

Interactive comment on “Planetary wave activity in the Arctic and Antarctic lower stratospheres during 2007 and 2008” by S. P. Alexander and M. G. Shepherd

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We thank the Referee for the comments on our manuscript. The Referee recommended not using the linear least squares method (Equation 8) for extracting planetary waves, and also suggested that we consider the height structure in greater detail. These comments have now been addressed and the new results are shown and discussed in detail in the revised manuscript. Some of the previous figures have been removed (Fig 11 – 13) and nearly all of the figures have been revised and improved for the new manuscript.

Major comments:

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1) Following the Referee’s comments on the use of linear least squares fitting with discrete periods, we use an improved method, all within the Hayashi-type approach, for examining planetary wave activity, adopting the suggestions made by Referee 1. In summary, the eastward and westward temperature perturbations are obtained via Hayashi’s (1971) space-time analysis, as previously. The stationary waves are then separated from the travelling waves (Pogoreltsev et al. (2009)) without using discrete wave periods. Wavelet analysis is then conducted on these travelling and stationary time series at each height. We note variations in maximum wave amplitudes in these analyses, however, we do not extract individual, discrete waves as we did with the linear least squares fitting. As pointed out, in the original manuscript we did not focus sufficiently on the variability of the amplitudes in height, even though this is one of the major strengths of using COSMIC data in lower stratospheric planetary wave analysis. This is now being remedied in the revised manuscript. Also, due to the recent availability of COSMIC data from the boreal winter of 2008-09, we have included a discussion on wave activity during this year’s major sudden stratospheric warming and related it to that observed in the preceding two winters.

2) In our revised manuscript, we have decided to omit mention of the UKMO results because this is side-tracking from our main objectives and does not add to our discussion or conclusions.

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