Comments on “Mesospheric gravity waves and their sources at the South Pole”

The paper presents an interesting case study using data form 2003 and 2004 at SPA station. Overall I am happy with the paper, there are a couple of things I would like to see changed or added in to make it a better paper. Once these recommendations have been addressed I am happy for the paper to be published.

Minor comments:

Page 2 line 24: define NJIT

Page 5 line 5: I am assuming that the 94 events that are mentioned here use the ECMWF+NRLMSISE-00 background atmosphere rather than just the climatological background atmosphere? It needs to be clearer which background atmosphere you are using here.

Page 6 line 29: The authors are discussing wind divergences as a source of error for their results and say “while a real vertical wind profile over SPA would be ideal, the inclusion of available meteor radar winds at 95km could resolve this problem”. If they have the data already and it can help resolve how much error there could be introduced into their ray tracing then they should use it. I would like to see evidence that they have looked at the meteor winds and how they compare to the model winds around the mesopause region. I’d expect there is radiosonde data from SPA too so they would be able to get wind data for the troposphere and lower stratosphere to compare the model winds with too.

Page 7 line 2: It is not clear which of the sources they’ve identified they are saying in an identified one. This should be explained.

Figure 1: I find it very difficult to identify the wave fronts in this figure (Figure 2 is better). Maybe you could highlight the wave fronts rather than put and arrow in to make it easier for the reader to identify them?

Figures 3 and 4: The yellow lines are hard to make out. I’d suggest changing the yellow to something like red and then changing the red line to blue. Also, I appreciate they are showing the vortex shape but seeing the “line” in Figure 3 and 4a is difficult. Maybe they could have a zoomed in plot too showing the line more clearly?

Figure 5: This figure doesn’t really convey what the authors say it should, it is quite difficult to make out the contours and the path of the wave just looks like it goes diagonal a bit the straight up. I can’t see that this Figure adds anything to the paper so maybe it should be removed. I will leave this decision up to the authors.