

## Comment on acp-2021-957

Anonymous Referee #2

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Referee comment on "Dramatic changes in atmospheric pollution source contributions for a coastal megacity in northern China from 2011 to 2020" by Baoshuang Liu et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-957-RC1>, 2022

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The manuscript applied a machine learning-based meteorological normalization approach to decouple the meteorological effects from air quality trend in a coastal city in northern China, and further assessed the changes in the contributions of pollution sources in Qingdao in the past ten years. There are some minor issues need to be solved.

1. In the last paragraph of the introduction, if any, it is suggested to add some evaluation articles on the changes in air quality and the effectiveness of control measures before and after major events held in Qingdao (e.g., the 2018 the Shanghai Cooperation Organization summit in Qingdao). Clarify the differences with this paper to support the particularity of this study.
2. In the sampling and analysis section (L144-145), what is the basis for collecting 22 hours a day? Why not 24 hours?
3. Have the sample data of 2011-2012, 2016, and 2019 been carried out for source analysis, respectively? Please clarify. In addition, the data of all sites were chronologically ordered end to end for each PMF analysis? PMF is usually used for source analysis based on the long-time data of one site. Please explain the rationality.
4. In the process of PMF calculation, the author analyzed DISP and BS (Fig. S9-11, Table S14), but the author did not mention it in the introduction of PMF method. Please add.
5. In recent years, scholars have studied the change of air quality in many cities around the world (such as Beijing), many of which use random forest and other methods. In section 3.11, it is suggested to add the content of comparative analysis with other cities.
6. L401-404 "The observed and normalized concentrations of PM<sub>2.5</sub> during the whole study period were 93 and 83  $\mu\text{g m}^{-3}$ , suggesting that unfavorable meteorological conditions generated approximately 10  $\mu\text{g m}^{-3}$  of growth of PM<sub>2.5</sub>", can the difference of simple subtraction represent the influence value of meteorology? Is there any basis?
7. L542-581, this paper analyzed the changes in source contributions in the winter heating periods in Qingdao from 2011-2012, 2016, and 2019. The author should clarify the reasons and necessity of this analysis.