

Interactive comment on “Dynamic Processes Dominating Ozone Variability in Warm Seasons of 2014–2018 over the Yangtze River Delta Region, China” by Da Gao et al.

Anonymous Referee #2

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This paper discussed the meteorological influence on the increase in ozone concentration in the YRD china. Abundant analysis methods were used to try to figure out the reason to the increase in the ozone concentration. The results are some helpful to ozone pollution control and prediction. I have some comments in the following to improve this paper.

General comments: You attributed the effect of low RH on the increase in the ozone concentration to the strong solar radiation and high temperature in all kinds of SWPs. However, why does RH show a significant correlation with ozone concentration instead of the more direct meteorological factors temperature and radiation? Moreover, as you

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said, the lack of clouds contribute much to the high concentration of ozone. Why not analyze the impact of cloud property (such as cloud fraction, cloud thickness, cloud height, cloud liquid content) in the meteorological dataset? Cloud is the direct impact factor probably. Through the results and discussion section, they are almost qualitative description. Additional quantitative analysis and discussion are needed to make your conclusion more significant and scientific. The discussions in S3.3.2 about the impacts of SWP on ozone concentration are too similar for five SWPs. They all results in the downward motion, high temperature, strong radiation. I suggest to pay more attention to the difference in the impact among SWPs.

Line 115: How many sites in total in 26 cities were used in your research? Or you used the mean concentration for each city? Line 125: How many missing data in your dataset? Can you evaluate the influence of these missing data on your conclusion? Line 130: Please list the number of coefficients you used in this function. Line 244: I suggest to use all data instead of monthly mean over 26 cities to do linear fitting because some extreme high concentration in several cities may change the fitting results. Please show the fitting function and correlation coefficient. Line 272: How did you define the coefficient of meteorological factors like WPSH, EASM? How did you calculate the correlation between meteorological factors and ozone concentration? Fig3: The abbreviations are different in the figure and captions. Line 352: Here you said “SWP1 is affected by the southeasterly flow...”, while “Southwesterly flow” for SWP1 in the Table 1. Section 3.3.1: It is better to show these six SWPs in figure addition to the Table 1, at least in the supplementary. Table 1: What do the meteorological factors mean? Regional average during all warm seasons? Line 379: How did you analyze the daily variation? What is the influence on the result? Line 384: How can you get the conclusion that frequency change has less impact than the intensity change? Please add quantitative evaluation. Line 393: Please describe the difference in WPSH using some representative index like WPSH index, ridge position, instead of the puzzled word “wider”. Line 399: If the downward airmass comes from ocean with abundant water vapor, although the cloud is hard to form, the RH on the surface possibly increases.

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How can you explain the negative correlation between surface RH and ozone concentration? same question for the explanation of other SWPs. Line 511: I don't think it is obvious that frequency changes have an impact. It looks that the contribution from frequency changes is comparable to that from intense changes according to Fig9. Could you give more explanation or evidence? Line 517: What are pattern V? Line 517: What is the definition of "SWP11"? How did you calculate it? It is better to show the number for each SWP. Line 551: I did not find much quantitative analysis in your discussion, but it should be needed.

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