

Reviewer's report

Title: Between-airport heterogeneity in air toxics emissions associated with individual cancer risk thresholds and population risks

Version: 2 Date: 27 January 2009

Reviewer: Kazuya Inoue

Reviewer's report:

The manuscript demonstrates that both the maximum individual risk and nearby total population risk posed by the airports with same emission rate vary substantially across airports and that both risk measures are not well correlated with each other by using the sophisticated atmospheric model (AERMOD). The manuscript also indicates variation of both risk measures across airports can be predicted reasonably well only by easily available variables. The results shown in the manuscript may be useful for policy makers concerning airport modifications or expansions. The manuscript is generally well written and easy to understand except that description of atmospheric model in use (AERMOD) is not enough and that some calculation equations are missing (These flaws will be suggested concretely in the Discretionary Revisions section).

Major Compulsory Revisions:

None

Minor Essential Revisions:

General comments will appear at first, followed by specific comments.

- 1) The authors do not refer to the predictive performance of the atmospheric model in use (AERMOD). They should refer to it somewhere in the manuscript.
- 2) The radius considered for total population risk calculation is 50 km throughout the manuscript. Show the reason why you chose this specific value.

Page 13 lines 14-16. The radii considered for the calculation of 'iF' in the references are also 50 km ? If not, you cannot compare the obtained results with those in the references simply.

Page 14 line 17. 'The population cancer risk' should be 'The population cancer risk at the DMIRET'.

Page 16 lines 5-6. I don't know the reason why the physical interpretability of the regression model is enhanced by using the log transformation on mixing height.

Page 16 lines 9-10. Show the meaning of 'interaction between population and mixing height'.

Page 18 lines 2-3. '44 percent higher' should be replaced by '79 percent higher' because $1/0.56$ equals 1.79.

Page 20 line 5. Maximum individual risk and total population risk across airports shown in the manuscript probably mean those calculated for the same emission rate. Please clarify this.

Page 20 lines 12-14. Is the last sentence true? The method seems only applicable for pollutants whose dose-response curve is linear.

Page 28 Table S1. The numeric for the standard deviation (SD) of annual average mixing height and that of annual average max daily mixing height seems wrong.

Page 31 Figure S4. Identify the plot which is stated as outlier in the text.

Discretionary Revisions:

Page 8 lines 5-8. I don't know the meaning of 'radius' or 'radii' here. Please explain these meanings in the manuscript, though readers can probably know them when they see the references.

Page 8 line 21. The word 'Parallel crossing runways' could have the reader confound. Could you use another word?

Page 11 line 16. Represent 'iF' using mathematical equations.

Page 14 lines 17-18. Show the equation to derive population cancer risk at the DMIRET.

Page 15 line 6. Show the calculation equation for Lifetime cancer cases (0.04).

Page 15 line 8. Show the calculation equation for MIR ($2.5E-7$).

Page 17 line 21. I don't know the difference between a 'volume source' and an 'area source'. Please explain the difference in the manuscript, though readers can probably know it when they see the references.

Page 25 Table 2. 'Intercept' column should be moved to the most right. Clarify which are dependent variables and which are independent variables.

Page 25 Table 3. Clarify which are dependent variables and which are independent variables.

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.