

## Supplementary Material

### Formation of marine secondary aerosols in the Southern Ocean, Antarctica

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1. Figures

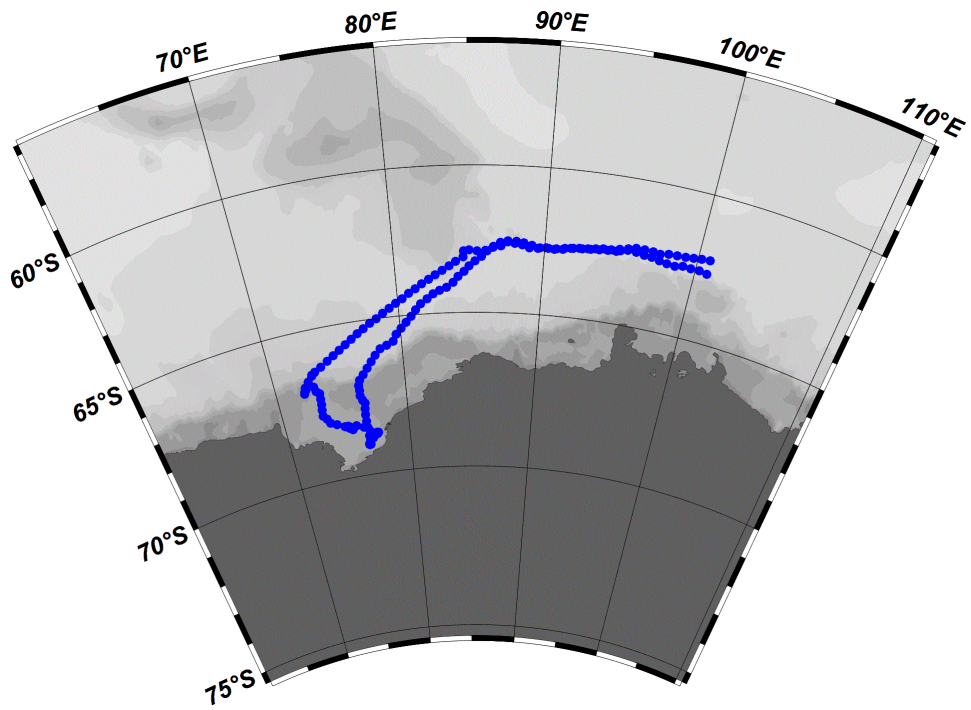


Fig.S1 Route map during the monitoring period.

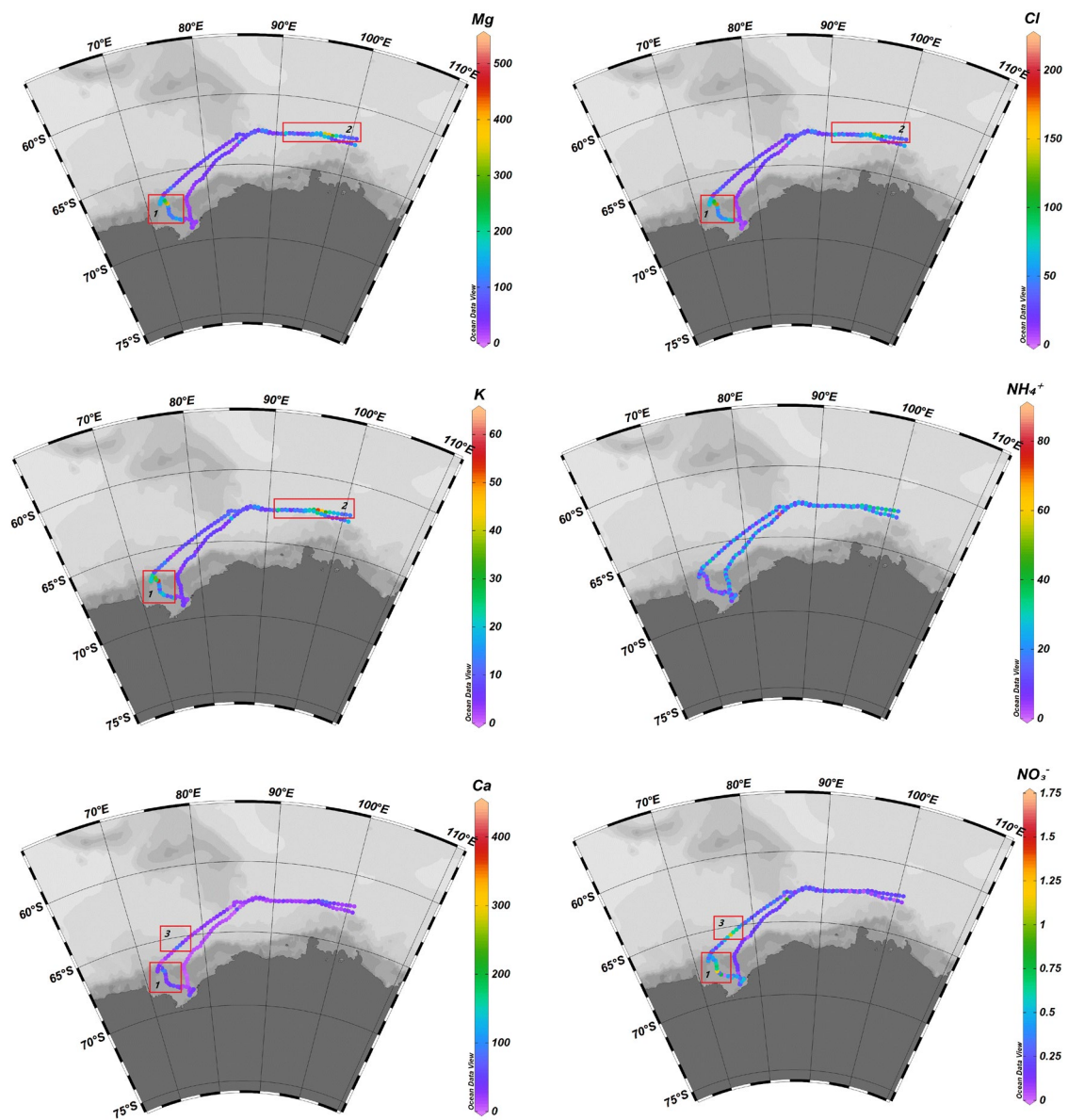


Fig.S2 Spatial distribution of mass concentrations of  $Mg^{2+}$ ,  $Ca^{2+}$ ,  $Cl^-$ ,  $NH_4^+$ ,  $K^+$ , and  $NO_3^-$  in marine aerosols during the cruise.

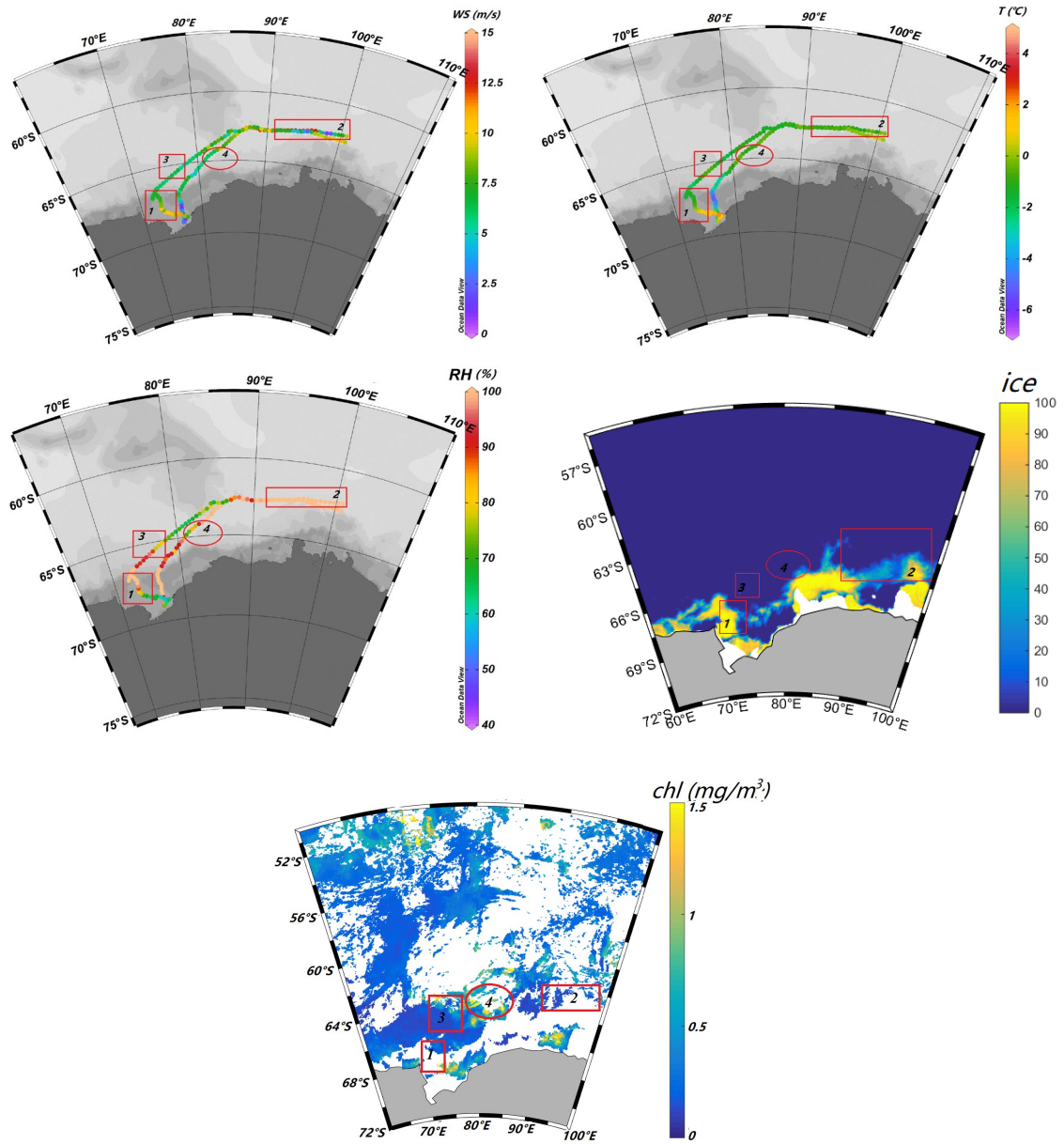


Fig.S3 Spatial distribution of WS, T, RH, ice and chl-a from Dec.24, 2017 to Jan. 8, 2018 in Prydz Bay, Antarctica.

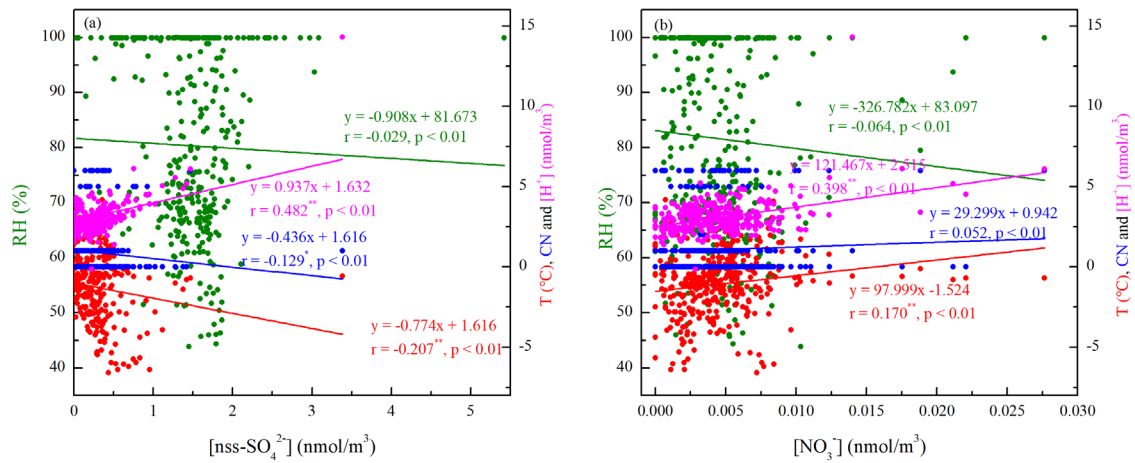


Fig.S4 Relationships between  $[\text{nss-SO}_4^{2-}]/[\text{NO}_3^-]$  and other parameters including RH, T, CN,  $[\text{H}^+]$ .

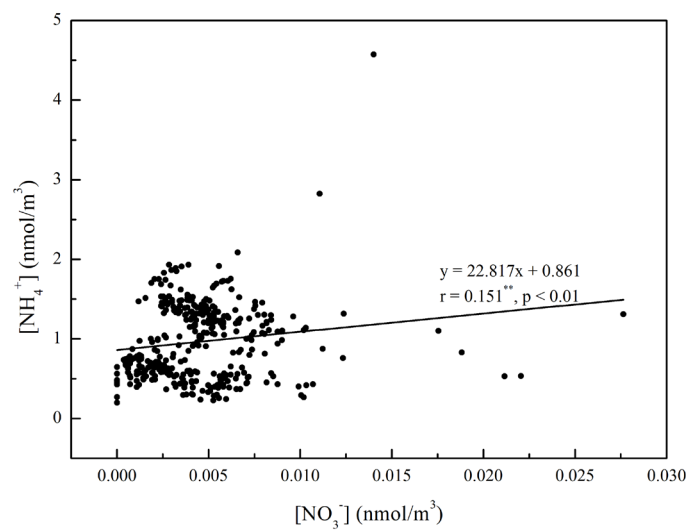


Fig.S5 Relationship between  $[\text{NO}_3^-]$  and  $[\text{NH}_4^+]$ .

## 2. Tables

Table S1 Correlations between water soluble ions in marine aerosols with the meteorology parameters

	Na <sup>+</sup>	Mg <sup>2+</sup>	Cl <sup>-</sup>	K <sup>+</sup>	SO <sub>4</sub> <sup>2-</sup>	NH <sub>4</sub> <sup>+</sup>	NO <sub>3</sub> <sup>-</sup>	MSA <sup>-</sup>
T	0.095	0.103	0.099	0.065	-.184**	-.136*	.170**	-0.04
RH	.248**	.250**	.266**	.259**	.253**	.134*	-0.064	.181**
WS	.399**	.405**	.432**	.337**	0.047	-0.03	-0.022	.242**
visibility	-.311**	-.315**	-.321**	-.316**	-.145**	-.113*	0.101	-0.081
CN	.236**	.245**	.239**	.264**	0.064	0.093	0.052	0.064

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Table S2 Correlations between [MSA<sup>-</sup>]<sub>p</sub> and other ions in marine aerosols

	[Na <sup>+</sup> ]	[Mg <sup>2+</sup> ]	[Ca <sup>2+</sup> ]	[K <sup>+</sup> ]	[NH <sub>4</sub> <sup>+</sup> ]	[SO <sub>4</sub> <sup>2-</sup> ] <sub>p</sub>	[NO <sub>3</sub> <sup>-</sup> ] <sub>p</sub>	[Cl <sup>-</sup> ]
Pearson Correlation	0.153**	0.133*	0.043	0.108*	0.306**	0.620**	-0.033	0.133*
Sig. (2-tailed)	0.004	0.011	0.437	0.042	0	0	0.538	0.011
N	359	359	332	359	359	359	359	359

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).