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Atmospheric Measurement Techniques Discussions

Interactive comment on "A method to improve the determination of wave perturbations close to the tropopause by using a digital filter" *by* P. Alexander et al.

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Main ítems Figures 3 and 4 of the present version show T' and TD', the latter being T' after the correction by the double filtering method. Please notice that the variance in Figure 7 of the present version gives a non-dimensional indirect indication of T' (complete method) and TD' (double filtering method), so both profiles are a rough quantitative representation of the temperature perturbation for each method. We preferred to show the effect on variance (which is roughly equivalent to energy) rather than on T' because of its physical meaning. Note for example that at low latitudes the application of the complete method (one filter) leads typically to 6 fold variances as compared to

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the “true” reference values (roughly 3 against 0.5), whereas the double filtering leads to differences around 20% (0.6 against 0.5). Similar discrepancies may be found at middle and high latitudes (the typical variance values change). All this may not be clear from the present version, so we will clarify this item in a new version of the manuscript.

If ideal filters would exist, part of the problem would still be there because the tropopause kink usually departs from a sinusoid or any other function that may be used as a basis. Regarding the details of both filters, they are extensively given in the references (Scavuzzo et al. 1998 and Schönwiese 2006), so we believe it would not be appropriate to repeat them here as it would partially change the focus of the work. In order to clarify the long wavelengths issue we must again resort to Figure 7. The energy of the long scales that was not removed by the first filtering but by the second is represented essentially by the difference between the complete and the double filtering profiles. We will state this fact in our revised version and include a figure with our filter response.

In order to see the sharpness of the tropopause against latitude we will include a figure which shows the typical kink in the dataset at low, middle and high latitudes. In addition, we will state that the largest discrepancies in Figure 7 occur at low latitudes due to the sharp lapse rate (we forgot to include this important comment in the present version).

We will include a new figure based on a large radio occultation dataset on average potential energy per geographical cell after one and after double filtering.

Minor items -The abstract will be changed according to the suggestions. -The kind of filtering for Figure 1 will be stated. -Ok, we will add the LRT heights in Figures 5 and 6. -We will eliminate Figure 2, as this was also suggested by Referee 2. -Ok, we will change the sentence on LEO heights. -Ok, we will clarify the meaning of T’/T in the first occurrence of our revised version.

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