General comments: This manuscript attempts to evaluated the effects of "2+26" regional integrative strategy on air quality improvement in China, by comparing of variation of PM2.5 concentrations and source contribution in Beijing during four pollution episodes. The study uses airborne pollutants modeled by the WRF-CAMx model and the observed PM2.5 to understand how "2+26" strategy can affect the PM2.5 reduction during the pollution episodes. The topic is interested ones because the impact of emission-reduction on air quality has been still unclarified, and the results was very helpful to control the air pollution in cities. However, the authors have not made best use of the model results. The model can provide information on meteorological condition, emission and regional distribution of pollutants. These information should be supplemented and analyzed to know the influence of meteorological condition on the implementation of "2+26" strategy. There needs to be significant improvement in results interpretation and more analysis needs to be done to know the control factors of variation of PM2.5 and SNA. I would thus recommend a major revision to improve this manuscript.

Specific comments:

Q1. In Discussion Session, the authors stated the influence of meteorological factors on PM2.5 concentration and explained the different effects of "2+26" strategy on PM2.5 reduction for different pollution episodes. Using WRF-CAMx model, author can obtain the detailed meteorological field. However, only average RH and wind speed for four pollution episodes was shown in Table 2. Then how authors determine the airborne pollutants in Beijing was transported from neighboring areas during pollution episodes? There is also no meteorological data under unpolluted weathers (AQI < 50), how can we know the meteorological difference between pollution and clean days? I can't follow "a high-humidity condition" without comparison with a background value. In Line 438-444, the author pointed that "although unified emission-reduction measures were implemented in its neighboring areas, the significantly restricted regional transport did not fully project the effect of the "2+26" strategy to the local $PM_{2.5}$ concentrations in Beijing", so to what extent can meteorological condition affect the implementation of "2+26" strategy? And under what circumstances the meteorological condition will have important effect on implementation?

Q2. There is no detailed information of meteorological parameters and concentration of SO_2, NO_x, and NH_3 during four pollution episodes. However, the SNA formation is related with the precursor. I think the related information should be supplemented and analyzed before comparison of $PM_{2.5}$ reduction.

Q3. In Introduction Section, the authors explained the specific emission-reduction measures in detail. However, there is no emission data for airborne pollutants, such as SO_2, NO_x, NH_3, dust, etc., from 2013 to 2018. Whether the emission of all these precursor gas was really reduced greatly by implementing "2+26" strategy? I suggested that the authors analyze the emission variation in detail to evaluate the "2+26" strategy.

Q4. Section 2.2.2. Supplement the sampling duration, sample numbers and the membrane to collected $PM_{2.5}$. Was the sampling duration 15min for ions and 1 hour for OC/EC?

Q5. Revise the Section 2.3.1 to make the description of WRF-CAMx more concise

Q6. Section 2.3.1 In this manuscript, the authors simulated several episodes during 2013-2017.

During these years, emissions in China changed obviously due to lots of national strategies. Emission inventory is an important factor which would influence model results. So please clarify which years' emission inventories were used in this study? Did you consider "coal to gas" strategy in your emission inventory?

Q7. L207-209. The input and output of CMAx is in binary format. However, output from MCIP is in NETCDF format, please clarify how to use NETCDF meteorological data in CMAx?

Q8. Section 2.4 The authors explained that meteorological parameters contributed to the underprediction of simulated $PM_{2.5}$, could you give out some information about the model performance of meteorological parameters such as T, RH, WS, WD?

Q9. The author found that composition of $PM_{2.5}$ changed obviously due to the national strategies, therefore it is important to show the model performance of inorganic components in $PM_{2.5}$ such as SO_4^{2-}, NO_3^-, NH_4^+ but not only show the result of $PM_{2.5}$. If the model performance is satisfied, further analysis of PSAT would be reasonable, otherwise, results of PSAT would not be convincing.

Q10. Supplement the criteria or error index that can verify the satisfactory simulation for PSAT.

Q11. In Section 3.2, only the variation of ions in PM2.5 was discussed. Organic compounds are one of major components of $PM_{2.5}$. Since the OC/EC has be analyzed, I think the OC variation should be discussed here.

Q12. From Fig. 4b, very high concentration of NO_2^- was observed during the pollution episode in March, 2018. The value is very abnormal, almost two times higher than NO_3^-. In general, nitrite shows very low concentration in atmospheric aerosols and contributs little to water soluble inorganic ions. What's the reason for this abnormal value? I think the authors should check the data and discussed the reason.

Q13. L320-321. Which data can support the "The main source for NO_3^- is vehicle exhaust" in Beijing? How did you verified the vehicle exhaust was main sources of NO_3^- in Being just as the cited reference suggested in other cities? I think the source appointment of NO_3^- will be helpful to support your suggestion on vehicle exhaust in conclusion.

Q14. L320-321. As "The main source for NO_3^- is vehicle exhaust" and the vehicles that cannot meet the Environmental Levels I and II was forbidden during orange alerts, why the concentration of NO_3^- was much higher during orange alerts in Mar, 2018 than that in March, 2013 without emission-reduction (Table 4)? Increased NO_3^- corresponded to deceased concentration of NH_4^+ during pollution episodes, so what's possible existing form of NO_3^- in $PM_{2.5}$?

Q15. L364-365. Please clarify what changes have been made to the air pollutants emission after "Coal to Gas".

Q16. L378-383. According to Fig.6, the local emission contributed 49.46% - 88.35% to PM2.5 during four pollution episode, indicating the local emission had a great effect on $PM_{2.5}$ in Beijing. This is contradicting L92-93. And the different emission-reduction strategies did not lead to a clear pattern for the regional transport. So the $PM_{2.5}$ reduction really was a result of "2+26" strategies or the meteorological condition? Whether the strict regulation on vehicle exhaust will be more effective than that of regional emission control under specific wind direction? The meteorological condition should be analyzed in detail for each pollution episode.

Q17. Overall, some of the conclusions on page 20 appear to be speculation with little data or discussion to support it, such as L494-495. Analysis and discussion on regional distribution of $PM_{2.5}$ needs to be supplemented.

Technical corrections:

L139. Supplement the link of website PM25.in. It's difficult to follow.

L164. Change "、" to ",".

L183. Change "*" to "×".

P12. Fig.4, change "NO^{2-}" to "NO_2^-"