

## Supporting Information

# **Continental pollutants modulate organic nitrogen and light absorption of marine organic aerosols over East Asian marginal seas**

Chao Yu<sup>1,#</sup>, Lin Zheng<sup>1,#</sup>, Yujue Wang<sup>1,2\*</sup>, Meijing Guo<sup>1</sup>, Xu Yu<sup>3</sup>, Yuqi Guo<sup>1</sup>, Sisi Song<sup>1</sup>, Kyoung-Soon Jang<sup>4</sup>, Xiaohong Yao<sup>1,2</sup>, Jian Zhen Yu<sup>5</sup>, Huiwang Gao<sup>1,2</sup>

<sup>1</sup>Frontiers Science Center for Deep Ocean Multispheres and Earth System, Key Laboratory of Marine Environment and Ecology, Ministry of Education of China, Ocean University of China, Qingdao, China.

<sup>2</sup>Laboratory for Marine Ecology and Environmental Science, Qingdao Marine Science and Technology Center, Qingdao, China.

<sup>3</sup>Jiangsu Key Laboratory of Atmospheric Environment Monitoring and Pollution Control, Jiangsu Collaborative Innovation Center of Atmospheric Environment and Equipment Technology, Joint International Research Laboratory of Climate and Environment Change, School of Environmental Science and Engineering, Nanjing University of Information Science and Technology, Nanjing, Jiangsu, China.

<sup>4</sup>Bio-Chemical Analysis Team, Korea Basic Science Institute, Cheongju, 28119, Republic of Korea

<sup>5</sup>Division of Environment & Sustainability, Hong Kong University of Science & Technology, Hong Kong, China.

*Correspondence to:* Yujue Wang ([wangyujue@ouc.edu.cn](mailto:wangyujue@ouc.edu.cn))

#: The first two authors contributed equally to this work.

Figures S1 to S6

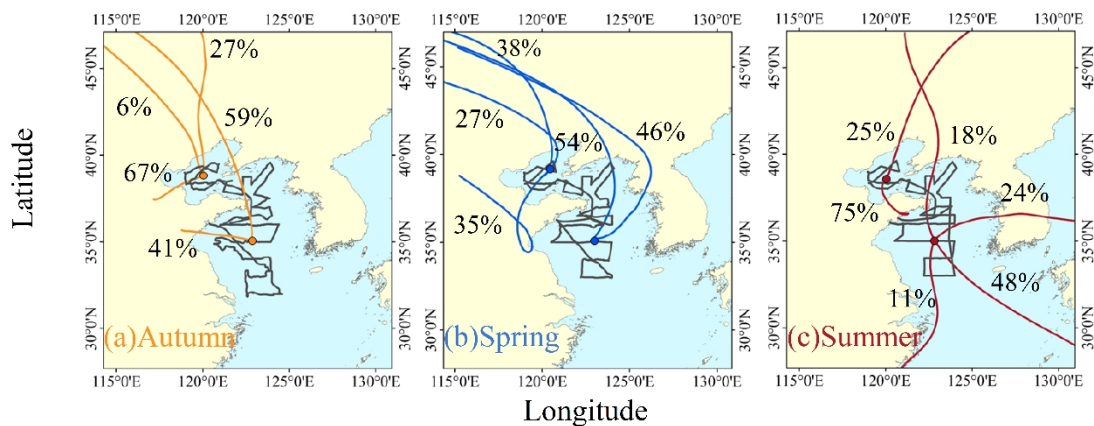


Figure S1 Cruise observation area and the 72-hrs backward trajectories of air masses during each cruise.

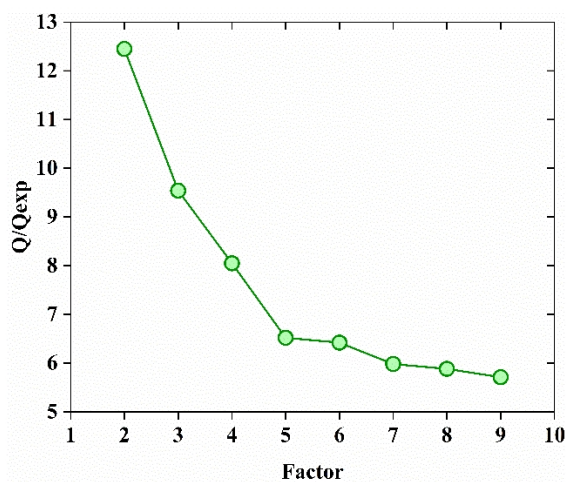


Figure S2 Variation of  $Q/Q_{exp}$  with different solution numbers resolved by PMF source apportionment.

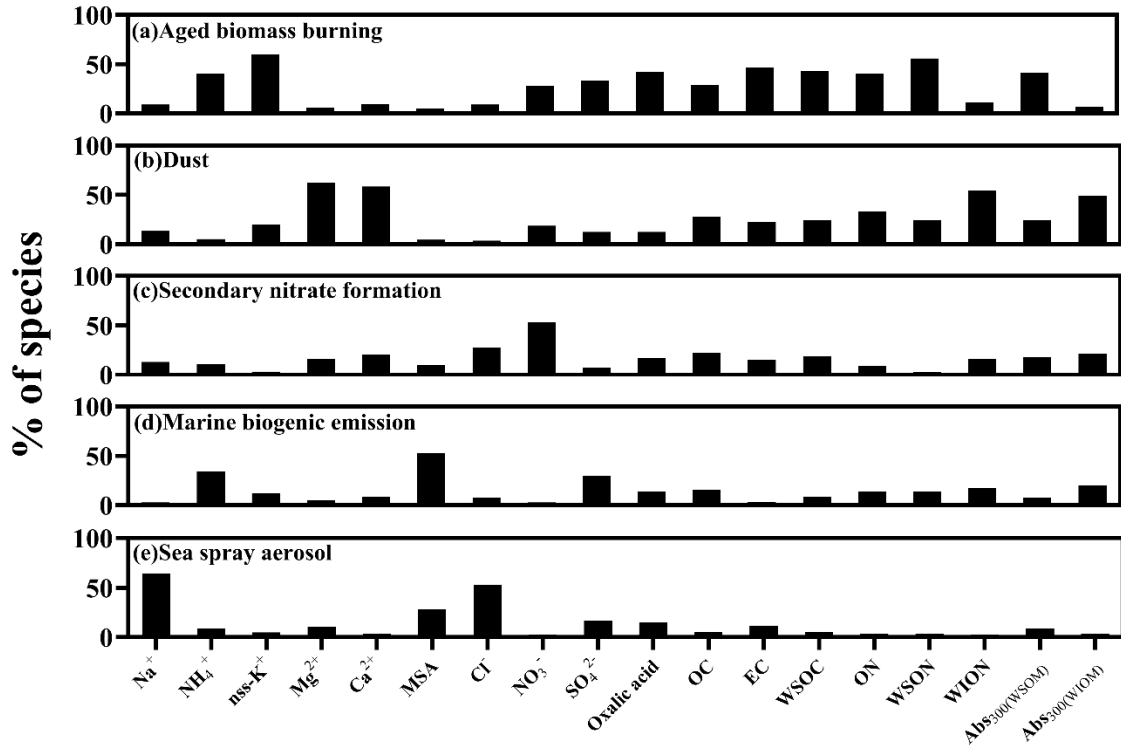


Figure S3 Explained source profiles resolved by PMF.

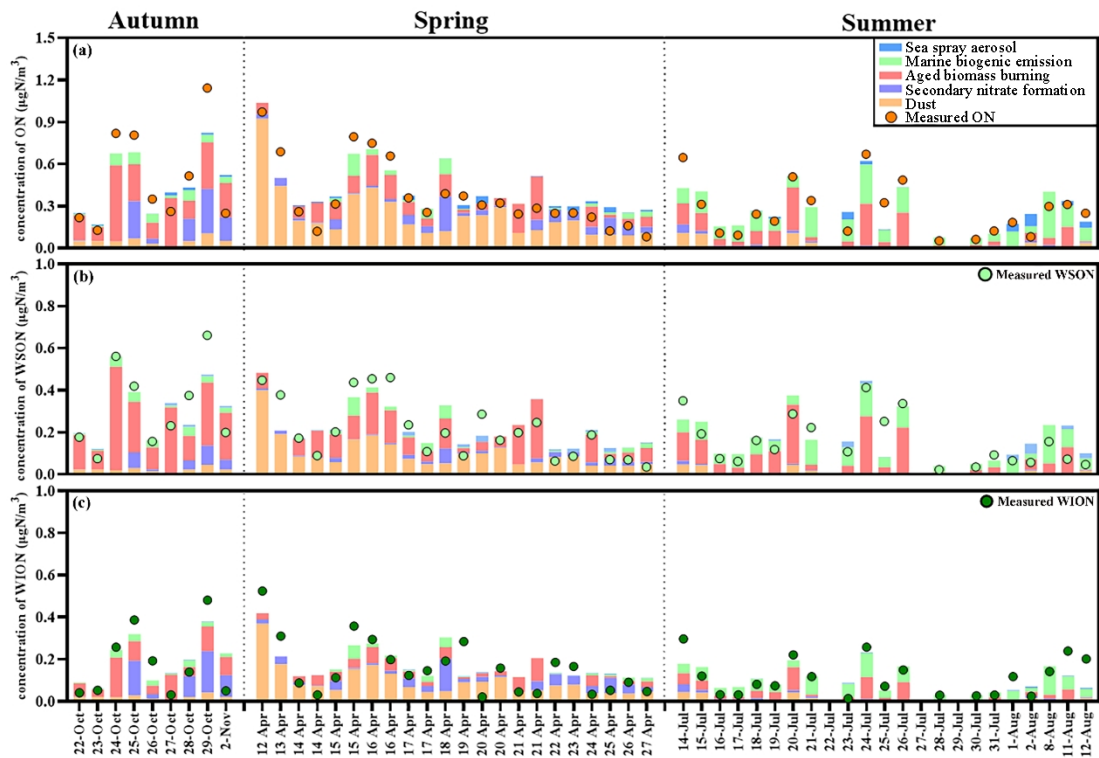


Figure S4 Source contributions of ON, WSON, and WION in marine aerosols over the YBS.

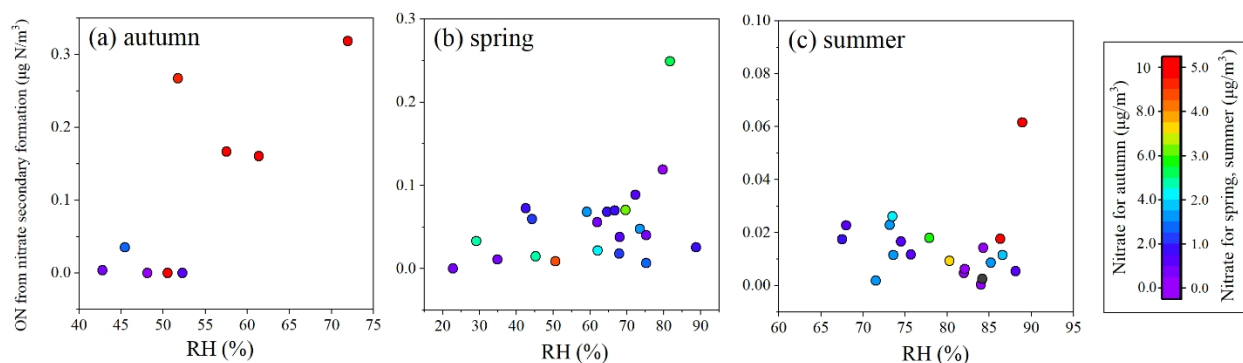


Figure S5 Variation of ON from nitrate secondary formation as a function of RH in each season. The markers are colored by nitrate concentrations. The spring and summer samples used the same color bar, and the autumn samples used a different one.

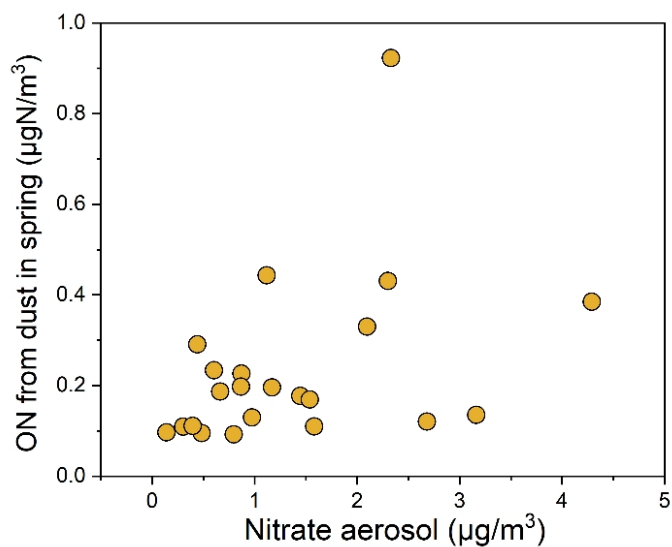


Figure S6 Variation of ON from dust as a function of nitrate aerosols during the spring cruise.