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Atmospheric Chemistry and Physics Discussions

Interactive comment on "An estimation of the ^{18}O / ^{16}O ratio of UT/LMS ozone based on artefact CO in air sampled during CARIBIC flights" *by* S. Gromov and C. A. M. Brenninkmeijer

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The authors have observed CO increase in the samples taken in UT/LMS and stored in stainless steel canisters. Elevated CO correlates with elevated ozone and also demonstrates an increase in d18O(CO). Based on that oxidation of hydrocarbons (possibly methane) by ozone in canisters, being catalysed by stainless steel is proposed as the most likely mechanism. Finally the authors discuses that elevated CO has (maybe indirectly) recorded d18O signals of ozone in UT/LMS. Notably, the authors write: ". . .the molecular lifetime (the period through which the species' isotope reservoir becomes entirely renewed, as opposed to the "bulk" lifetime) of O3 encountered along the C1

flight routes is estimated on the order of minutes to hours at daylight (H. Riede, MPI-C, 2010), thus the isotope composition of the photochemically regenerated O3 resets quickly according to the local conditions." Thus the d18O values observed reflect not the original signature of ozone from the stratosphere but the ozone being photochemically recycled in UT/LMS. This is very interesting scientific finding.

Given that, I would suggest giving some supporting references and/or more detailed info (or discussion) on the reactions involved. Second, can the authors speculate on the dependence of d18O signals of the recycled ozone on the local conditions in UT/LMS? How large variations could be expected? Third, is there any information on ozone reactions catalysed by stainless steel?

As a technical comment – I suggest to address the method of d18O(CO) measurements and how the d18O signal of CO is preserved. One can give a few lines supported by references.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 21037, 2014.