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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Observation of a mesospheric front in a dual duct over King George Island, Antarctica" *by* J. V. Bageston et al.

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This paper describes a rare wave/frontal event classified as a bore observed over an Antarctic site. Although these events have been observed numerous times at low- and mid-latitudes, they have only been reported once at high latitudes. One of the fundamental requirements for these events to exist is the presence of a ducting environment in which, the bore propagate. The authors utilize MF radar winds and SABER temperature measurements to address the presence of mesospheric duct. Although the coincident wind and temperature measurements are not co-located, the authors does convincing job of showing that the observed structures are most likely large-scale features, and therefore a good representative of the environment over Ferraz Station. The paper is well-written and further confirms the idea that these waves are rare at polar

latitudes over Antarctica. The paper will be a significant contribution to the very limited literature on high-latitude bores. I recommend the paper for publication after minor revisions are considered.

Minor Comments: 1) In general, I am missing a more detailed description of the evolution of the event. It is evident from the images in Fig. 1 (at least the middle images), that we are considering a wall/bore event. However, a bore have other characteristics, such as the formation of trailing wave crests with time. Does the event propagate into the imagers FOV or does it form inside the FOV? According to the text, it appears to me that the event formed inside the FOV, which is very rare and should allow for additional discussions. For example, if it forms inside the field of view, one may be able to address the formation rate of trailing wave crests. Is there any variation in the observed wave parameters or Intensity? Does the front steepen as it progress across the FOV? Also, the event is said to last $\sim$40 minutes. However, does it truly last 40 min or does it just propagate outside the FOV? This is a rare event; therefore I think a more detailed description would be in order. 2) Since the vertical wavenumber is estimated, could the author also estimate the vertical wavelength? For a bore to fit inside the duct, I would imagine the vertical wavelength of the trapped signature should match the depth of the duct. 3) Use same font size on all figures (or at least make font size on Fig 5 larger). 4) It is difficult to see the event in the first image in Fig1. I recommend, only showing the other two images (stacked vertical if only using one column or horizontally if shown over two columns). 5) Check references to Figure 2 throughout the paper. There seems to be several errors in referencing to (a), (b) etc. 6) In line 12 on page 16192, it is stated that the vertical wavenumber squared has not been calculated before in previous studies. There is a paper by Stockwell et al regarding the Nielsen et al. bore event, which is currently in press (JGR), where the vertical wavenumber squared is being calculated. The paper can be obtained on the AGU website under “articles in press”.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 16185, 2011.