



5B.3: An Internal Atmospheric Process Determining Summertime Arctic Sea Ice Melting in the Next Three Decades

Tuesday, May 21, 2019

09:00 AM - 09:15 AM

📍 Williams Village Conference Center - Room B

Arctic sea ice melting processes in summer (JJA) due to internal atmospheric variability have recently received exceptional attention in the community. Recent results show that a regional barotropic atmospheric process over Greenland and the Arctic Ocean in JJA featuring either a year-to-year change or a low-frequency trend toward a geopotential height rise is an essential contributor to September sea ice loss in both the real and model worlds. This regional rise of the height is found to be partially driven by remote forcing in the tropics in a form of a Pacific-Arctic teleconnection.

To further examine how this atmospheric process and its impacts on sea ice will behave under future warming scenarios and whether our previous findings of the atmospheric process are model dependent, we make use of three single model large ensemble simulations (CESM Large Ensemble, MPI Grand Ensemble and CanESM Large Ensemble) to study how this atmospheric process is manifested in both historical and future simulations of each model under three different RCP scenarios. We show that the same atmospheric process, resembling the observed one, also dominates internal sea ice change on interannual to interdecadal time scales in the future under various forcing scenarios. This suggests the importance of internal variability in determining present and future sea ice variability regardless of the modeling environment. Nevertheless, neither of the models are shown to be able to mirror the observed Pacific-Arctic teleconnection in either the historical or future runs. Our study makes a way forward to a more comprehensive understanding of atmospheric dynamic processes driving sea ice loss and their possibly decisive role in determining the uncertainty of the timing of first sea ice free summer and the seasonal predictability of summertime sea ice.

Authors

Daniel Topal

Eötvös Loránd University

University of California - Santa Barbara

Qinghua Ding

Jonathan L. Mitchell

Ian Baxter

[Find Similar](#)

View Related Events

Day: Tuesday, May 21, 2019

