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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Now you see it, now you don't: impact of temporary closures of a coal-fired power plant on air quality in the Columbia River Gorge National Scenic Area" *by* D. A. Jaffe and D. R. Reidmiller

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General Comments:

The submitted manuscript explores air pollution attribution questions for a particular source/receptor configuration in Oregon, USA. The work employs observed air quality and back trajectory analysis over a 13 year period. Interestingly, the period of study contains short intervals when the major source was not operating. The study is thus an example of a "natural experiment". Results of the present work are contrasted

with those of earlier (grey literature) studies of the same source/receptor pairs using Eulerian modelling techniques. The present work is convincing, and apparently not subject to some of the weaknesses of the earlier studies. While there are aspects of the submitted work that will need improvement, it provides both an interesting resolution to a locally important environmental question, as well as a fine illustration of an important mode of analysis. It should be published.

Specific Comments:

1) The abstract should be rewritten. It is far longer than it need be. It should capture the research questions listed on page 4. As it is, the abstract reads as if the work was not based on any particular question or idea, but rather was simply an analysis of an interesting data set. While the technicalities of the paper are not novel, the novelty lies in the way the data and its analysis were deployed to provide answers to an interesting (and important), though highly specific, environmental question.

2) Research Questions (Page 4): Research question number 4 (dealing with temporal trends) is only indirectly related to the overall thrust and major issue of the work. It can be deleted without any loss of substance. If this is done, section 3 (e) and the related conclusion paragraph should also be deleted.

3) Figure 3 & page 9, lines 23 to 26: The authors note that "no significant relationship results", and then in the next sentence say that "closer examination .. illustrates" that a relationship does exist. If a statistical significance analysis shows no relationship, then the question is closed and cannot be opened by any further analysis, discussion or examination.

4) There exist a number of instances of arbitrary, or needlessly vague definitions. These should be tightened up.

4.1) Page 6, lines 4 & 5: "Portland" and "east CRG" are not well-defined regions. More precise language is needed here. If specific regions are used in the paper, their spatial

extent should be marked on Figure 1.

4.2) Page 6, section 3 (a) and Table 1: Months are arbitrary divisions of a year. The authors should repeat their analysis with time blocks ranging from 10 days to 60 days, centered around November to see what sub period of a year (defined by relative day-of-year) has the maximum frequency of high PM days.

4.3) The paper refers to “regions” (page 6, line 5); “source region” (page 6, lines 2 and 4); “categories” (page 7, line 10) and “transport pathway” (page 7, line 27); “backtrajectory categories” (page 9, line 1) in a way which implies these are all equivalent. Careful thought and usage must be applied to make it absolutely clear to readers exactly what is being done.

5) The authors must specify over what horizontal spatial range their “source regions” (or whatever term they decide is best for this idea) are defined. I assume this will be decided by the range of back trajectories that arises in their analysis.

6) Table 2: The authors must explain how the classification that results in this table was performed. They must explain this in a way that makes it clear how they avoided bias in the classification. This is generally done by the investigators devising a classification scheme (a set of rules or criteria) and then allowing unbiased and uninformed but competent technicians to perform the classification.

Technical comments:

7) In a number of places the abbreviation U.S. is used. For an international journal, the full country abbreviation U.S.A. should be used.

8) The unit “short ton” may not be understood by international readers.

9) Figure 4: The information contained in this figure is all in table 5. The figure should be deleted.

10) Text, Table 4 and Figure 3: The text implies 163 available data points. Table 3 has

a total of 152 data points. Figure 3 (by rough count) has approximately 137 data points. This apparent disagreement must be clarified.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 14235, 2009.