

## ***Interactive comment on “Impact of Western Pacific Subtropical High on Ozone Pollution over Eastern China” by Zhongjing Jiang et al.***

**Anonymous Referee #3**

Received and published: 8 January 2021

This paper is studying the impact of Western Pacific Subtropical High (WPSH), a major synoptic system bringing specific meteorological conditions, on ozone over Eastern China in the summer months. It shows that when this system is strong, Northern China is seeing higher ozone compare to normal WPSH conditions. When the system is weak, Southern China is seeing higher ozone compare to normal WPSH conditions. Using the CTM GEOS-Chem, the authors show that chemistry (net chemical production = reaction rate and amount of ozone precursors) has a decisive role for ozone changes with respect to WPSH conditions. Natural emissions of precursors from biogenic and soil sources which are impacted by the temperature modulated by WPSH shows a non-negligible role to ozone changes.

The paper is investigating in more details the role of WPSH on ozone variability, com-

C1

plementing the work of Zhao and Wang 2017, using the CTM GEOS-Chem, which is very much appreciated. The manuscript is well written and the figures well displayed. I am in favor of its publication after taking into account the following minor remarks.

Abstract:

L 19-20: The sentence implies that meteorological conditions is the main factor that controls ozone production when it is only one of several factors (emissions of ozone precursors, amount of ozone precursors, amount of other species such as PM2.5, chemical regimes, etc...). The authors mention it at the end of the abstract but it should be clear right in the beginning of the paragraph.

Introduction:

L. 48: The authors should add the following publications Mills et al. (2018) and Fleming and Doherty et al. (2018) from the Tropospheric Ozone Assessment Report (TOAR):

Tropospheric Ozone Assessment Report: Present-day tropospheric ozone distribution and trends relevant to vegetation. Mills G, Pleijel H, Malley CS, Sinha B, Cooper OR, Schultz MG, Neufeld HS, Simpson D, Sharps K, Feng Z, Gerosa G, Harmens H, Kobayashi K, Saxena P, Paoletti E, Sinha V, Xu X,. Elem Sci Anth. 2018;6(1):47. DOI: 10.1525/elementa.302.

Tropospheric Ozone Assessment Report: Present-day ozone distribution and trends relevant to human health. Fleming, Z.L., Doherty, R.M., von Schneidmesser, E., Malley, C.S., Cooper, O.R., Pinto, J.P., Colette, A., Xu, X., Simpson, D., Schultz, M.G., Lefohn, A.S., Hamad, S., Moolla, R., Solberg, S. and Feng, Z., 2018. Elem Sci Anth, 6(1), p.12. DOI: 10.1525/elementa.73.

Data and methods:

L. 141: The authors should further explain and detail the composite analysis.

Results:

C2

L.212: Typo, change “,” to ”.”

L.218: As already mentioned, the composite analysis should be further explained and detailed in the method section.

L. 263: The authors should clarify their interpretation of ozone enrichment and dilution from the wind anomalies (strong versus normal or weak versus normal WPSH).

L. 281: Does 0.57 translate a reliable model performance? It seems rather modest. The authors should give a range of reliable models and their performance in terms of correlation coefficients. That would guide readers who are not experts in model performances. Could the authors add the (normalized) mean bias as well? This more exhaustive evaluation for summer months would nicely complement the work on spring months in Ni et al. (ACP 2018) cited by the authors.

Ni, R., Lin, J., Yan, Y., and Lin, W.: Foreign and domestic contributions to springtime ozone over China, *Atmos. Chem. Phys.*, 18, 11447–11469, <https://doi.org/10.5194/acp-18-11447-2018>, 2018.

L. 310: How do the authors conclude about dilution and accumulation of ozone based on maps of wind anomalies only? This statement deserves more details and/or references.

L.315: Did the authors mean "free troposphere"?

L. 356: Add "(see Section 3.3)" as it seems to refer to the findings above.

---

Interactive comment on *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2020-646>, 2020.