

Interactive comment on “Wind-profiler observations of gravity waves produced by convection at mid-latitudes” by Y. G. Choi et al.

Anonymous Referee #3

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General Comment:

In recent years there have been significant advances in our understanding and modelling of gravity wave generation by convection. Observations are required to test the models and to constrain the results since there is, as yet, no satisfactory way of relating storm intensity to wave amplitudes. VHF wind profiler observations of stratospheric vertical velocities and momentum fluxes provide a potentially important way of constraining the models. However, while the results in this paper are qualitatively plausible they need to be backed up by more quantitative analyses.

Specific Comments:

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The discussion of the convective event itself is particularly weak and the paper would benefit from a more extended analysis of the convection, including estimates of the depth of latent heat release, the horizontal extent of the heating and the passage of the storm relative to the position of the profiler. For example, if UKMO weather radar and rainfall data are available then they can be used to provide such information in a similar manner to that described in Alexander et al (JGR, 109, doi:10.1029/2004JD004729, 2004). Such results can then be used to inform the discussion in a more quantitative manner concerning vertical wavelengths and periods. The concluding paragraph notes that this storm seems unique in terms of the gravity wave response compared with other convective events. An analysis such as that described above would help understand why this is so and make the results more useful to theoreticians and modellers.

Finally, more use could be made of the information already at hand. For example, the almost north-south orientation of the momentum fluxes suggest that waves are propagating almost orthogonal to the background winds at heights near 13 km, so ground-based and intrinsic periods should be very similar. This will simplify the use of the dispersion and polarization relations in trying to determine the relationship between the heating depth and vertical wavelengths etc.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 11029, 2005.

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