Reviewer's report

Title: Socioeconomic deprivation and environmental noise exposure in Montreal, Canada

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Reviewer: Matthias Braubach

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Overall a nice paper showing some first work on noise and equity in Montreal. My comments thus mainly focus on aspects I think can be improved for sake of clarity and relevance, and are not indicating serious issues. Largely, they identify things difficult for readers to understand, and provide suggestions to the authors.

Major compulsory revisions: None

Minor essential revisions:

1) Some more relevant literature could be used and quoted. I mean to remember there is also a study by Forastiere for noise and equity in Rome, showing similar results as in Paris.

2) The interpretation of data and the interaction between noise and income quintiles could be more detailed, explaining why noise is clustered in some areas (although traffic noise burden would be expected as linear...) and why income variations are somewhat more dispersed.

3) My main comment is this: It would be interesting to know how the quintiles relate to each other. Fig. 1 only gives the combination of noise/income quintiles with some categories, showing spatial distribution, but it is not possible to get a complete overview this way. It would thus be helpful to add a 5x5 table where the number of dissemination areas for each possible combination is shown (how many areas combine the worst noise with the best income level, how many combine second-worst noise with best income level, and so on for the total 25 combinations). This would (a) allow to assess better the interaction between income and noise and (b) enable to see how many areas actually perform worst for both scales - the figure only offers the score 9+10 which is kind of misleading as it restricts identification of areas where both burdens are combined. Also, with such a table, combinations can be looked at from both perspectives while right now, the score of e.g. 7 could be produced by a 5 for noise and a 2 for income, or exactly the opposite (or various other combinations...). This does not mean anything as it is not clear what is really behind the value 7. A table showing all these combinations and how many areas (or % of areas) fall into this combination would help a lot to understand the situation.

4) I do doubt that the "material" deprivation indicators are really material indicators of deprivation as they almost all relate to social status dimensions in financial capacity terms. They will affect material deprivation but then, this is also
true for unemployment, which probably is partially affecting income. I suggest the authors may want to rephrase the section on their indicators (page 4, lines 115-122) and suggest that their indicators may touch upon both dimensions of deprivation but I’d rather see them as SES-related measures and definitely not material deprivation (the way it as introduced before). However, as results are presented separately for each indicator, I feel it is no problem to just tone down this section on indicator (see exeption noted below in another comment).

5) I was a bit confused reading first about the map where income seems to be chosen as the "main indicator" for deprivation, and then reading that income showed the strongest association. Maybe the sequence of presentation of the results should be reconsidered, explaining first the correlation results and then going for the map description and how it was done.

6) Following on from comment 5, I feel often the term "deprivation" is used as an umbrella term for all or just one of the indicators. I’d suggest not to use these terms as synonyms as the indicators better stand for themselves, rather than for deprivation which is a more complex construct.

7) I’d suggest adding a little section on the strengths of correlations as to my knowledge correlation coefficients of 0.3 are not very impressive. It should be discussed in more detail whether a correlation of 0.4 between income and noise is remarkable, or not. As above, I’d be cautious of the statement that material deprivation indicators show strong correlations (line 169) - I do not consider them to be material deprivation indicators. However, if you want to distinguish indicators 1/2 from indicators 3-6, then I’d also expect discussion on why the latter ones (your "material" indicators) perform stronger.

8) I do not understand the sentence on single factor impacts (lines 160-163).

9) Lines 59-60: I think zoning regulations don`t aim at this. The lower tolerance may rather be a result of the residents there.

10) Overall, the discussion could be more dealing with the results and the various reasons why the findings are made (especially discussing the combinations of the table I suggested above). There seems to be much more on putting the results in context with other studies, then discussion of the results and their implications per se.

11) I think there would be merit in discussing why you find unequal noise distribution in Montreal while various European studies did not find it. One hypothesis to be tested could be that in e.g Paris, commuting is so troublesome that affluent people may prefer to live central, accepting the noise. If Montreal is, due to its structure, less problematic, then this effect would be less strong and then the expected association between lower social status and higher noise exposure could come through more easily. This is just one idea but I’d welcome some more discussion of this.

12) One of the potential limitations not mentioned in the discussion is the use of modelled data. Results could be totally different if measured noise was used. Future studies could make some spot measurements to obtain an idea to what extent the modelled data is in line with reality, or not.
13) The maps presented in some figures have different scales - I kind of doubt the 1000km scale in Figure 1, for example! Also it would be good to explain the symbols on the supplementary map showing highways; this is not obvious to the reader.

**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.