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Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "On the seasonal dependence of tropical lower-stratospheric temperature trends" *by* Q. Fu et al.

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Reply to the Anonymous Referee #2 by Q. Fu, S. Solomon, and P. Lin

We first thank the referee for valuable comments and suggestions on our manuscript. We also very much appreciate that the referee found that "the findings of this paper . . . add significantly to our picture of past and likely future changes in the BDC". Here we respond to the referee's major comments and the responses to the referee's detailed comments will be provided in details when we submit our revised version of the paper for publication in ACP.

"My criticism of the paper is that in places explanation could be clearer (see details comments below). In particular I found the explanation on pp21826-21827 generally



confusing and my general feeling was that the fact you had to use different methods for different parts of the year (different methods for different parts of the SH seasonal variation and a different method for the NH seasonal variation) to extract the dynamical signal undermines confidence in your results. A clearer description of the method used for the SH would help and for the SH you could alternatively simply accept that the dynamical trend in the Novemer-May period is small."

A clearer description of the method will be provided by addressing both referees' comments and suggestions. In particular, we plan to apply a single method to all months over both SH and NH high latitudes, which is achieved by using an improved eddy heat flux index.

"I also wasn't convinced that the many plots show latitude-longitude structure (e.g. Figure 3 and Figure 7) helped the argument much. If you feel that seeing the detailed latitude-longitude structure is an important part of the arguments you make then that needs to be clearer".

For example, Fig.3 clearly shows that there is the dynamic warming in the SH winter and spring seasons but not in the summer and autumn seasons, which is not clearly shown in the zonal mean trends (e.g., see June, October, and November in Fig.2). Thus the warming patterns seen in the latitude-longitude plots support our results based on the regression. We will make these arguments clearer in our revised version.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 21819, 2009.