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Supplementary Materials for "Subseasonal Forecast Improvements from Sea Ice Concentration Data Assimilation in the Antarctic"

Yong-Fei Zhang[1], Mitchell Bushuk[2], Michael Winton[2], William Gregory[1], Bill Hurlin[2], Liwei Jia[2,3], and Feiyu Lu[1]

[1]Atmospheric and Oceanic Sciences Program, Princeton University, Princeton, New Jersey
[2]National Oceanic and Atmospheric Administration/Geophysical Fluid Dynamics Laboratory, Princeton, New Jersey
[3]University Corporation for Atmospheric Research, Boulder, Colorado

Correspondence: Yong-Fei Zhang (yongfeiz@princeton.edu)

[1]The corresponding author's present address: Earth System Science Interdisciplinary Center, University of Maryland, College Park, Maryland

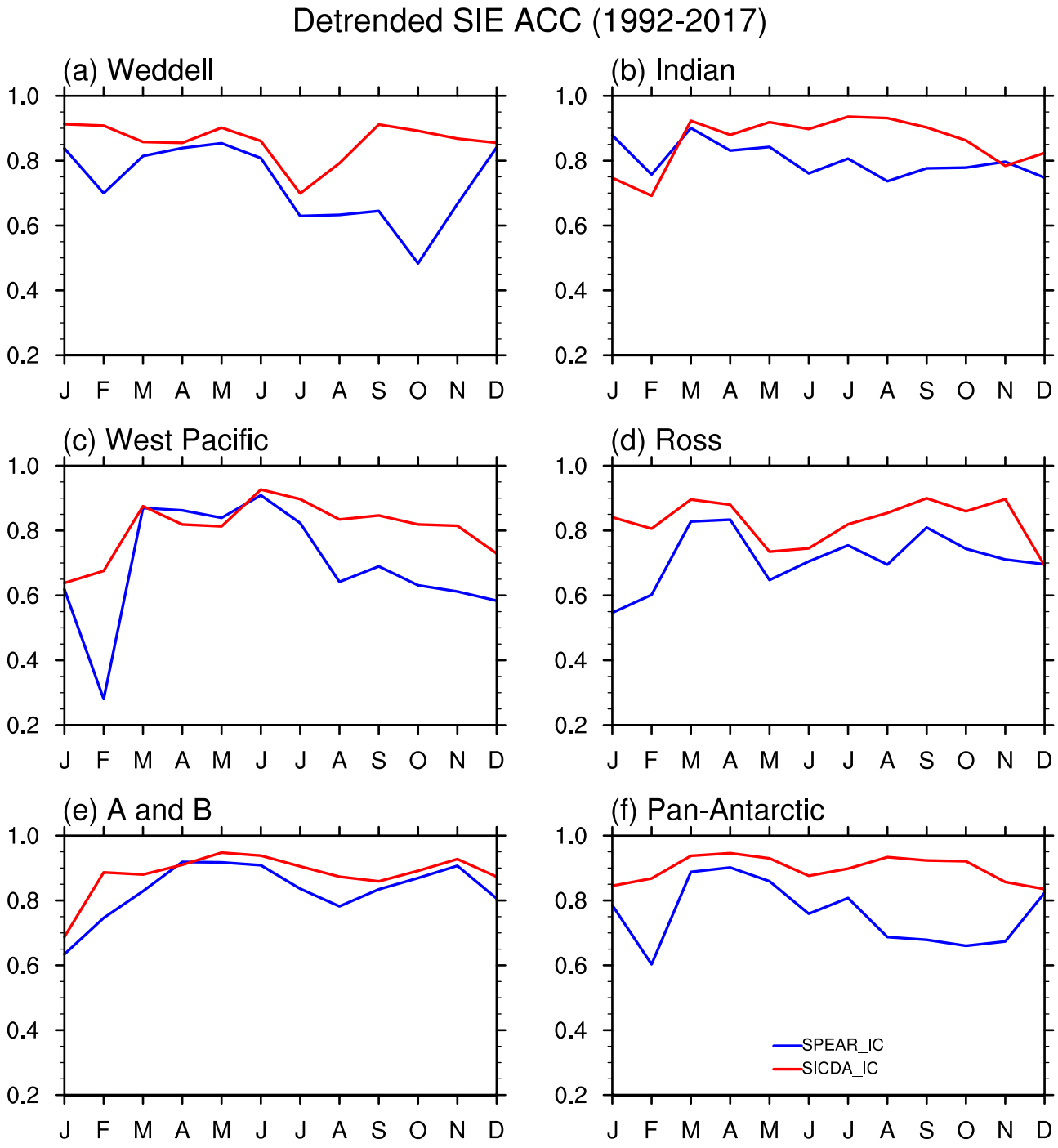

Figure S1. Detrended ACC of regional SIE from SPEAR_IC (blue) and SICDA_IC (red). The detrended ACC values are calculated against the NSIDC SIC observations using monthly SIE from 1992 to 2017.

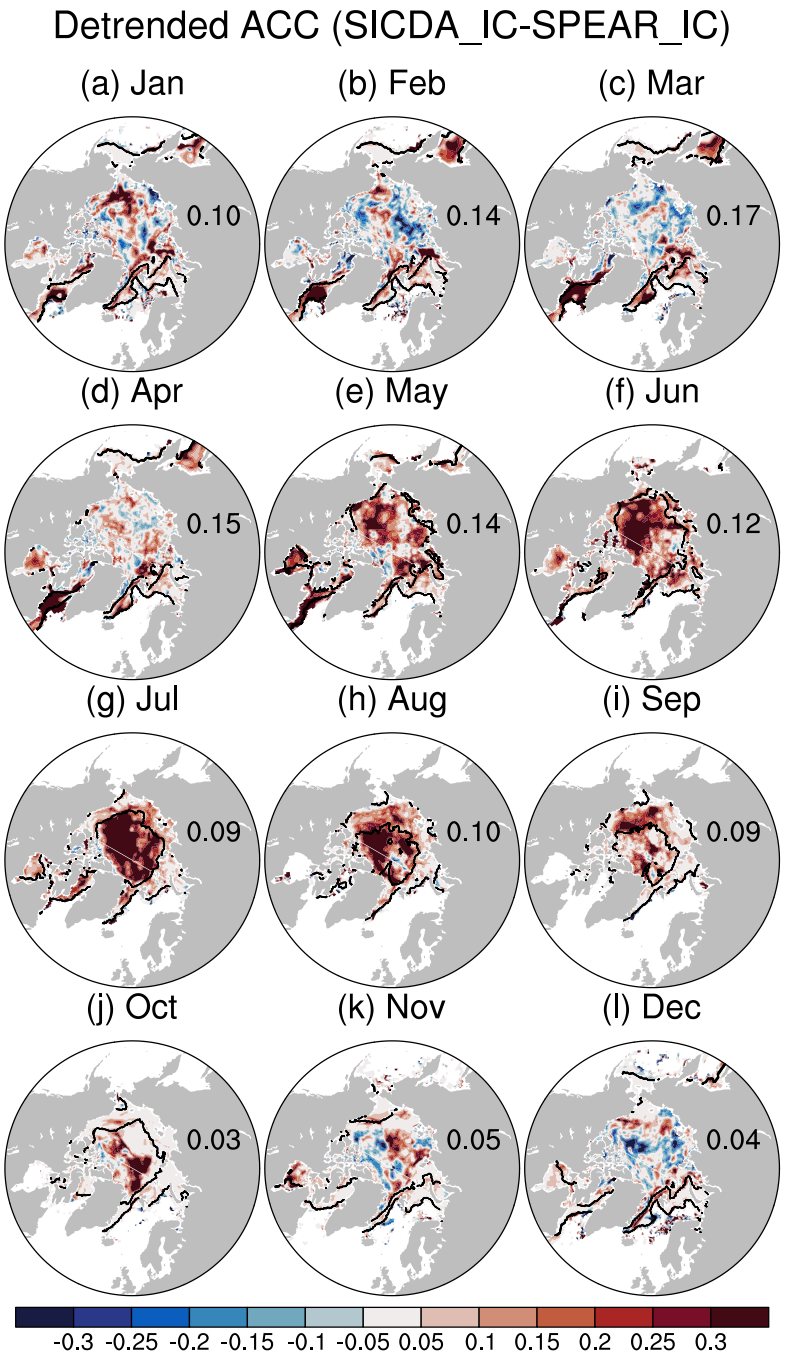

Figure S2. The detrended SIC ACC difference between the two ICs (SICDA_IC - SPEAR_IC) in the Arctic. The ACC The black lines on each map represent the 10% SIC interannual variability zone. The numbers on each map are the area-weighted average of the ACC difference within the 10% SIC variability zone.

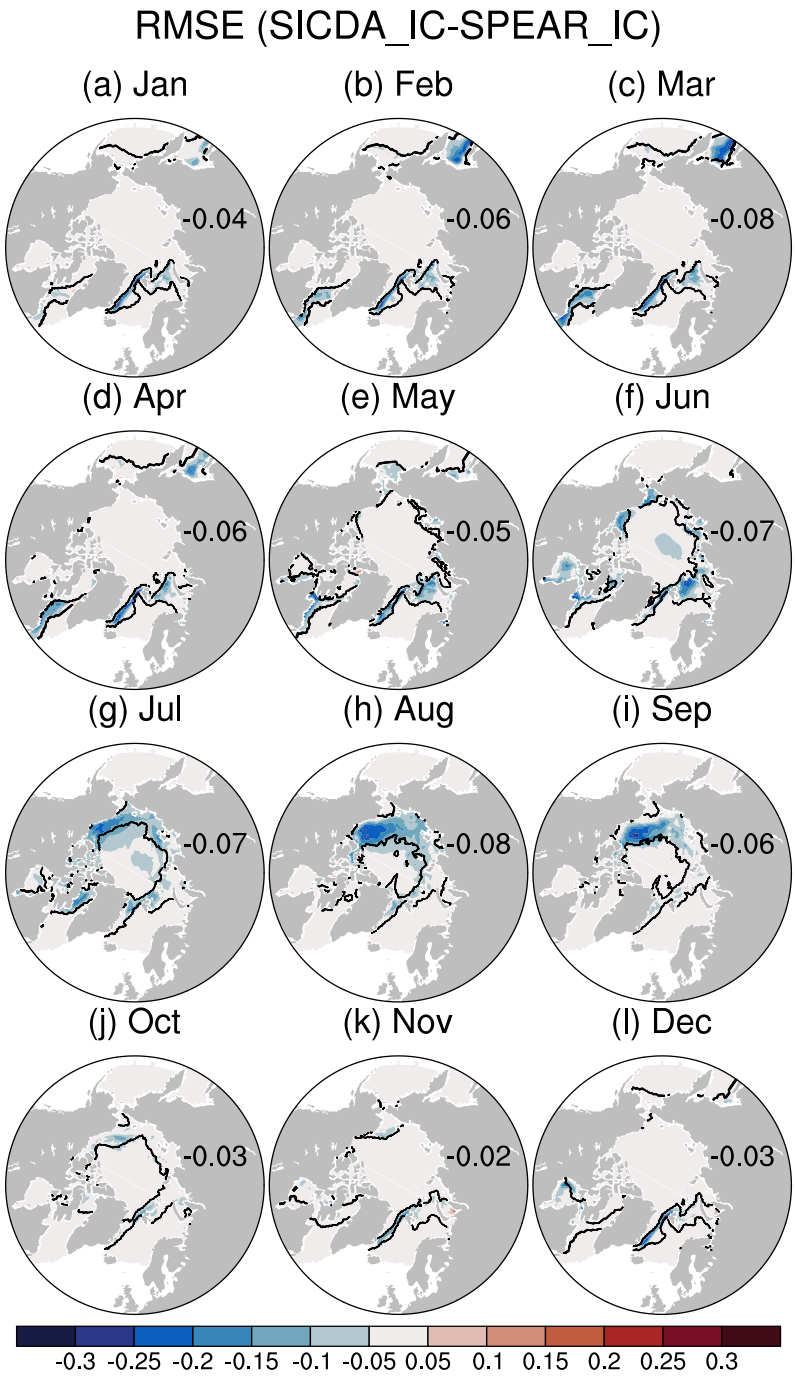

Figure S3. The SIC RMSE difference between the two ICs (SICDA_IC - SPEAR_IC) in the Arctic. The black lines on each map represent the 10% SIC interannual variability zone. The numbers on each map are the area-weighted average of the RMSE difference within the 10% SIC variability zone.

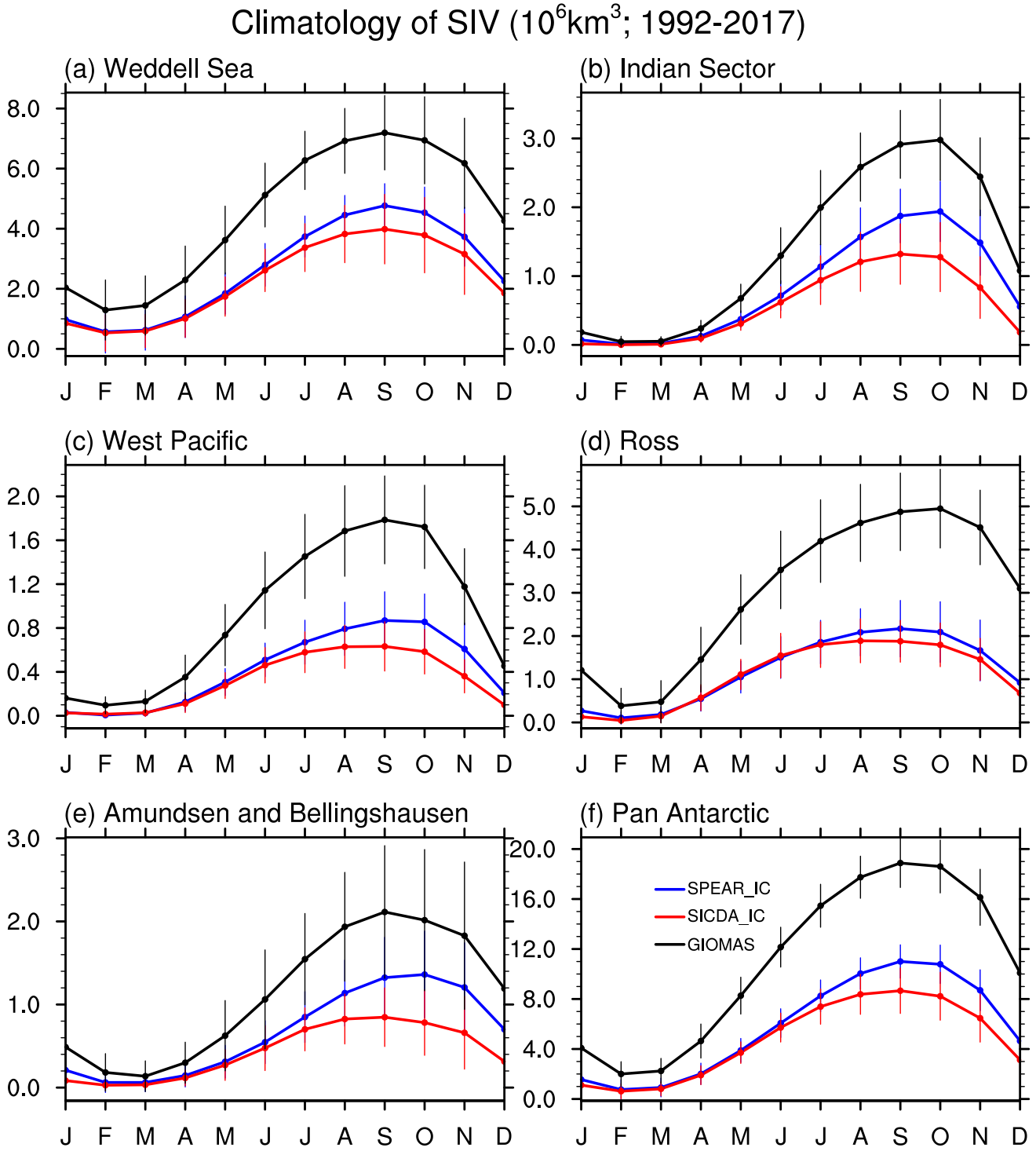

Figure S4. The 26-year (1992–2017) mean seasonal cycle of Antarctic SIV for SPEAR_IC (blue), SICDA_IC (red), and GIOMAS (black). Each error bar represents two standard deviations of regional SIE calculated over the years.

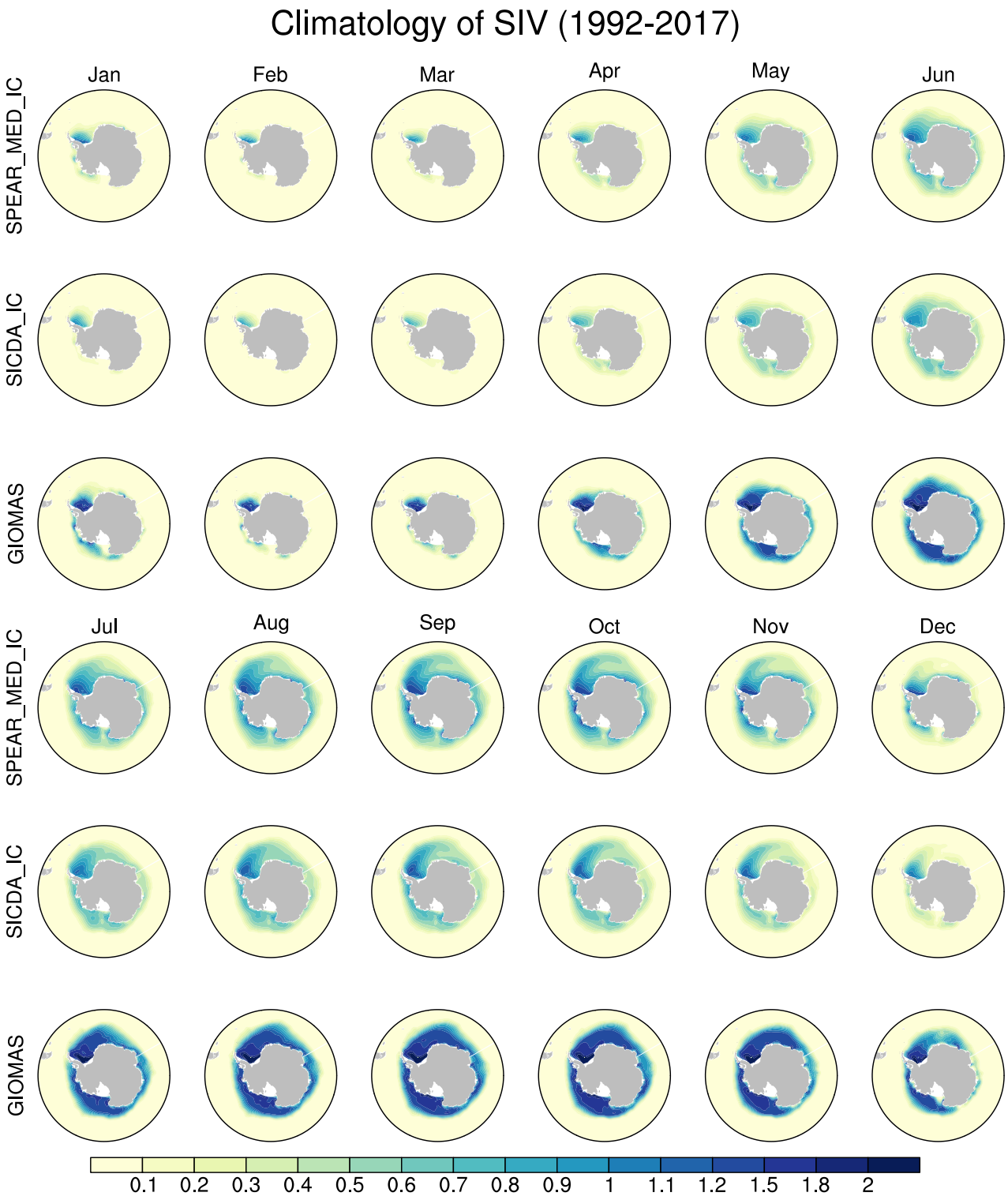

Figure S5. The 26-year (1992–2017) mean Antarctic SIV for SPEAR_IC, SICDA_IC, and GIOMAS.

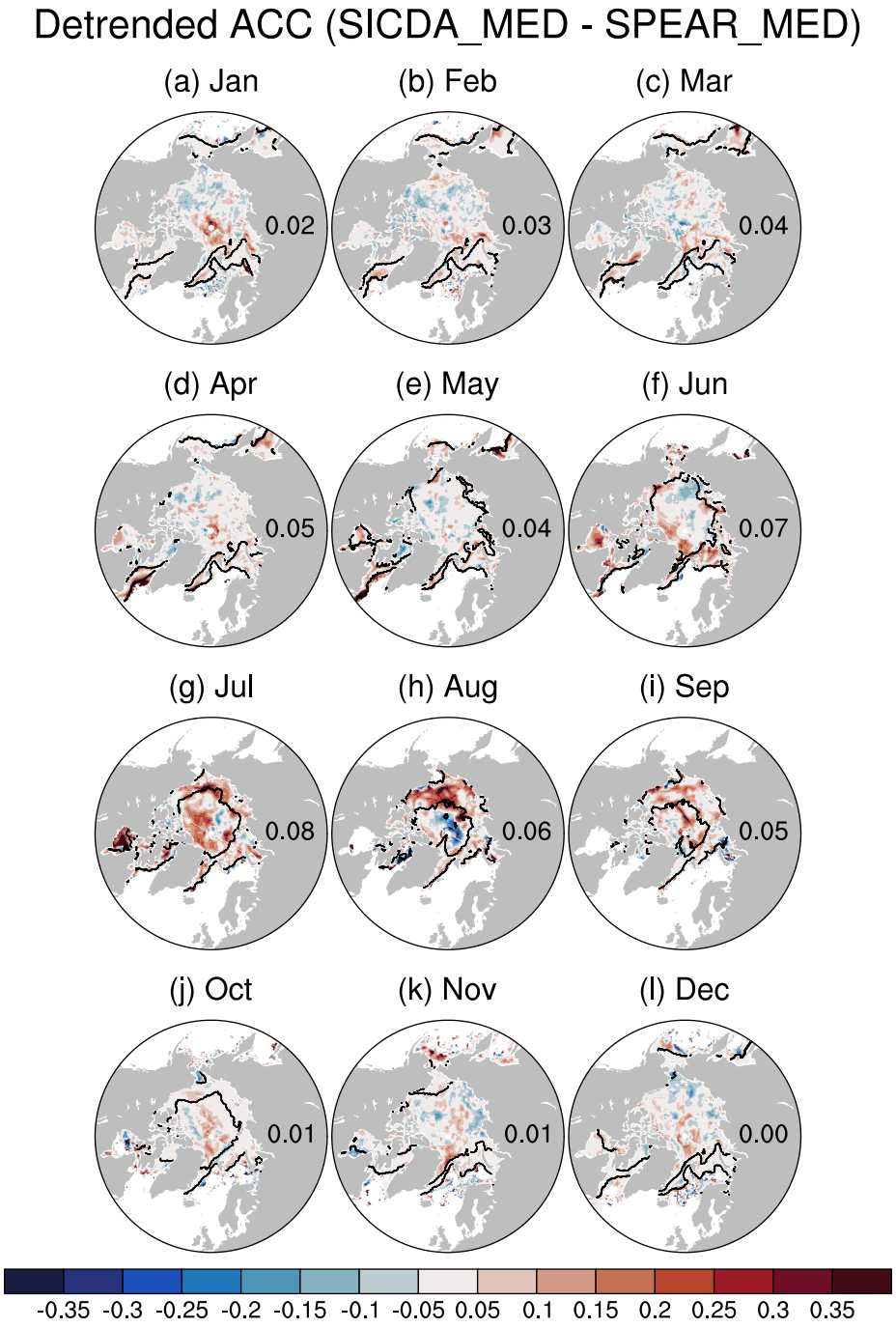

Figure S6. 45-forcast-day mean of the detrended SIC ACC difference between the two reforecast experiments (SICDA - SPEAR). The black lines on each map represent the 10% SIC interannual variability zone calculated based on observations. The numbers on each map are the area-weighted average of the ACC difference within the 10% SIC variability zone.

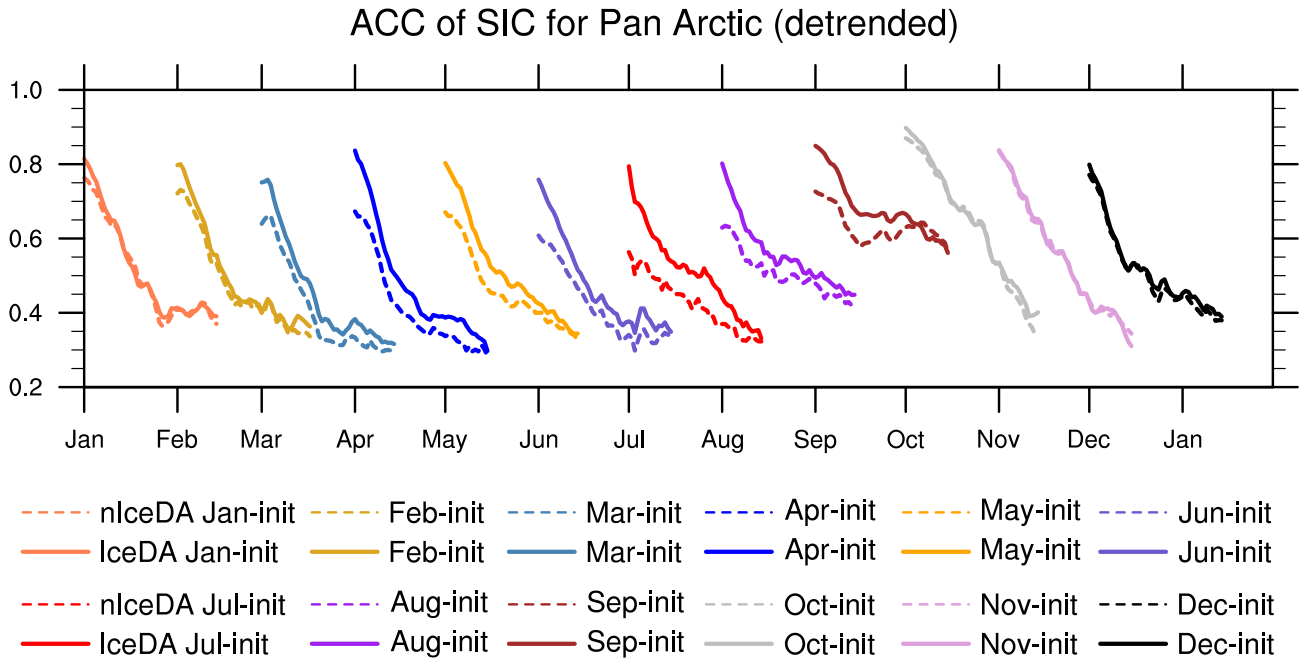

Figure S7. Detrended ACC of SIC as a function of forecasting days from the 12-initializaiton months for SPEAR_MED (dashed lines) and SICDA (solid lines).

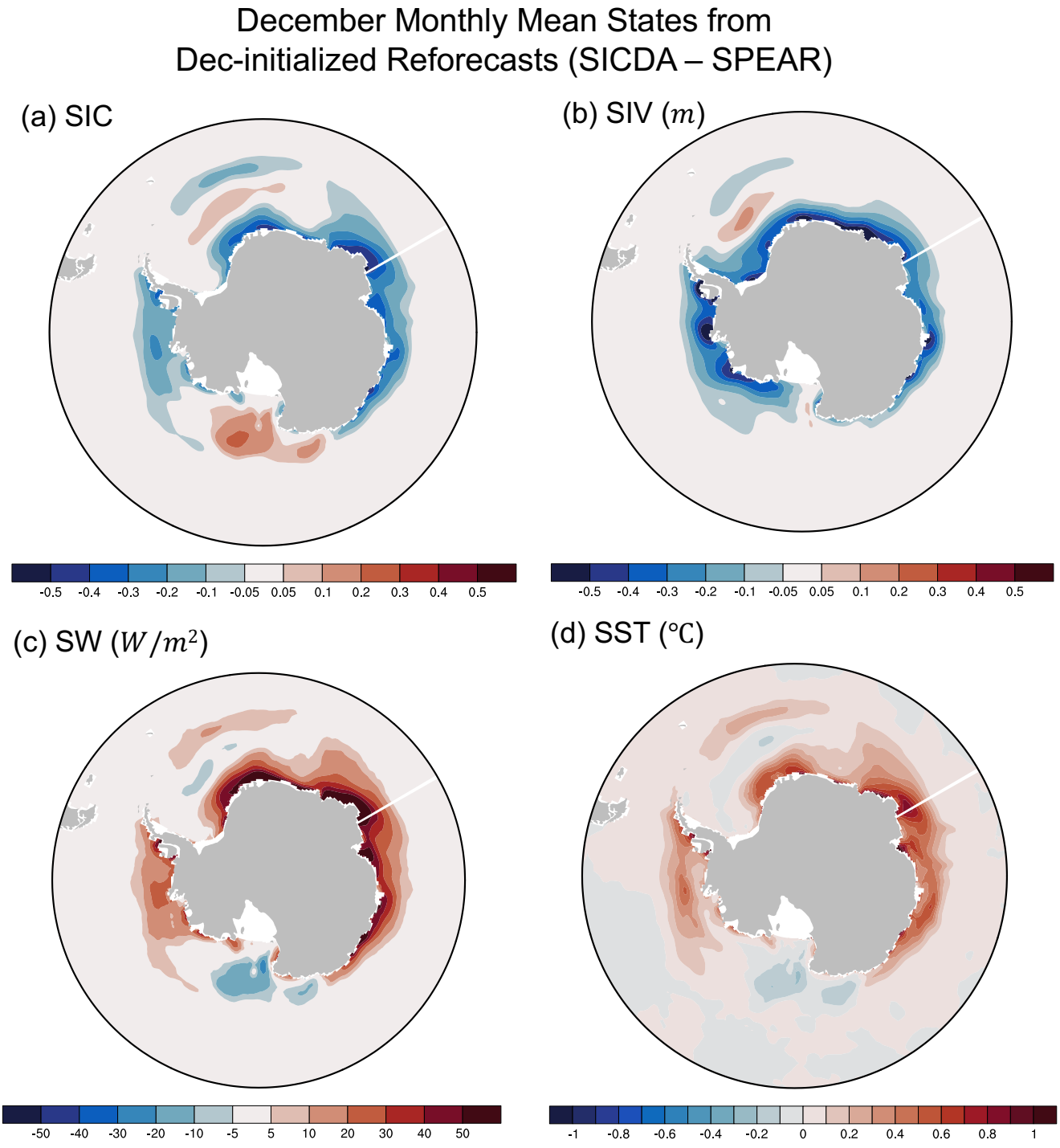

Figure S8. The difference of December monthly mean states between the December-initialized reforecast experiments from SICDA and SPEAR (SICDA – SPEAR) (a) SIC, (b) SIV, (c) SW, and (d) SST.