Reviewer's report

Title: Particulate air pollution and chronic ischemic heart disease in the eastern United States: a county level ecological study using satellite aerosol data

Version: 1 Date: 11 May 2009

Reviewer: Marta Blangiardo

Reviewer's report:

The paper presents a study to evaluate the association between particulate air pollution (measured by aerosol optical depth) and chronic ischemic heart disease in the eastern United States. Three model are considered: a ordinary least square, a spatial lag and a spatial error.

The paper is well written and explore an interesting topic which could have an impact at the level of the health policies.

Major point:

1) In the section "CIHD data" you point out that you do not consider a county if the number of deaths is too small (less than 5). How many counties are lost doing this? Could you use an alternative method to deal with the unstability of the SMR when the numbers of events are small, for instance borrowing information from counties with similar characteristics, which allow to smooth the SMR (i.e. multilevel models or hierarchical model in a Bayesian framework). These could be appropriate as the data used here could be treated as hierarchical (counties in the same state in the same region) Have you though about using them? Please discuss this point

2) In the section "Linking CIHD wuth AOD" you said that the "significance was tested by comparison to a reference distribution obtained by random permutations". Could you explain the method used? What you are permutating?

3) In the discussion you said that you did not consider confounders like smoking prevalence, cholesterol level, etc... Could you explain why you decided against it? Are the data not easily available or are there other reasons?

4) In the discussion you said that the values of the R2 are low. Could it be because the dose response between AOD and SMR is not linear? Have you tried any other shape (e.g. quadratic, cubic, spline)? Please discuss this point.

Minor points:

1) in equation (1) please explain what is rho. Is it the same as lambda in equation (2)?

Discretionary revision

1) In the introduction you said that the study area is the Eastern US as the Pearson's correlation between AOD and PM2.5 is higher than in the Western
regions of the US. Do you think there is a reason for that? I think it would be useful to explain a bit more if there is an hypothesis behind this to increase the strength of the paper

**Level of interest:** An article whose findings are important to those with closely related research interests

**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