Supplemental tables

Supplemental Table 1

interannual variability (% of climatological mean wind speed)					
	ERA5	NCEP-NCAR	MERRA	JRA3Q	UKESM
full year	1.18	2.42	1.80	1.13	1.00
DJF	1.67	3.05	2.20	1.58	1.53
MAM	1.35	2.74	2.23	1.42	1.39
JJA	1.72	2.69	2.20	1.69	1.63
SON	1.94	2.84	2.07	1.76	1.72

ST1: Interannual variability (IAV) of mean open-ocean wind speed between 40°S and 60°S for 1980-2019. *IAV calculated as the unbiased standard deviation of the timeseries normalized by its mean, shown in percent of the mean climatological wind speed.*

Supplemental Table 2

extreme low winds (m s^{-1}): weighted average of lowest 5% of daily values					
	ERA5	R1	MERRA2	JRA3Q	UKESM1
full year	2.04	0.44	0.07	0.13	0.00
DJF	1.87	0.42	0.07	0.14	0.00
MAM	2.03	0.47	0.07	0.12	0.01
JJA	2.16	0.46	0.08	0.13	-0.01
SON	2.09	0.42	0.07	0.14	-0.02
extreme high winds (m s^{-1}): weighted average of highest 95% of daily values					
	ERA5	R1	MERRA2	JRA3Q	UKESM1
full year	15.61	-0.14	-0.35	0.59	0.32
DJF	14.75	-0.18	-0.45	0.51	0.27
MAM	15.76	-0.11	-0.42	0.57	0.31
JJA	16.23	-0.12	-0.19	0.67	0.36
SON	15.68	-0.15	-0.33	0.61	0.37

ST2: High and low tails of the wind distribution. *Tails given in m s^{-1} for ERA5 and as a bias in m s^{-1} for the remaining products. To calculate extreme winds, we calculate the daily weighted 95th (5th) percentile of winds from the 1°x1° gridded product, then take the weighted average of all cells above (below) this percentile. For any season, the seasonal extreme winds are then the average of these daily extreme winds.*

Supplemental Table 3

climatological jet position (°S), 1980-2019					
	ERA5	R1	MERRA2	JRA3Q	UKESM1
full year	-52.1	0.5	-0.2	-0.2	0.5
DJF	-52.3	0.2	-0.2	-0.2	0.6
MAM	-52.7	0.2	-0.1	-0.2	0.3
JJA	-52.3	0.8	-0.3	-0.3	0.2
SON	-51	0.8	-0.2	-0.3	0.9

ST3: Seasonally-subdivided climatological jet position. *Absolute position is given for ERA5, and differences from ERA5 are given for the other reanalyses and UKESM1 (positive numbers indicate a less southerly jet position).*

Supplemental Table 4

trends in jet position (°S dec^{-1}), 1980-2019					
	ERA5	R1	MERRA2	JRA3Q	UKESM1
full year	-0.11	**-0.16**	-0.01	-0.09	**-0.2**
DJF	**-0.24**	**-0.27**	-0.22	-0.22	**-0.4**
MAM	-0.13	**-0.24**	-0.12	-0.14	**-0.23**
JJA	-0.01	-0.02	0.19	0.04	0.1
SON	-0.05	-0.11	0.11	-0.05	**-0.27**
trends in jet position (°S dec^{-1}), 1980-1999					
full year	-0.21	-0.29	-0.25	-0.17	**-0.51**
DJF	**-0.68**	**-0.74**	**-0.84**	-0.58	**-1.39**
MAM	-0.6	**-0.78**	-0.67	-0.56	**-0.63**
JJA	0.02	0.07	0.08	0.09	0.13
SON	0.4	0.28	0.42	0.38	-0.16

ST4: ***Seasonally-subdivided trends in climatological jet position****. Trends significant at the 5% level are given in bold.*

Supplemental Table 5

	trends in SAM index (hPa dec^{-1}), 1980-2019					
	observations	ERA5	R1	MERRA	JRA3Q	UKESM
full year	**0.55**	**0.6**	**1.09**	**0.62**	**0.48**	**0.59**
DJF	**1**	**0.92**	**1.14**	**1.08**	**1.07**	**0.93**
MAM	**0.81**	**0.81**	**1.33**	**1.1**	**0.77**	**0.75**
JJA	0.47	0.57	**1.22**	**0.39**	0.27	0.61
SON	-0.09	0.1	0.66	-0.08	-0.2	0.08
	trends in SAM index (hPa dec^{-1}), 1980-1999					
	observations	ERA5	R1	MERRA	JRA3Q	UKESM
full year	**1.64**	**1.47**	**2.54**	**2.19**	**1.64**	**1.53**
DJF	**2.93**	**2.7**	**3.28**	**3.06**	**2.87**	**3.13**
MAM	**2.91**	1.94	**3.11**	**2.82**	2.05	1.54
JJA	0.52	0.71	2.14	1.64	0.89	1.1
SON	0.18	0.53	1.61	1.23	0.74	0.34

ST5 caption: ***Seasonally-subdivided trends in the natural SAM index.*** *Trends significant at the 5% level are given in bold.*

Supplemental Table 6

1980-1999	GHG + ozone	GHG only	ozone only
FY	**0.06**	-0.01	**0.08**
DJF	**0.11**	-0.03	**0.14**
MAM	0.02	**-0.05**	**0.07**
JJA	**0.08**	-0.03	**0.10**
SON	0.04	0.05	-0.01
1980-2019	GHG + ozone	GHG only	ozone only
FY	**0.03**	0.01	0.01
DJF	**0.04**	0.02	0.03
MAM	0.02	-0.01	**0.03**
JJA	0.02	0.02	-0.01
SON	0.02	0.02	0.00

ST6: Attribution of wind trends (m s^{-1} dec^{-1}) to GHG and ozone forcing for 1980-1999 and 1980-2019 in the UKESM1 model runs. *Values for GHG + ozone refer to the ensemble mean trend of the OZONE-HIST run, while the GHG only column refers to the OZONE-1950 run. The effect of ozone only is then obtained by subtracting OZONE-1950 from OZONE-HIST. Statistically significant trends are given in bold.*