

Earth Syst. Dynam. Discuss., referee comment RC1  
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## Comment on esd-2022-9

Anonymous Referee #1

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Referee comment on "Complex network analysis of fine particulate matter (PM<sub>2.5</sub>): transport and clustering" by Na Ying et al., Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2022-9-RC1>, 2022

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The manuscript investigates the transport of PM<sub>2.5</sub> concentrations and the potential clustering of 336 cities in China over a 5-year period based on a complex network approach. Their results indicate that the probability density functions of the degrees, weighted degrees, and the lengths of links follow the power-law decay. In addition, the distributions of high-weighted degrees are aligned with high PM<sub>2.5</sub> concentrations. This implies that high pollution in cities is not only caused by local emissions but also associated with transportation from other cities. They suggest that the Beijing-Tianjin-Hebei-Henan-Shandong (BTHHS) cluster is a key region to control pollution levels in China since this area exports most of the PM<sub>2.5</sub> pollution to other cities. Thus, their discovery can help to identify the optimal collection of cities to take the same measures to control air pollution. Overall, the manuscript is interesting and useful for the implementation of air pollution control measures in China. The paper is well written and is publishable after they address the following comments:

- Section 2, Line 75. Please mention the time resolution of the PM<sub>2.5</sub> concentrations. Are they hourly or daily?
- Is the word "for rea" in line 145 of the caption in Figure 2 a spelling mistake? Please check the text carefully for similar errors.
- On-Page 7, line 170, "The average path length is 4.61 and 3.15 for the original and shuffled network, indicating that cities transport the PM<sub>2.5</sub> concentrations to other cities crossed almost three other cities. PM<sub>2.5</sub> cities have a higher clustering coefficient and lower average path length, compared with the shuffled network", but the average path length of the original network is 4.61, which is greater than 3.15 of the shuffled network, which is contrary to the description in the text. Please check carefully.
- Page 7 Lines 175, Is the word "short distances (<1000 km) a mistake " Please check it
- The part before Section 3.2 on Page 8 refers to the pictures in the wrong order, e.g. Figure 6 in line 190 should actually be Figure 5. Figure 7 in line 200 should be Figure 6. Please check the text carefully.
- The title of Figure 6 is wrong, please check the typo in the full text carefully.
- The Figures in the manuscript are not clear. Please provide a clear version.

- Please explain the connections and differences between others and this research in the Summary and discussion. And I also suggest elaborating on the limitations of the study in the summary and discussion.
- There are many grammatical mistakes in the article, so it is recommended to modify them carefully. Please see my more specific comments on the marked manuscript (attached with the comment file).

Please also note the supplement to this comment:

<https://esd.copernicus.org/preprints/esd-2022-9/esd-2022-9-RC1-supplement.pdf>