Atmos. Chem. Phys. Discuss., 7, S5896–S5897, 2007
www.atmos-chem-phys-discuss.net/7/S5896/2007/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Chemical Isolation in the Asian monsoon anticyclone observed in AtmosphericChemistry Experiment (ACE-FTS) data" *by* M. Park et al.

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Received and published: 11 October 2007

We have a small contribution to the discussion after reading this interesting paper by Park and co-workers. It struck us that the expression "chemical isolation" is a bit strange, but it also stimulated thinking about what exactly was going on. Concerning the point, also mentioned by ref 1, perhaps the authors could provide one additional figure focusing on the anticyclone region, indicating with short lines (if applicable, the geographical length of an occultation measurement) the profiles "inside", and with alternate lines the profiles "outside" the region. The title furthermore states that the "isolation is observed in data". Perhaps the paper is an analysis of observations; in

particular satellite based measurements can be viewed clearly as "observations". With data we think about perhaps model output, otherwise words like "measurements" or "measurement results" ought maybe to be considered. This then leads to our next remark; not all concentrations shown in for instance figure 2 do agree with reality and need "truthing". CH3Cl never exceeds 600 pptv in the free troposphere we believe. The authors perhaps could more clearly communicate how these have been derived, and correct them before final publication. Concerning the correlations of trace gas concentrations in figure 4, we note that although the photochemical age concept may apply to the "inside" conditions, here the spread in the results is too large to establish a meaningful correlation. For the "outside" conditions mixing and photochemical removal form a complex interplay, in particular because of mixing with air masses that have a stratospheric "signature" leading to slopes that are hard to interpret, meaning that even though the correlations are rather compact, the agreement with a shown photochemical slope may be coincidental. Concerning a photochemical age, and referring to figure 5b, we note that it should rather be the ratio between the relative reductions (changes in concentrations) of two tracers that give a measure for photochemical age, and not the ratio itself. Thus, whereas the profiles "inside" being very steep forms a very strong proof of vertical mixing, the lack of mixing (chemical isolation..) based on the tracer correlations is harder to proof. One may like to try to analyze the ratios between the logarithmic changes to find a more valid indicator for photochemical ages. Finally, as non-satellite colleagues we also are curious if any systematic differences between "inside" and "outside" could instill a bias in some or all results. For instance water vapor, which is more abundant "inside" we presume.

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 13839, 2007.