

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

O. Cooper (Referee)

Owen.R.Cooper@noaa.gov

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Editor’s review of On Interpreting Studies of Tracer Transport by Deep Cumulus Convection and its Effects on Atmospheric Chemistry By Mark G. Lawrence and Marc Salzmann

This review is by Owen R. Cooper, a co-editor for ACPD/ACP and the editor of this paper.

The purpose of this paper is to raise awareness of the shortcomings of deep convective parameterizations in chemical transport models, specifically the fact that these parameterizations are superimposed on the mean convective transport within the coarse res-

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olution global wind fields. Therefore, sensitivity tests in which the convection scheme is shut off still contain mean convective transport. The implications of this finding are discussed and some recommendations are made for future research, although at this time the authors have not been able to come up with a satisfactory solution to this complicated problem.

After two readings I find this paper to be very well written and it does a good job of leading the reader through the complicated budget issues of large scale and parameterized convection. It raises some important questions about the legitimacy of diagnosing transport by switching convection schemes off and on, and I think this paper will make a significant contribution to the scientific literature and it will be a valuable reference for those interested in improving CTM convection schemes.

Aside for some minor comments below I find this paper acceptable for publication in ACP at this time. However I am still open to changing my opinion if the two anonymous referees raise significant concerns that were not apparent to me during my review.

There is one issue that I would like to see addressed, if only briefly: If some 30For example, assume a polluted air parcel in the tropical boundary layer is lofted to the upper troposphere due to the DCC parameterization. Approximately 30

Minor comments

Figure 1. In the caption please explain the large black X.

Page 5 line 6 I'm not so sure about the term "contiguous DCC updrafts". Contiguous means neighboring or touching, which implies several DCC updrafts side by side. But if I understand the context I think what you mean to say is something like continuous DCC updrafts that extend from the boundary layer to the upper troposphere, although I can't think of a single word to get this point across.

Page 5 line 10 should be "transport tracers from the BL"

Figure 2 To clarify, the large-scale mass flux is determined when the deep convection

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parameterization is switched off?

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