Supplement of Seasonality and scenario dependence of rapid Arctic sea ice loss events in CMIP6 simulations

Annelies Sticker et al.

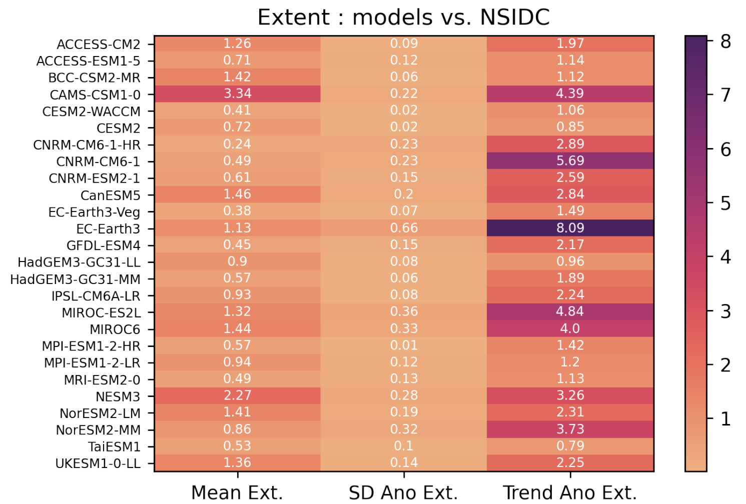

Figure S1. The SIE metrics of CMIP6 models. The three columns correspond to model performance metrics on the mean state (Mean Ext.), standard deviation (SD Ano), and trend (Trend Ano Ext.) of monthly anomalies of the Arctic SIE during the period 1979–2014 compared to the NSIDC-0051. Lower values indicate better skill.

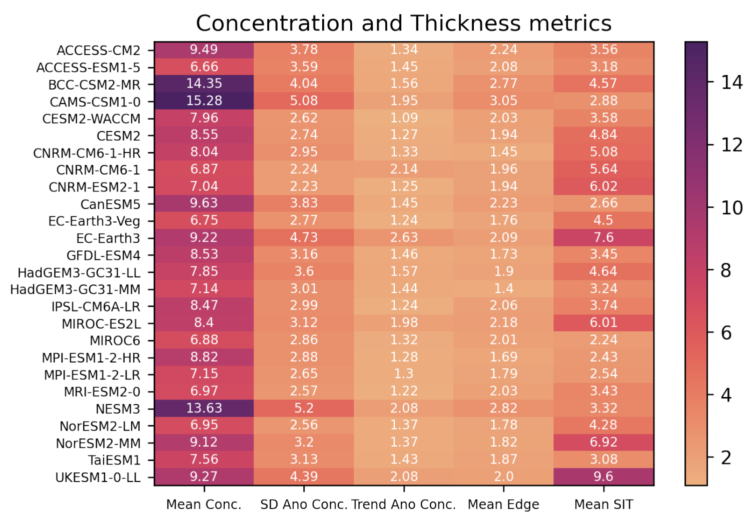

Figure S2. The SIC metrics of CMIP6 models output. The five columns correspond to model performance metrics on the Arctic SIC mean state (Mean Conc.), standard deviation (SD Ano), trend (Trend Ano.), the mean state Arctic sea ice-edge location metrics and the mean state of Arctic SIT of monthly anomalies during the period 1979–2014 compared to the NSIDC-0051 for SIC and PIOMAS reanalysis for SIT. Lower values indicate better skill.

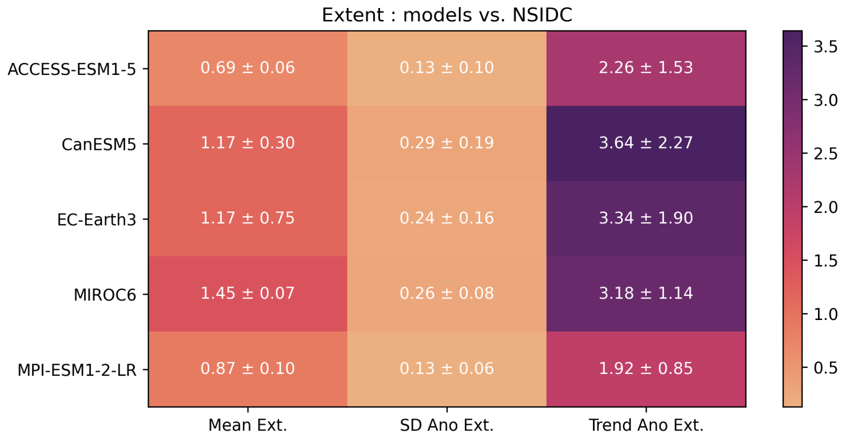

Figure S3. The SIE metrics of the five large ensembles. Values in white represent the mean and one standard deviation over metrics for each member. The three columns correspond to model performance metrics on the mean state (Mean Ext.), standard deviation (SD Ano), and trend (Trend Ano Ext.) of monthly anomalies of the Arctic SIE during the period 1979–2014 compared to the NSIDC-0051. Lower values indicate better skill.

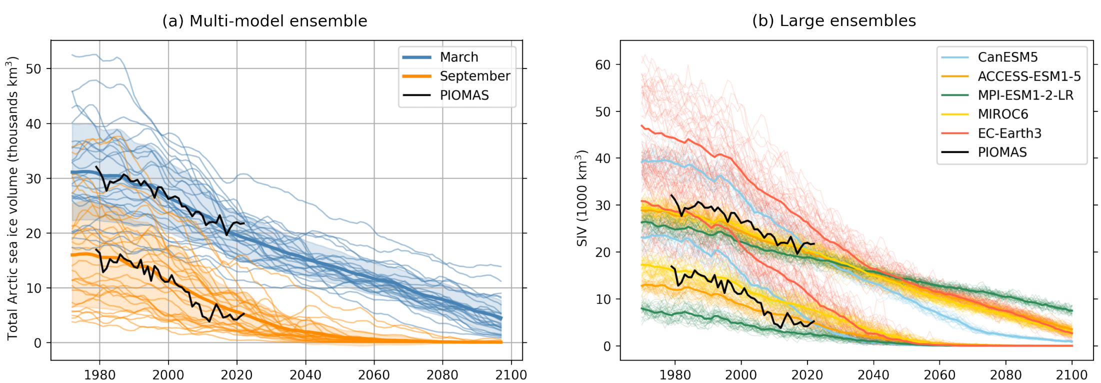

Figure S4. Same as Fig.1 but for SIV. The black lines show the PIOMAS reanalysis data.

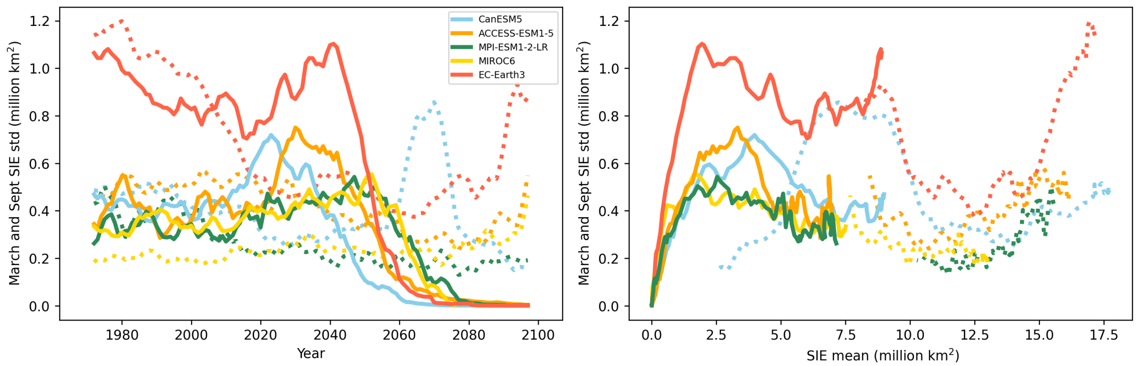

Figure S5. Standard deviation of the 5-year running mean SIE for March (dotted lines) and September (solid lines) as a function of time (left) and September and March SIE mean state (right) for the five large ensembles following high emission scenario SSP5-8.5.

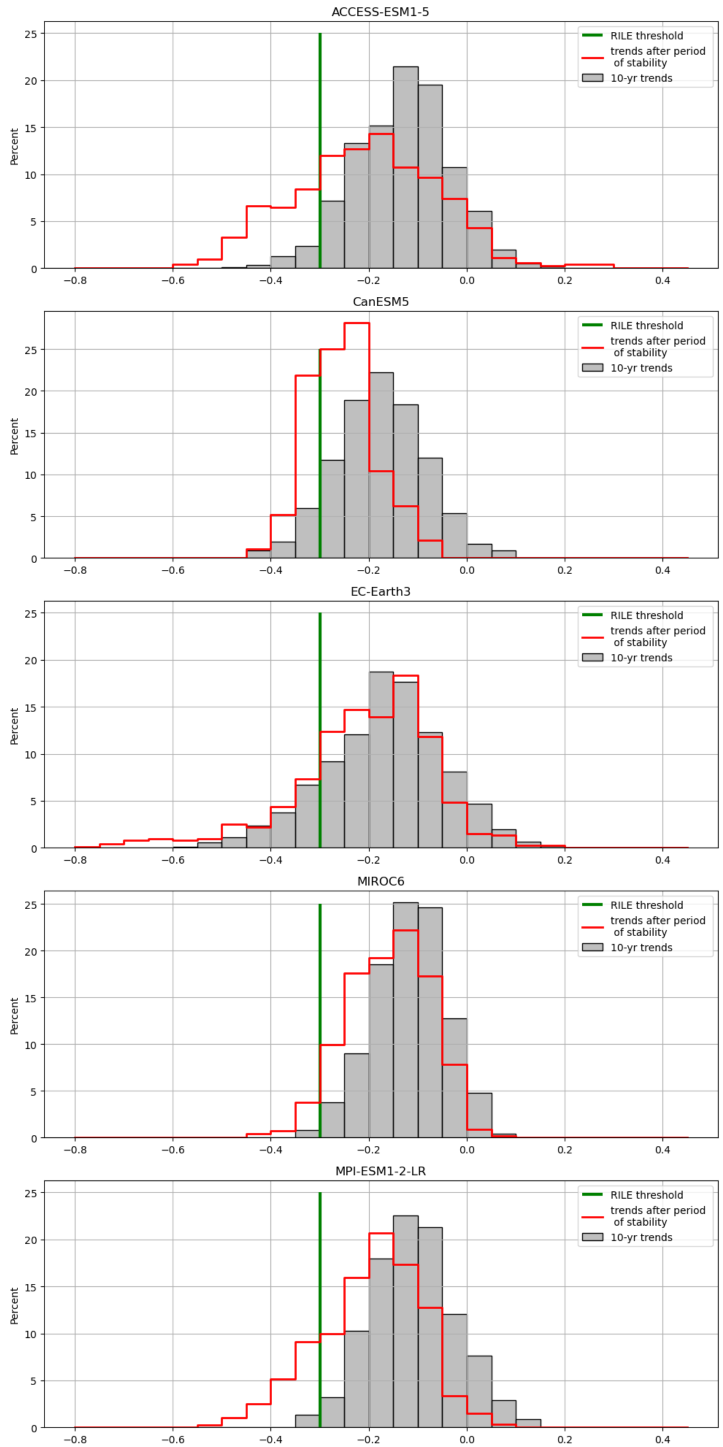

Figure S6. Same as Fig.6 but for the five large ensembles following the SSP5-8.5 scenario. For all large ensembles, the distribution of trends after a period of stability is statistically different from all 10-year trends at the 95% significance level using a z-test.

MODEL NAME	ref historical simulations	ref SSP5-8.5 simulations	ref SSP1-2.6 simulations
1. ACCESS-CM2	Dix et al. (2019a)	Dix et al. (2019c)	Dix et al. (2019b)
2. ACCESS-ESM1-5	Ziehn et al. (2019a)	Ziehn et al. (2019c)	Ziehn et al. (2019b)
3. BCC-CSM2-MR	Wu et al. (2018)	Xin et al. (2019b)	Xin et al. (2019a)
4. CAMS-CSM1-0	Rong (2019c)	Rong (2019b)	Rong (2019a)
5. CESM2-WACCM	Danabasoglu (2019a)	Danabasoglu (2019c)	Danabasoglu (2019b)
6. CESM2	Danabasoglu (2019d)	Danabasoglu (2019f)	Danabasoglu (2019e)
7. CNRM-CM6-1-HR	Voldoire (2019a)	Voldoire (2019e)	Voldoire (2020)
8. CNRM-CM6-1	Voldoire (2018)	Voldoire (2019d)	Voldoire (2019b)
9. CNRM-ESM2-1	Seferian (2018)	Voldoire (2019f)	Voldoire (2019c)
10. CanESM5	Swart et al. (2019a)	Swart et al. (2019c)	Swart et al. (2019b)
11. EC-Earth3-Veg	(EC-Earth)	(EC-Earth)	(EC-Earth)
12. EC-Earth3	(EC-Earth)	(EC-Earth)	(EC-Earth)
13. GFDL-ESM4	Krasting et al. (2018)	John et al. (2018b)	John et al. (2018a)
14. HadGEM3-GC31-LL	Ridley et al. (2019a)	Good (2020b)	Good (2020a)
15. HadGEM3-GC31-MM	Ridley et al. (2019b)	Jackson (2020b)	Jackson (2020a)
16. IPSL-CM6A-LR	Boucher et al. (2018)	Boucher et al. (2019b)	Boucher et al. (2019a)
17. MIROC-ES2L	Hajima et al. (2019)	Tachiiri et al. (2019b)	Tachiiri et al. (2019a)
18. MIROC6	Tatebe and Watanabe (2018)	Shiogama et al. (2019b)	Shiogama et al. (2019a)
19. MPI-ESM1-2-HR	Jungclaus et al. (2019)	Schupfner et al. (2019a)	Schupfner et al. (2019b)
20. MPI-ESM1-2-LR	Wieners et al. (2019c)	Wieners et al. (2019a)	Wieners et al. (2019b)
21. MRI-ESM2-0	Yukimoto et al. (2019a)	Yukimoto et al. (2019c)	Yukimoto et al. (2019b)
22. NESM3	Cao and Wang (2019)	Cao (2019b)	Cao (2019a)
23. NorESM2-LM	Seland et al. (2019a)	Seland et al. (2019c)	Seland et al. (2019b)
24. NorESM2-MM	Bentsen et al. (2019a)	Bentsen et al. (2019c)	Bentsen et al. (2019b)
25. TaiESM1	Lee and Liang (2020a)	Lee and Liang (2020c)	Lee and Liang (2020b)
26. UKESM1-0-LL	Tang et al. (2019)	Good et al. (2019b)	Good et al. (2019a)

Table S1. References for different climate models under various scenarios

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