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Interactive comment on "Low temperature mid-infrared cross-sections for peroxyacetyl nitrate (PAN) vapour" *by* G. Allen et al.

G. Allen et al.

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Firstly, we thank Anonymous Referee #1 for their comments and welcome suggestions. We now address the referee's specific comments in turn:

1/ We agree that despite the potential importance of PAN retrievals in the atmosphere, there is still a lack of a detailed discussion of this potential or any results in the literature at present. However, work already carried out by the authors of this paper has confirmed the detection of PAN in atmospheric infrared emission spectra and PAN concentrations in the upper troposphere have been retrieved. Those results are soon to be published and are beyond the scope of this paper, which aims only to alert the atmospheric community to the existence of new spectral reference data for PAN and their potential importance. The meaning of the last sentence in the second paragraph

of page 5671 is to stress that the accuracy of any retrieval of concentration data, requires accurate spectral reference data for all atmospheric gases that absorb or emit radiation in the spectral range of interest to the target species (in this case PAN), i.e. an accurate retrieval of PAN concentration requires a good knowledge of other gases exhibiting spectral influence in the same spectral range over which the retrieval of PAN is performed. We will endeavor to make this clearer in the text.

2/ The term “super greenhouse gas” will be removed. This term refers to molecules known to have a high global warming potential, defined as the radiative forcing relative to equal loadings of carbon dioxide. Since this has not yet been published, we shall prefer not to speculate on the global warming impact of PAN in this paper.

3/ The Referee is correct to note that we have not included in the experimental section, the details of the use of dry nitrogen gas, which is later referred to in the results section. This clearly needs to be corrected and we will describe its purpose and methodology in the text. In summary here, we use dry nitrogen gas to avoid, as much as possible, the potential problems associated with water vapour that may include the presence of unwanted water vapour lines in measured spectra and errors on the measured PAN cell pressure.

4/ The method employed to calculate error-weighted regression fits to our data has been explained in greater detail in previous work by Allen et al., Atmos. Chem. Phys, 5, 1-10, 2005, which details such a method for PAN spectra measured at room temperature. For further details of this regression method, we propose here to refer the reader to those results by including a reference to that work in the text.

Technical corrections: We will revise the manuscript to include all technical corrections as directed. With reference to technical correction 5, the statement “overlap between all values” is intended to describe that the errors assigned to integrated PAN band intensities allow, at their extremes, the possibility of an overlap between individual band intensities calculated at 250 K and 295 K. We will make this clearer in the text.

ACPD

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We thank Anonymous Referee #1 again for their valued and useful suggestions.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 5669, 2005.