Joint (AC)³ IRTG and LGS-CAR ATM on Arctic midlatitude linkages

12 - 13 November 2024

Venue

Vilhelm Bjerknes lecture hall at
Leipzig University, Leipzig Institute for Meteorology LIM
Stephanstraße 3, Leipzig

Agenda

TUESDAY, 12 November 2024		
09:30 – 10:00	**Welcome and Overview (AC)³**	*Manfred Wendisch* Leipzig University
10:00 – 11:00	**Introduction to Arctic-midlatitude linkages**	*Judah Cohen* AER, USA
11:00 – 11:30	*Coffee break*	
11:30 – 12:30	**Understanding atmospheric rivers and blocked flows as both a consequence and cause of Arctic amplification**	*Jonathon Preece* University of Georgia, Athens, USA
12:30 – 14:00	*Lunch*	
14:00 – 15:00	**Melting icesheets, shifting ocean currents, racing winds – Tracing pathways of change in North Atlantic climate**	*Marilena Oltmanns* National Oceanography Centre, Southampton, UK
15:00 – 18:00	**Project work – part I**	

(AC)³ is a Collaborative Research Center Transregio at the Universities of LEIPZIG | BREMEN | KÖLN
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Joint (AC)³ IRTG and LGS-CAR Advanced Training Module ATM

12 - 13 November 2024

WEDNESDAY, 13 November 2024

09:00 – 10:00	**Simulation of blocking and impacts in global models – are we getting there?**	*Reinhard Schiemann* University of Reading, UK
10:00 – 10:30	*Coffee break*	
10:30 – 11:15	**The influence of sea ice loss on midlatitude winter extremes**	*Marlene Kretschmer* Leipzig University
11:15 – 12:00	**The role of the Scandinavian/Ural blocking for pathways of Arctic-midlatitude linkages**	*Dörthe Handorf* AWI Potsdam
12:00 – 13:30	*Lunch*	
13:30 – 15:00	**Project work – part II**	
15:00 – 15:45	**Project work presentations**	
15:45 – 16:00	**Concluding remarks and outlook**	*Manfred Wendisch* Leipzig University
18:30	*Dinner*	

Group projects

Project 1	*Marilena Oltmanns*	**tbd**
Project 2	*Marlene Kretschmer*	**The link between atmospheric blocking and sever winter weather**
Project 3	*Judah Cohen*	**tbd**
Project 4	*Dörthe Handorf*	**tbd**
Project 5	*Reinhard Schiemann*	**ENSO -blocking teleconnections**
Project 6	*Jan Kretzschmar*	**Impact of reduced sea ice cover in AI weather models on meridional transport into the Arctic**
Project 7	*Jonathon Preece*	**tbd**

For further information, please visit the IRTG webpage (ac3-tr.de/phd/), the LGS-CAR webpage (tropos.de/lehre/promovieren/leipzig-graduiertenschule) or contact the IRTG coordinator Christa Genz (irtg@ac3-tr.de).

(AC)³ IRTG - PhD workshop
'Start-up your PhD'
14 - 15 November 2024

Abstracts & short bios

Judah Cohen, AER, USA
Introduction to Arctic-midlatitude linkages

Abstract: The consequences of Arctic extremes could be significant and widespread across the globe via changes in the jet stream, storm tracks, the polar vortex as well as changes in the ocean circulation. Previous studies have linked the changing Artic to cold spells, snowfall, heat waves, extreme rainfall, wildfires in the Northern Hemisphere midlatitudes and even responses deep in the tropics. Identifying the causes of the extreme weather and potential connection to rapid Arctic change is instrumental to predicting these events and allow emergency management organizations to prepare for adverse winter weather conditions. In my talk I will focus on the observation that despite accelerated Arctic warming, there have been a surprising number of historic cold air outbreaks in the United States (US), Asia and even Scandinavia in recent years, which may even be increasing in frequency. These societally impactful extreme weather events have garnered much scientific inquiry and media attention. However, this topic remains an active area of research and debate, such as the role of internal variability, identification of cause and effect, lack of consensuses between model and observational studies, complicate the problem.

Short bio: Dr. Judah Cohen, Director of Seasonal Forecasting and Principal Scientist at Atmospheric and Environmental Research (AER). Cohen also has a Research Affiliate appointment in the Civil and Environmental Engineering Department of MIT. In addition to his research interests on the polar vortex, Arctic mid-latitude linkages and weather extreme, Cohen is leading AER's development of seasonal forecast products and machine learning models for subseasonal (3-6 weeks) forecasts. Cohen served as a Fulbright Scholar in Ireland, served as co-chair of the US CLIVAR working group on Arctic mid-latitude linkages. Cohen is also currently serving as a Mercator fellow at the University of Leipzig.

Jonathon Preece, Department of Geography, University of Georgia, Athens, USA
Understanding atmospheric rivers and blocked flows as both a consequence and cause of Arctic amplification

Abstract: Atmospheric rivers and blocking anticyclones are dynamically linked phenomena that exert a fundamental control on the cryosphere via local surface energy balance forcing and the advancement of Arctic amplification. This talk will detail these mechanisms of Arctic change and present evidence that their impacts further promote the occurrence of blocked flows and concomitant moisture transport.

Short bio: Jonathon Preece is a Postdoctoral Teaching and Research Associate at the Department of Geography, University of Georgia. He earned his PhD in Geography about the topic ‚Local and Remote Drivers of Greenland Ice Sheet Surface Mass Loss Under Arctic Amplification'. His research interests include atmospheric teleconnections, ENSO, Climate-Cryosphere interactions, hydroclimatology, surface-atmosphere coupling, and the impact of climate change on snowpack and water resources.

Marilena Oltmanns, National Oceanography Centre in Southampton, UK
Melting icesheets, shifting ocean currents, racing winds – Tracing pathways of change in North Atlantic climate

Abstract: Ice-ocean-atmosphere feedbacks are a key driver of variability in the North Atlantic region. An increasing occurrence of extremes in ice, ocean and atmospheric variability over the last decades raises questions about their causes, connections, and climate impacts. Combining new statistical approaches with observations, models, and theory, this lecture will demonstrate drivers of change in the amplitude, frequency, and character of North Atlantic ocean and atmospheric variability over the last 70 years and discuss implications for European climate.

Short bio: Marilena Oltmanns is an ocean and climate scientist at the National Oceanography Centre in Southampton. She completed her PhD at Massachusetts Institute of Technology and Woods Hole Oceanographic Institution in the US and then worked at GEOMAR – Helmholtz Center for Ocean Research Kiel as a postdoc, before taking on a research/senior scientist position in the UK. Her research centres around the role of the ocean in the climate system with a specific focus on extreme events and rapid climate change.

Reinhard Schiemann, University of Reading, UK
Simulation of blocking and impacts in global models – are we getting there?

Abstract: In this overview presentation, I will first briefly discuss the different types of blocking, how blocking is identified in models, how blocking has varied historically, and what surface impacts are associated with blocking. The main part of the talk will then present multi-model assessments of how blocking is represented in different generations of model intercomparison projects, especially CMIP6, and highlight some examples of how blocking representation and predictability has been improved through increases in resolution in the atmosphere and ocean, and parameterisation development, but also remaining model biases. Blocking projections will also be presented, with a focus on high-latitude blocking and impacts, and remaining knowledge gaps.

Short bio: Reinhard Schiemann is a Senior Scientist at the UK National Centre for Atmospheric Science at the University of Reading. His research targets the question of how weather and climate extremes and their impacts (blocking, storms, drought, flooding) change in a changing climate. To support such research, Reinhard has made several investments in climate modelling, at high resolution (e.g., CMIP6-HighResMIP), and more recently in the generation of a new Large Ensemble of global model simulations (UK NERC CANARI).

Marlene Kretschmer, Leipzig University, Germany
The influence of sea ice loss on midlatitude winter extremes

Abstract: The Northern Hemisphere stratospheric polar vortex (SPV) plays a key role in mid-latitude weather and climate. However, in what way the SPV will respond to global warming is not clear, with climate models disagreeing on the sign and magnitude of projected SPV strength change. Here I address the role of Barents and Kara (BK) sea ice loss in this. I discuss evidence for a non-linear response of the SPV to global mean temperature change, which is coincident with the time the BK seas become ice-free. Using a causal network approach, I demonstrate that climate models show some partial support for the previously proposed link between low BK sea ice in autumn and a weakened winter SPV but that this effect is plausibly very small relative to internal variability. This can be found in both CMIP5 and CMIP6 models, as well as large single model ensembles. Given the expected dramatic decrease in sea ice in the future, even a small causal effect can explain all of the projected ensemble-mean SPV weakening and the different signed response in the model ensembles. Overall, the results indicate the importance of exploring all plausible implications of a changing Arctic for regional climate risk assessments.

Short bio: Marlene is a junior professor for Climate Causality at the Leipzig Institute for Meteorology at Leipzig University. Before that, she was a Postdoc and Marie Curie Fellow at the Department for Meteorology at Reading University and earned her PhD in Climate Physics at the Potsdam Institute for Climate Impact Research. Her work focuses on understanding the large-scale atmospheric drivers and teleconnections of regional extreme events in present and future climate.

Dörthe Handorf, AWI Potsdam, Germany

The role of the Scandinavian/Ural blocking for pathways of Arctic-midlatitude linkages

Abstract: Despite an improved understanding of mechanisms underlying Arctic-midlatitude linkages over recent years, there is still no consensus, if and how much Arctic amplification contributes to the observed winter cooling over Eurasia. Observational studies have shown that negative temperature anomalies over Eurasia occur more frequently in winters with deep warming over the Barents-Kara Seas.

An analysis of atmospheric circulation regimes over the North-Atlantic Eurasian region shows that deep warming over the Barents-Kara Seas is related to a high probability of the occurrence of the Scandinavian-Ural blocking regime (SUB), and subsequent large positive anomalies of meridional energy transport into the Arctic via the North-Atlantic pathway. On the other hand, the SUB is a precursor for weak stratospheric vortex events.

The critical role of the representation of the SUB is investigated in simulations with global atmospheric circulations models forced by sea surface temperature (SST) and sea-ice anomalies representing recent past, present and future conditions. A nonlinear response in terms of changes of the frequency of occurrence of SUB in early winter for the recent past and for the future has been detected that is either related to SST or sea ice changes. Furthermore, the sensitivity of vertical propagation of planetary waves related to these SUB blocking changes is analysed, which is critical for the initiation of a stratospheric pathway of Arctic-midlatitude linkages.

Short bio: Dörthe Handorf is a senior scientist at the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI), Research Department Potsdam. She completed her Phd thesis in 1996 at AWI Bremerhaven and Humboldt University Berlin on the topic of parametrization of the stable atmospheric boundary layer. Over the past years, her primary research interests have been the interaction between polar climate change and the large-scale atmospheric circulation, as well as the improvement of Earth system models through the incorporation of more accurate representations of atmospheric polar processes.

Joint (AC)³ IRTG PhD workshop on Start-up your PhD - Project management for PhDs

14 - 15 November 2024

Content and goals

Entering your PhD program is like entering a whole new world. After years and years of course work, sitting in class rooms and chasing credit points you are probably thrilled at the prospect of finally applying all you've learned to a real project: your PhD. And rightly so - doing a Phd can be great! You will come up with creative ideas to answering questions nobody has asked before. You will create something nobody has created yet. And you will be the main person responsible for the shape and success of your project. At the same time, all this can be pretty overwhelming. A PhD project is so huge it's often hard to even know where to start. How do you break the immense work load into manageable tasks and milestones? How do you manage the available time and resources so you can finish on time and without risking your mental health. How do you manage yourself and how do you build a support network?
In this interactive workshop, you will learn how to use the most important tools to help you cope with this new set of challenges.

Topics we will cover

Day 1 (9:00h - 17:00h)

1. Make a plan!

- Goal setting: What do you want to achieve with your PhD?
- Phases of a project
- From big-picture planning to daily to-do lists
- SMART targets
- Meeting deadlines through backward planning

2. Manage your resources

- Find your „sacred" hours – time boxing
- Prioritize your tasks: Eisenhower Matrix
- Plan active breaks
- Remove distractions
- What to do when focus is nowhere to be found
- The Pomodoro technique
- „Touch the hometrainer" (make starting easy)
- The 60/40 rule of planning your day
- Intelligent scheduling

Day 2 (9:00h - 13:00h)

3. Build your resilience and deal with crises

- Managing perfectionism: The pareto principle
- Your superpowers
- How to create a support network
- What to do when nothing works out - pivoting and adapting to changes
- Knowing when to quit

(AC)³ IRTG - PhD workshop 'Start-up your PhD'

14 - 15 November 2024

Training philosophy and course logistics

The course will be highly interactive and hands-on.
Through a mix of theoretical input, practical group excercises and individual work, peer-to-peer feedback and on-demand individualized support to participants in the form of feedback during the course the trainer will make sure participants leave the workshop with a tangible outcome and a clear set of steps they can take to implement the newly-aquired skills into their work.

Trainer:

Dr. Andrea Perino - Training and coaching for PhDs
https://www.andreaperino.com/

Andrea Perino studied Biology at the University of Freiburg and graduated with the diploma thesis about 'Habitat choice in the forest dwelling, gleaning bats Myotis bechsteinii, Myotis nattereri and Plecotus auritus (Chiroptera, Vespertilionidae)' in 2013. For her PhD in conservation ecology at the Martin-Luther-Universität Halle-Wittenberg and the German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig in 2019 she developed a theoretical framework for the novel restoration concept „Rewilding". Rewilding aims to restore ecosystems that are resilient to environmental change with minimal human management. As Science-Policy coordinator at the German Centre for Integrative Biodiversity Research (iDiv), she was bridging between cutting-edge biodiversity research and policy makers before she founded her own training and coaching business. She is certified by the Coach Training Alliance since 2021.

For further information, please visit the IRTG webpage (ac3-tr.de/phd/) or contact the IRTG coordinator Christa Genz (irtg@ac3-tr.de).