**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Development and application of a reactive plume-in-grid model: evaluation over Greater Paris" *by* I. Korsakissok and V. Mallet

Anonymous Referee #2

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It is a good paper tackling an important aspect of the atmospheric pollution modelling. In spite of there was in the past several works about how to deal with point sources in Eulerian models even using Lagrangian models, the main contribution is to include the chemical transformation of the pollutants in a plume-in-grid model.

However, there are some specific minor comments. They are the following:

1) The scientific notation used in some parts is confused and hard to follow, especially in section 2.2.1. For example, in the case of equation (1), where it is not clear the definition of volume.

2) In section 3.1, it is said "The meteorological fields where interpolated from ECMWF

fields". Does it mean that no mesoscale meteorological model was used?. How was the interpolation done?. Is it a mass conservative interpolation or a simplle mathematical interpolation?. More details are needed. I think that it would be an important source of error and to use some mesoscale meteorological model should be better.

3) In section 3.2, concerning to the plume rise parameterization, I can not figure out whether the Briggs formulae is better than others considering that some point sources ar in urban areas.

4) Results show that in this urban scenario with a large contribution of area sources respect to point sources, the improvements in the estimated concentrations are very short. May be it should be interesting to check this new plume-in-grid model in a more rural scenario. In addition, some used dispersion parameterizations are more suitable for rural areas.

5) I highly recommend changing the colour scale in figure 9 in order to get a more clear and sharp separation between positive and negative values. Now it is difficult to see that difference.

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