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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Nitrogen oxides in the boundary layer and free troposphere at the Mt. Bachelor Observatory" *by* D. R. Reidmiller et al.

Anonymous Referee #2

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This paper presents a comprehensive summary of NOx observations made from the Mt. Bachelor mountain top observatory over multiple seasons. It also presents an interesting analysis using meteorological data taken on ski chair lift ascents to separate boundary layer and free tropospheric air. The analysis presented appears to be careful and thorough, though a bit long. The paper is well written with few noticeable grammatical errors. This work is publishable with minor changes and clarifications.

Specific comments

Section 3.2 and Figures 4 and 5 I admire the use of the chairlift's to provide sounding data. I find the explanation of the analysis a bit lacking. What in panels a and b of Figure 4 indicates that the rise in NOx in panel c is a result an air mass change? Figure 5 panel a is somewhat confusing and cluttered. If the line is the average of 3

ascents, are the colored data points all the points from each ascent? The date and times clutter the figure. I'm not always certain which time goes with which trace.

Page 5767 line 12 - remove comma after 5. I do not follow why the time-of-day segregation is better than that based on specific humidity. For example, what is the significance of the a 14 pptv difference in means in spring 2007?

Section 3.3.1 - Other GTE missions, such as Pem Tropics A and B, were instrumented with NO and NO2 and, at least transited through the regions discussed here. Data may be available in the archives, if not published.

Section 3.3.2 I think this section is unnecessary. As the second sentence says the observations are dependent on the unique geography of each site. There isn't much comparison, rather explaining why the observations are different. I also do not see how observations from many of those sites could really influence the observations at MBO. I am not opposed to leaving it in but I don't think it adds much to the paper. If left in I do feel care needs to be taken comparing observations of NOx from the 1984 to 2007. The differences are due not only to geography but the change in the nature of the NOx emissions over the 20+ years.

Section 3.3.3 I think this section is very good and more important than the authors give it. I feel the table in the supplemental section should be in the main text because this shows how these measurements compare to independent instruments from a different platform take at the same time.

Figure 2 The poor contrast between the blue and green make some of the bars difficult to read.

Figure 4 Possible show a shorter time series, i.e. 9:50 to 11:16 so the difference between the shaded period and that immediately before is easier to see.

Figure 5 See above

Figure 6 It is somewhat difficult to read the letters on top of the shaded regions.

Figure 8 The outline of the white boxes is hard to see

Table 3a The font in the table is smaller than that in tables 1 and 2 and is difficult to read

Table 3b Same critique of the fonts and the the underscores in the conditions column should be removed.

Table 5 Same critique of fonts. I find the change in font sizes from table to table to be distracting.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 5751, 2010.