Introduction

The manuscript describes an analysis and interpretation of data from the BAQS Met field study. The data are rich and varied, and provide ample opportunity to develop an understanding of the extremely complex relationships between mesoscale meteorology and ozone air pollution in the far southwestern corner of Ontario, surrounding lakes Erie, Huron and St. Clair, and adjoining portions of the USA. The data are supplemented by output from a grid based, regional scale air quality model. The most important meteorological features represented in the data are interacting lake breeze fronts, land/lake breezes and strong diurnal boundary layer development. The data are exceptionally well presented, well analyzed and interpreted in useful and interesting ways.

General Comments

1) The figures in the manuscript are uniformly excellent. They are well drafted, clear, informative and complete. A minor exception to this is the plotting of wind direction (see specific comment 16)
2) The work would benefit greatly from a clearly stated set of objectives .
3) The authors are far to cavalier in their unquestioning acceptance of the correctness of the AURAMS model output.

Specific Comments

1) Throughout the paper, EDT is used. The phenomena under consideration are almost solely driven by solar heating, which argues that local solar time should be used. Since EST is easier to access, and very close to local solar time, this would be a more appropriate time frame.
2) Line 45: Higher than what?
3) Line 74: Surely you mean spatial, rather than temporal?
4) Lines 90-94: This really is not an adequate statement of study objectives.
5) Section 2: Surely there is a BAQS-MET overview paper that describes all available data from the study?
6) A number of references in the paper (Halla et al, 2010; Hayden et al, 2010; Sills et al, 2010; Stroud et al 2010) are to works that are either under review, or in preparation. I assume those will all be part of the BAQS-MET special issue. If those papers are not accepted for publication, all references to them must be removed.
7) Lines 152 & 153: This seems to be a statement of objectives. It must be presented much earlier in the work.
8) Line 209: This seems to be the wrong figure reference. 3c seems more appropriate.
9) Lines 255 to 260: The authors must make some attempt to evaluate the veracity of the model runs before discussing them. Figure 2 can form the beginning of this evaluation.
10) Lines 280 to 320: The authors write about model output as if it is reality. Much more subtle wording is needed.

11)Line 517 - 519: The authors must explain how “these suggest a local to regional transport”.
12) Line 541: The authors describe a “great complexity”, but make no attempt to show that the AURAMS model is able to capture this complexity.
13)Figure 3 caption: The caption must state that these are model results. The use of the work “predicted” is inappropriate here.
14)Figure 4 caption: The caption must state that these are model results.
15)Figure 12 caption: I believe red and black have been exchanged here.
16)Figures 6 and 12: Linear plots of wind direction are always a problem. The vertical axes should be chosen so that plotted points do not “switch” across the plot as in Figure 6, 0800-1300, 06/07/2007. There exist a number of solutions to this problem.