Supplement

Spatial and seasonal variability in volatile organic sulfur compounds in seawater and overlying atmosphere of the Bohai and Yellow Seas

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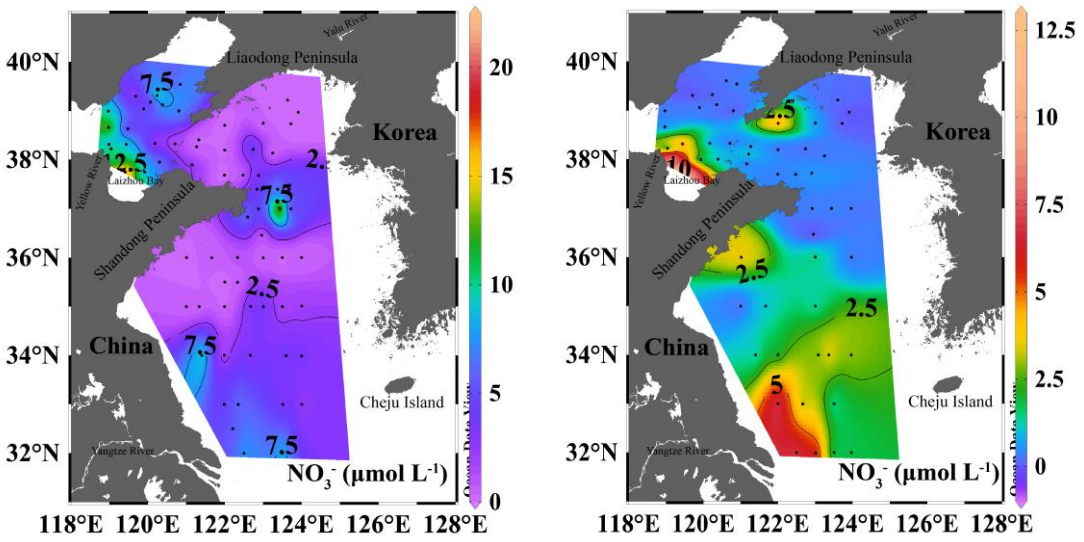
Introduction

This supporting information provides the nitrate distribution, 72 h backward trajectory of the air mass, the pre-concentrator parameters of the three-stage cold trap, the calculation formulas for Henry's constant, and correlation analyses of the three VSCs and environmental factors in the BS and YS in spring and summer 2018. The data are also available for download at https://doi.org/10.6084/m9.figshare.14971644.



(a) (b)

Figure S1. Spatial distributions of nitrate in the surface water of the BS and YS in spring (a) and summer (b).

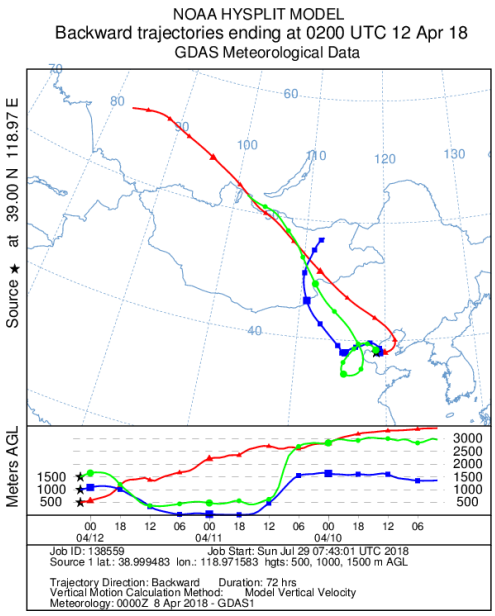


Figure S2. 72 h backward trajectory of the air mass above station B49 in the BS in spring 2018.

Table S1. The pre-concentrator parameters of the three-stage cold trap.

Stage	Adsorbent	Trapping temperature *T*/°C	Preheating temperature *T*/°C	Stripping temperature *T*/°C	Baking temperature *T*/°C	Baking time. *t*/min
1	Glass beads	-170	20	10	150	2
2	Tenax	-50	-	170	180	2
3	Cryotrapping	-150	-	120	100	2

Table S2. The calculation formulas for Henry's constant.

	Henry's constant calculation	Parameter
COS	$H = C_1 \mathrm{EXP}[C_2 (1/T-1/T^{\Theta})]$	$C_1 = 2.2 \times 10^{-2}$ mol L^{-1} atm^{-1}; $C_2 = 2100K$
DMS	$H = C_1 \mathrm{EXP}[C_2 (1/T-1/T^{\Theta})]$	$C_1 = 4.8 \times 10^{-2}$ mol L^{-1} atm^{-1}; $C_2 = 3500K$
CS_2	$H = C_1 \mathrm{EXP}[C_2 (1/T-1/T^{\Theta})]$	$C_1 = 5.5 \times 10^{-2}$ mol L^{-1} atm^{-1}; $C_2 = 2800K$

Table S3. Correlation analyses of the three VSCs and environmental factors in the BS and YS in spring.

	COS	DMS	CS_2	COS (g)	DMS (g)	CS_2 (g)
COS	1					
DMS	0.021	1				
CS_2	0.193	0.281*	1			
COS (g)	-0.246	-0.355	-0.182	*1*		
DMS (g)	0.296	0.040	0.274	0.117	1	
CS_2 (g)	-0.201	-0.264	-0.213	0.554**	-0.013	1
Chl a	0.132	0.044	-0.095	0.033	0.179	-0.141
Temperature	0.286*	0.082	0.319**	-0.257	0.179	-0.372
Salinity	0.110	-0.009	-0.109	0.240	0.019	0.236
Silicate	-0.103	-0.252*	-0.029	0.351	-0.008	0.540
Phosphate	-0.084	-0.205	-0.353**	0.621	-0.128	0.360
Nitrate	-0.299*	-0.293*	-0.226	0.075	-0.096	0.044
DOC	-0.146	-0.153	-0.073	0.037	-0.122	0.008

* indicates $P < 0.05$, ** indicates $P < 0.01$.

Table S4. Correlation analyses of the three VSCs and environmental factors in the BS and YS in summer.

	COS	DMS	CS_2	COS (g)	DMS (g)	CS_2 (g)
COS	1					
DMS	0.009	1				
CS_2	-0.007	0.424**	1			
COS (g)	0.358	0.472	0.184	1		
DMS (g)	-0.266	0.404	0.310	0.451	1	
CS_2 (g)	0.452	0.229	0.424	0.855**	0.251	1
Chl a	-0.059	0.250	0.274*	0.461	-0.294	0.565
Temperature	0.088	-0.076	-0.143	-0.097	-0.349	0.072
Salinity	0.128	-0.172	-0.143	-0.120	-0.352	-0.044
Silicate	0.114	0.122	0.276*	0.312	-0.548	0.377
Phosphate	0.104	-0.169	-0.245	-0.490	-0.539	-0.482
Nitrate	-0.095	0.145	0.057	-0.008	0.224	-0.155
DOC	0.342*	-0.015	0.012	0.020	0.924	0.319

* indicates $P < 0.05$, ** indicates $P < 0.01$.