Corrigendum to Atmos. Chem. Phys., 17, 3785–3797, 2017
https://doi.org/10.5194/acp-17-3785-2017-corrigendum

Atmospheric Chemistry and Physics
Open Access
EGU

Corrigendum to "A new time-independent formulation of fractional release" published in Atmos. Chem. Phys., 17, 3785–3797, 2017

Jennifer Ostermöller[1], Harald Bönisch[2], Patrick Jöckel[3], and Andreas Engel[1]

[1]Institute for Atmospheric and Environmental Sciences, Goethe University Frankfurt, Frankfurt, Germany
[2]Institute of Meteorology and Climate Research, Karlsruhe Institute of Technology, Karlsruhe, Germany
[3]Deutsches Zentrum für Luft- und Raumfahrt (DLR), Institut für Physik der Atmosphäre, Oberpfaffenhofen, Germany

Correspondence to: Jennifer Ostermöller (ostermoeller@iau.uni-frankfurt.de)
and Andreas Engel (an.engel@iau.uni-frankfurt.de)

Published: 20 September 2017

In Ostermöller et al. (2017) we present a new formulation to derive fractional release factors (FRFs) for ozone-depleting substances, which provides a refined correction for the tropospheric trends. We have now noticed an error in the computation of the species-dependent mean arrival time Γ^*, which is needed to parameterize the arrival time distribution G^* in the new formulation for calculation of FRFs. The correction only concerns the plots shown in the right column of Fig. 4 (substances CF_2Cl_2 and CH_3CCl_3) from Ostermöller et al. (2017). By mistake, Γ^* was calculated too small for these compounds, which resulted in an overestimation of the FRF of CFC-12 (CF_2Cl_2) compared to the idealized tracer, which has no tropospheric trends. For methyl chloroform (CH_3CCl_3) we found an overestimation in times of positive tropospheric trends and an underestimation in times of negative tropospheric trends. We interpreted this result as an overly large correction between Γ and Γ^*. This conclusion was correct but the differences were caused by the wrong calculation of Γ^* for these two species. Applying our new method to the same data set with the corrected Γ^* according to the parameterization of Plumb et al. (1999) we now find an even better overall agreement between the FRF for the idealized tracers and the newly formulated FRF for the realistic tracers. We now find a slight underestimation in times of positive trends of mixing ratios, similar to the behaviour of CFC-11 ($CFCl_3$), which is, as well as N_2O, not concerned by the correction. In times of negative trends, the FRF of methyl chloroform shows a small overestimation compared to the idealized tracer on the 2- and 3-year age isosurface. On the 4-year age isosurface we now find a very good agreement between the realistic and the idealized tracers of all considered species. Overall this correction does not change any of the conclusions given in Ostermöller et al. (2017), and the agreement of the new fractional release formulation with fractional release from the idealized tracers is now better than previously stated.

References

Ostermöller, J., Bönisch, H., Jöckel, P., and Engel, A.: A new time-independent formulation of fractional release, Atmos. Chem. Phys., 17, 3785–3797, https://doi.org/10.5194/acp-17-3785-2017, 2017.

Plumb, I. C., Vohralik, P. F., and Ryan, K. R.: Normalization of correlations for atmospheric species with chemical loss, J. Geophys. Res.- Atmos., 104, 11723–11732, https://doi.org/10.1029/1999JD900014, 1999.

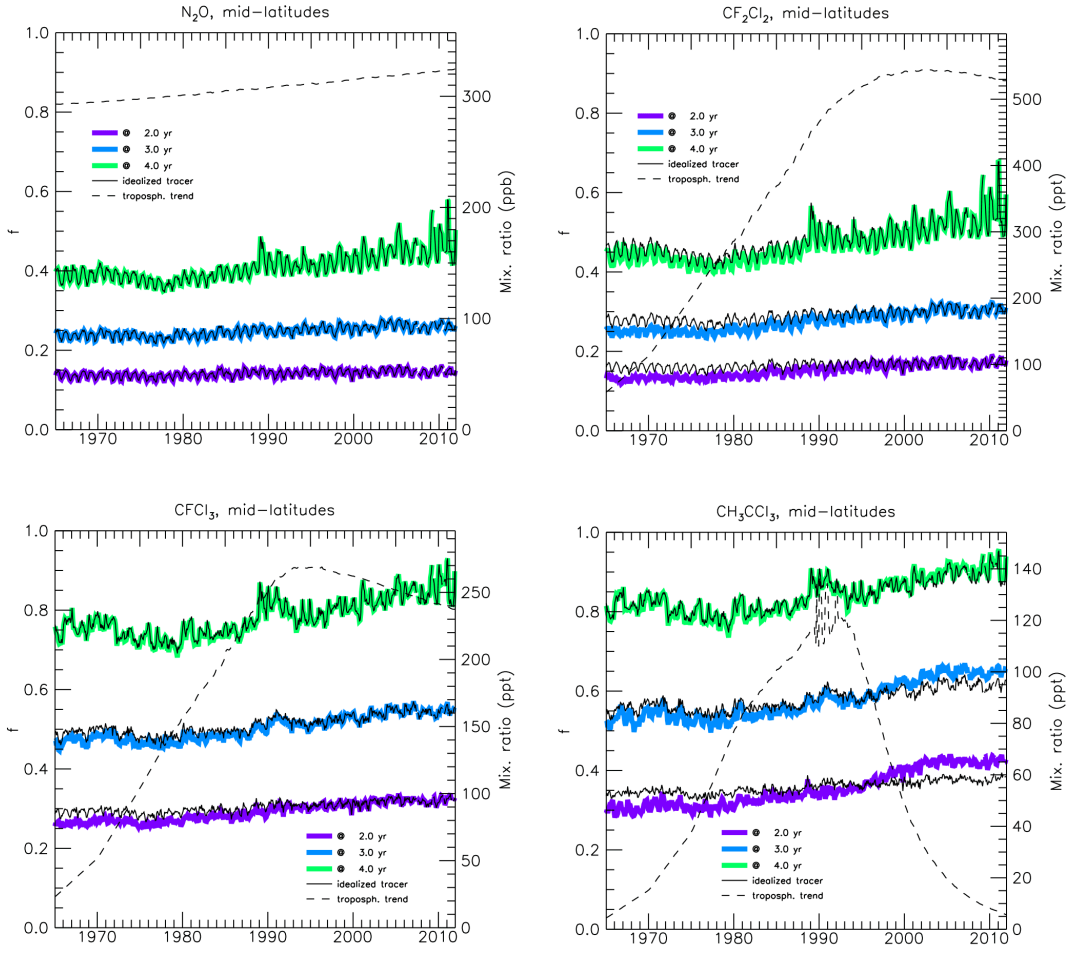

Figure 4. Temporal evolution of FRF calculated by the new formulation, taking into account chemical loss. The results of the realistic tracers are shown in colour on different age isosurfaces. The results of the idealized tracers are shown in solid black lines, whereas the tropospheric trend is plotted in dashed lines. We find much better agreement between idealized and realistic tracers compared to the current formulation of FRF (corrected Fig. 4 from Ostermöller et al. (2017)).