

## Workshop on Climate Prediction in the Atlantic-Arctic sector

Jointly organised by the Bjerknes Climate Prediction Unit and the EU Modelling Cluster  
5-7th June 2019, Bergen, Norway

### Agenda

#### Wed., 5th June 2019

Registration will be open starting at 8:15

Streaming will start at 8:30: <http://webcast.imr.no/replay/webcastShow.html?key=S2acRsnarRiHCMj>

8:35-08:50	Welcome by Noel Keenlyside
08:50-09:00	Franz Immler, Head of Sector Climate Action at the EC
<b>Mechanisms giving rise to climate predictability</b> <i>Chair: Helene Langehaug, NERSC</i>	
09:00-09:30	Rong Zhang (GFDL, <b>keynote</b> ) Mechanisms for decadal climate predictability in the Atlantic-Arctic sector
09:30-9:50	Nour-Eddine Omrani (UiB, BCPU) Understanding the multidecadal Northern Hemisphere climate variability from the perspective of damped Coupled stratosphere/troposphere/Ocean oscillation
09:50-10:10	Jennifer Mecking (University of Southampton, Blue-Action) Ocean versus Atmosphere in the Eastern North Atlantic Subpolar Gyre Ocean Heat Content
10:10-10:30	Pablo Ortega (BSC, APPLICATE) A multi-model comparison of the ocean contributions to multidecadal variability in the North Atlantic
<b>10:30-11:00 BREAK</b>	
<b>Mechanisms giving rise to climate predictability cont.</b> <i>Chair: Fei Li, NILU</i>	
11:00-11:20	Shuting Yang (DMI, Blue-Action, EUCP) On the climate variability and the recent abrupt cooling over Subpolar North Atlantic
11:20-11:40	Jeremy Grist (NOC, Blue-Action, PRIMAVERA) Re-emergence of North Atlantic subsurface ocean temperature anomalies in a seasonal forecast system
11:40-12:00	Hilla Gerstman (ETH Zurich, Blue-Action) Stratospheric influence on extreme weather events in the North Atlantic basin
12:00-12:20	Guillaume Gastineau (SU, Blue-Action) Atmospheric response to the observed sea-ice variability: role of continental snow cover and decadal SST variability



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<b>12:20-13:30 LUNCH at IMR canteen</b>	
<b>Mechanisms giving rise to climate predictability cont.</b> <i>Chair: Jennifer Mecking, University of Southampton</i>	
13:30-13:50	Johann Jungclaus (MPI, PRIMAVERA, <b>invited</b> ) Detecting changes in North Atlantic variability under global warming
13:50-14:10	Marius Årthun (UiB, BCPU, Blue-Action) The role of Atlantic heat transport in future Arctic winter sea ice loss
14:10-14:30	Paul Kushner (University of Toronto) Competing Roles of Fast and Slow Climate Responses to Aerosol Forcing in Sahel Precipitation during the Late 20th Century
<b>14:30-14:45 BREAK</b>	
<b>Challenges to developing climate services</b> <i>Chair: Tor Eldevik, UiB</i>	
14:45-14:50	Beatriz Balino (UiB, CORA) Brief overview of the Joint Coordination Office for WCRP Regional Activities
14:50-15:20	Francisco J. Doblas Reyes (BSC, EUCP, <b>keynote</b> ) Transitioning climate prediction from research to operations and services
15:20-15:40	Erik Kolstad (NORCE, Blue-Action, <b>invited</b> )
15:40-16:00	Anne Britt Sandø (Institute of Marine Research, BCPU) Potential applications of climate predictions on different levels in the marine ecosystem
16:00-16:20	Mette Skern-Mauritzen (Institute of Marine Research) The use of climate predictions to inform fisheries and ecosystem management – an ICES perspective
<b>16:20-16:30 BREAK</b>	
16:30-17:30	<p>Panel discussion</p> <ul style="list-style-type: none"> <li>● Siri Kalvig, Executive Director at Nysnø Klimainvesteringer</li> <li>● Franz Immler, Head of Sector Climate Action, EASME, European Commission</li> <li>● Francisco J. Doblas Reyes, Director of Earth Sciences Department at BSC</li> <li>● Erik Kolstad, senior researcher at Regional Climate &amp; Climate Services group, NORCE, and adjunct professor at Centre for Climate and Energy Transformation, UiB</li> <li>● Mette Skern-Mauritzen, Leader of the Ecosystem Processes research group at Havforskningsinstitutt</li> <li>● Tor Eldevik*, Co-leader of the Bjerknes Climate Prediction Unit and Deputy director of the Bjerknes Centre for Climate Research</li> </ul> <p>* panel discussion facilitator</p>



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Thu., 6th June 2019

<b>Mechanisms giving rise to predictability cont.</b> <i>Chair: Stefan Sobolowski, NORCE</i>	
09:00-09:20	Elisa Manzini (MPI, Blue-Action) Nonlinear Response of the Stratosphere and the North Atlantic-European Climate to Global Warming
09:20-09:40	Pier Luigi Vidale (University of Reading, PRIMAVERA) Global Climate Modelling at High Resolution in PRIMAVERA/HighResMIP
09:40:10:00	Dmitry Sein (AWI, PRIMAVERA) Simulating the Arctic climate with the AWI climate models: From global to regional scales
<b>Climate predictability limits</b>	
10:00-10:20	Jon Robson (University of Reading, <b>invited</b> ) Recent multivariate changes in the North Atlantic climate system, with a focus on 2005–2016
<b>10:20-10:50 BREAK</b>	
<b>Climate predictability limits cont.</b> <i>Chair: Ingo Bethke, UiB</i>	
10:50-11:10	Thomas Jung (AWI, APPLICATE) Advanced prediction in polar regions and beyond (APPLICATE): Recent progress
11:10-11:30	Iuliia Polkova (Universität Hamburg, Blue-Action) Preconditions for cold air outbreaks and prediction skill
11:30-11:50	Helene R. Langehaug (NERSC, BCPU, Blue-Action) Assessing poleward propagation of temperature anomalies in decadal hindcast experiments
11:50-12:10	Juliette Mignot (IPSL, Blue-Action, EUCP) IPSL-EPOC decadal prediction system: an update from the trenches
12:10-12:30	Daniela Matei (MPI, Blue-Action) Decadal-scale predictive skill of the North Atlantic upper-ocean salt content and its attribution to the initialization of the North Atlantic Ocean Circulation
<b>12:30-13:40 LUNCH at IMR canteen</b>	
<b>Climate predictability limits cont.</b> <i>Chair: Martin King, NORCE</i>	
13:40-14:00	Rosemary Eade (Met Office, <b>invited</b> ) Decadal Variability and Trends with a focus on the North Atlantic Oscillation



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14:00-14:20	Panos Athanasiadis (CMCC, Blue-Action, PRIMAVERA) Preliminary title: Decadal prediction of NA Blocking
14:20-14:40	Francois Counillon (NERSC, BCPU, Blue-Action) The role of model bias for prediction skill and methods to constrain it
<b>14:40-15:00 BREAK</b>	
15:00-17:00	Discussion sessions (see specific program below)
18:30-20:00	Posters (see full list below)
20:00-	Dinner at NERSC

### Fri., 7th June 2019

<b>Data assimilation for reanalysis and model initialization</b> <i>Chair: Madlen Kimmritz, NERSC</i>	
09:00-09:30	Eugenia Kalnay (UMD, <b>keynote</b> )
09:30-09:50	Steve Penny (University of Maryland, <b>invited</b> )
09:50-10:10	Benjamin Menetrier (IRIT, <b>invited</b> ) Localization for ensemble DA: objective diagnostic and efficient application
10:10-10:30	Patrick Laloyaux (ECMWF, <b>invited</b> ) Application of coupled data assimilation at ECMWF
<b>10:30-11:00 BREAK</b>	
<b>Data assimilation for reanalysis and model initialization</b> <i>Chair: Francine Schevenhoven, UiB</i>	
11:00-11:20	Yiguo Wang (NERSC, BCPU, Blue-Action) Development of ensemble-based data assimilation techniques for climate prediction
11:20-11:40	Victor Estella Perez (LOCEAN, Blue-Action) Reconstructions of the AMOC in the historical period using surface data with the IPSL coupled model
11:40-12:00	Madlen Kimmritz (NERSC; BCPU, Blue-Action) The role of ocean and sea ice for seasonal prediction in the Arctic



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12:00-12:20	Filippa Fransner (UiB, BCPU) Ocean biogeochemical predictions - the role of initial conditions and sources of potential predictability
<b>12:20-13:30 LUNCH at IMR canteen / Bjerknes CPU leadership and advisory board meeting</b>	
13:30-15:30	Discussion ( <i>tbc</i> : spill over from Thursday; wrap up)
<b>15:30 End of workshop</b>	

## Posters

### Mechanisms

1. Ramon Fuentes-Franco (SMHI, PRIMAVERA, EUCP) Possible tropical sources of predictability for inter-annual variability of summer precipitation over Northern Sweden and Finland
2. Hjálmar Hátún (Faroe Marine Research Institute) An inflated subpolar gyre blows life towards the northeastern Atlantic
3. Valerio Lembo (University of Hamburg, Blue-Action) Prediction of the long-term climate response in a coupled climate model using response theory
4. J. Oelsmann (presented by Johann Jungclaus) (MPI-Met) AMOC-related SST variations as a driver of the Atlantic Multidecadal Variability in MPI-ESM1.2
5. Lea Svendsen (UiB, BCCR, BCPU) Pacific contribution to decadal surface temperature trends in the Arctic
6. Noel Keenlyside (UiB, BCCR, BCPU) Impacts of CGCM bias reduction on the equatorial Atlantic inter-annual variability

### Predictability limits

7. Ingo Bethke (UiB, BCPU, Blue-Action) Improving statistical methods for assessing climate prediction skill
8. Torben Schmith (DMI, Blue-Action, EUCP) Semi-empirical improvement of seasonal forecasts of European winter temperatures
9. Fei Li (NILU, BCPU) Subseasonal-to-Seasonal Forecasts with the Norwegian Climate Prediction Model
10. Bo Christiansen (DMI, Blue-Action, EUCP) The skill of dynamical decadal forecasts with focus on the North Atlantic region
11. Stefan Sobolowski (NORCE) Investigating drivers of midlatitude circulation biases in climate reanalysis ensembles
12. Leilane Passos (UiB, BCPU) Interannual to Decadal Predictions of Thermohaline Anomalies and Air-Sea Interaction in the Subpolar North Atlantic and the Nordic Seas

### Data assimilation

13. Sebastien Barthélemy (UiB, BCPU) Hybrid covariance and dual resolution assimilation for high resolution model
14. Ali Aydogdu (NERSC) Data assimilation using adaptive, non-conservative, moving mesh models
15. Avneet Singh (BCPU) Optimising cross-covariance update in strongly coupled data assimilation



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## Data assimilation posters list ctd.

16. Francine Schevenhoven (BCPU) Efficient algorithms to train supermodels
17. Julien Brajard (NERSC) Data assimilation as a machine learning tool or in combination with it to emulate a dynamical model from sparse and noisy observations.
18. Tian Tian (DMI, Blue-Action) The role of Arctic sea ice initialisation in decadal climate prediction: linking the Arctic sea ice loss and the mid-latitude climate

## Discussion Sessions

**(Thu. 6<sup>th</sup> and Fri. 7<sup>th</sup>. 1.5 hrs in 3 separate rooms. Last 30 mins as plenary wrap-up in main workshop room)**

### Topic 1: Ocean and sea ice predictability (Facilitators: Pablo Ortega, Steffen Olsen *tbc*)

- Constraining the limits of climate prediction through perfect model analyses
- Improving skill through better observations/initialization strategies
- Ocean-sea ice contributions to predictive skill over the continents
- Pacemaker experiments to assist model development: design, identification of key processes and model limitations
- Key observations to assess the realism of models (and their simulated mechanisms), evaluate/improve models

### Topic 2: Atmospheric predictability (Facilitators: Panos Athanasiadis & Guillaume Gastineau)

- Air-sea interaction mechanisms and coupled processes underlying seasonal and decadal predictability in the mid-latitude atmospheric circulation (PA).
- Dynamical processes linking changes in Arctic cryosphere to mid-latitude atmospheric interannual variability (PA).
- Interaction between blocking and eddy-driven jets (PA).
- Signal-to-noise ratio in decadal prediction or in the PAMIP/Blue-action coordinated experiments designed to study the sea ice influence (GG).
- Role of the stratosphere and that of the continental surfaces (snow, soil moisture...) for predictability.
- Suggestions for future modelling strategies relevant for climate prediction for Europe.

### Topic 3: Models, errors, and ensemble size (Facilitators: François Counillon & Noel Keenlyside)

- How to treat model bias, and their impact on prediction
- What class models are required
- Resolution versus ensemble size
- Role of the stratosphere in decadal prediction. Role of model biases, in particular biases in the representation of the stratospheric vortex, and atmospheric dynamical processes in general, for decadal prediction
- Suggestions for future modelling strategies relevant for climate prediction for Europe
- Observational campaigns and long-term observational programmes suitable for assessing high-resolution global climate models



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## Logistics

**Venue of the event:** at Pynten (about 180m from the [Institute of Marine Research - IMR](#) main building) for oral presentations and discussion sessions. At [Nansen Environmental and Remote Sensing Center - NERSC](#) for posters & social dinner. At IMR main building for lunches and some discussion sessions.

**See map:** <https://drive.google.com/open?id=1OjMhGU43-MfJFOFJ1nMm4cW8Tbc&usp=sharing>

### Important contacts:

Anne Britt Sandø (access to IMR and Pynten): +47 934 34 060

Mandy Kong (workshop logistics information): +47 944 25 289

Noel Keenlyside (back up): +47 944 25 297

Helene Langehaug (access to NERSC and poster logistics): +47 988 46 240

François Counillon (back up access to NERSC and poster logistics): +47 993 51 953

**To and from airport:** <https://avinor.no/en/airport/bergen-airport/to-and-from-the-airport/bus-and-taxi/bus>

### Getting around Bergen:

- walking (check the forecast before and bring a raincoat or umbrella);
- public transport: <https://www.skyss.no/en> ;
  - for Pynten and IMR, bus 11 will get you closest but it might be quicker to walk. It leaves from the city centre stop “Strandgaten” at 07:48, 08:18 and 08:48. It takes 8min to reach the stop closest to Pynten, which is “Sjøfarendes aldershjem”. You can just tell the bus driver you wish to go to the Nordnes swimming pool.
  - for NERSC (posters & dinner), the bus and light rail stop “Florida” is closest.
  - Bus and light rail tickets can be bought from the vending machines at the stops or by downloading the mobile app. It is cheaper than buying from the driver on board.
- Getting across Vågen (e.g. from Hotel Thon Orion to Pynten): <https://www.beffenfergen.no/english/>

## Presentations

We kindly request participants to make their presentations available in Zenodo (<https://www.zenodo.org/communities/blue-actionh2020>) after the workshop. You will receive instructions on how to do this.



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