Earth & Environmental Systems Modeling

2024 EESM PI Meeting

August 6-9, 2024

Bethesda North Marriott Hotel & Conference Center

Rockville, Maryland, USA

Date and Time: Wednesday, August 7, 2024, 1:00-4:00 p.m.

Session Name: H. High Latitude

Room / Location: White Flint Room

Breakout Chairs: Andrew Roberts, LANL (afroberts@lanl.gov), Wilbert Weijer, LANL (wilbert@lanl.gov)

Topic Leads: Matt Hoffman, LANL; Steve Price, LANL; Milena Veneziani, LANL; Wieslaw Maslowski, Naval Postgraduate School; Debra Sulsky, University of New Mexico; Xiangdong Zhang, NC State; Jon Schwenk, LANL; Erin Thomas, LANL; Stephanie Waldhoff, PNNL; Elizabeth Hunke, LANL; Darin Comeau, LANL

Breakout Session Agenda

1:00-1:05 p.m.: Introduction to breakout session - Wilbert Weijer and Andrew Roberts

1:05-2:10 p.m.: *Identify a hierarchy of high-latitude multiscale and non-linear interactions critical to polar warming, and to the occurrence of extreme and threshold events in the Arctic and Antarctic.*

- Moderators: Erin Thomas, LANL; Xiangdong Zhang, NCSU
- Rapporteurs: Jon Schwenk, LANL; Darin Comeau, LANL
- Zoom monitor: Wilbert Weijer, LANL

1:05-1:25 p.m.: Eight 2-minute flash talks (coordinator: Wilbert Weijer)

- Teleconnection drivers for Antarctic atmospheric rivers in E3SMv2 and CESM2 – Christine Shields, NCAR
- Arctic Atmospheric Rivers: Historical Trends and Impact on Wintertime Arctic Warm Extremes – Hailong Wang, PNNL
- Arctic Cyclones and Its Driving Role in the Rapidly Changing Arctic Climate System – Xiangdong Zhang, NCSU
- Temporal fluctuations in Arctic atmospheric modes of variability – Alex Jonko, LANL
- Importance of Local Processes and Feedbacks in Modeling a Changing Arctic Climate System – Wieslaw Maslowski, NPS
- Reducing Uncertainty in Estimates of the Biological Production of the Arctic Ocean – Jaclyn Clement Kinney, NPS

- Ice melt from ocean warming in a global ultra-high resolution ocean/seaice model – Julie McClean, UCSD
- The Role of Bering Strait Ocean Heat Transport in Arctic Warming – Wilbert Weijer, LANL

1:25-2:10 p.m.: Discussion

2:10-3:30 p.m.: *Combine all known critical processes in an Earth system model to simulate polar warming with global feedbacks on decadal to centennial timescales in a computationally feasible manner.*

- Moderators: Darin Comeau, LANL; Deborah Sulsky, UNM
- Rapporteurs: Wieslaw Maslowski, NPS; Matt Hoffman, LANL
- Zoom monitor: Wilbert Weijer, LANL

2:10-2:30 p.m.: Eight 2-minute flash talks (coordinator: Andrew Roberts, LANL)

- A Comprehensive Understanding of the Effects of Two Missing Longwave Physics on the Climate and Its Projected Changes Simulated by the E3SM v2 – Chongxing Fan, University of Michigan
- Wave – Sea Ice Interactions in Global Climate Simulations of the Energy Exascale Earth System Model (E3SM) – Erin Thomas, LANL
- Advancing sea ice physics in E3SM Version 4 – Andrew Roberts, LANL
- Towards a dynamic Greenland Ice Sheet component in E3SM – Andrew Nolan, LANL
- Antarctic ice shelf melt and cavity circulation processes in high resolution regionally refined E3SM configurations – Irena Vankova, LANL
- The State of Polar Climate in Fully Coupled E3SM – Stephen Price, LANL
- Enhancing Polar Modeling Capabilities in E3SM for Evaluating Arctic Marine Ecosystem Change – Nicole Jeffery, LANL
- Accelerating modeling and discovery with data science and machine learning in Arctic environments – Jon Schwenk, LANL

2:30-2:45 p.m.: Break

2:45-3:30 p.m.: Discussion

3:30-4:00 p.m.: *Determine impacts of high-latitude Earth system change on humans and make this information actionable to stakeholders.*

- Moderators: Stephanie Waldhoff, PNNL; Matthew Hoffman, LANL
- Rapporteurs: Deborah Sulsky, UNM; Erin Thomas, LANL
- Zoom monitor: Wilbert Weijer, LANL

3:30-3.40 p.m.: Four 2-minute flash talks (coordinator: Stephanie Waldhoff)

- Modeling the future prospects for Arctic shipping of fossil resources under global change – Taryn Waite, PNNL
- Earth system models in a community and regional planning and decision support context: Perspectives from Arctic Alaska – Hajo Eicken, UAF
- Quantifying uncertainty in projections of sea-level contribution from the Antarctic Ice Sheet – Matthew Hoffman, LANL
- Using E3SM to understand bio-geo-chemical dynamics in high latitude marine ecosystems and deriving model products relevant to Arctic Stakeholders – Georgina Gibson, UAF

3:40-4:00 p.m.: Discussion

4:00 p.m.: Adjourn

Wednesday Poster Session

- #077 Arctic Atmospheric Rivers: Historical Trends and Impact on Wintertime Arctic Warm Extremes – Hailong Wang, PNNL
- #078 A Comprehensive Understanding of the Effects of Two Missing Longwave Physics on the Climate and Its Projected Changes Simulated by the E3SM v2 – Chongxing Fan, University of Michigan
- #079 Teleconnection drivers for Antarctic atmospheric rivers in E3SMv2 and CESM2 – Christine Shields, NCAR
- #080 Modeling the future prospects for Arctic shipping of fossil resources under global change – Taryn Waite, PNNL
- #081 The Role of Bering Strait Ocean Heat Transport in Arctic Warming – Wilbert Weijer, LANL
- #082 Temporal fluctuations in Arctic atmospheric modes of variability – Alex Jonko, LANL
- #083 Wave – Sea Ice Interactions in Global Climate Simulations of the Energy Exascale Earth System Model (E3SM) – Erin Thomas, LANL
- #084 Importance of Local Processes and Feedbacks in Modeling a Changing Arctic Climate System – Wieslaw Maslowsi, NPS
- #085 Reducing Uncertainty in Estimates of the Biological Production of the Arctic Ocean – Jaclyn Clement Kinney, NPS
- #086 Ice melt from ocean warming in a global ultra-high resolution ocean/seaice model – Julie McClean, UCSD
- #087 Earth system models in a community and regional planning and decision support context: Perspectives from Arctic Alaska – Hajo Eicken, UAF
- #088 Antarctic ice shelf melt and cavity circulation processes in high resolution regionally refined E3SM configurations – Irena Vankova, LANL
- #089 Quantifying uncertainty in projections of sea-level contribution from the Antarctic Ice Sheet – Matthew Hoffman, LANL
- #091 Towards a dynamic Greenland Ice Sheet component in E3SM – Andrew Nolan, LANL
- #092 Advancing sea ice physics in E3SM Version 4 – Andrew Roberts, LANL
- #093 Arctic Cyclones and Its Driving Role in the Rapidly Changing Arctic Climate System – Xiangdong Zhang, NCSU

Thursday Poster Session

- #077 Investigating the drivers of pan-Arctic water storage change with multisource remote sensing data – Yu Zhang, PNNL
- #078 The role of atmospheric rivers (ARs) in the moisture and energy budget of the Arctic – Mark Seefeldt, University of Colorado
- #079 Warming Permafrost Model Intercomparison Project (WrPMIP) – Christina Schädel, Woodwell
- #080 Identifying and Correcting Regional Climate Bias in Reanalysis Forcing Products for Site-level WrPMIP Simulations – Jon Wells, NAU

- #081 Enhanced Modeling and Prediction of Arctic Sea Ice: Insights from RASM and CMIP6 Simulations, Younjoo Lee, NPS
- #082 Enhanced Sea Ice Mechanics with the Material Point Method, Deborah Sulsky, UNM
- #083 Future projections of Antarctic sub-ice-shelf melting with E3SM v2.1 – Darin Comeau, LANL
- #084 Analysis and Comparison of Greenland Ice Sheet Surface Mass Balance and Energy Budget in E3SM – Chloe A. Whicker-Clarke, UCI
- #085 Spatiotemporal Clustering Algorithms for Lead Detection in SAR Data – Yawen Guan, Colorado State University
- #090 North Atlantic surface water mass transformation contributions to Atlantic Meridional Overturning Circulation in eddy-parameterized and eddy permitting simulations – Benjamin Moore-Maley, LANL (presented by Julie McClean)