

## ***Interactive comment on “On interpreting studies of tracer transport by deep cumulus convection and its effects on atmospheric chemistry” by M. G. Lawrence and M. Salzmann***

**Anonymous Referee #2**

Received and published: 15 August 2008

This paper calls attention to a previously unknown pitfall in using classical general circulation models to study the effects of deep convection on atmospheric chemistry. The problem stems from the way vertical tracer transport by deep convection is parameterized in these models, causing misinterpretation of results from previous sensitivity simulations. Specifically, it is shown that turning off the model's deep convective tracer transport does not have the intended effect. This is because a portion of the deep convective transport is still artificially retained in a mean transport term, which arises from the assumption that convective circulations are locally mass balanced within each model grid column. A key implication is that previous studies may have underestimated the net effect of deep convection on atmospheric chemistry. This paper is clear and

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informative, and I find no problem with publishing it in its current form.

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 12163, 2008.

**ACPD**

8, S6026–S6027, 2008

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