Mediation pathways and effects of green structures on respiratory mortality via reducing air pollution

Yu-Sheng Shen [a] Shih-Chun Candice Lung[a, b, c, *]

[a] Research Center for Environmental Changes, Academia Sinica, Taipei, Taiwan.
[b] Department of Atmospheric Sciences, National Taiwan University, Taipei, Taiwan
[c] Institute of Environmental Health, National Taiwan University, Taipei, Taiwan

[*]Corresponding author, Research Center for Environmental Changes, Academia Sinica, No. 128, Sec. 2, Academia Rd, Nangang, Taipei, Taiwan 11529; Tel: 886-2-26539885 ext. 277, Fax: 886-2-27833584, Email: sclung@rcec.sinica.edu.tw.

Supplementary Information

1.Indicators of landscape metrics

Table S1. Indicators of landscape metrics (class level)

Indicator	Formula	Unit
Percentage of Landscape (PLAND)	$\left(\sum_{j=1}^{n} a_{ij} \Big/ A\right)(100)$ a_{ij}: area of patch j (class i). A: total landscape area.	%
Aggregation Index (AI)	$[g_{ss}/(\max \rightarrow g_{ss})](100)$ g_{ss}: number of like adjacencies between pixels of patch type (class) s obtained using the single-count method. max→g_{ss}: maximum number of like adjacencies between pixels of patch type (class) s obtained using the single-count method.	%
Percentage of Like Adjacencies (PLADJ)	$\left(g_{ii} \Big/ \sum_{k=1}^{m} g_{ik}\right)(100)$ g_{ii}: number of like adjacencies between pixels of patch type (class) i obtained using the double-count method. g_{ik}: number of adjacencies between pixels of patch types (classes) i and k obtained using the double-count method.	%
Patch Density (PD)	$(n_i/A)(10{,}000)(100)$ n_i: number of patches in the landscape of patch type (class) i. A: as previously defined.	Number per 100 hectares
Mean Nearest Neighbor Distance (ENN_MN)	$\sum_{j=1}^{n'} h_{ij} \Big/ n'_i$ h_{ij}：distance between patch j (class i) and patch of the corresponding class. n'_i：number of patches in the landscape of patch type (class) i with nearest neighbor distance.	Meters
Area-Weighted Mean Nearest Neighbor Distance (ENN_AM)	$\sum_{j=1}^{n} \left[h_{ij} \left(a_{ij} \Big/ \sum_{j=1}^{n} a_{ij} \right) \right]$ h_{ij}, a_{ij}：as defined above.	Meters
Largest Patch Index (LPI)	$(MAX\ (a_{ij})/A)(100)$ a_{ij}, A: as defined above.	%

Source: Leitão et al. (2006); McGarigal and Marks (1995).

2.Calculation of the ratio of secondary aerosols to primary aerosols

The detail calculation of secondary aerosols/primary aerosols includes four steps. Those steps are as follow:

Step 1: Obtaining the SOC/OC and POC/OC from results of Chou et al. (2010).

SOC/OC = SOC/(SOC+POC) = five-years mean of SOC/(five-years mean of SOC+ five-years mean of POC) = 2.12/(2.12+4.78) ≒ 0.307

POC/OC = 1 − (SOC/OC) ≒ 0.693

Step 2: Using the SOC/OC and POC/OC ratios to calculate the approximate concentration of SOC and POC in OC component in Chang et al. (2010)

SOC = 0.307×5 = 1.535

POC = 0.693×5 = 3.465

Step 3: Summing up the primary aerosols from EC and POC, and summing up the secondary sources from SOC, SO_4^{2-}, and NO_3^- in Chang et al. (2010)

primary aerosols = EC+POC = 1.6+3.465 = 5.065

secondary aerosols = SOC+SO_4^{2-}+NO_3^- = 1.535+6.4+1.8 = 9.735

Step 4: Calculating the ratio of secondary aerosols to primary aerosols

secondary aerosols/primary aerosols = 9.735/5.065 = 1.9