

Interactive comment on “Interferences of commercial NO₂ instruments in the urban atmosphere and in a smog chamber” by G. Villena et al.

Anonymous Referee #2

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Authors describe both positive and negative interferences of commercial NO₂ instrument in highly polluted conditions (tunnels and smog chambers). The first section of the manuscript dealing with the problems with chemiluminescence instruments with molybdenum NO₂ converters does not represent a new contribution to scientific progress. Problems with molybdenum converters have been known for over 40 years. Similarly, the detailed discussions of problems with Luminol NO₂ instrument is equally irrelevant as this technique has not been used by atmospheric scientists for many years given the numerous well understood interferences with this NO₂ measurement technique.

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The only "new" results presented in the manuscript relate to the performance of the 3 instruments: NO₂-LOPAP, chemiluminescence-blue light converter (CL-BLC), and FTIR in a smog chamber. Specifically, the new finding is an interesting hypothesis on why a single channel NO/NO_x CL-BLC would under predict calculated NO₂ in highly to extremely polluted conditions. These conditions require high the photolysis of glyoxal leading to the production of HO₂ and OH, which can directly (or indirectly via OH reactions with alkanes and alkenes) convert NO to NO₂ in the BLC chamber.

While this is an interesting phenomenon, I disagree with the authors that this potential artifact has any significant importance in the "real" world outside of tunnels and smog chambers. Atmospheric measurements with CL-BLC and one of the selective spectroscopic techniques (DOAS, LIF, CRDS, etc) showing real-world importance of this HO₂/RO₂ NO₂ artifact would be a substantial scientific finding. Without having to resort to a new study, I agree with reviewer #1 that box model calculations of this NO₂ artifact using real-world levels (from published rural and urban studies) of NO, NO₂, O₃, glyoxal, alkanes, alkenes, etc would help prove the potential significance of this artifact.

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