

The manuscript by Zhang et al. revealed the recent wetting inhibits growing near-surface ozone in remote Northwestern China, an arid and semi-arid region located in the hinterland of the Asian-European continent based on a series of modeling experiments. The study topics of the paper is interesting, and it gives our understanding of variation of near-surface ozone under the background of regional climate change. However, the explanation of the physical and chemical processes in the simulated ozone change should be clarified. More in-depth and detailed analyses are needed to support the conclusion with major revisions:

1. Generally, Ozone variations depend both local photochemical production and regional transport. Climatologically, the contribution of foreign ozone (ozone produced outside China's troposphere) in the surface layer distributes as a “western high and eastern low” pattern over China with a large portion of near-surface ozone over Northwestern China with a large portion of near-surface ozone over Northwestern China (Li et al., 2014; Li et al., 2016). The ozone variation over Northwestern China should consider the contribution of foreign ozone.

References

Li, X., Liu, J., Mauzerall, D.L., Emmons, L.K., Walters, S., Horowitz, L.W., Tao, S., 2014. Effects of trans-Eurasian transport of air pollutants on surface ozone concentrations over WesternChina. *J. Geophys. Res. Atmos.* 119 (21), 12338–12354.

Li, J., Yang, W., Wang, Z., Chen, H., Hu, B., Li, J., Sun, Y., Fu, P., Zhang, Y., 2016. Modeling study of surface ozone source receptor relationships in East Asia. *Atmos. Res.* 167, 77–88.

2. By employing the regional air quality model WRF-Chem, the recent-summer (1998-2017) ozone variations over Northwestern China were simulated. The model simulations with a nudging option in WRF were conducted from June 1st to August 31st in each summer from 1998 to 2017. Are the boundary conditions of meteorology only prescribed in the WRF model without considering the boundary conditions of chemistry in the simulation experiments? the foreign ozone contribution to the region of Northwestern China could not be simulated from 1998 to 2017. Please add a Figure of the WRF-Chem modeling domain.
3. The variations of ozone including daytime ozone formation and nighttime ozone

titration. It is only observed during daytime that surface air temperature facilitates the formation of ozone, and relative humidity inhibits ozone generation on the troposphere. Please investigate the variations of daytime ozone over Northwestern China from 1998 to 2017.

4. Both Sections 1 Introduction and 4 conclusions are too simple. Please add the reviews on the regional ozone variations over recent years in Northwestern China and the discussions on the uncertainty of this modeling study.