Reviewer's report

Title: Using New Satellite Based Exposure Methods To Study The Association Between Pregnancy PM 2.5 Exposure, Premature Birth And Birth Weight In Eastern Massachusetts

Version: 1 Date: 30 December 2011

Reviewer: Anna Molter

Reviewer's report:

Major Compulsory Revisions

None required

Minor Essential Revisions

1. Section 2, exposure data, cumulative traffic density: Please provide a reference, when stating that traffic emissions are only a small part of the total PM2.5, as this may differ in other study areas.

2. Section 2, exposure data, cumulative traffic density: please provide an example map that shows how road segments and birth addresses were assigned to grid points. Please also explain why you used this method rather than the “traditional” approach of calculating traffic intensity within a 100m buffer of the birth addresses.

3. The title of Table 3 contradicts the description in section 3. Does an increase in PM2.5 increase the OR of a full term birth or the RR of a preterm birth?

4. Section 3, paragraph 4: Typing error at start of sentence.

5. Section 4, paragraph 5: Please provide a reference for spatial homogeneity of PM2.5.

6. Section 4, paragraph 5: A further limitation of the 10x10km grid is the modifiable areal unit problem, which not only relates to the scale of a grid, but also to its spatial structure (e.g. Dark & Bram, 2007; Parenteau & Sawada, 2011). The authors should also include this in their discussion.

Furthermore, a general limitation in (most) air pollution studies is that they rely on outdoor concentrations, which may differ from indoor concentration and personal exposure. Although the authors use a very promising new method to estimate exposure, exposure misclassification may still be an issue.

Discretionary Revisions

1. Section 1 paragraph 1: Do you mean smaller body size for gestational age?

2. Figure 1 is a bit difficult to read, due to clustering of births in high pollution areas. Could you make this map clearer?

Level of interest: An article of importance in its field
Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests