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Interactive Comment

Interactive comment on "Measurements of NO, NO_y, N₂O, and O₃ during SPURT: implications for transport and chemistry in the lowermost stratosphere" *by* M. I. Hegglin et al.

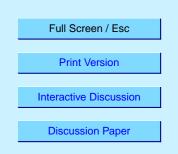
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The present manuscript describes measurements of reactive nitrogen gases, N2O and O3 around the tropopause and lower stratosphere. Conclusion on the seasonality of the cross tropopause transport and the photochemistry of TL/LMS ozone are made. The study is very valuable, however an advertent reader may miss a tighter and concise interpretation of the data (see below).

(1) It is known that the fraction (6.5 per cent) of missing (from the tropospheric background, 320 ppb) N2O is photochemically converted into stratospheric NOy. This frac-



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tion is usually labeled [NOy*]. Since N2O and NOy are measured within the present study, a reader may thus wonder why the authors do not consider at all the difference of [NOy]-[NOy*] = [NOy'], which could provide some indications on the sources of the extra NOy' c.f. either due to transported from elsewhere or produced in-situ. Adding this information would be much helpful to understand better the potential sources of TL/LMS NOy.

(2) Also the provision a plot of observed and model (if possible modeled) NOx/NOy ratio would be much instructive to provide more insight into the apparent, and often in literature stated excess NOx found around the tropopause when compared to NOy in photochemical equilibrium.

(3) Chapter 4.4 provides a quite instructive discussion on the different regimes of ozone production and losses around the tropopause. However, I guess if reactive halogen bearing gases (CIO, BrO would have been added (e.g., Salawitch et al., 2005), Sensitivity of ozone to bromine in the lower stratosphere, Geophys. Res. Lett., 32, L05811, doi:10.1029/2004GL021504), the outcome would look much different.

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