Atmospheric
Chemistry
and Physics

Open Access

Discussions

EGU

Interactive comment on "Evident PM$_{2.5}$ Drops in the East of China due to the COVID-19 Quarantines in February" *by* Zhicong Yin et al.

Anonymous Referee #2

Received and published: 30 September 2020

General comments: This paper attempted to quantify the effect COVID-19 on the evident PM2.5 decline after removing the influences of climate anomalies and expected routine emissions reductions. Combined with GEOS-Chem model experiments, they used both high and low emission scenarios to simulated the percentages of PM2.5 changes due to meteorological conditions which tended to increase PM2.5 in February 2020, particular in North China. And they further extrapolated the PM2.5 change due to expected routine emission reductions to isolate the decline in PM2.5 concentration due to COVID-19 quarantines in the East of China quantitatively. This study presents some interesting results and could help us better understand the response of air quality to the COVID-19. However, I think the author needs to add some more detailed and rigorous exposition to present their results. Before it can be publishable, I would like the authors

to address my following comments. Major comments Line 65-75 This section requires a more detailed description of the model evaluation. At the end of this section, the author just showed the model could capture the change of meteorological conditions, with high similarly between simulated and observed PM2.5 data. But it is essential that the performance of this model could reproduced the observed true value of PM2.5 concentration. Please evaluate against observation. Line 93 The difference of PM2.5 was linearly decomposed into three parts. I think this is a reasonable approximation, but the author should give more explanation on the rationality of such decomposition. Line 98-99 Please give a detailed calculation method of calculating the percentages of PM2.5 changes due to meteorological conditions. Line 110 The author performed linear extrapolation to obtain PMdR in 2020. The reason to use linear extrapolation here is that the emission reduction caused by the policy is linear, or that the PM2.5 decline caused by emission reduction is approximate linear based on the calculated value of PMdR from 2015 to 2019? The calculated extrapolation results in 2020 are compared with others studies in the latter part of the paper, but please analyze the uncertainty of using this method itself. Line 145 The changes of circulation field, humidity and wind under stagnant weather are analyzed here. Could you give more details about the specific changes in the weather conditions under these stagnant days? Such as boundary layer height and wind speed? Line 167-170 The results of PMdC showed great differences in the north and south regions. What do you think is the cause of this regional difference? Can you give some explanation? Specific comments Line 98 Please explain "the ratio of PMdM of each year/PMdOBS in 2017" more clearly. Are you sure this is divided by "PMdOBS in 2017" here? Or by observed PM2.5 in 2017? Line 101 Keep the same one decimal place. Line 103 Please specify which value is multiplied by this percentage. Line 112 The citation format of this reference is incorrect. Line113 I think it makes more reasonable to write the abbreviation for Beijing-Tian-Hebei here instead of on line 132. Line 124 The abbreviations for North China here and line 122 are repeated. Line 195 Please write NOx here and line 68 in the same way. Figure 1a Clarify what the red and blue bars mean so that the reader can understand this

information. Figure 2 Please give the latitude and longitude range of NC, YRD and HB in the figure caption. Figure 3 The "due to" after each subheading is repeated, leaving out the last three. Figure 4 Add the units of climate elements in the caption (c) and (d). Figure 5 The y-coordinate name is inconsistent with the figure caption. Figure 6 Add the y-coordinate variable name and unit, just like Figure 5. Figure 7a Change the subtitle "PMd" to "PMdOBS" to maintain consistency of expression.

C3