Response to Reviewer 1's Comments:

We thank the reviewer for their comments. The reviewer's comments are in black text and our responses are in red text. Any additions to the manuscript are in blue text. Reference to page and line numbers refer to the original manuscript.

Comments on "Intercomparison and evaluation of satellite peroxyacetyl nitrate observations in the upper troposphere - lower stratosphere" by Pope et al.

The paper provides detailed intercomparison of peroxyacetyl nitrate from satellite observations (MIPAS and ACE-FTS), Aircraft and chemical transport model (TOMCAT). This paper provides interesting results on comparison during all the seasons. The paper is well written and can be accepted for publication in ACP after the minor revision. I suggest authors to incorporate following suggestions.

(1) Authors should add a statement as to why two-year time period 2007-2008 is used for inter-comparison.

We use the years 2007-2008 because this is the time period where we had available data for from multiple datasets (i.e. MIPAS, ACE-FTS and the aircraft data). We have added the following text on page 9 line 6, "We perform TOMCAT simulations for 2007-2008, since MIPAS, ACE-FTS and aircraft data are available for this period."

(2) Although authors have cited reference, readers should know the difference between retrieval methods used by the University of Leicester (UoL) and the Institute of Meteorology and Climate Research, Karlsruhe Institute for Technology (IMK). A brief description will be appreciated.

On page 6, lines 17-19, we have altered "The UoL and IMK MIPAS PAN retrieval methods are discussed by Moore and Remedios (2010) and Glatthor et al. (2007), respectively." to "The UoL MIPAS PAN retrieval is based on an optimal estimation scheme in logarithmic parameter space, while the IMK MIPAS PAN retrieval consists of inversion of level-1B spectra to vertical profiles of atmospheric state parameters by constrained non-linear least squares fitting in a global-fit approach. The constraint is implemented as a 1st order Tikhonov regularisation with an all-zero a-priori profile. The two MIPAS retrieval schemes are discussed in more detail by Moore and Remedios (2010) and Glatthor et al. (2007), respectively, and compared in section 3.2.".

(4) A brief description on 'uncertainty in IMK MIPAS PAN retrieval' should be added.

The IMK and UoL MIPAS PAN errors are discussed on page 10 and 11, lines 18-29 and 1-3 respectively. Differences in the retrievals which might be causing the product biases are discussed in section 3.2. Therefore, the IMK and UoL MIPAS errors are discussed to an equal extent. We have added some information on page 10, line 22 to outline the sources of errors in the retrievals. "Sources of retrieval error include measurement noise, interfering signals from other trace gases, errors in the temperature profile, instrument pointing, spectroscopic errors, calibration errors and instrumental line of shape (Glatthor et al., 2007).".

(5) conclusion sections should provide quantitative statements on comparison.

We feel that the conclusions have suitable levels of quantitative information in them. Throughout the conclusions, we quantitatively highlight the important differences and similarities between datasets. More information could be added about the results from previous sections, but this would defeat the object of the conclusions where concise statements are required.

Where the MIPAS - ACE-FTS and TOMCAT – aircraft comparisons are summarised, these are important, but secondary results in the paper and discussed is less detail. Again, to try and keep the conclusions succinct.

(6) X-axis and y-axis labels in figures 2, 3, 4,7,8,9, 10,11,12,13 are not clear.

We have increased the axis label sizes in line with the reviewers comment.

References:

Glatthor, N., von Clarmann, T., Fischer, H., Funke, B., Grabowski, U., Höpfner, M., Kellmann, S., Kiefer, M., Linden, A., Milz, M., Steck, T., and Stiller, G. P.: Global peroxyacetyl nitrate (PAN) retrieval in the upper troposphere from limb emission spectra of the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS), Atmospheric Chemistry and Physics, 7, 2775–2787, doi:10.5194/acp-7-2775-2007, 2007.