Frank Kauker (on data assimilation and observational data needs)

followed by open discussion. Inoue will contribute to the discussion about observational needs with the Radiosonde Observing System Experiment.

## Friday 11:00-12:30: Coordination and Funding

Joint with the "Ocean" BOG

- 10-minute presentation by Jean Claude Gascard
- 10-minute presentation by Helge Goessling (PPP)
- 10-minute presentation by Andrey Proshutinsky (FAMOS and Ocean MIPs)

followed by an open discussion