

## ***Interactive comment on “Scaling behaviour of the global tropopause” by C. Varotsos et al.***

### **Anonymous Referee #1**

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#### General comments

The paper addresses the relevant scientific question within the scope of ACP and presents new results. The authors has applied the detrended fluctuation analysis (DFA) method to the global tropopause height time series derived from radiosonde data and are trying to add some light to the question if the long-term changes in the tropopause could carry climate change signal. The paper good structured and contains appropriate number and quality of references. However the reference (Grytsai et al., 2007) is not proper reference. The title clearly reflects the contents of the paper and the abstract provides a concise and complete summary. The paper is written in clear and fluent language.

#### Specific comments

The main conclusion of manuscript is that the tropopause height fluctuations in small

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intervals (4 month?) correlated to fluctuations in long-time intervals (few years - 6 years?) in a power-law dependence. And this dependence is different for different latitudinal bands. Those are important and valuable results. However would be interesting if authors could propose the physical explanation (or at least suggestion) why the exponent of this dependence is larger in the tropics compare to mid and high latitudes, and is larger in Northern than in Southern hemisphere? Authors conclude that this property would increase the reliability of the existing long-term climate modelling, however it still uncertain how these results could be used to improve modelling. The persistence was obtained for the interval time ranging from about 4 months to about 6 years" - is any physical consequences in this result or just technical result due to data sequence statistic behavior?

#### Technical corrections

Page 17892 line 22: "WMO 1957" correct to "WMO, 1957" Page 17898 line 24: "years (ENSO)" - not clear why ENSO is mentioned here? Page 17900 line 14: "northern" correct to "Northern" Page 17901 lines 14-15: need to correct lines. Page 17902 lines 20-21: need to correct lines. Page 17902 lines 32-33: need to correct lines. Page 17905 in Fig. 2 capture: "northern" correct to "Northern"

In conclusion I support the paper, which presents new and substantial results. The interpretation and conclusions are sufficient to support obtained results. The DFA method and results are valid and enough outlined.

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 17891, 2008.

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