

Supplementary Material

Table S1: see Excel spreadsheet “gpi_basin_month.xls”, where data can be found by model, month, basin and experiment. Sheet “GPI” contains the GPI results for RCP4.5, G4, the t-test and Wilcoxon signed-rank test results for their difference over the years 2020-2069. Sheet “VI” contains the VI analogous results.

Table S2 Monthly GPI and VI as a fraction of the annual totals. Note that in the TC season VI is relatively low. The TC seasons defined by 10% anomaly in GPI months are highlighted in yellow.

GPI Month	NH		SH		Anomalies	
	RCP4.5	G4	RCP4.5	G4	NH mean	SH mean
1	0.07	0.05	0.08	0.10	0.69	1.10
2	0.04	0.03	0.10	0.11	0.40	1.25
3	0.03	0.03	0.12	0.12	0.32	1.43
4	0.04	0.05	0.13	0.14	0.52	1.59
5	0.07	0.09	0.13	0.13	0.92	1.52
6	0.10	0.11	0.11	0.08	1.27	1.16
7	0.11	0.12	0.07	0.06	1.38	0.77
8	0.11	0.11	0.05	0.04	1.35	0.52
9	0.11	0.12	0.04	0.04	1.39	0.49
10	0.12	0.11	0.05	0.05	1.39	0.57
11	0.11	0.11	0.06	0.06	1.29	0.71
12	0.10	0.09	0.07	0.08	1.09	0.89

VI Month	NH		NH		Anomalies	
	RCP4.5	G4	RCP4.5	G4	NH mean	SH mean
1	0.09	0.10	0.07	0.06	1.17	0.78
2	0.11	0.11	0.06	0.06	1.32	0.69
3	0.11	0.11	0.05	0.05	1.34	0.63
4	0.10	0.10	0.05	0.06	1.20	0.67
5	0.09	0.08	0.07	0.07	0.99	0.87
6	0.07	0.07	0.09	0.09	0.85	1.04
7	0.07	0.08	0.10	0.10	0.92	1.21
8	0.08	0.08	0.11	0.11	0.96	1.33
9	0.08	0.07	0.11	0.12	0.89	1.37
10	0.06	0.06	0.11	0.11	0.71	1.32
11	0.06	0.06	0.10	0.09	0.73	1.15
12	0.07	0.08	0.08	0.08	0.92	0.93

Table S3: The fraction of total annual GPI and VI accounted for by the 6 month TC seasons chosen in each hemisphere across the 6 TC basins. Note that in the TC season VI is relatively low.

Basin	GPI		VI	
	RCP4.5	G4	RCP4.5	G4
WNP	0.62	0.64	0.43	0.43
ENP	0.70	0.71	0.35	0.33
NA	0.75	0.71	0.34	0.34
NI	0.58	0.60	0.60	0.61
SI	0.67	0.66	0.40	0.42
SP	0.74	0.76	0.38	0.38
mean	0.68	0.68	0.42	0.42

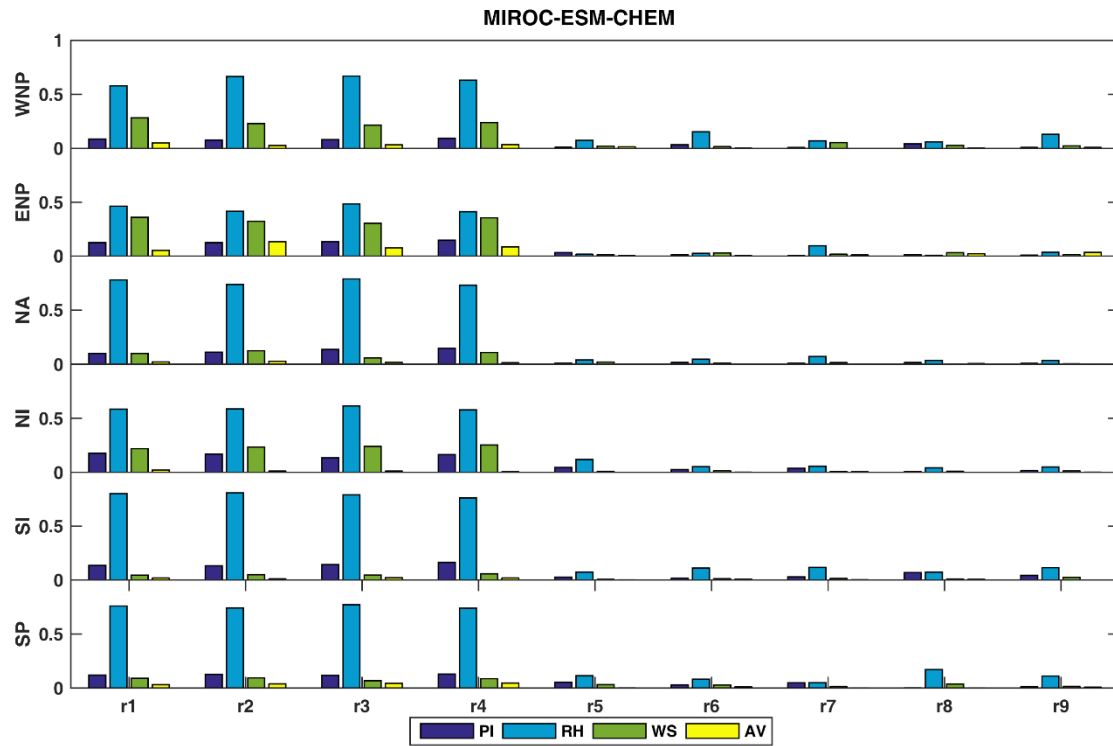


Figure S1. As Fig. 5 but for the 9 realizations of MIROC-ESM-CHEM: The fractional variance contribution of components of GPI during the TC season and within the six TC basins during 2020-2069.

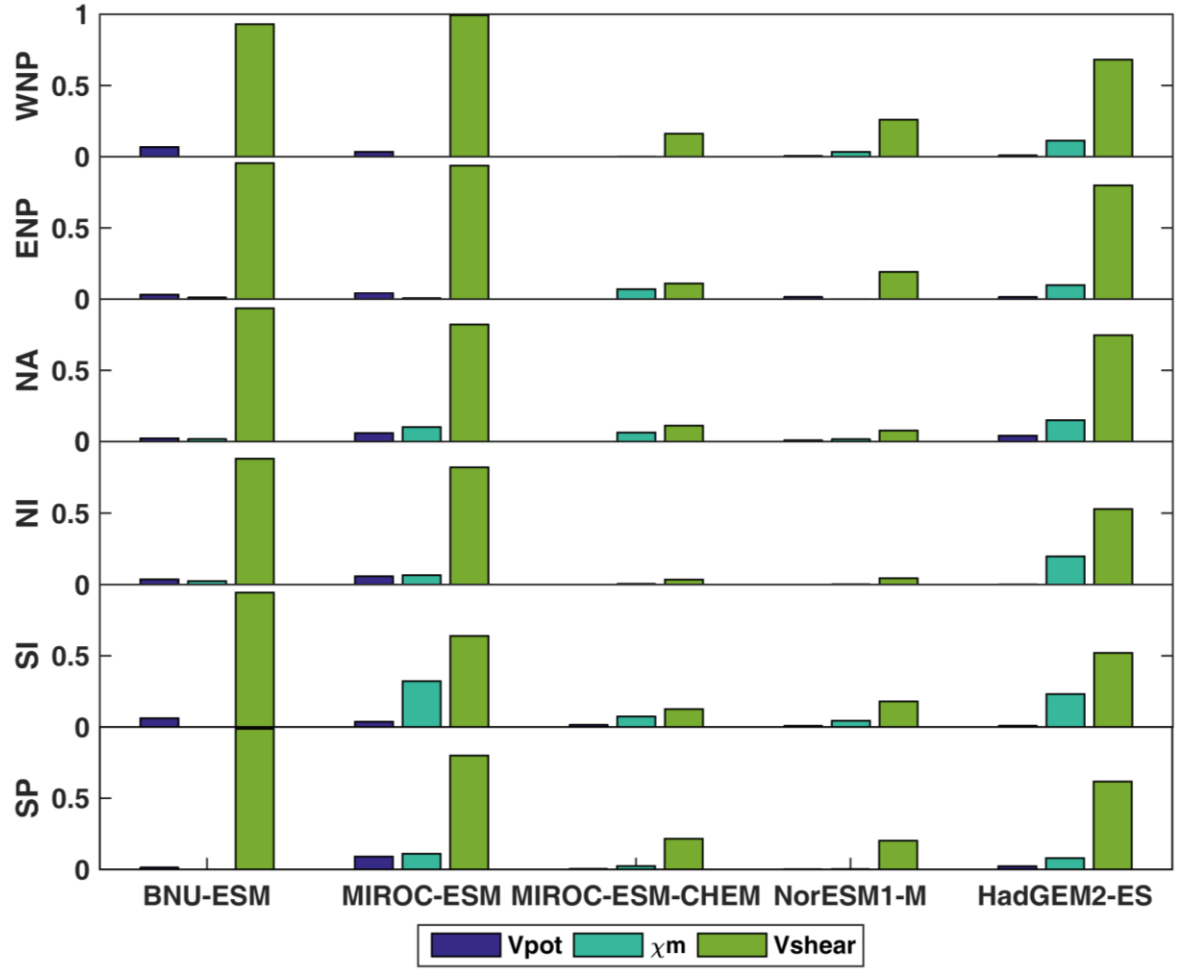


Figure S2. The fractional variance contribution of components of VI during the TC season and within the six TC basins during 2020-2069.

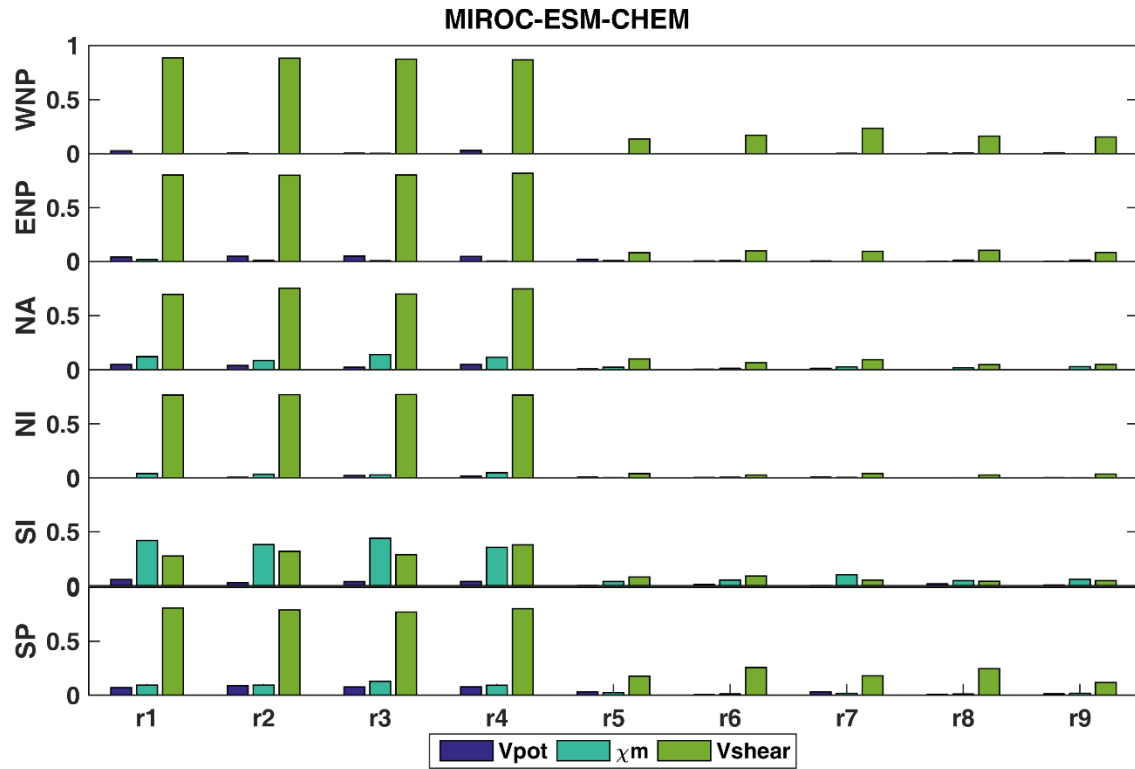


Figure S3. As S2 but for the 9 realizations of MIROC-ESM-CHEM: The fractional variance contribution of components of VI during the TC season and within the six TC basins during 2020-2069.

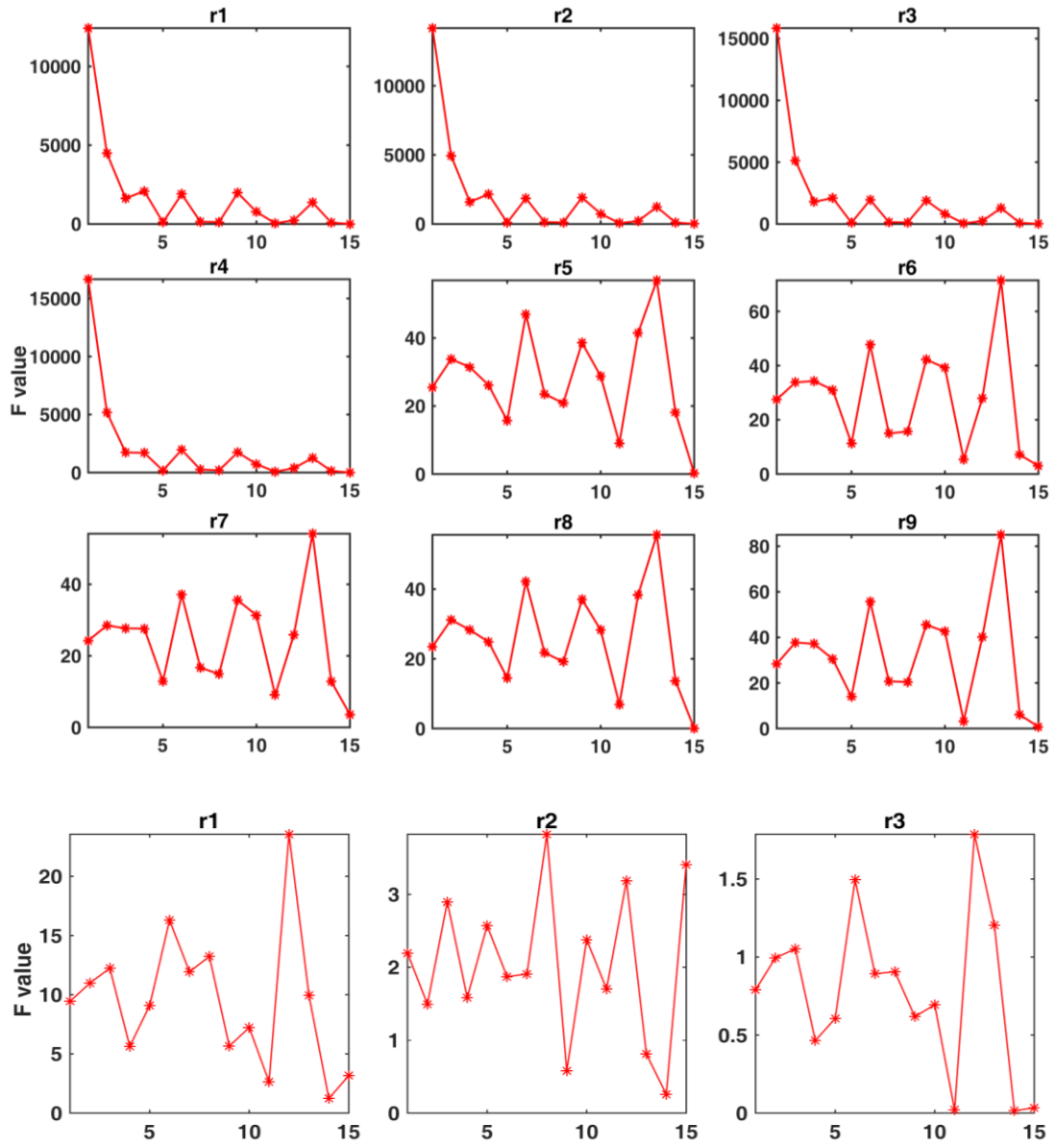


Fig. S4 As Fig6: The F-statistic of the 15 different combinations of regression variables for GPI differences between G4 and RCP4.5, but for each of realizations 1-9 of MIROC-ESM-CHEM, (top 3 rows), and for the 3 realizations of CanESM2 (bottom row). The x-axis on each panel represents the combination of components used as predictors in each regression equation: 1:(PI,RH,WS,AV), 2:(PI,RH,WS), 3:(PI,RH,AV), 4:(AV,RH,WS), 5:(PI,AV,WS), 6:(PI,RH), 7:(PI,WS), 8:(PI,AV), 9:(RH,WS), 10:(RH,AV), 11:(AV,WS), 12:(PI), 13:(RH), 14:(WS), 15:(AV).

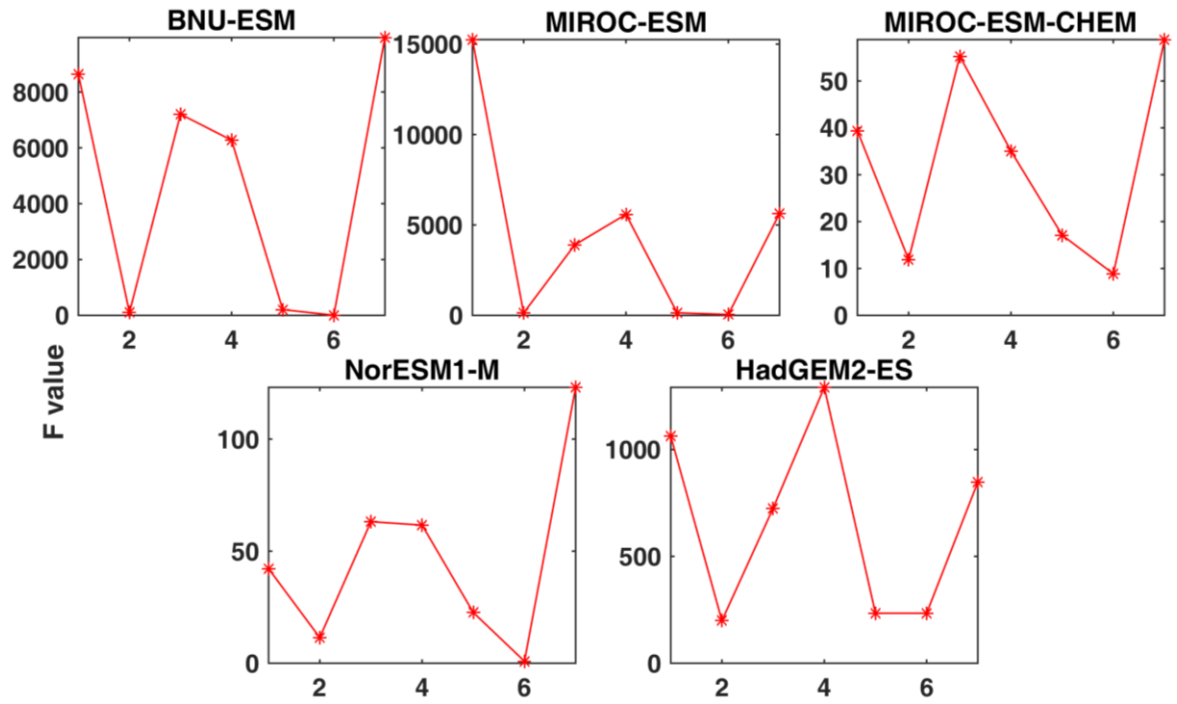


Figure S5. The F-statistic of the 7 different combinations of regression variables for VI differences between G4 and RCP4.5. The x-axis on each panel represents the combination of components used as predictors in each regression equation: 1:($V_{pot}, V_{shear}, \chi_m$), 2:(V_{pot}, V_{shear}), 3:(V_{pot}, χ_m), 4:(V_{shear}, χ_m), 5:(V_{pot}), 6:(χ_m), 7:(V_{shear}).

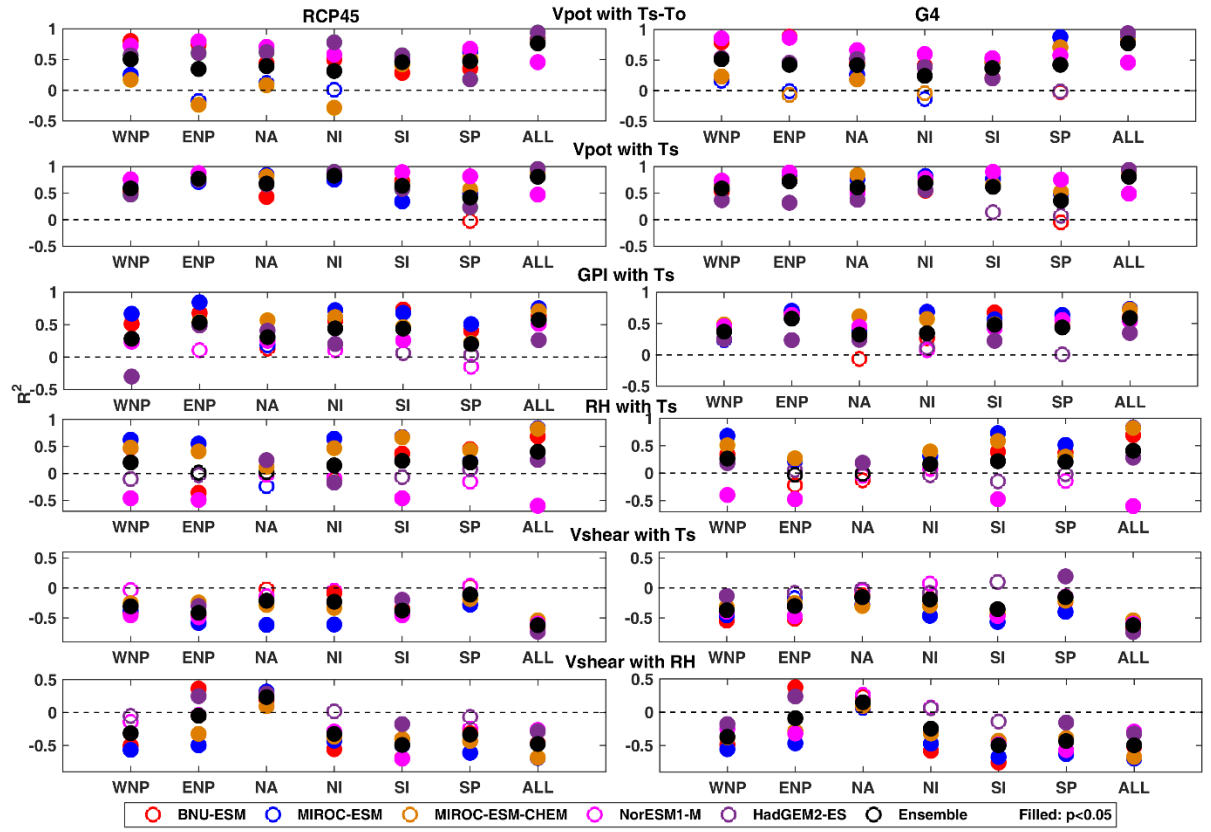


Figure S6. The correlations (R^2) between variable fields in RCP4.5 (left column), and G4 (right column) separately for comparison with Fig. 7. Top to bottom V_{pot} anomalies as a function static stability T_s-T_o ; sea surface temperature differences (T_s) and: V_{pot} , GPI, relative humidity, and vertical wind shear. Data is during TC season and across the six TC basins for the years 2020-2069. Each model is weighted equally in the ensembles regardless of number of observations.

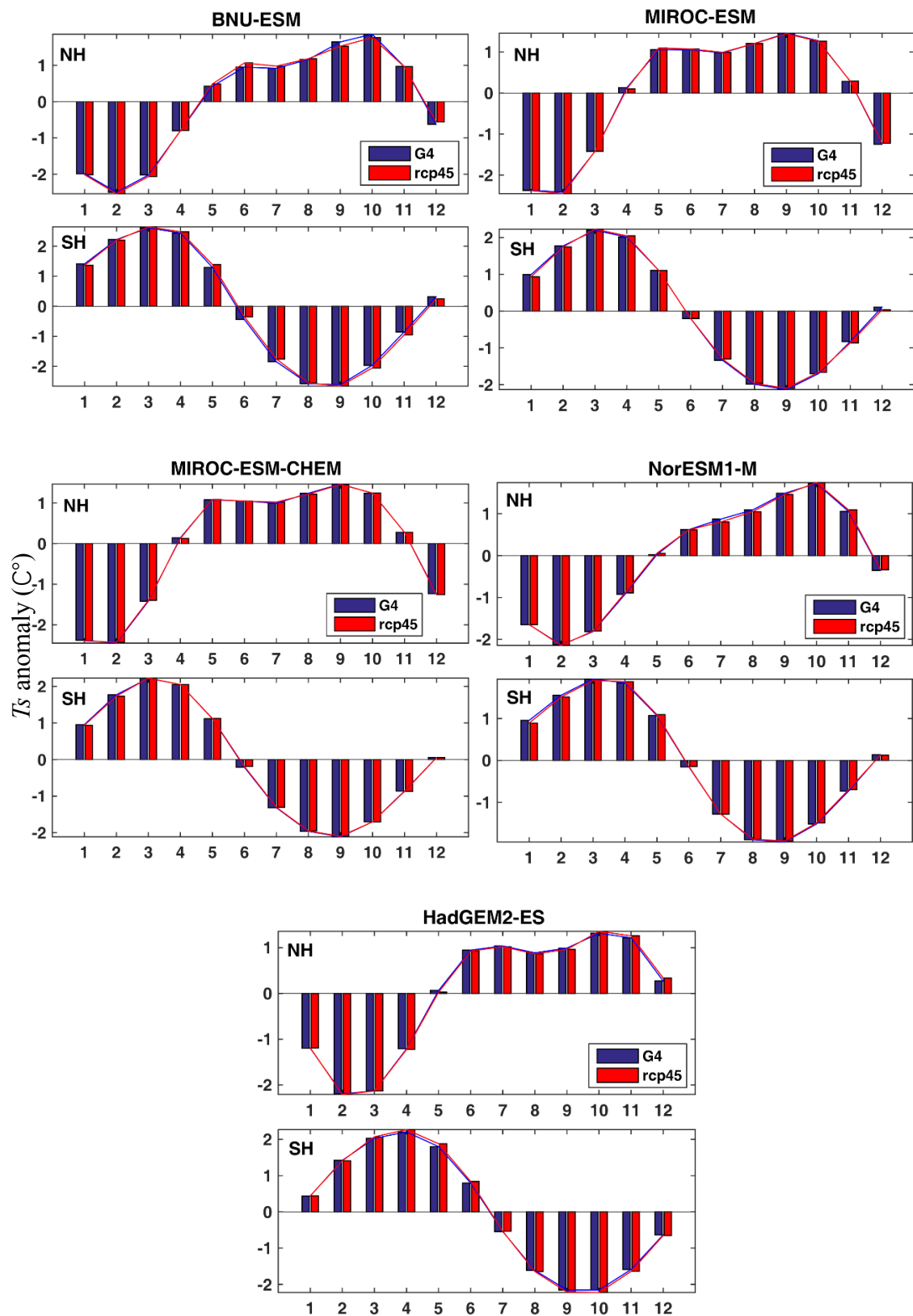


Figure S7. The seasonal cycle of T_s during 2020-2069 in Northern and Southern Hemisphere TC basins.

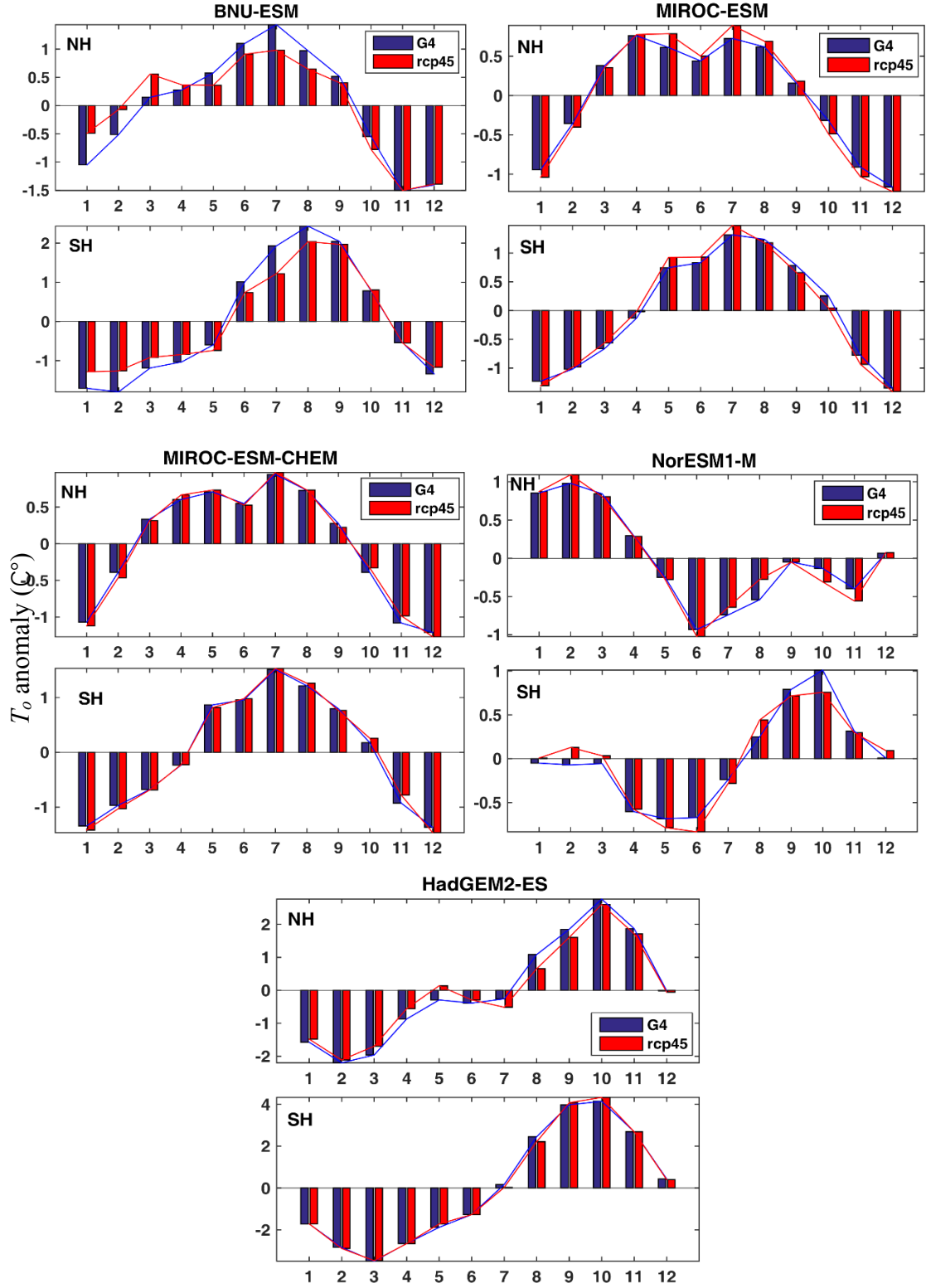


Figure S8. The seasonal cycle of T_o (100hPa) during 2020-2069 in Northern and Southern Hemisphere TC basins.

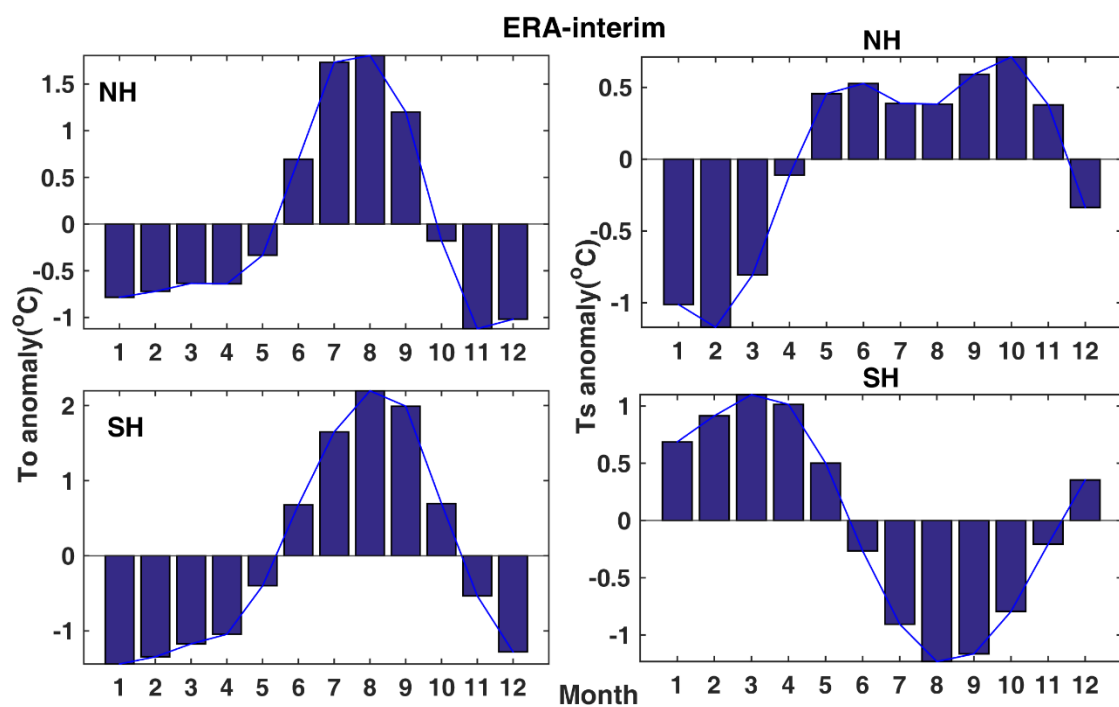


Figure S9. The seasonal cycle of $T_o(100\text{hPa})$ and T_s in Northern and Southern Hemisphere TC basins from ERA-interim for 1987-2016.