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Interactive comment on "The influence of typhoons on atmospheric composition deduced from IAGOS measurements over Taipei" *by* Frank Roux et al.

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The manuscript by Roux et al. presents an excellent data analysis, revealing the chemical transport structure of typhoons over the Pacific using IAGOS data. As described in the manuscript, the discussion section in particular, stratosphere-to-troposphere transport induced by convective storms has been observed and analyzed in a number of previous studies. This study, however, provides the clearest 3D structure of the process. The technique of analysis, translating the time evolution of the typhoon systems into spatial extent using takeoff and landing profiles from/to a single airport (Taipei/Taoyuan), is a highly effective way to use the data. Integrating new generation

of re-analysis ERA5 and satellite maps of the storms, the chemical profiles are nicely connected to the anatomical structure of the typhoon system.

Specifically, I find it a very good diagnostic to identify the consistency between the O3-RH relationship from measurements and the PV-RH relationship from the ERA5. This pair of "tracers" allows the author to separate the convection generated high PV in the center of the storms from the stratospheric influenced high PV air wrapped at the outer rim of the typhoon circulation.

Overall, I find the result of this work important and the method of integrating meteorological information and chemical measurements inspiring. I recommend the manuscript to be accepted for publication largely as it is, with some minor corrections. I have some suggestions, optional for the authors, which may enhance the take home message of the work.

Minor changes and corrections:

1. Page 4: line 142: "where F is.." => No F in the equation

2. Page 7, Line 267: this sentence needs to be revised. The word "determine" is too strong. "…two more cases to highlight the common features"?

3. Page 8, you made a number of references of "low CO" to values of ∼100 ppbv, which is somewhat problematic. Overall, the CO signatures are weak.

4. Figures:

* Figure 1 labels are too small to read on a print page.

* Fig 4: "Yellow box"

Additional suggestions:

1) Figure 1 serves a purpose but could have much more information content. As shown in later profiles, the individual profiles could be very structured. These mean profiles,

however, are kind of uninteresting. Suggest you to try “box-and-whisker” plots with distribution in layers instead of mean and standard deviation.

2) Figure 2&3 could use some color adjustment to highlight the features you want readers to see. Panels C in particular. Fig. 2C could be clearer if color changes for CO above/below 100 ppb and 50 ppbv. Fig. 3C should show color change at 0 to highlight direction change

3) After presenting the details of three cases, it would be more satisfying to have a summary figure quantifying the layer influenced by the stratospheric air, its vertical extent and the amount of ozone enhancement. It is possible to do this using all 18 profiles but present the data in the tracer-tracer space. For an example, see Fig. 3 of Randel et al., 2016. If you have a large anti-correlation between O3 and RH, it would be a strong support for transport. The part of the tracer space with positive ozone anomaly and unclear anti-correlation with RH may indicate other mechanisms, including lightening NOx facilitated ozone production.

Randel, W.J., L. Rivoire, L. L. Pan and S. B. Honomichl (2016), Dry layers in the tropical troposphere observed during CONTRAST and global behavior from GFS analyses, J. Geophys. Res. Atmos., 121, 14,142–14,158, doi:10.1002/2016JD025841.

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