

Dear referee #1,

Thanks for your thoughtful comments and suggestion. We have taken account of the reviewer's suggestions and revised the manuscript carefully to meet all the reviewers' requirements. All the changes have been highlighted in the revised manuscript. My detailed responses, including a point-by-point response to the review's comments, are as follows:

General comments:

"This manuscript provides a precise and a valuable summary of the monthly aerosol optical properties and their vertical distributions in the Yangtze River Delta (YRD) region, and well analyzes the characteristics and meteorological conditions during the major transport periods in strengthening air pollution in YRD region. It is scientifically written, sound, original and well-structured. I recommend to accept it after minor revision as indicated below:"

Response: Thank you for the positive comments on our manuscript.

Specific comments:

1. "Line 96, 'these' can be deleted."

Response: It has been changed in the manuscript at Line100, P4 as" in conjunction with direct sun AOD data collected at same wavelengths".

2. "Line 113, please pay attention to the usage of the preposition."

Response: The preposition has been changed at Line117, P5 as "The products of CALIPSO were used for this study, and these are available at the NASA Langley Research Center (<https://www-calipso.larc.nasa.gov/>)."

3. "Line 128, Please check the English grammar."

Response: It has been checked at Line132, P6 as "The software TrajStat (<http://www.meteothinker.com/products/trajstat.html>) (Ngan et al., 2015) was used."

4. "Line 255, Please check the English grammar."

Response: It has been checked at Line258-260, P12 as "Cluster-2 travels on the lowest and fastest stemming from north of Anhui province, accounts for 30.95%, and correlates with the PM_{2.5} concentration of 74.45 ± 30.17 µg/m³."

5. "Line 291, "and" can be deleted"

Response: It has been deleted in the manuscript at Line295, P13 "They are transported over long distances and their influence can be identified on regional even global scales."

6. "Line 408, Please check the English grammar."

Response: It has been checked at Line413, P18" While aerosols transported from the northern, southern or desert areas contribute much to the ambient atmospheric

pollution in the YRD region, a high concentration of aerosols with diverse properties are also emitted locally.”

7. “Line 426, Please modify ‘the heights of 3 and 5 km’”.

Response: It has been modified at Line431, P19 as “Furthermore, another layer identified as “dust” exists between the heights of 3-5 km”.

Dear referee #2,

Thanks for your thoughtful comments and suggestion. We have taken account of the reviewer's suggestions and revised the manuscript carefully to meet all the reviewers' requirements. All the changes have been highlighted in the revised manuscript. My detailed responses, including a point-by-point response to the review's comments, are as follows:

General comments:

"The authors present a notable effort in investigating aerosol optical properties associated with typical haze events in the Yangtze River Delta, with distinct atmospheric environment from northern China garnered lots of attention. Compared with the few previous studies, this work gives a comprehensive insight in this wet and rainy region, and revealed the special role of regional transport, which can be an important reference to the community. Besides, some minor revisions are needed before publication."

Response: We appreciate the referee for the valuable and constructive reviews of our manuscript.

Specific comments:

1. "The specific scope of the Yangtze River Delta in Figure 1 left needs to be confirmed, and better give region of the Yangtze River Delta in the right."

Response: Figure 1 has been modified in the manuscript (L724, P28) and uploaded.

2. "For the daily MODIS aerosol data, the Level 2 MODIS AOD at 10 km resolution can better show potential sources around the YRD."

Response: Thanks for the valuable comment. We have altered the archive data of the Level 3 MODIS AOD to the Level 2 to better illustrate the AOD distribution over YRD region. And the Figure S2 in the supplement has also been modified and uploaded.

3. "It's difficult to quantify aerosol-PBL interactions directly from observations. To be rigorous, exact descriptions are suggested based on the current results and corresponding references such as: Tang et al., Mixing layer height and its implications for air pollution over Beijing, China, Atmos. Chem. Phys., 16, 2459-2475, doi:10.5194/acp-16-2459-2016, 2016."

Response: Thanks for your thoughtful suggestion. We have carefully referred the corresponding references and cited them in the revised manuscript at Line43-45, P2 as "Based on Tang et al. (2016)'s research, the atmospheric mixing layer provide useful empirical information for improving meteorological and atmospheric chemistry models and the forecasting and warning of air pollution."