

We thank for the constructive comments and suggestions. We revised our manuscript according to the comments and suggestions. The changes in the revised manuscript are yellow-highlighted. The following are our responses to the comments.

Comments to the author:

Thank you for the responses to the reviewer's comments, which are sufficient to accept this paper for publication. Please consider the attached technical corrections (English language) in the corrected text on lines 147-157 prior to final publication.

Response: Thanks for your kind suggestions. We have also noticed the drawback of this technique, but have to accept what has been available at the site. A favorable NO₂ measurement technique based on cavity ring-down principle could be applied in the future. We discuss the possible interference in the revised paper. See page 5, line 147.

“It should be mentioned that the measurement of NO₂ was via conversion to NO by a molybdenum NO₂-to-NO converter heated to about 325 °C, which was known to suffer from the interference of other NO_y compounds such as PAN and HNO₃ (Steinbacher et al., 2007; Jung et al., 2017). This implies that the measured NO₂ mixing ratios were higher than actual values. However, it is impossible to quantify the overestimated parts due to the lack of other information. The interference might be enhanced with the increasing ratios of PAN to NO_x (PAN/NO_x). Qiu et al. (2020) reported an increasing PAN/NO_x from 2011 to 2018 at a background site in the North China Plain, but it is not clear if there was a similar increase in PAN/NO_x in the YRD. During the transport of air masses to the background site, HNO₃ should be reduced by deposition or partitioning in the particulate phase and intercepted by filters before NO_x was measured. Since NO_z (NO_y-NO_x) was produced by NO_x oxidation, the overestimation of NO_x by partial conversion of NO_z, in turn, might be a positive offset in the difference between the measured mixing ratios and the emission of NO_x when discussing their long-term trends.”