**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Receptor modelling of secondary particulate matter at UK sites" by A. Charron et al.

Anonymous Referee #1

The manuscript presents a work of potential interest to other people working on the subject, however it is difficult to see what is really new about the data on this paper, as there are previous publications (cited) on this matter and same data set. The authors therefore need to clarify what is innovative in this paper. The results and discussion section is too long given the limited scope of the conclusions. There needs to be a better balance between these sections. Some more detailed comments and recommendations are shown below:

- Page 27256, line 23: "in common with many other administrations": how many? such as? The comment seems vague. - Page 27257, line 12: why "only" five days/month? Is this not enough for the results? - Page 27258, lines 1-9: the manuscript questions the value of chemistry-based transport models, but offers no similar criti-

cism for receptor modelling. Authors should attempt to identify the weaknesses and strengths of such models, providing a more balanced comparison between the two methods. - Page 27259, lines 1-2: "A careful analysis of data..:", how careful? Why is the power station unimportant? Maybe there is only a "minimal influence" on PM mass (whatever that is), but what about chemical components? How representative of a truly rural site is the monitoring site at Harwell given the fact that it is close to major industrial and traffic activities (the nearby A34 is a major Eurohighway: http://commons.wikimedia.org/wiki/File:The_A34,_Harwell_-_geograph.org.uk_-_444131.jpg)? - Section 2.1.1: all this information would be clearer if shown in a more detailed map figure showing location of main possible pollution sources around the site. Same applies for the EROS site. - Page 27260, line 2: why did you change type of filters? - Page 27260, line 20: which second dataset? - Page 27261, line 12: change "is" for "are" - Page 27262, line 11: explain why a factor of 1.8 was chosen. - Page 27262, line 20: how far was the meteorological site from the monitoring site? - Page 27265, section 3: this section is very long and would benefit from being clarified and better organised. In this case mixing results and discussion does not work well, the text would be easier to read if firstly the results were stated, and then a discussion provided. - Page 27268, lines 3-5: this is weak, more clarification on the process is needed. - Page 27269, line 10: contrary to the statement, sulphate and nitrate seem to show higher concentrations with E-NE winds. - Page 27270, line 6: in addition to the potential source for chloride in northern Europe, the figure also shows high concentration in for example central Spain. I'm not sure about the explanation given here. - Page 27270, sulphate concentrations: what about the darker spots in the Atlantic with more sulphate (for example) concentrations than other spots around. Authors should mention these problems in their discussion. - Page 27271, line 4: comparison between figures is not that clear. - Page 27271, lines 10-20: should not this be discussed under section 3.2? - Page 27273: what are the differences between C5 and C7, and between C1 and C6? Also C2 and C6 are very similar in values (lines 21-24)and C6 is only crossing Brittany. - Page 27273-27274: Explain in more detail how do you see the pro-

portion of stagnation at each C situation? - Page 27275, line 13: what kind of biogenic emissions occur in the warmer months in the area? - Page 27276, lines 10-14: this text has been shown previously. In general section 3.6 is not well linked to previous parts. Either delete it or explain better how to use these data. - Page 27278: the conclusions are short and weak making the results and discussions section too long. It needs improving, stating what is new about the manuscript. - Page 27284, Table 1: will the last two columns on the right change if you show the PM10 data for the same periods as the PM2.5? - Page 27293, figure 7: define SOM. - Page 27294, figure 8: why are differences so big between concentrations in figures 7 and 8? For example in figure 7 with E winds concentrations are c. 25 ug/m3, and in figure 8 C2 (east backtrajectory) are c. 15ug/m3.

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