

We appreciate reviewer two polite and insightful comments. The specific issues are responded two below, number accordingly. We have addressed the ambient conditions concern by discussing sensitivity to exchange and running simulations at ambient conditions. This did not change the predication of the NO_x-O₃ equilibrium value, but did reduce the timescale to equilibrium as we had hypothesized it would in our original draft. This is further discussed in the final discussion section and in our response to Wiegel and Savarino.

1. Yes steady state can be reached, typically within less than 1 hour but can be as high as 9 hours as discussed in the last section of the manuscript with specific examples. We have amended the abstract accordingly. In the NO_x-O₃ only equilibrium the NO_x = asymmetric O₃ $\Delta^{17}\text{O}$ values as added to the discussion section.
2. NO_x is the driver of tropospheric chemistry in general, even in the absence of pollution, which we take to mean anthropogenically elevated NO_x, O₃, and VOC's. We feel the more general term is applicable
3. This has been corrected
4. This has been discussed in new section on exchange sensitivity
5. Based on comments by Wiegel and this reviewer we revisited this assumption by modeling the reactions for 2 hours after the light was extinguished. As detailed in the other response the discussion of NO_x rather than NO₂ was amended throughout the text.
6. Based on modeling sensitivity we established this sink reaction (and exchange) became important above at mixing ratios (>1ppmv) and the text has been amended as such.
7. The steady state was confirmed by the models as discussed in text.
8. they emphasize different aspects (pressure or amount at fixed pressure) in different parts of the paper.
9. corrected
10. the 20ppmv is the least amount of gas (10 micromole) able to be run in dual inlet at high precision, without cryo-focusing.
11. see 12
12. We added several paragraphs testing the modeling sensitivity to the various exchange reaction, we discuss which are important under different conditions. This did not fundamentally change our initial conclusion.
13. We included equilibrium and KIE when known but assumed none where no data was available. Since the paper is fundamentally about $\Delta^{17}\text{O}$ ignoring KIA has no influence on the results discussed. In addition $\delta^{18}\text{O}$ effect in ozone is substantially higher than typical exchange and kie.
14. Discussion of the j coefficient has been added to the text and commented in the reply to Wiegel. The j coefficient has not impact on the final $\Delta^{17}\text{O}$ but does on the timescale to equilibrium shown by both the model and the results. new discussion added.
15. Channel symmetry accounts for statistical probability of a reaction based on orientation as shown in reaction scheme table. for example every Q + ONO exchange leads to a QNO where as only 1/2 of the collisions between O + QNO lead to ONO
16. Mentioned simply for completeness, we are not discussing N isotope fractionation.

17. O_3/NO is generally 10 to 100 in natural atmosphere. We have rerun the simulations under natural conditions and discussed in detail in the final section. The simulations show that O_3 - NO_x equilibrium values are roughly the same under both conditions, but the timescale to equilibrium varies as discussed.
18. New simulation, called dark reactions, were added as discussed in the response to Wiegel.
19. This is discussed in the new exchange section.
20. We have revised the language stating that we are addressing two phenomena, NO_x - O_3 only equilibrium, which establishes a maximum $\Delta^{17}O$ value, and O equilibrium in NO_x which is a function of HO_2 oxidation and O_3 . The two values are not the same. Further details are in response to Savarino.
21. The do equal asymmetric $O_3 \sim 48\%$. Addd to the text.
22. These reflect random uncertainties in the experiment
23. The number of graphs has been reduced.