

This study explores the local and synoptic meteorological influences on summertime ozone variability in eastern China. The authors have used two different approaches, including MLR and SOM, and their MLR method includes the effects of synoptic patterns. In general, I think this manuscript is well structured and the topic is suitable for ACP. The presentation quality is also very high. So I recommend publication in ACP after fixing only a few minor issues.

Minor comments.

L123. Please specify the value of d_{\max} used in this study?

L283. It is worthwhile to mention the trends of anthropogenic emissions during this period. During the period of 2013-2017, the NO_x emissions have declined (Zheng et al., 2018) and the VOC emissions almost remain constant (Zheng et al., 2018; Shen et al., 2019).

Line 299. The correlation of temperature with ozone is higher in the north than in the south. I guess this is because the temperature gradient along the latitude is much larger in the north than in the south. So the synoptic activities (or jet wind) in the north can be well represented by temperature. But in the south, the marine flux into the continent won't result much changes in temperature but will definitely elevate the relative humidity. As a result, relative humidity displays much stronger correlation with ozone in the south. However, I never found any paper that discusses about the reason of this distinct north-south feature. Maybe the author can simply say like this.

The correlation of temperature with ozone is higher in the north than in the south over eastern China (Figure 2c), which is consistent with the pattern found in the US (Camalier et al., 2007; Shen et al., 2016).

Line 305. Relative humidity can also be a strong indicator of transport in the southern China. So I won't use the words "mainly" here.

Figure 5. I would strongly recommend using the leave-one-out cross validation to avoid overfitting if the authors haven't done this.

Figure 6. I don't know if there is a way to separate the effects of local meteorology and synoptic patterns. They are so closely related. I would suggest deleting this figure and also the text related.

Zheng, B., et al.: Trends in China's anthropogenic emissions since 2010 as the consequence of clean air actions, *Atmos. Chem. Phys.*, 18, 14095–14111, <https://doi.org/10.5194/acp-18-14095-2018>, 2018.

Shen, L., L. J. Mickley and E. Gilleland, Impact of increasing heatwaves on U.S. ozone episodes in the 2050s: Results from a multi-model analysis using extreme value theory, *Geophys. Res. Lett.*, 43, doi:10.1002/2016GL068432, 2016.

Camalier, L., Cox, W., and Dolwick, P.: The effects of meteorology on ozone in urban areas and their use in assessing ozone trends, *Atmos. Environ.*, 41, 7127-7137, <https://doi.org/10.1016/j.atmosenv.2007.04.061>, 2007.

Shen, L., et al., 2005-2016 trends of formaldehyde columns over China observed by satellites: increasing anthropogenic emissions of volatile organic compounds and decreasing agricultural fire emissions, *Geophys. Res. Lett.*, 46, 4468-4475, 2019