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*Supplement of*

## **Phosphorus solubility in aerosol particles related to particle sources and atmospheric acidification in Asian continental outflow**

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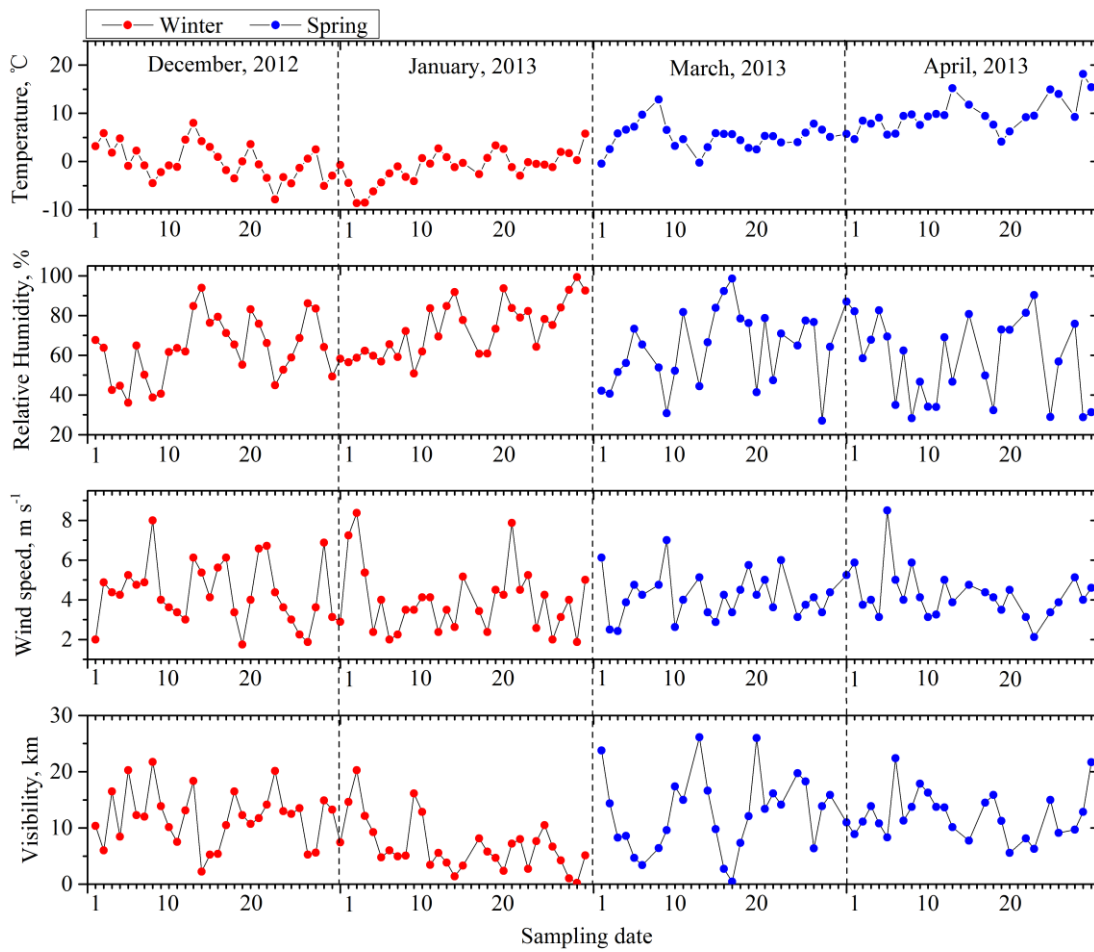
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**Table S1: Correlation matrix of various forms of P and P solubility versus total trace element and water-soluble ion levels.**

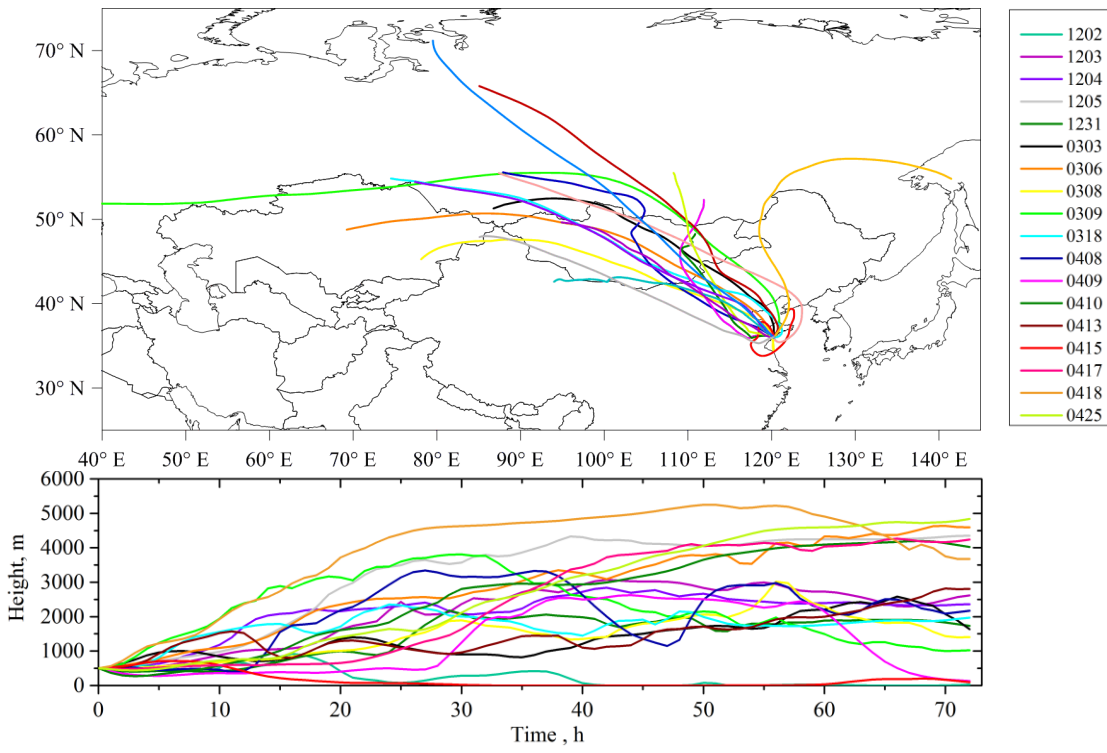
	TP	TDP	DIP	DOP	P solubility	Al	Fe	Ca	Mn	Ba	Ni	Zn	As	Cd	Pb	K	nss-K <sup>+</sup>	Cl <sup>-</sup>	nss-SO <sub>4</sub> <sup>2-</sup>	NO <sub>3</sub> <sup>-</sup>
All (n=112)																				
TP	-	0.43**	0.32**	0.39**	-0.24*	0.76**	0.83**	0.77**	0.78**	0.86**	0.42**	0.50**	0.42**	0.31**	0.35**	0.82**	0.55**	0.26**	0.25*	0.26**
TDP	0.43**	-	0.94**	0.39**	0.70**	0.00	0.17	-0.02	0.29**	0.22*	0.50**	0.80**	0.85**	0.83**	0.80**	0.54**	0.63**	-0.11	0.51**	0.42**
DIP	0.32**	0.94**	-	0.07	0.71**	-0.10	0.07	-0.12	0.17	0.10	0.35**	0.70**	0.81**	0.81**	0.75**	0.44**	0.48**	-0.27**	0.37**	0.22*
DOP	0.39**	0.39**	0.07	-	0.14	0.28**	0.32**	0.29**	0.40**	0.36**	0.54**	0.47**	0.30**	0.25**	0.33**	0.42**	0.57**	0.44**	0.48**	0.65**
P solubility	-0.24*	0.70**	0.71**	0.14	-	-0.48**	-0.34**	-0.53**	-0.21*	-0.35**	0.20*	0.41**	0.52**	0.59**	0.50**	-0.02	0.24**	-0.26**	0.38**	0.26**
Winter (n=60)																				
TP	-	0.60**	0.58**	0.41**	0.01	0.50**	0.72**	0.59**	0.72**	0.83**	0.54**	0.65**	0.57**	0.53**	0.52**	0.77**	0.67**	0.70**	0.44**	0.46**
TDP	0.60**	-	0.97**	0.67**	0.78**	-0.01	0.34**	-0.06	0.53**	0.37**	0.67**	0.81**	0.84**	0.82**	0.80**	0.67**	0.85**	0.55**	0.88**	0.88**
DIP	0.58**	0.97**	-	0.48**	0.76**	-0.01	0.31*	-0.04	0.52**	0.34**	0.57**	0.74**	0.80**	0.77**	0.75**	0.64**	0.80**	0.47**	0.82**	0.79**
DOP	0.41**	0.67**	0.48**	-	0.50**	-0.02	0.28*	-0.08	0.34**	0.29*	0.69**	0.69**	0.61**	0.65**	0.61**	0.47**	0.66**	0.51**	0.72**	0.81**
P solubility	0.01	0.78**	0.76**	0.50**	-	-0.34**	-0.12	-0.48**	0.11	-0.15	0.42**	0.48**	0.57**	0.59**	0.54**	0.24	0.52**	0.09	0.73**	0.72**
Spring (n=52)																				
TP	-	0.60**	0.35**	0.40**	-0.62**	0.89**	0.88**	0.86**	0.81**	0.88**	0.36**	0.54**	0.61**	0.50**	0.49**	0.88**	0.50**	0.26	0.12	0.17
TDP	0.60**	-	0.75**	0.44**	0.04	0.37**	0.30*	0.36**	0.28*	0.31*	0.54**	0.71**	0.73**	0.71**	0.53*	0.47**	0.60**	0.20	0.36**	0.56**
DIP	0.35**	0.75**	-	-0.25	0.13	0.09	0.08	0.04	-0.02	0.03	0.28*	0.38*	0.53**	0.58**	0.29*	0.18	0.32*	-0.09	0.26	0.25
DOP	0.40**	0.44**	-0.25	-	-0.11	0.41**	0.33*	0.46**	0.44**	0.41**	0.42**	0.53**	0.35*	0.25	0.39**	0.45**	0.44**	0.42**	0.17	0.48**
P solubility	-0.62**	0.04	0.13	-0.11	-	-0.68**	-0.64**	-0.68**	-0.59**	-0.69**	-0.02	-0.10	-0.19	-0.06	-0.23	-0.58**	-0.11	-0.13	0.25	0.24

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

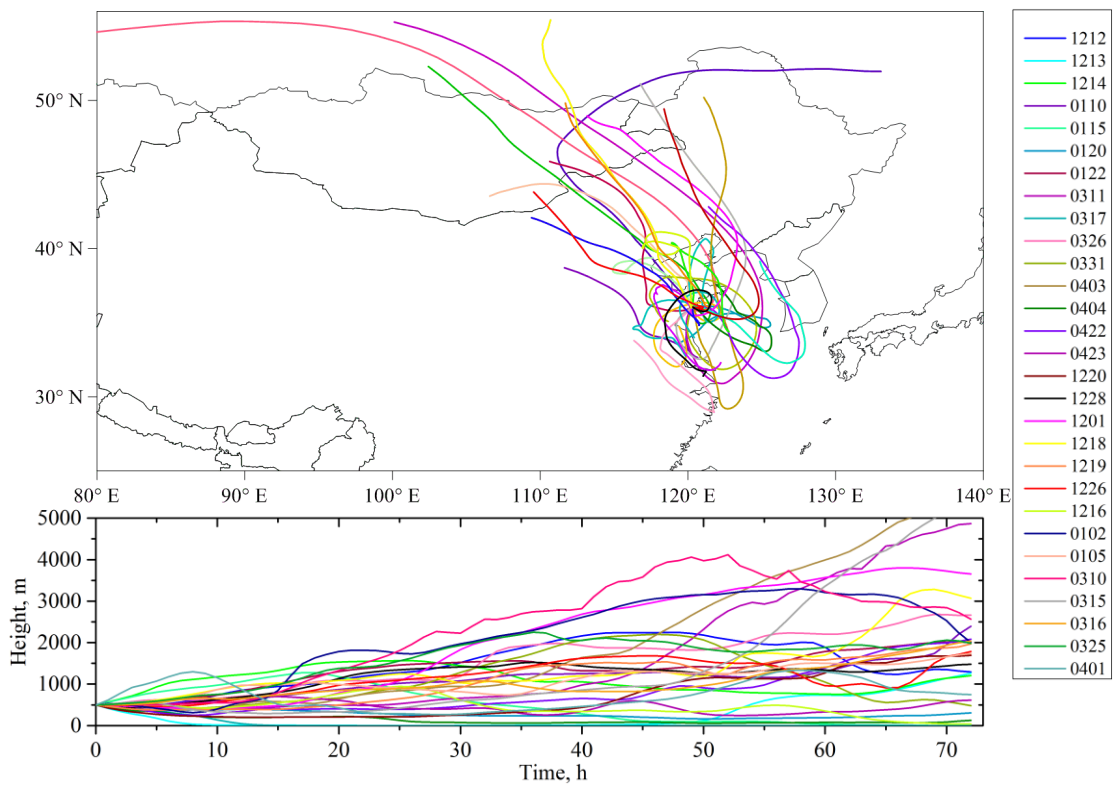
\*\*, Correlation is significant at the 0.01 level (2-tailed).



**Figure S1: Temporal variations of meteorological parameters (temperature, relative humidity, wind speed and visibility).**



**Figure S2: The 72 h air mass back trajectories for high Al-loaded samples with an Al concentration higher than  $6000 \text{ ng m}^{-3}$  (calculated by HYSPLIT at 500 m above ground level).**



**Figure S3: The 72 h air mass back trajectories for low Al-loaded samples with an Al concentration lower than  $2000 \text{ ng m}^{-3}$  (calculated by HYSPLIT at 500 m above ground level).**