

Polar Climate Working Group WELCOME!

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PCWG plans for a sea ice components for CESM3 and beyond

Plan for sea ice within CESM3:

- using new CICE6 model physics including: improved snow physics, landfast ice, floe-size distribution (improved wave-ice interactions)
- Adding better ice-ocean freshwater / salt coupling (done!)
- Possible C-grid capability
- Inclusion of sea ice biogeochemistry and coupling to ocean

Plans for CESM3+

- Parameterizations of subgridscale snow heterogeneity influence
- Improvements to albedo (optical properties of ponds, spectral resolution, etc.)
- Improvements to pond parameterization (water retention on ice, etc.)

PCWG CESM Experiments to Investigate:

- Antarctic sea ice-biological interactions
- Factors driving historical sea ice variations
- Sea ice and polar climate predictability
- The influence of forcing uncertainty on sea ice change
- Factors influencing polar amplification
- Arctic moisture sources, atmospheric rivers, and changing precipitation
- Antarctic freshwater discharge and its climate influence

1:30	Welcome and logistics	Hansi Singh Marika Holland Dave Bailey
1:45	Can CESM simulate the cyclone-driven record sea ice loss of January 2022? (online)	Ed Blanchard- Wrigglesworth
2:00	The impact of observed wind variability on Arctic sea ice, Antarctic sea ice and AMOC (online)	Lettie Roach
2:15	ARctic Serenade: Dancing with Arctic Atmospheric Rivers in the Changing Climate Symphony (in person)	Rudra Thaker
2:30	Role of long-term changes of Atmospheric rivers in shaping moisture variability in the Arctic (online)	Qinghua Ding
2:45	Discussion 1	
3:00 - Break		
3:30	Arctic precipitation in circulation-constrained CESM1/2 simulations and the role of meridional moisture transport (online)	Ian Baxter
3:45	Progress Towards a Single-Column Model (Icepack) Case Study for the MOSAiC Expedition (in person)	David Clemens- Sewall
4:00	Time of emergence for Antarctic sea ice and ecosystems (in person)	Laura Landrum
4:15	Robust polar amplification in ice-free climates relies on ocean heat transport and cloud radiative effects' (online)	Mark England
4:30	Arctic amplification and its seasonal migration from 1/8x to 8xCO2 forcing (in person)	Ivan Mitevski
4:45	Using CICE5 to explore Barents-Kara sea ice variability from synoptic to seasonal timescales (in person)	Peter Siew
5:00	Discussion	
5:15	Adjourn	

Discussion 1:
Better integrating observations and models to improve sea ice models and their applications

Discussion 2:
Using CESM for actionable polar science



Discussion 1. Better integrating models and observations to improve sea ice models and their applications



What is the problem and why is this timely?

1. Current state of sea ice models
2. Current observations, new field data and remote sensing products

Observational needs (not a laundry list)

1. High level information on needs for field and remotely sensed data
2. Opportunities and challenges from reanalysis data

Guidance on how best to use data of different types to develop and assess models

1. Issues of spatial and temporal scale
2. Issues of observational uncertainty
3. Technical challenges (data formats, etc.)

Innovative techniques and guidance on how best to use them

1. Data Assimilation, Nudged simulations, storyline approach
2. Single column modeling systems
3. Machine learning

Moving forward - summary of needs and opportunities

Discussion 2. Using CESM for polar actionable science

- Many projects are using CESM for actionable polar science: NNA examples, RVCC, SEARCH, Antarctic MPAs, others
- Is there value in sharing information across projects?
- If so, what information would be useful?
- How might we go about sharing information?
- What common issues/best practices are emerging?
- Are there particular modeling needs?