

Supplementary Material for “Arctic sea ice loss drives increasing Arctic wind speeds with combined impact on surface roughness and boundary layer stability”

Alice K. DuVivier^{1*}, Marika M. Holland¹, Stephen J. Vavrus², Laura Landrum¹, Christine Shields¹ and Rudradutt Thaker^{2,3}

^{1*}Climate and Global Dynamics, National Center for Atmospheric Research, Boulder, CO, USA.

²Nelson Institute Center for Climatic Research, University of Wisconsin, Madison, WI, USA.

³Department of Atmospheric and Oceanic Sciences, University of Wisconsin, Madison, WI, USA.

*Corresponding author(s). E-mail(s): duvivier@ucar.edu;

1 Description

This supplementary information contains one table and six figures that provide additional information for the manuscript listed above, but are not essential for the analysis.

2 Tables

Table 1 2020-2100 linear trend and coefficient of determination

Season	CESM2-LE				SMOOTH			
	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer
Sensible Heat Flux								
trend ($(W\ m^2)decade^{-1}$)	0.52	0.82*	-0.13	-0.33	0.52	0.79*	-0.07	-0.33
r^2 (unitless)	0.91	0.88*	0.81	0.98	0.82	0.79*	0.12	0.88
Latent Heat Flux								
trend ($(W\ m^2)decade^{-1}$)	2.17	0.63*	-0.12	-0.50	2.08	0.59*	-0.08	-0.46
r^2 (unitless)	1.0	0.78*	0.92	0.99	0.96	0.69*	0.43	0.88

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Supplementary Figures

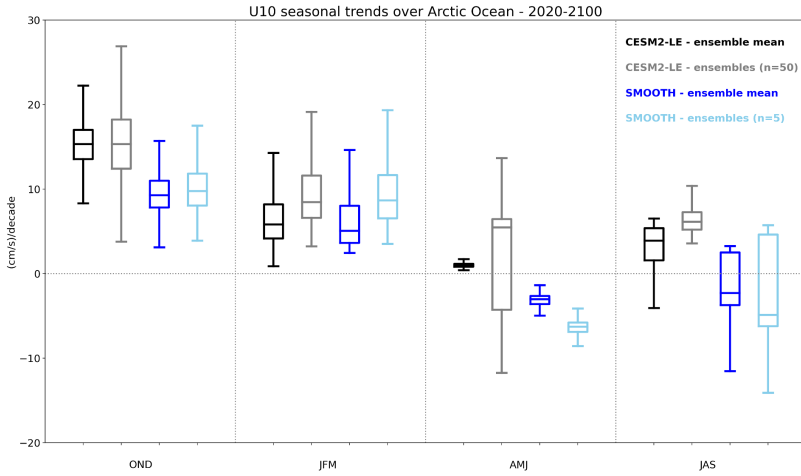


Fig. S1 CESM2-LE and SMOOTH central Arctic distribution of 10m wind speed linear trends ($m s^{-1} decade^{-1}$) for each season (Autumn - OND; Winter - JFM; Spring - AMJ; Summer - JAS) at all spatial points in the central Arctic for the CESM2-LE and SMOOTH ensemble means (black and dark blue, respectively) and for all ensemble members (grey and light blue, respectively).

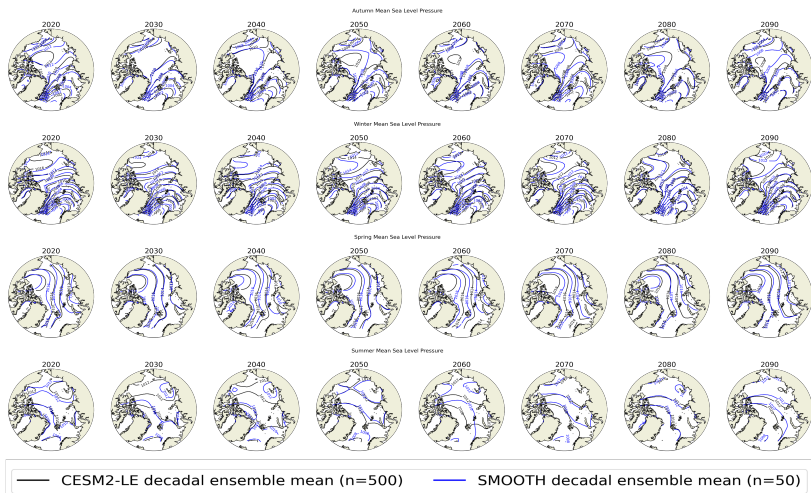


Fig. S2 Seasonal mean sea level pressure (hPa) for each season (Autumn - OND; Winter - JFM; Spring - AMJ; Summer - JAS) over decades 2020-2090. Decadal means are averaged over all years and all ensemble members in the given decade (n=500 for CESM2-LE; n=50 for SMOOTH).

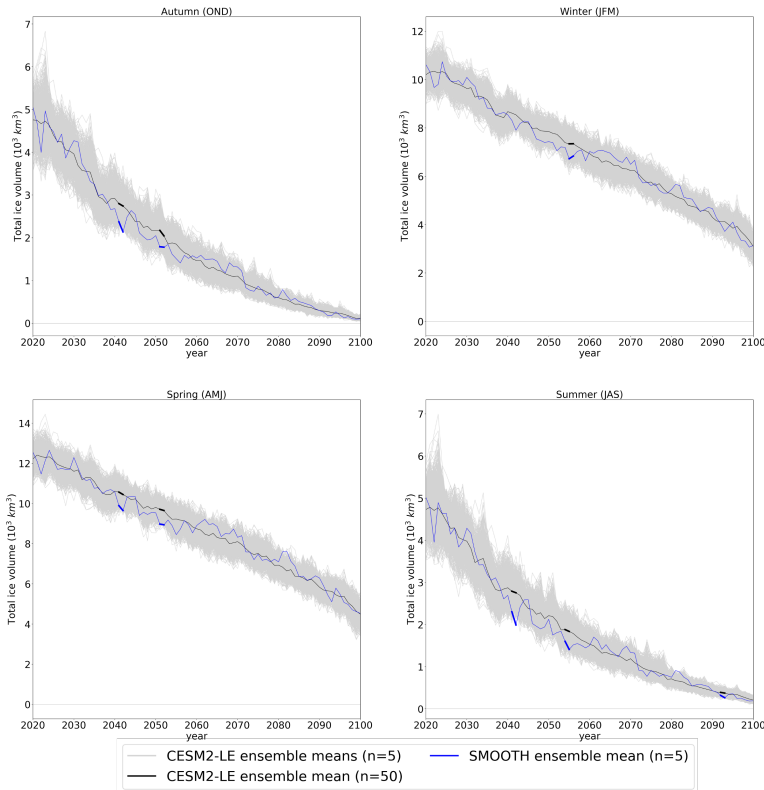


Fig. S3 CESM2-LE and SMOOTH central Arctic average total sea ice volume (km^3) time series for a) Autumn, b) Winter, c) Spring, and d) Summer. Blue solid lines indicate SMOOTH ensemble mean (n=5), black solid lines indicate CESM2-LE ensemble mean (n=50), and grey solid lines indicate 1000 CESM2-LE bootstrapped ensemble means (n=5). The blue and black solid lines are thick for years in which the differences are significant at the 95% confidence level.

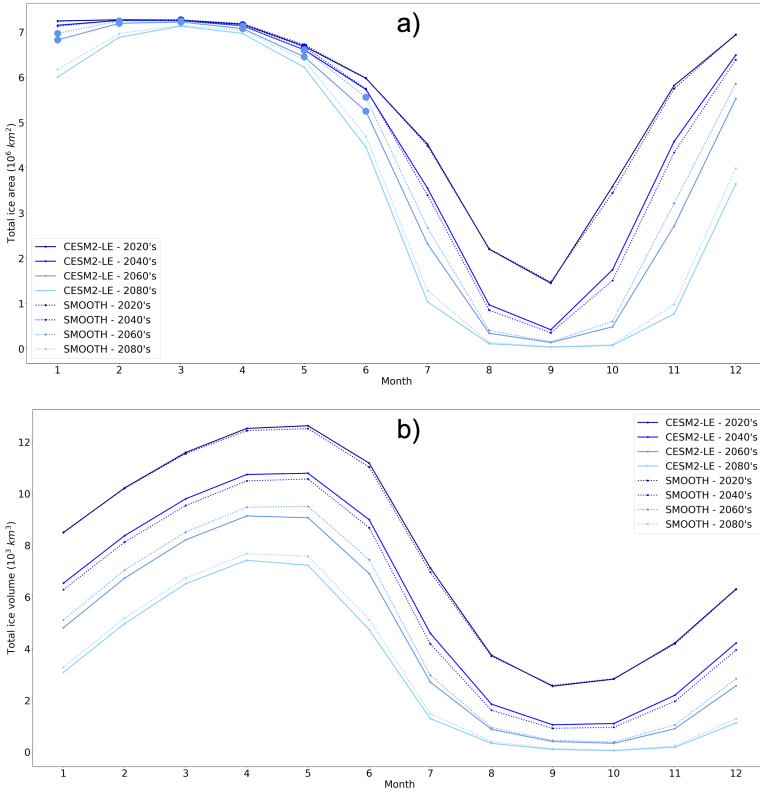


Fig. S4 CESM2-LE and SMOOTH central Arctic annual cycle for a) sea ice area (km^2) and b) sea ice volume (km^3). The ensemble mean decadal average ice area for CESM2-LE (solid line) and SMOOTH (dashed line) is shown for the 2020's, 2040's, 2060's, and 2080's (dark to light blue, respectively), and significant differences at the 95% confidence level are indicated by the large filled circles.

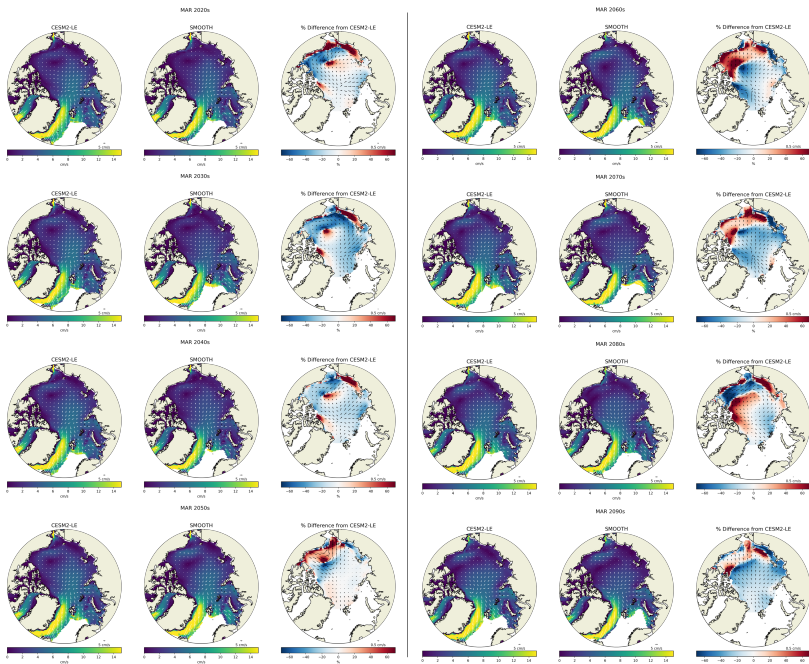


Fig. S5 Decadal March sea ice velocity (cm s^{-1}) for CSM2-LE, SMOOTH, and percent difference of SMOOTH from CSM2-LE for 2020-2090. Decadal means are averaged over all years and all ensemble members in the given decade ($n=500$ for CSM2-LE; $n=50$ for SMOOTH).

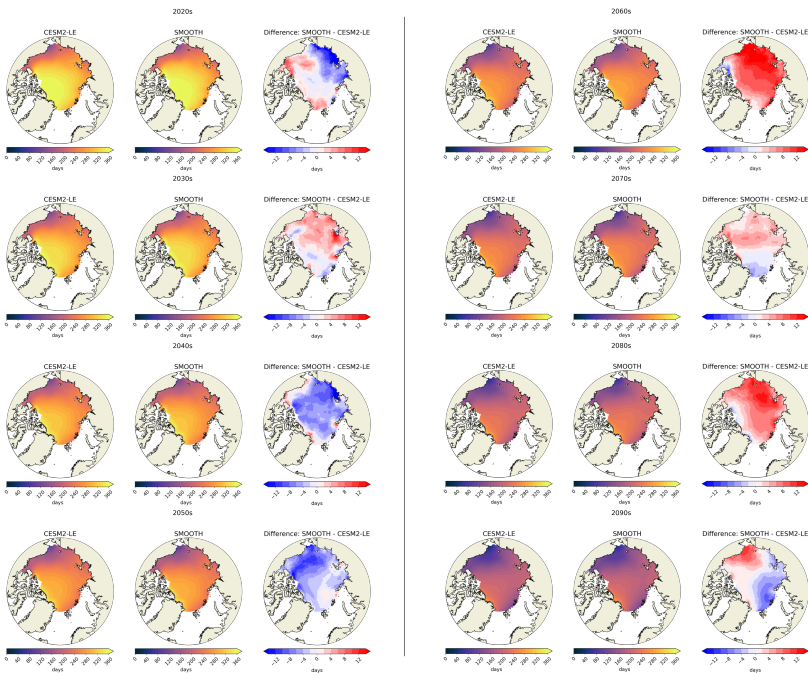


Fig. S6 Decadal ice season length (days) for CESM2-LE, SMOOTH, and difference (SMOOTH - CESM2-LE) for 2020-2090. Decadal means are averaged over all years and all ensemble members in the given decade (n=500 for CESM2-LE; n=50 for SMOOTH).