

Figure 1. Temporal NSWS changes over South Asia. Annual mean near-surface wind speed (NSWS) trends under the RCP8.5 scenario for (a) the 100-member ensemble mean of MPI-ESM, (b) inter-member standard deviation, (c) the mean trend of the 10 members with the highest increase in NSWS over South Asia, and (d) the mean trend of the 10 members with the highest decline in NSWS over South Asia between 2021 and 2050. Slant hatching denotes trends that

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7	passed a significance test with $P < 0.05$ . The box in (a) to (d) highlights the South Asia region
8	(5°N–30°N, 65°E–90°E). (e) Time series of the 9-year running mean of NSWS anomalies (relative
9	to the 1980–2010 mean). Purple, dark-blue, and green solid lines represent reanalysis data from
10	CRA40, ERA5, and JRA55, respectively. Gray and brown solid lines represent the ensemble mean
11	of all members of MPI-ESM for the present (1970–2014) and future (2015–2099), with light-gray
12	and light-brown lines indicating the associated 5th and 95th percentiles. Orange and blue solid
13	lines represent the ensemble mean of the ten simulations with maximum and minimum trends in
14	NSWS. Dashed lines refer to the maximum and minimum ranges of MPI-ESM.
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Figure 2. The leading inter-member EOF pattern of the NSWS trend over South Asia and the associated sea surface temperature trend under the RCP8.5 scenario between 2021 and 2050. (a) An EOF analysis was applied to the 100 members' NSWS trends over South Asia ( $5^{\circ}N$ - $30^{\circ}N$ ,  $65^{\circ}E$ -90°E) in MPI-ESM, with the member index replacing the time index in a conventional EOF analysis. (b) The group differences between the mean trend of the ten members with the highest decline in NSWS over South Asia and the ten members with the highest increase. The box in (a) and (b) highlights the South Asia region. (c) The regression pattern between the PC score

and the sea surface temperature trends of corresponding members. Slashes denote regions
significant at the 95% confidence level.



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Figure 3. The leading inter-member EOF pattern of the NSWS trend over South Asia and the associated sea surface temperature trend under the RCP4.5 scenario between 2021 and 2050. (a)–(c) Same as in Figure 2, but for the representative concentration pathway 4.5 (RCP4.5).



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Figure 4. Large-scale circulations associated with the inter-member EOF and climatological circulations under the RCP8.5 scenario between 2021 and 2050. (a) The regression pattern between the PC score and the trends of corresponding members' zonal wind (shading) and wind (vector) at 850 hPa. Shading and vectors denote significance at the 0.10 level. (b) Climatological zonal wind (shading) and wind (vector) at 850 hPa from 2021 to 2050 across all members of MPI-ESM. (c) Same as (a), but for winds near the surface. (d) Same as (b), but for winds near the surface.



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Figure 5. Histograms of the NSWS trend over South Asia in the future under the RCP8.5 scenario with and without the impact of the IPO. (a) Histograms and fitted distribution lines of the area-averaged South Asian NSWS trend derived from the 100 MPI-ESM ensemble members from 2021 to 2050. The gray bars and black fitted curves show the frequency of the occurrence of NSWS trends, while the red bars and red fitted curves represent the frequency of NSWS trends with the IPO's influence removed through linear regression against the IPO index in individual runs. (b) Same as (a), but for the period from 2021 to 2095.



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Figure 6. Histograms of the NSWS trend over South Asia under the RCP8.5 scenario with and without the impact of the AMO between 2021 and 2050. (a) Histograms and fitted distribution lines of the area-averaged South Asian NSWS trend derived from the 100 MPI-ESM ensemble members from 2021 to 2050. The gray bars and black fitted curves show the frequency of the occurrence of NSWS trends, while the red bars and red fitted curves represent the frequency of NSWS trends with the AMO's influence removed through linear regression against the AMO index in individual runs.