

Interactive comment on “Is there a stratospheric fountain?” by J.-P. Pommereau and G. Held

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This is an interesting study but I think the interpretation of the data rests on some oversimplistic assumptions. The main problem is that the impact of lifting and adiabatic cooling in the TTL, considered carefully by Sherwood et al. (2003), is not assessed. Instead the authors dismiss gravity waves on the basis of smoothness of the temperature anomaly profiles. Tropospheric heating will produce a dynamical response that can be viewed as a gravity wave packet; the vertical displacements associated with this will not be confined to high vertical wavenumbers as evidently assumed by the authors. The reasoning used by the authors to rule out gravity wave effects is thus technically incorrect, and I don't see any other way the authors can rule out adiabatic cooling as the sole cause of their signal (although I'd be happy to see evidence of turbulent heat transport!). The horizontal wind field is not relevant to this matter either since the “waves” (if one views them this way) are generated locally and need not have a clearly

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observable horizontal component. A nice recent paper on the lifting above convection and the resulting cool anomalies is Holloway and Neelin (2007), which I suggest the authors consult. This paper views the response more simply as an adjustment rather than a set of waves. In any case it cools the TTL.

Another problem is the sampling noise (see the lower stratosphere in Fig. 3 where there is a big signal even for the non-convective case which is presumably noise, or some other effect not considered in the paper).

Minor comment: there are several references to Sherwood (2000) in the context of a two-step process for air reaching the stratosphere. These citations should be to Sherwood and Dessler.

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