Supporting Information for "Substantial Weakening of Indian Summer Monsoon Synoptic Activity in Response to Polar Sea Ice Melt"

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Contents of this file
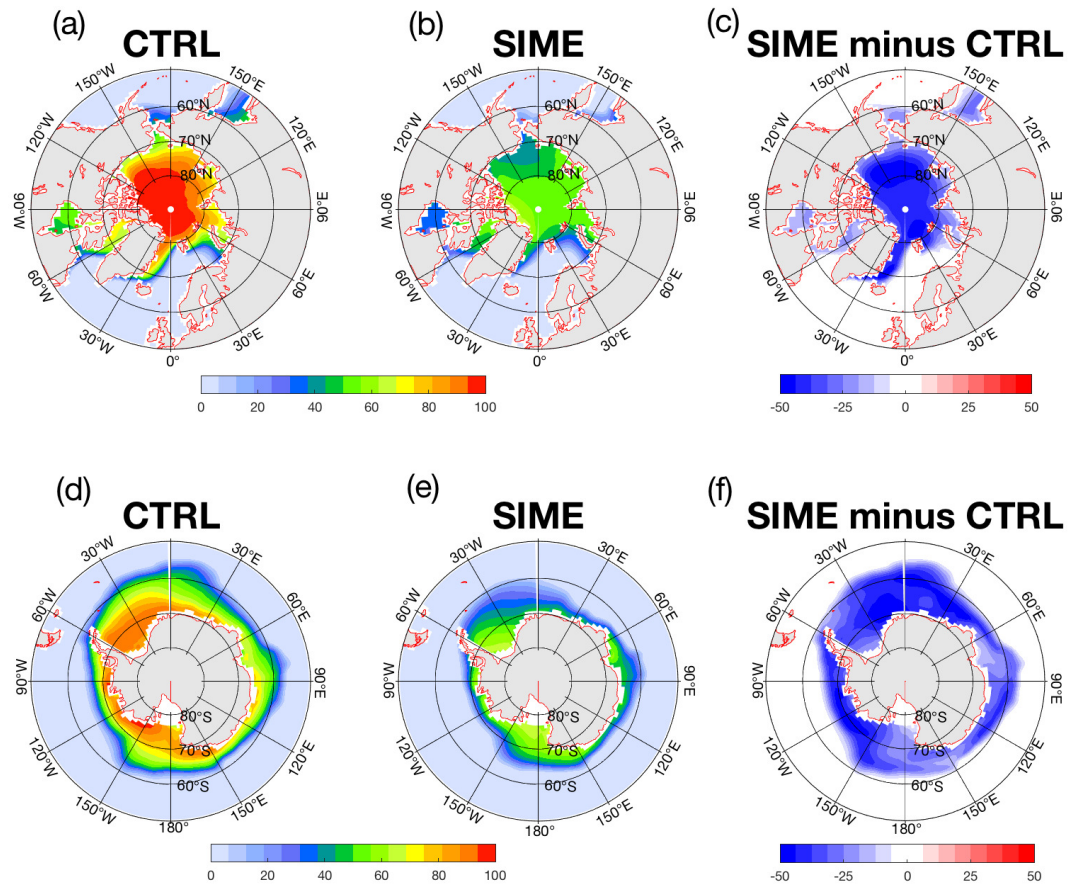
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Figure S1. Annual mean climatology of sea ice concentration (%) over the Arctic in (a) CTRL and (b) SIME experiments, and (c) the difference in annual mean climatology of sea ice concentration over the Arctic between SIME and CTRL. (d) - (f) Same as (a) - (c), except for the Antarctic sea ice concentration.

Table S1. Categorization of monsoon LPS based on pressure depth (ΔSLP)

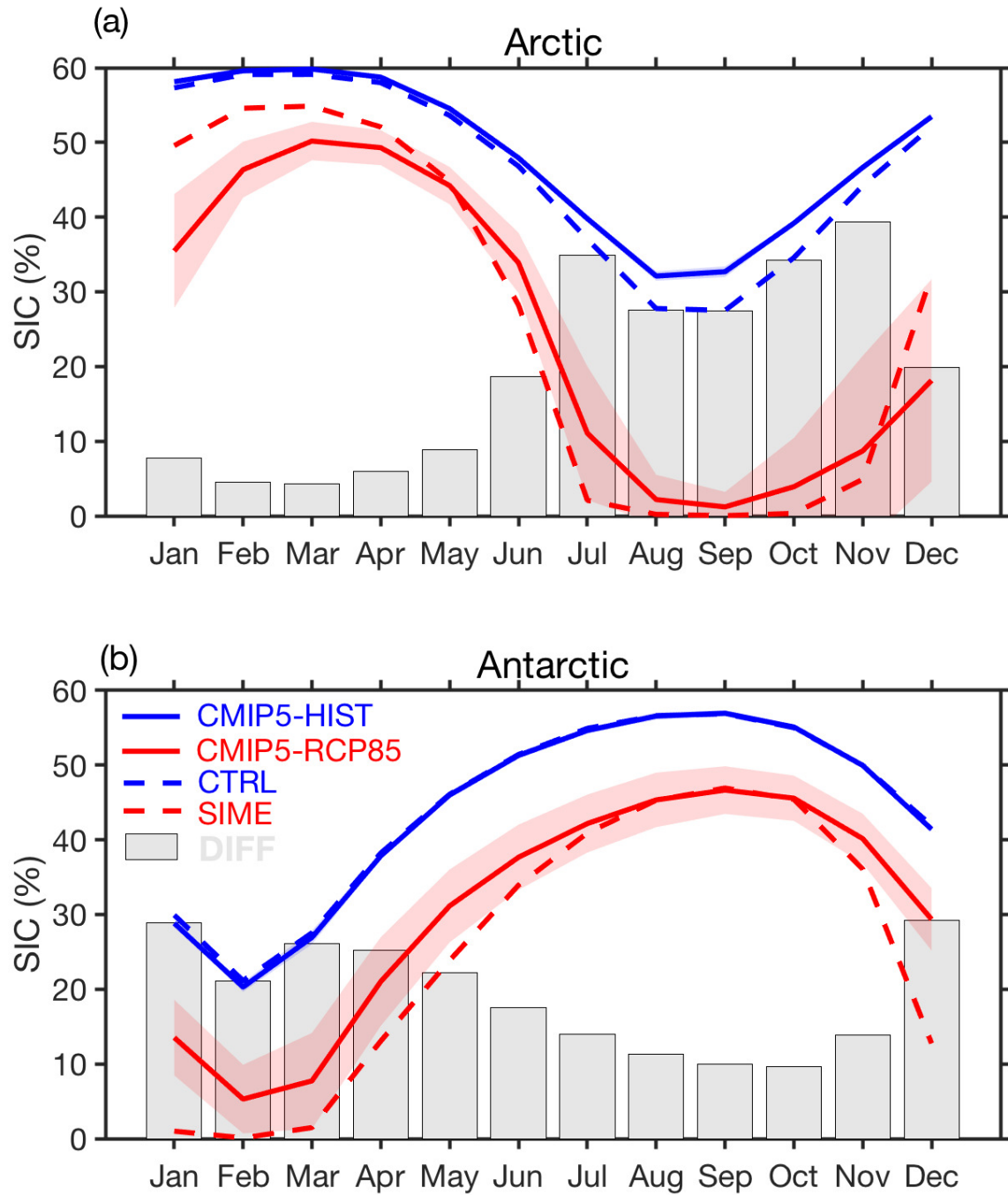| Δ SLP (hPa)	LPS category
≤ 2	Low
> 2 and ≤ 4	Depression
> 4 and ≤ 10	Deep depression
> 10 and ≤ 16	Cyclonic storm
> 16	Severe cyclonic storm

October 5, 2021, 4:11pm

Figure S2. Seasonal cycle of sea ice concentration over the (a) Arctic and (b) Antarctic from the CTRL, SIME, historical, and RCP8.5 simulations. The historical (RCP8.5) simulations of CESM1.1 for 1981 - 2000 (2081 - 2100) period are considered. The bars show the difference in

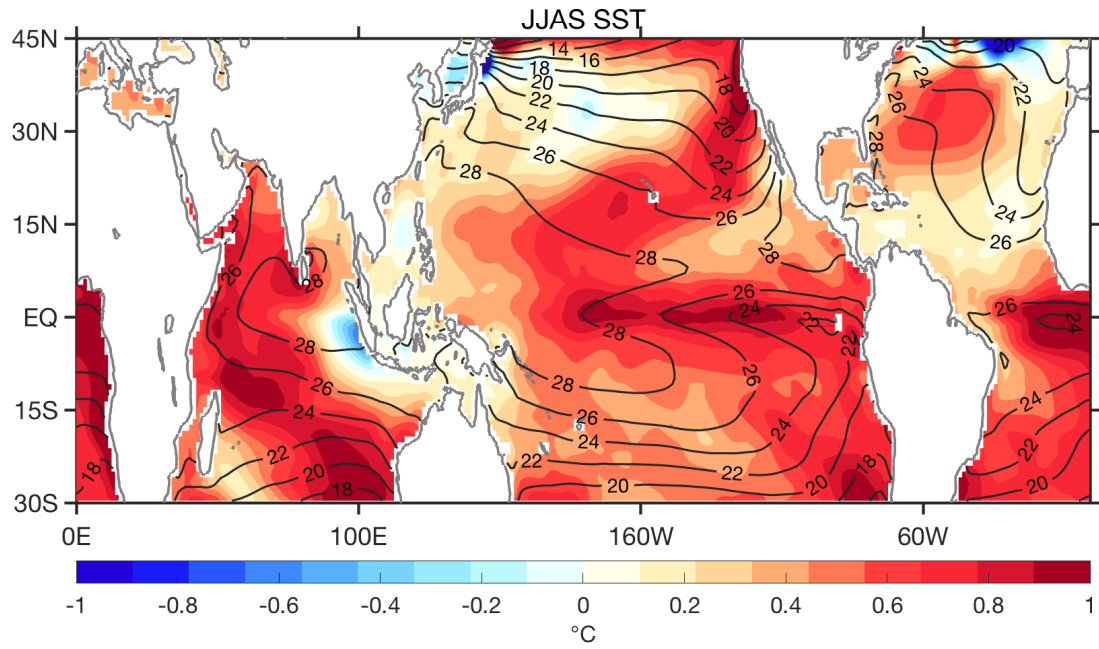SIC between CTRL and SIME experiments.

Figure S3. June - September mean climatology of sea surface temperature from CTRL simulation (contours; unit: °C) and the difference between SIME and CTRL simulations (shading). The calculations are based on the last 10 years of simulations.
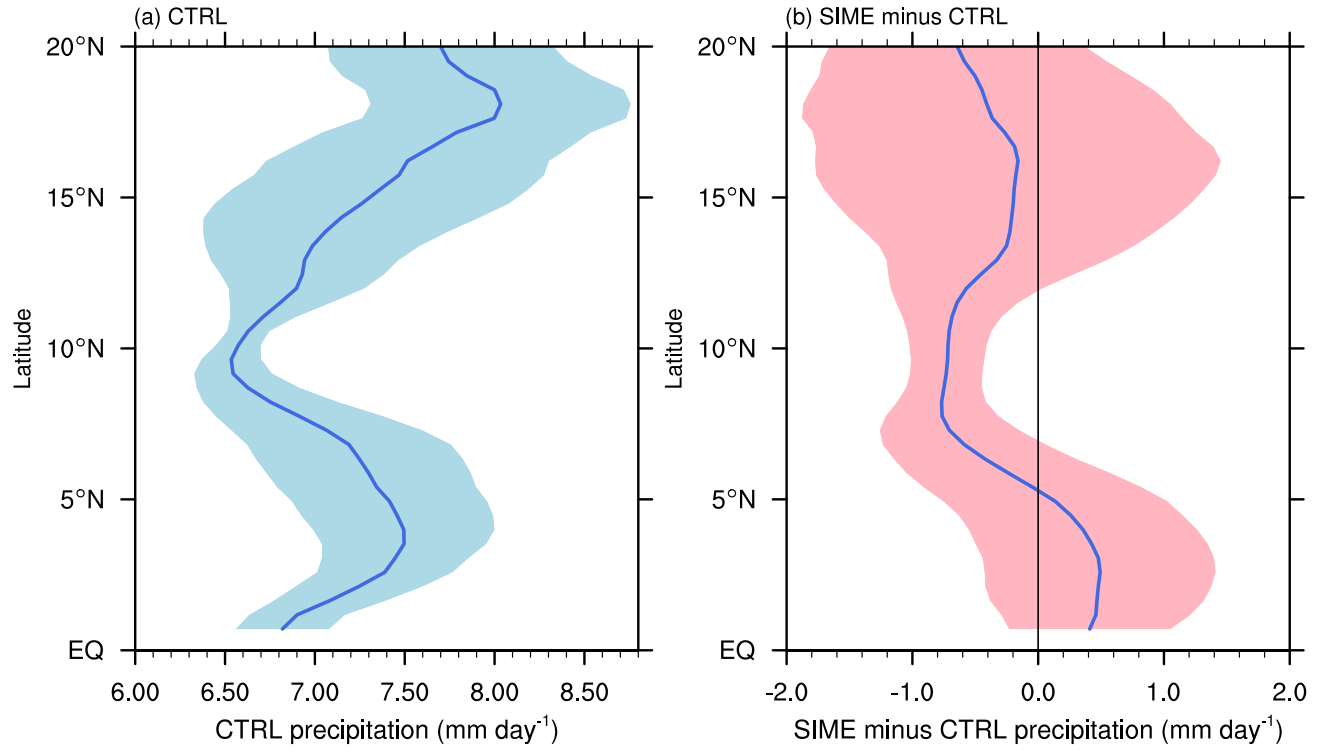
Figure S4. July-August mean zonal mean (50°E - 100°E) precipitation from (a) CTRL simulations and (b) difference in July - August mean precipitation between SIME and CTRL simulations. The solid line shows ensemble mean and the shading ensemble spread