

## ***Interactive comment on “Impacts of shipping emissions on PM<sub>2.5</sub> air pollution in China” by Zhaofeng Lv et al.***

**Zhaofeng Lv et al.**

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### Response to Referee's Comments 1

1. In the topic: “PM2.5 air pollution” should be changed to “PM2.5 pollution”

Response: Thanks for the suggestion. The title was changed as recommended.

Revision in manuscript: (1) Page 1, Line 1: The title is revised as “Impacts of shipping emissions on PM2.5 pollution in China”.

2. In the section of “Abstract”: At the end of ABSTRACT, a sentence should be added to tell readers the significance of this work.

Response: Thanks for the suggestion. A sentence was added at the end of ABSTRACT

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STRUCT to illustrate the importance of this work.

Revision in manuscript: (1) Page 2, Line 6-8: “The results presented in this work implied that shipping emissions had significant influence on air quality in China, and to reduce its pollution, the current Domestic Emission Control Area (DECA) should be better expended at least 100 Nm to the coastline.”

3. In the INTRODUCTION section. Some reference about ship emission pollution in or haze formation should be added (i.g. in page 7 in line 15, Environ.Sci.Technol. 2017, 57, 202; Science of the Total Environment 2017, 578, 121;)

Response: Thanks for the suggestion. The references were added to introduce the severe haze pollution and air quality impacts induced by ships in China.

Revision in manuscript: (1) Page 2, Line 18-21: “In China, the severe haze pollution remains a significant concern because of its high frequency of occurrence, especially in megacities, where ships can contribute 20-30

4. The present manuscript need improve English writing entirely. For example: Page 7, line 10, “Results and discussions”; Page 9, line 10: “PM2.5 concentrations” should be changed to “PM2.5 concentration”; Page 9 line 20 “SO<sub>4</sub>” and “NO<sub>3</sub>” should be spelled correctly.

Response: Thanks for the suggestion. These English writing problems were revised in the paper.

Revision in manuscript: (1) Page 7, Line 18: “Result and discussions” (2) Page 9, Line 26: “The averaged increases of PM2.5 concentration” (3) Page 6, Line 2: “primary sulfate (PSO<sub>2</sub>- 4)” (4) Page 9, Line 21-23: “The shipping emissions caused not only the increase of PPM (element carbon (EC), primary organic aerosol (POA) and primary sulfate (PSO<sub>2</sub>- 4)), but also secondary PM (secondary sulfate (SO<sub>2</sub>- 4), nitrate (NO<sub>3</sub>- 3), ammonium ion (NH<sub>4</sub><sup>+</sup> 4) and SOA) formed from primary emitted precursors.” (5) Page 10, Line 7: “and the regional averaged contributions of SO<sub>2</sub>- 4, NO<sub>3</sub>- 3 and NH<sub>4</sub><sup>+</sup> 4”

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4 were 49.2(6) Page 10, Line 11: "the ratio of PSO2- 4/EC" (7) Page 10, Line 24: "the secondary NO- 3 formation"

Reference

Fu, H., and Chen, J.: Formation, features and controlling strategies of severe haze-fog pollutions in China, *Sci Total Environ*, 578, 121-138, 10.1016/j.scitotenv.2016.10.201, 2017. Liu, Z., Lu, X., Feng, J., Fan, Q., Zhang, Y., and Yang, X.: Influence of Ship Emissions on Urban Air Quality: A Comprehensive Study Using Highly Time-Resolved Online Measurements and Numerical Simulation in Shanghai, *Environ Sci Technol*, 51, 202-211, 10.1021/acs.est.6b03834, 2017.

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Please also note the supplement to this comment:

<https://www.atmos-chem-phys-discuss.net/acp-2018-540/acp-2018-540-AC1-supplement.pdf>

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2018-540>, 2018.