General comments: This manuscript quantified the relative contribution of meteorological conditions and emission control to the decrease of PM2.5 concentrations in Beijing using models. The results suggested that emission control was crucial for the air quality in Beijing, with a contribution of 80% to the decrease in PM2.5 concentrations using KZ filtering and WRF-CMAQ model. The topic is very interesting because the relative importance of influencing factors on air pollutants has been still unclarified. The method and result is helpful to understand the main influencing factors of air pollution and develop effective measures for pollution control and prevention in cities. I would thus recommend this manuscript to be published in ACP after improvement.

Specific comments:

Q1. L89-92. It is difficult to follow this sentence. Since DingLing Station and the MiYun Station as two background stations, what's purpose of choosing the Qianmen station and the Yufa Station? And the Yufa station can't be found in Fig.1.

Q2. L108. As far as I know, MECI emission inventory is only for 2012, 2014 and 2016, However in this paper, emission inventory in 2013 and 2017 were used. Please clarify more clearly.

Q3. L116. Which years' local environmental statistical data and reported emission data were used? From 2013 to 2017? Please clarify it. Did you compare the emission data of this Beijing local-emission inventory with others'? How about the difference? Since the emission is a basic for your research.

Q4. Section 3.1. Filtering is a key research method for this study, which decomposes the original signal into trend signal and seasonal signal and the disturbance. Although the contribution rate in Table 3 partially reflects the composition of the decomposition, a time series diagram is still necessary to show that the components are correct after filtering.

Q5. Section 3.2.2. Model evaluation is the key point in this paper. If the model data is not consistent with observation, contribution of emission control is out of the question. It seems that lots of data are far from the observation especially during the heavy air pollution days. So it is better to convert Fig 2 to time series plots, which can tell us more detailed information about the model evaluation.

Q6. Section 3.2.2. You verified the accuracy of the WRF-CMAQ model using the data of three stations. How about other urban stations? This does not mean that the figures of all stations should be supplemented, but it does require that extrapolation to difference between observed and WRF-CMAQ simulated PM2.5 concentrations.

Q7. L339. How did you get the conclusion "KZ filtering provides a more reliable method"? Just because the KZ filtering was station-based and WRF-CMAQ model was

a grid-based? The averaged relative contribution of meteorological variations to PM2.5 reduction using the WRF-CMAQ model was very similar to that using KZ filtering. Verification is very important for the model results. So what's the criteria for judging reliability of your model?

Q8. L398-399. Supplement the correlation coefficient between wind speed and PM2.5. And how about the influence of the other meteorological parameters (such as T, RH, wind direction) on PM2.5?

Q9. Contribution of local emission-reduction measures was discussed in this paper. Please describe the reduction amount of each pollutant (SO_2, NO_x, PM) from each measure (e.g. coal boilers, residential use, industrial restructuring). It is better to discuss the contribution of reduction of different pollutants, which could reflect the effect of primary emission and secondary formation.

Technical corrections:
L40. I suggest that authors change keyword "PM2.5 reduction" to "PM2.5".
L144. Supplement the time period for "a historical record".
L184. Supplement the link for "the website PM25.in".
P183. Check and revise the Formula (9).