Two anonymous reviews of the draft manuscript:
"Is MM5 good enough for air-quality models?"

REVIEW #1:

Comments on the Manuscript No. 03/178/HS

Harrison has written a paper entitled "Is MM5 hood enough for air-quality models? This paper poses an interesting and relevant question. However, the author makes little attempt to answer that question with the work presented in the manuscript. In fact, the author even concedes in the manuscript that "Each user must decide", and "It is not clear whether MM5 winds may usefully assist air-quality modeling", which really negates the intended purpose of the paper. This manuscript needs a significant overhaul before publication should be considered. The following are the major problems with the manuscript:

- The "conclusions" are based strictly on one implementation and use of MM5, i.e. UW's semi-operational implementation of MM5. Since there is not "standard" version of MM5, per se, and even UW's configuration changed during the "evaluation period", that implementation cannot be used alone to assess the adequacy of MM5 for air-quality modeling. The author makes no distinction between semi-operational and retrospective research uses of MM5 and does not discuss impacts of using different model systems.

- There is no evidence (either through discussion or citation in the manuscript) that the author has researched the current or past usage of MM5 (or similar models) for air-quality modeling. It is clear from some of the author's statements within the manuscript that he is unaware of MM5's and it predecessor's usage for air-quality modeling for nearly 20 years.

- Only horizontal wind fields are examined. All other meteorological fields are ignored. Although winds are important for transport processes, they are not the only meteorological factors that influence air-quality modeling.

- The author does not define any criteria for "good enough". Arbitrarily, a threshold of 5 m/s was used by the author without relating this number to any published works or relevance to air-quality modeling.

- An air-quality model was never invoked as part of this study. While the influence of meteorological fields on air-quality models is strong, the assessment of adequacy for air-quality modeling cannot be performed without actually examining air-quality model output. In addition, no events of significance for air quality were identified or examined.

- The use of colloquial language, the level of conjecture, and the absence of citations throughout the manuscript are inappropriate for a professional publication. For example, one cannot realistically expect to publish "Come on, Fellas!" in a journal.
Even if the title of the manuscript were changed, the work does not merit publication as original research. While the performance of the winds in the UW MM5 system against rawinsonde data may be of internal interest, it is not of great benefit to the research community at large. There is not insight as to why the statistics are poor at "low" wind speeds. There is no investigation of the physical processes in the model, the orographic influences, the representativeness and accuracy of the rawinsonde data, the statistical methodology, or any specific weather events (synoptic, mesoscale, or microscale) that contribute to the data presented by the author. Far more insight and analysis of the data (including citations of specific aspects of other evaluations, particularly outside the UW family) is required before this work can be considered publishable as original research.

REVIEW #2

Review of manuscript 03/178/HS

Although a paper describing differences between model simulations and observations can always be useful and interesting, the manuscript entitled "Is MM5 good enough for air-quality models" by Dr. Harrison is not acceptable for publication in Atmospheric Environment. The title itself is a very broad question that cannot be answered by what is presented in the paper. The author compares a particular version of the model to four radiosonde stations in the Pacific Northwest. That is a very limited scope for such a title. He never shows the domain setup, or the distribution of the vertical levels, and is not precise about giving other information about the model version used in this study. Clearly, the model configuration would play an important role in determining the outcome of such a study. In fact, for very light winds, the choice of model configuration is probably more important than the choice of model.

The author seems unaware that MM5 model output is used by many air-quality groups around the world with success to simulate and predict air quality. At least he does not mention any references describing air pollution applications using MM5. In addition, there has been much previous work by other authors comparing MM5 output to radiosonde data. Although the author lists a number of references, he doesn't tell anything about the work. Do they show similar results or different results? What's the point?

I also have some concerns that are somewhat more specific and are independent of the more general scope of the paper. Nowhere
does the author give details on the interpolation issues. How were the model winds interpolated to the radiosonde stations? This is a very critical issue, especially [but not only] over mountainous terrain, both horizontally and vertically, and can create large errors. Reading the paper, I am not even sure that the author realizes this point. The fact that there is a bias in wind direction at all levels and at all wind speeds looks very suspicious to the reviewer. Were the winds from the modeled grid rotated properly to the radiosonde locations, accounting for the map projection? How can this be done? This can make a difference for both wind direction and wind speed.

If the interpolation issues would be clarified and assuming that the rotation is done properly, the author may have enough material for a paper. "Just another" comparison of model data to observed data over a particular region 'good' or 'bad' results - would still be somewhat boring to this reviewer however, unless we could learn a little bit more about the cause of the success or failure.