Polar Climate Working Group Update

June 2020 CESM Meeting

Co-chairs: M. Holland and H. Singh

CICE Consortium Liaisons: D. Bailey and A. DuVivier
• Science Highlights from PCWG CESM2 Special Issue Papers
• CICE6, The Next Generation Sea Ice Model
• Community Simulations
• PCWG Workshops
• Future PCWG Science Priorities
And likely a couple more to come!


Comparing Arctic sea ice evolution in
- CESM2 (CAM6)
- CESM2 (WACCM6)
- CESM1-LENS

DeRepentigny et al (2020)
PCWG CESM2 Special Issue Papers: Science Highlights

Attributing differences in climatological Arctic sea ice state in
- CESM2 (CAM6)
- CESM2 (WACCM6)
to aerosol treatments and clouds.

DuVivier et al (2020)

Arctic Cloud Liquid Water Path Difference, CESM2(CAM6) – CESM2(WACCM6)
PCWG CESM2 Special Issue Papers: Science Highlights

Arctic Clouds and Precipitation

McIlhattan et al (2020)

Snow on Arctic Sea Ice

Webster et al (2020)
PCWG CESM2 Special Issue Papers: Science Highlights

Attributing differences in climatological Antarctic sea ice state to mushy layer sea ice thermodynamics.

Sea Ice Growth Terms, Mushy – BL99

Open Water Sea Ice Growth

Bailey et al (2020)  

Singh et al (2020)
CICE6: The Next Generation Sea Ice Model

- Land-fast sea ice
- Floe size distribution \textit{(Roach et al)}
- SNICAR \textit{(Zender et al)}
- Sea ice biogeochemistry \textit{(Jeffrey et al)}
- ICEPACK column model
- Arakawa C grid \textit{(Bailey et al}; In Progress)
Community Simulations:
CESM2 Tuned Sea Ice Small Ensemble

Albedo of snow over sea ice increased by tuning the dry snow grain radius

3 ensemble members

Tuned Ice CESM2 Runs:
Jen Kay
More Community Simulations

• **CESM2 runs with CMIP5 forcing:** Pre-industrial, 20th Century, RCP 8.5 Future (Hannay et al)

• Regionally-refined Arctic CESM2 configuration

*Regionally-refined CESM CAM grid over Greenland*

Arctic Regionally-refined CAM6: Adam Herrington

PCWG Workshops

- CICE & Icepack Community Workshop and Tutorial (Feb 2020)
Future Science

- Integrating observations with models

Satellite Simulators in the CESM2: Abigail Smith

DuVivier et al (2020)
Future Science

• Coupling sea ice and ocean biogeochemistry
• Polar prediction and predictability
• Uncertainty in polar projections
• Navigating the new Arctic
We Seek Community Input!

hansingh@uvic.ca : Hansi Singh
mholland@ucar.edu : Marika Holland
dbailey@ucar.edu : Dave Bailey
duvivier@ucar.edu : Alice DuVivier

ccsm-polar-request@cgd.ucar.edu : Get on our mailing list!

Joint PCWG/LIWG/PaleoCWG Session

8:30 to noon, Wednesday June 17!