

The emerging human influence on the seasonal cycle of sea surface temperature

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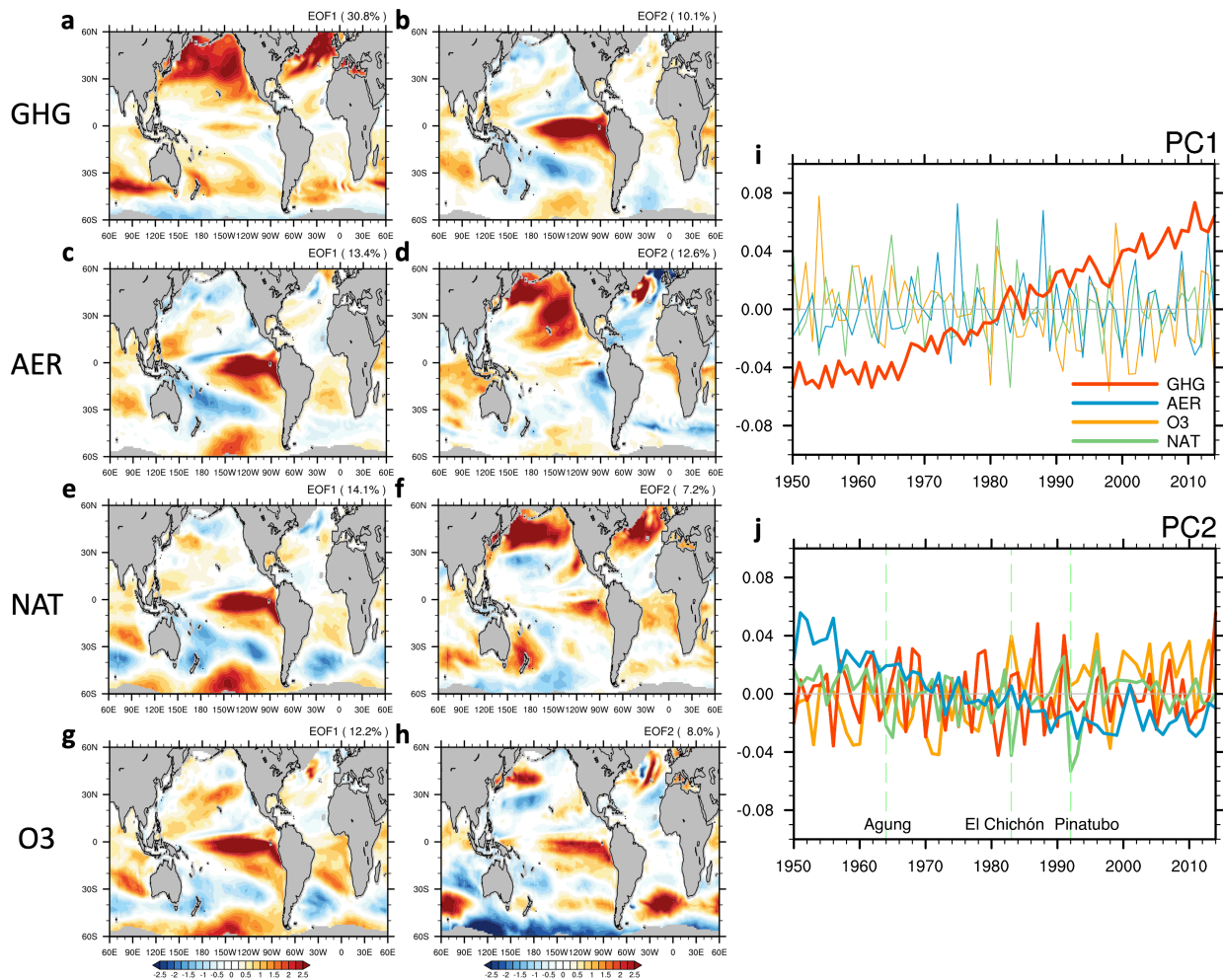
Supplementary Table 1. CMIP6 models and the number of model realizations used in this study. The left column shows the 10 CMIP6 models for which HIST, GHG, AER, and NAT runs were available. For O3, results were available from four models only (right column). The middle and right columns show the number of realizations available for each model. The identifiers of these realizations (r1, etc.) are indicated in brackets.

Model names	Number of realizations used in HIST, GHG, AER, and NAT	Number of realizations used in O3
ACCESS-CM2	3 (r1-r3)	--
ACCESS-ESM1-5	3 (r1-r3)	--
CanESM5	15 (r1-15)	10 (r1-r10)
CESM2	2 (r1 and r3)	--
CNRM-CM6-1	3 (r1-r3)	--
HadGEM3-GC31-LL	4 (r1-r4)	--
IPSL-CM6A-LR	10 (r1-r3)	10 (r1-r10)
MIRO6	3 (r1-r3)	3 (r1-r3)
MRI-ESM2-0	5 (r1-r3)	3 (r1, r3, and r5)
NorESM2-LM	3 (r1-r3)	--

Supplementary Table 2. Uncentered pattern correlations between fingerprints from different experiments. For HIST and GHG, the fingerprint is obtained from the first EOF mode. For AER, O3, and NAT, the second EOF mode is used as the fingerprint (see Supplementary Fig. 1.).

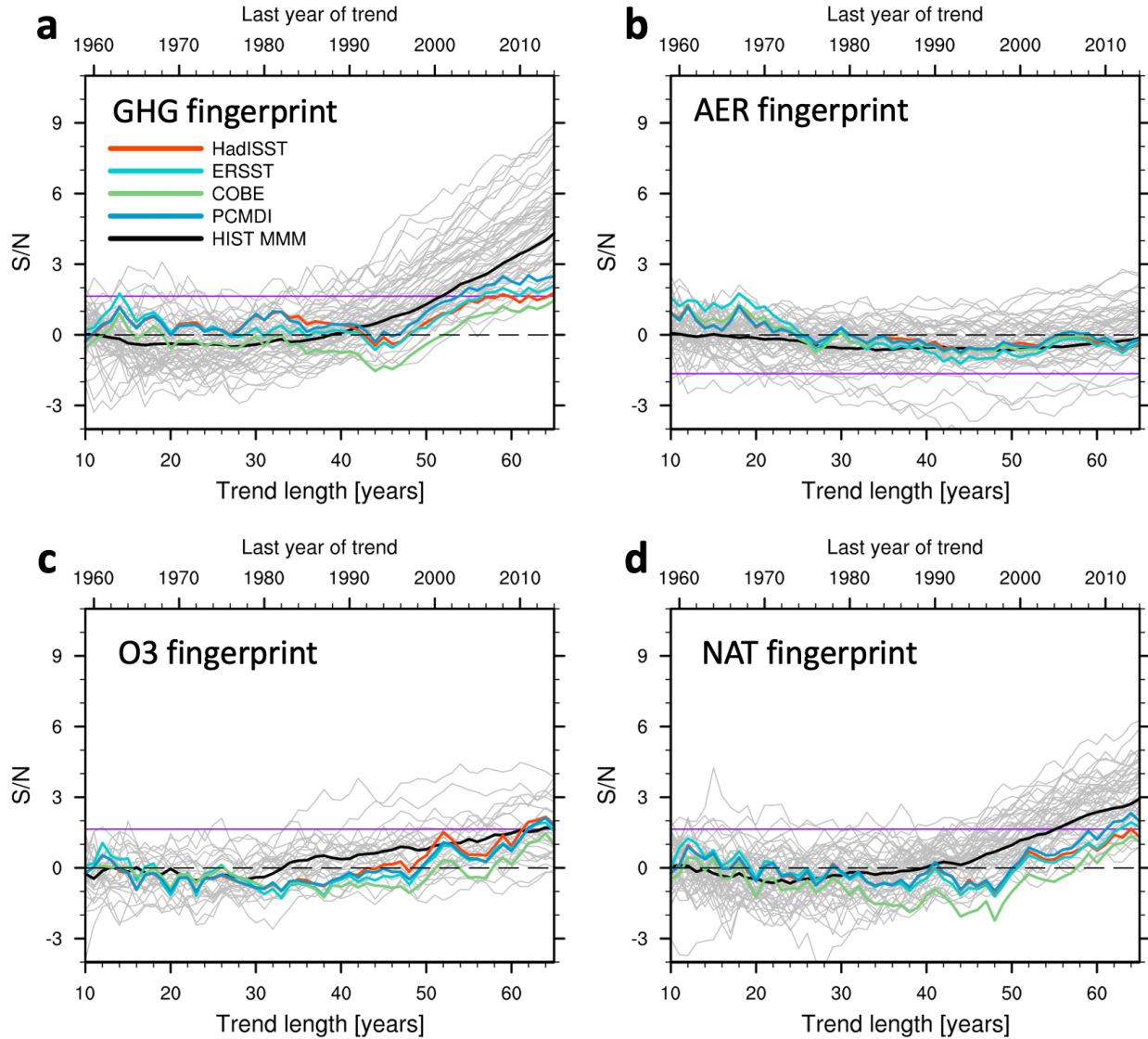
Pattern Correlation	HIST	GHG	AER	O3	NAT
HIST	1				
GHG	0.87	1			
AER	0.20	0.45	1		
O3	0.52	0.34	-0.06	1	
NAT	0.75	0.68	0.31	0.41	1

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Supplementary Fig. 1. First two EOFs of SST_{AC} anomalies calculated from the MMM of the GHG, AER, NAT, and O3 single-forcing experiments. a-h Results for EOF1 and EOF2 are in the left and right columns, respectively. The explained variances are shown in brackets. **i-j** Principal components for EOF1 and EOF2 from four single-forcing experiments. All calculations are over 1950-2014.

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Supplementary Fig. 2. S/N ratios of HIST runs and observations obtained using the fingerprints estimated from single-forcing experiments (GHG, AER, O3, and NAT). In Method 2, the SST_{AC} changes in the individual single-forcing runs are projected onto their respective fingerprints. The GHG fingerprint is the EOF1 pattern from the left column of Supplementary Fig. 1. Because the leading EOFs of AER, O3, and NAT simulations capture the effect of ENSO variability on SST_{AC} , the fingerprints for AER, O3 and NAT are the EOF2 patterns from the second column of Supplementary Fig. 1. The horizontal purple line is the 5% significance level.