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# *Interactive comment on* "Convective damping of buoyancy anomalies and its effect on lapse rates in the tropical lower troposphere" *by* I. Folkins

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Received and published: 14 November 2005

Figure 3: I now use absolute divergence values, rather than normalized divergences, and I think this makes the figure easier to interpret. I have also added another paragraph in the last part of this section which discusses the relationship between the coherence length of divergence patterns, and how quickly one would expect an area averaged divergence to go to zero.

Figure 4: The caption to this figure has been extensively revised.

Section 6: This Section makes a number of arguments, and wasn't clear to me which specific parts were unclear. However, Section 6 has been modified at a number of places where the wording was awkward.

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Results of Bretherton and Smolarkiewicz: I have added a note that B and S used analytic approaches and 2D cloud modeling to illustrate the response of the background atmosphere to a buoyancy anomaly, and that this way of thinking about how a buoyancy anomaly and the background atmosphere interact is widely accepted. Discussing their methodology in detail would be outside the scope of the paper. I actually don't think this is one of the main uncertainties of the paper. The main uncertainties would be the validity of the area averaged total divergence estimates from the ECMWF analysis, and whether or not cloud radiative effects make the radiative mass flux divergence non zero (between 2 km and 5.2 km). The main argument of the paper is that the convective divergence is small when averaged over spatial scales of 2000 km and larger, and this must be true if the total and radiative divergences are small on the same spatial scale, simply by mass conservation. While the particular explanation I use to explain why the convective divergence ends up averaging to a small value does invoke a way of thinking that comes from B and S, there may be other valid ways to explain the same result. So, the main argument of the paper does not ultimately rely on the results of B and S, though some of the interpretation does.

Discussion of radiative effect of clouds: There is no way to definitively address this uncertainty. One would require three-dimensional radiative transfer calculations using realistic 3D cloud fields, integrated for long periods of time over a full diurnal range, with cloud radiative heating rate perturbations inside clouds segregated from those outside clouds. I have added a reference on what appears to be a step in this direction (Giuseppe and Tompkins, 2003).

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Interactive comment on Atmos. Chem. Phys. Discuss., 5, 7309, 2005.

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