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Comment on acp-2021-249

Anonymous Referee #3

Referee comment on "Distinct evolutions of haze pollution from winter to the following spring over the North China Plain: role of the North Atlantic sea surface temperature anomalies" by Linye Song et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-249-RC2>, 2021

The authors linked the evolution of winter-spring haze pollution in the North China Plain to the SST anomalies over the North Atlantic sector. They demonstrated this linkage through composition analysis and a simple barotropic model. Seasonal prediction of air pollution is of great importance for the sake of public health. I think this manuscript's scope fits the ACP journal.

While the conclusion of this manuscript seems reasonable, I am not convinced about the scientific novelty of this study. Moreover, the authors have reported the role of North Atlantic SST in spring haze by Chen et al. (2019).

Specifically, it is a good idea to focus on the seasonal evolution of haze pollution. But I didn't find the relationship between winter haze pollution and spring haze pollution, and Figure 7 shows that leading meteorological factors driving haze pollution are identical in both persist and reverse winters. As such, I think the finding in this study is only about what drivers spring haze. Consequently, the main conclusions in this study are very similar with the previous one (Chen et al., 2019).

Statistically, the correlation coefficient between the winter and spring haze over 1980–2011 is only 0.30 (at the 90% confidence level), with a total of 11 (9) years for the in-phase (out-of-phase). This indicates that winter and spring haze pollution are not well connected.

I am sorry that I can't be more positive at this time. I encourage the authors to do further analysis if they believe this seasonal linkage.

Chen, S., Guo, J., Song, L., Li, J., Liu, L., and Cohen, J.: Interannual variation of the spring haze pollution over the North China Plain: Roles of atmospheric circulation and sea surface temperature, *Int. J. Climatol.*, 39, 783-798, 2019.