**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.

Anonymous Referee #1

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There is certainly a problem when one wants to calculate the temperature deviations around the tropopause with the aim of obtaining gravity wave information. Therefore, any approach that helps in solving this problem is most welcome. The authors claim that they do so using a method so-called double filtering, which includes using a filter two times. This is an interesting approach. Using artificial data the authors show that the results are improved against conventional methods of separating background and waves.

The paper deserves publication in AMT. However, much information is still missing on the article. So revision, in particular a much more detailed description of the filters

used, is recommended.

Main items The method has to be described in much more detail. If a bandpass filter is applied (1-10 km) to the entire profile then there should be no remaining trend or signal at wavelengths outside this range unless the filter is imperfect, which is certainly the case with real filters. Then using the 2nd filtering will probably improve the result, but I do not see from the paper what exactly is the result, i.e., what do the authors find, quantitatively, as T'.

And what would happen when using a (theoretical) ideal filter? Maybe I overlook some important thing here, but also then I would recommend to much more extensively describe the filters, their characteristics, remaining energy at long scales after using the filter once, etc.

Generally, the methods are rather briefly described. It is necessary to present more details on the filter used, and on the statistical analysis, for example, how sharp was the tropopause in the artificial dataset?

Also, I would prefer to see more results on real data, maybe a statistics on reduction of potential energy after applying the method.

Minor items

- Consider revising the abstract. The first 10 lines may be condensed to one or two sentences, but the content of the paper should be described, i.e., which kind of new filter is used, how much is the tropopause error reduced.

- Which kind of filtering is used in Fig. 1?

- Please insert the tropopause height in Figs. 5 and 6

- Consider removing Fig. 2.; one simply sees that there is no big signal in refractivity. You may add the refractivity profile to Fig. 1.

- Page 1182, l25: Not all LEOs orbit the earth at about 800 km, e.g., GRACE.

Technical items

- Relative temperature in section 4 is first used and then explained, please revise the order of the manuscript.