

# Supporting Information for ”Quantifying Anthropogenic Influences on Global Wave Height Trend during 1961-2020 with Focus on Polar Ocean”

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## Introduction

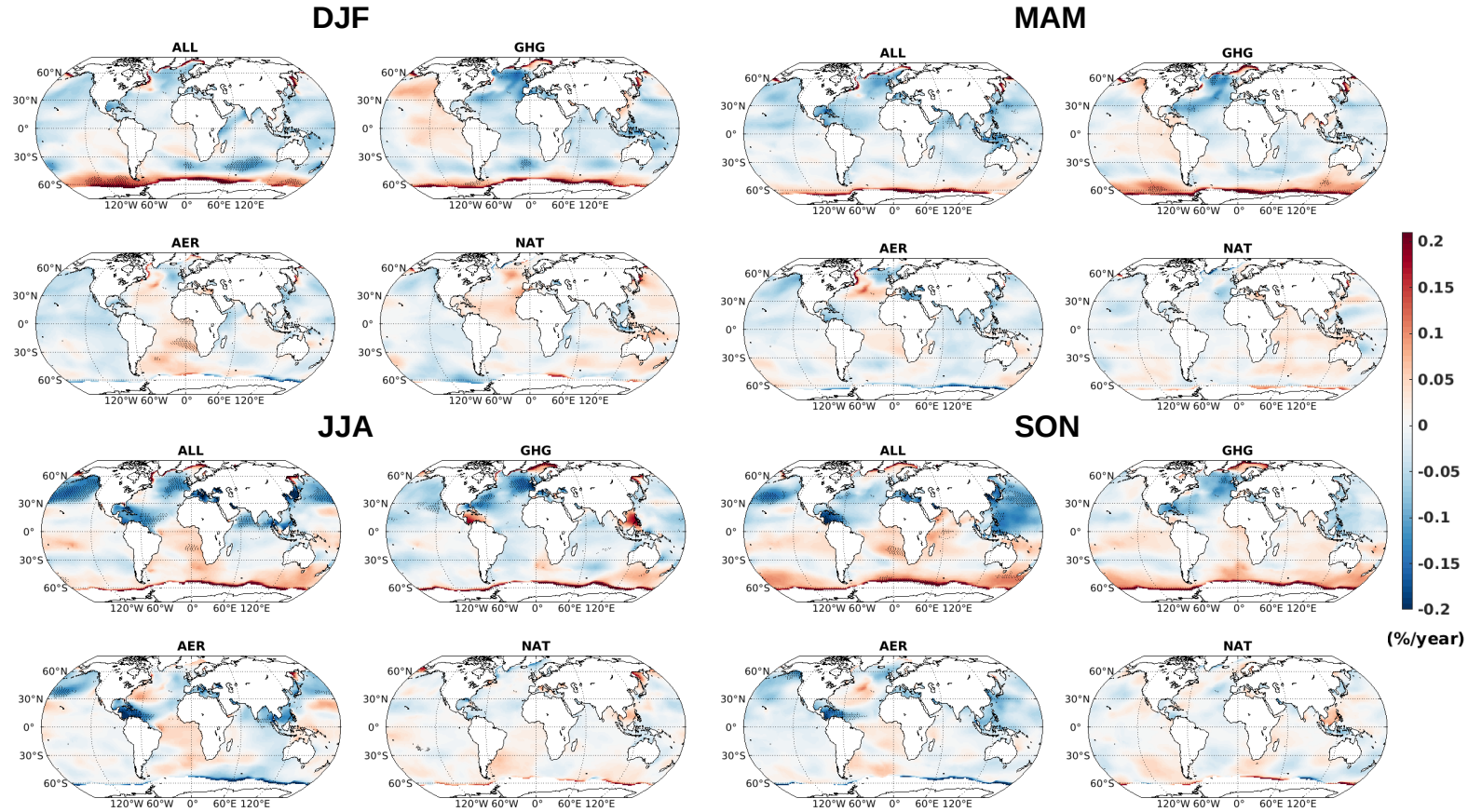
This supporting information contains two additional data table and four additional figures.

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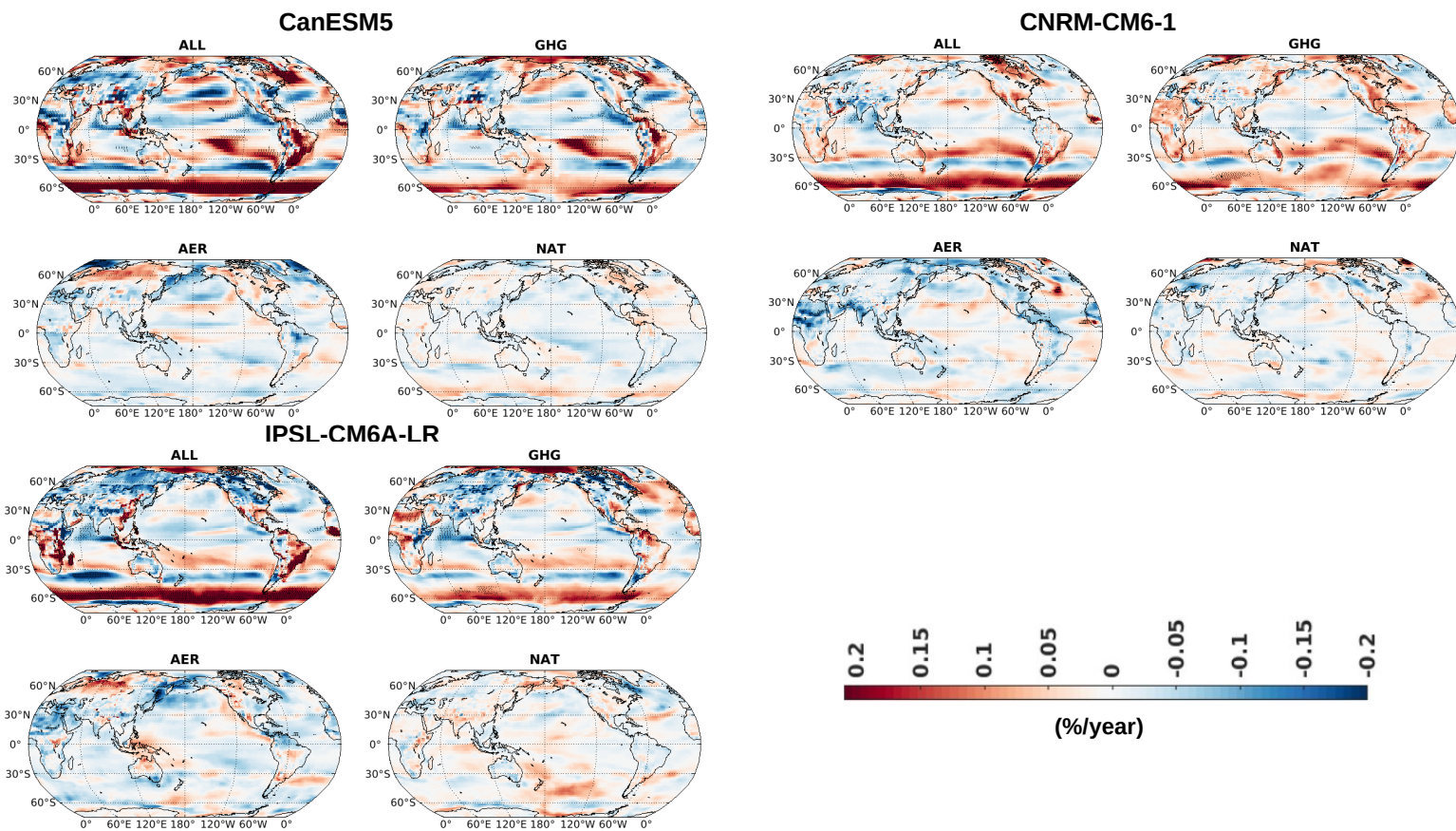
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**Table S1.**  $H_s$  simulations used for Linear trend estimation

Simulations	Wave Model	CMIP6 forcing	Experiment	Members
WW3/MRI-ESM2	WW3	MRI-ESM2.0	ALL, GHG, AER, NAT	5
WW3/ACCESS-CM2	WW3	ACCESS-CM2	ALL	1
WW3/EC-Earth3	WW3	EC-Earth3	ALL	1
MASNUM-WAM/FIO-ESM2	MASNUM-WAM	FIO-ESM v2.0	ALL	1



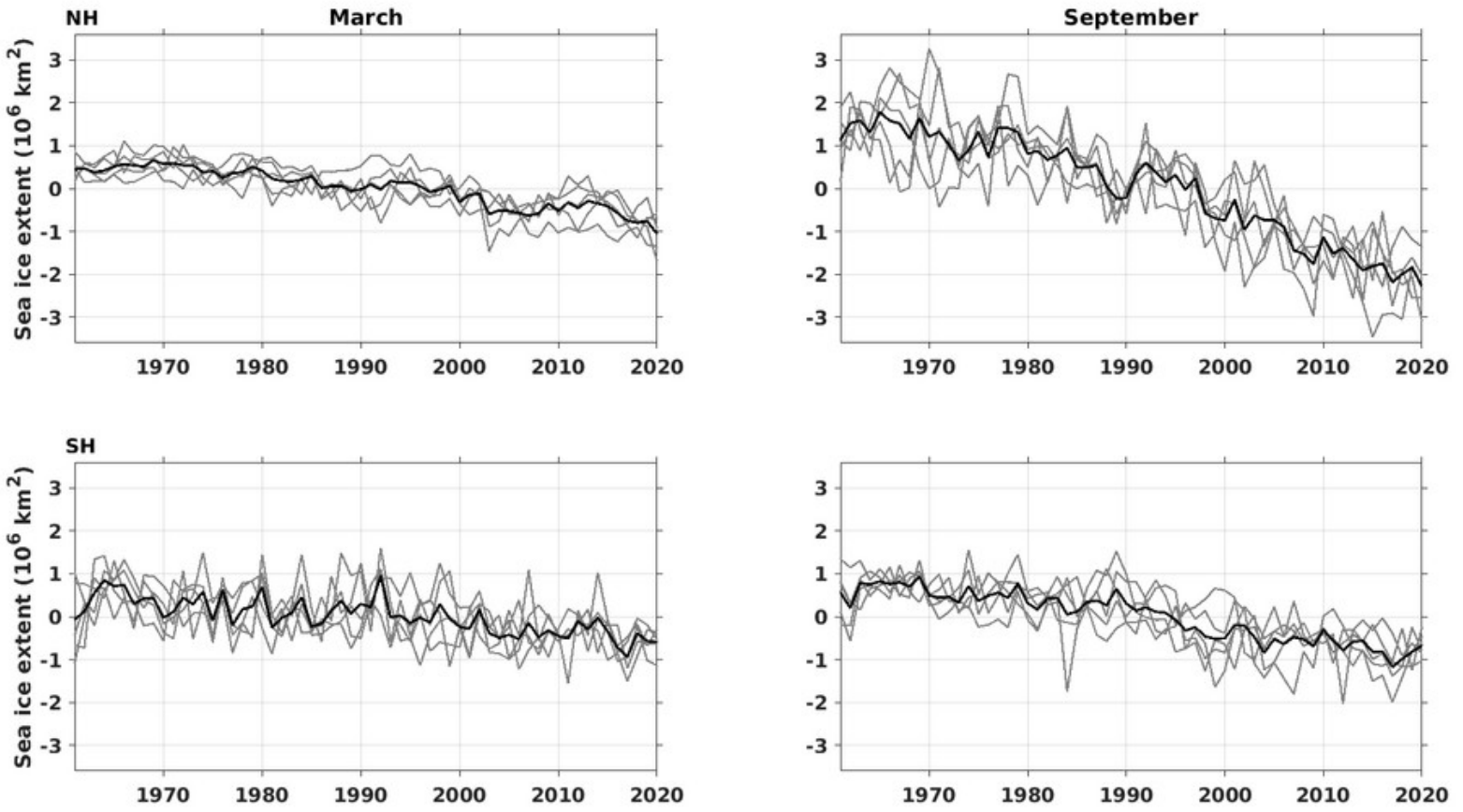
**Figure S1.** Linear trend (%) expressed as percentage change per year during 1961-2020 for seasonal mean  $H_s$  from WW3/MRI-ESM2.0 simulations for ALL, GHG, AER, and NAT forcing scenario (5 member mean). Robustness is defined at grids (stippling) considering both inter-annual and inter-member variability (See Method).



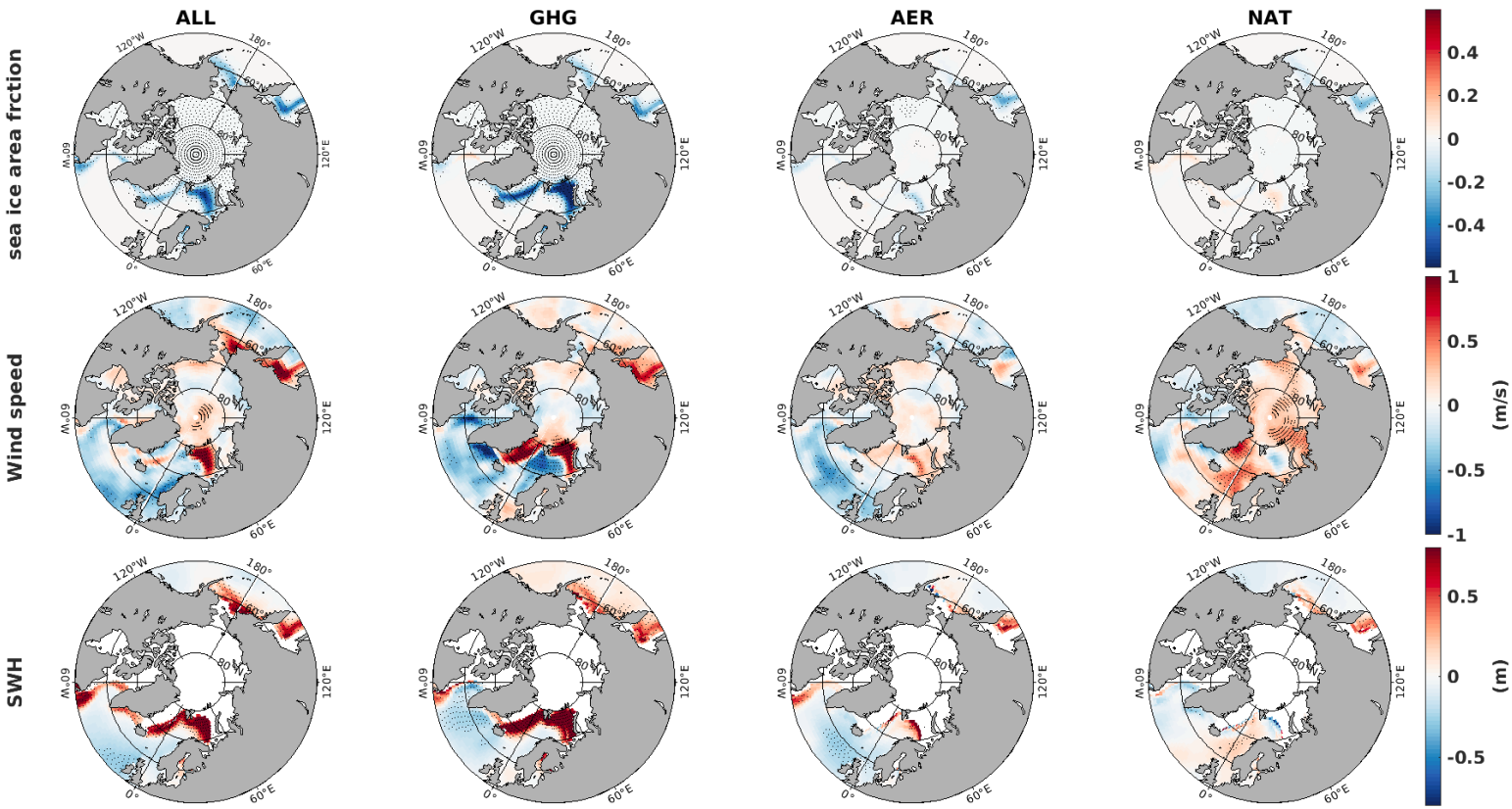
**Figure S2.** Linear trend (%) expressed as percentage change per year during 1961-2020 for annual mean wind speed from CanESM5, CNRM-CM6-1, and IPSL-CM6A-LR for ALL, GHG, AER, NAT forcing scenario (ensemble member mean). Robustness is defined at grids (stippling) considering both inter-annual and inter-member variability (See Method).

**Table S2.** Wind speed taken from CMIP6 models and number of ensemble members available

Model	historical	hist-GHG	hist-nat	hist-aer	resolution
CanESM5	15	15	15	15	$2.81^\circ \times 2.76^\circ \sim 2.79^\circ$
CNRM-CM6-1	10	10	10	10	$1.40^\circ \times 1.38^\circ \sim 1.40^\circ$
IPSL-CM6A-LR	11	10	10	10	$2.50^\circ \times 1.26^\circ$



**Figure S3.** MRI-ESM2.0 simulated sea ice extent (SIE) anomalies for (left) March and (right) September for the (upper) Arctic and (bottom) Antarctic. Anomalies are calculated with respect to the mean from 1961-2020. The grey lines are for each ensemble member and black lines are for ensemble mean



**Figure S4.** March Arctic Ocean changes: difference between (2001-2020) and (1961-1980) using ensemble mean values in MRI-ESM2.0 based simulations. Statistical significance (stippling) is following t-test using 5 members x 20 years = 100 data for each period.