

Atmos. Chem. Phys. Discuss., referee comment RC3
<https://doi.org/10.5194/acp-2021-359-RC3>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.



Comment on acp-2021-359

Anonymous Referee #3

Referee comment on "Measurement report: Fast photochemical production of peroxyacetyl nitrate (PAN) over the rural North China Plain during haze events in autumn" by Yulu Qiu et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-359-RC3>, 2021

General comments:

This paper explored enhancements in PAN over the North China Plain at the Shangdianzi (SDZ) site for two October days. After meteorological analysis, the authors determined that direct PAN transport was impossible given the timing of prevailing southerlies and used CO as a tracer to confirm. Local enhancements in photochemistry were determined to be the source of enhanced PAN. Authors used observations of various precursor species to calculate respective contributions and found that oxidation of acetaldehyde by the hydroxyl radical was the main pathway for PAN formation at the SDZ site.

I recommend this paper for publication given the following minor edits:

Specific comments:

- The title suggests generalizability to all cold-season haze events, though 3 October days were examined. Additional observation/analysis is necessary in order to determine generalizability to all cold-season pollution events with PAN enhancements. Revision to the wording of the title is suggested.
- The authors concluded that conditions were anomalously warm and wet for days of study, though title suggests "cold-season". As a reader, I question whether results are generalizable to "cold-season" days when anomalously warm and wet conditions are not present.
- Figure 3b -- it is unclear as to what "clean days" refers to.
- Improvements in grammar and language are suggested.

Technical comments:

- Line 116 - listed chemical species naming is not consistent with respect to chemical formula and English name use.
- Line 185 - lack of consistency in naming wind directions. "Southwesterly" should be used rather than "Northwestern". "Southwesterly" should be followed by "winds" to be complete (i.e. Southwesterly winds)
- Line 186 - sentence reads "...the SDZ site was **in** the south of a strong" should read "...the SDZ was **to** the south of a strong.."
- Line 187 - sentence reads "The southwesterly on 10/25 was caused by a weak high-pressure system with anticyclone in the southeast" should read "the southwesterly **winds** on 10/25 **were** caused by a weak high-pressure system with **an** anticyclone in the southeast."
- Line 195 - "meridian" should be "meridional"
- Line 217 - Wind direction naming consistency -- "southern wind" should be changed to "northerly wind" if this is what is meant.
- Lines 240-245 are not interpretable by the reader because the meaning of (Chem + Phys), (Chem), (Phys), were not clearly defined.
- Line 335 - "while our results **was** based on" should be "while our results **were** based on"
- Line 358, 395 - wind direction naming consistency needed.