Supplementary Information for Trends and spatial variation of oceanic dimethyl sulfide under a warming climate revealed by an artificial neural network model

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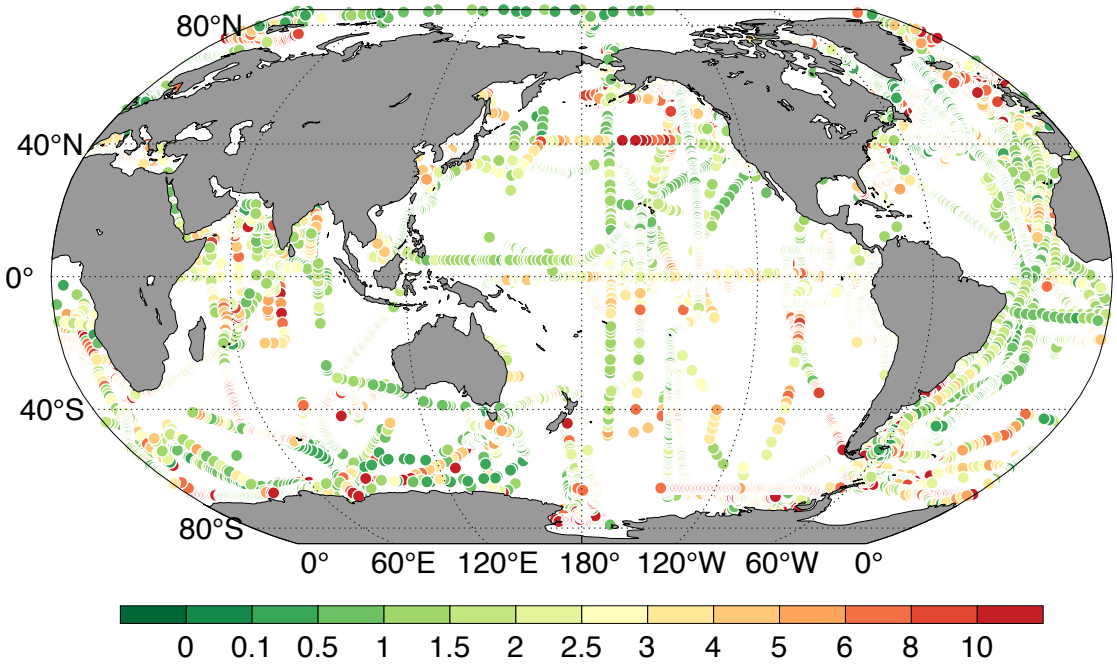

Fig. S1|Distribution of DMS observations. The color indicates DMS concentrations (Behrenfeld et al.).

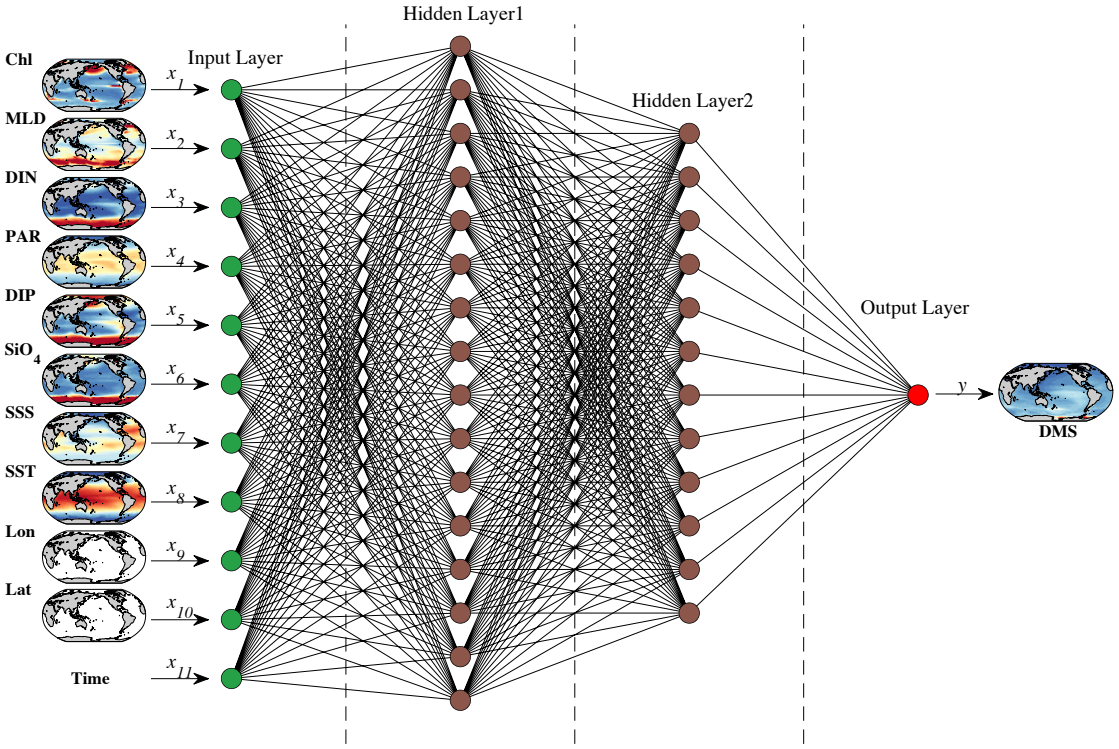

Fig. S2|Schematic diagram of the ANN model.

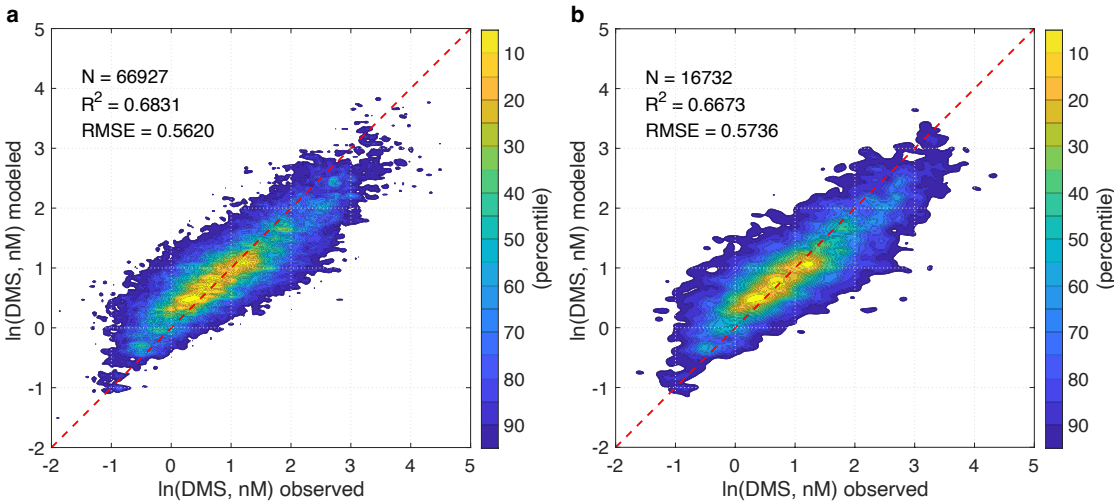

Fig. S3|Model versus observation plots on a logarithmic scale. a, training datasets. **b**, validation datasets. The color indicates the fraction of the joint distribution explained as a percentile that falls within a region of concentration space.

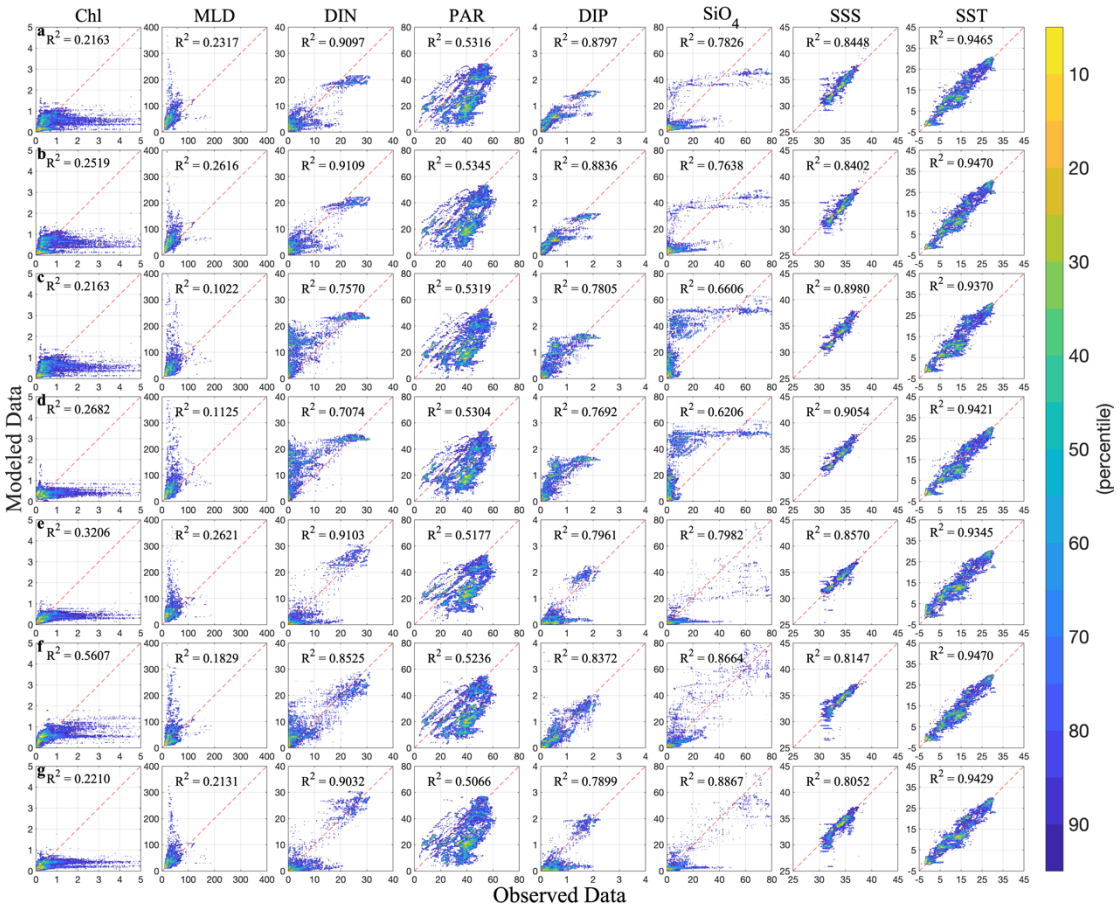

Fig. S4| Seven ESMs Model simulations versus observation plots on a logarithmic scale. a, CESM2. **b,** CESM2-WACCM. **c,** NorESM2-LM. **d,** NorESM2-MM. **e,** EC-Earth3-CC. **f,** GFDL-ESM4. **g,** IPSL-CM6A-LR. The color indicates the fraction of the joint distribution explained as a percentile that falls within a region of concentration space.

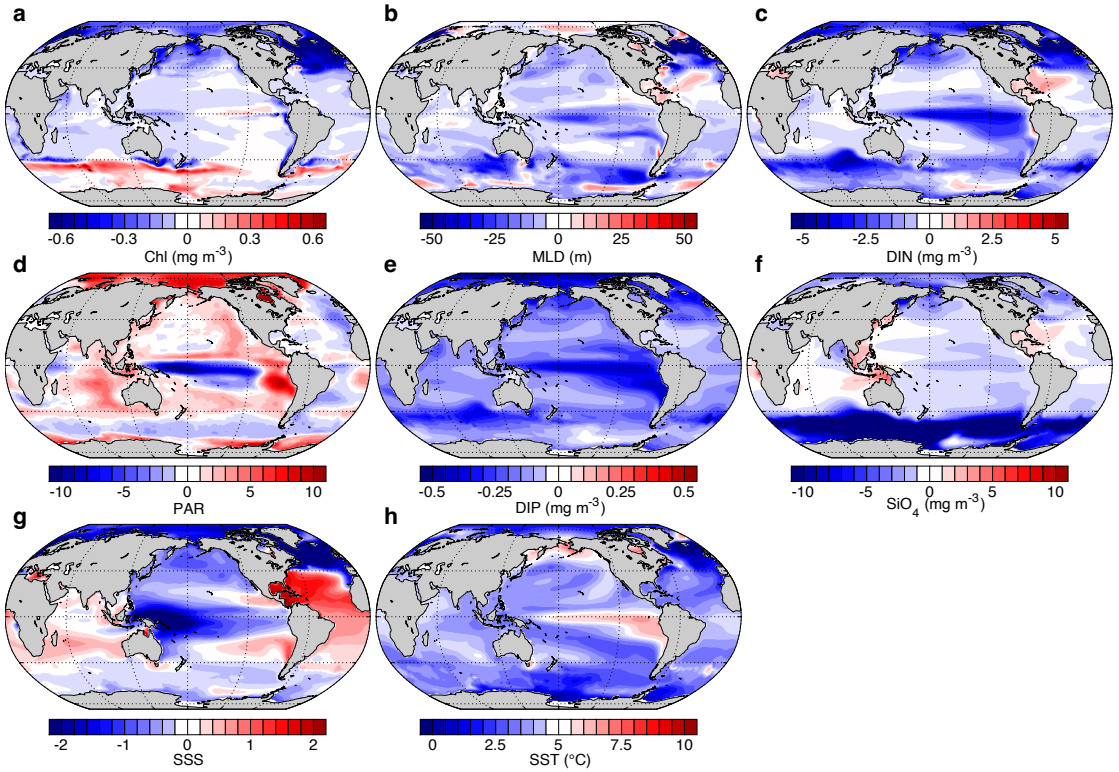

Fig. S5| Trends of the input environmental variables under high emission scenario (SSP5.85). a, Chl *a*. **b**, MLD. **c**, DIN. **d**, PAR. **e**, DIP. **f**, SiO_4. **g**, SSS. **h**, SST.

Table S1. DMS and environmental paraments data sources.

Parameters	Sources	Units	Reference
DMS	http://saga.pmel.noaa.gov/dms/ (last access: 1 May 2020)	nM	Kettle et al. (1999)
DMS	NAAMES	nM	Behrenfeld et al. (2019)
Chl *a*	https://oceandata.sci.gsfc.nasa.gov/SeaWiFS/(last access: 1 May 2020)	μg L-1	NASA (2018)
MLD	https://www.pmel.noaa.gov/mimoc/ (last access: 1 May 2020)	m	Schmidtko et al. (2013)
PAR	https://oceancolor.gsfc.nasa.gov/atbd/par/ (last access: 1 May 2020)	einstein m-2 d-1	Frouin et al. (2012)
SST	WOA2013	℃	Garcia et al. (2013)
SSS	WOA2013	psu	Garcia et al. (2013)
DIN	WOA2013	μM	Garcia et al. (2013)
DIP	WOA2013	μM	Garcia et al. (2013)
SiO_4	WOA2013	μM	Garcia et al. (2013)
ICE	CESM2-WACCM	-	-
WSP	CESM2-WACCM	m s-1	-

Table S2. Key characteristic and ocean biogeochemical components of four different ESMs prognostic DMS in CMIP6.

ESM name	Ocean model (grid)	Marine biogeochemical model	historical	SSP5-8.5
CNRM-ESM2-1	NEMO (294×362, 75 z levels)	PISCESv2-gas	10	5
MIROC-ES2L	COCO (256×360, 62 σ levels)	OECO2	10	10
NorESM2-LM	BLOM (360×385, 53 σ levels)	iHAMOCC	3	1
UKESM1-0-LL	NEMO (330×360, 75 z levels)	MEDUSA-v2	16	5