

Supplemental Information

Table S2: Mean (\pm standard deviation) PM mass fractions (as %) of water-soluble inorganic ions. P-values correspond to the comparison of the mass fractions in PM_{2.5} and PM₁₀ (n = 27 each). Stars (*) indicates the ions whose mass fractions to PM_{2.5} and PM₁₀ differ significantly.

| Water-soluble ion | % of PM _{2.5} | % of PM ₁₀ | p-value |
|-------------------|------------------------|-----------------------|---------|
| Ammonium | 8.87 \pm 3.02 | 5.88 \pm 2.45 | <0.001* |
| Sodium | 0.19 \pm 0.28 | 1.07 \pm 1.76 | 0.83 |
| Potassium | 1.01 \pm 0.40 | 0.56 \pm 0.17 | <0.001* |
| Magnesium | 0.05 \pm 0.07 | 0.19 \pm 0.14 | 0.01* |
| Calcium | 0.97 \pm 1.29 | 2.42 \pm 1.74 | 0.11 |
| Fluoride | 0.09 \pm 0.10 | 0.35 \pm 0.22 | <0.001* |
| Chloride | 2.02 \pm 2.06 | 1.66 \pm 1.29 | 0.45 |
| Nitrate | 4.02 \pm 1.92 | 3.36 \pm 1.74 | 0.28 |
| Sulfate | 16.16 \pm 4.28 | 11.01 \pm 3.46 | <0.001* |

Table S3: Ambient concentrations of PM₁₀ mass and inorganic ions measured at Bode in the Kathmandu Valley.

| Species | Overall | Daytime (8:00 am - 5:30 pm) | | Nighttime (6:00 pm – 7:30 am) | |
|--|----------------------|-----------------------------|-------------|-------------------------------|-------------|
| | Mean \pm std. dev. | Mean \pm std. dev. | Range | Mean \pm std. dev. | Range |
| PM₁₀ mass ($\mu\text{g m}^{-3}$) | 118.8 \pm 56.2 | 117.0 \pm 56.0 | 52.0-211.8 | 122.2 \pm 56.4 | 53.6-294.0 |
| Inorganic ions ($\mu\text{g m}^{-3}$) | | | | | |
| Ammonium | 5.8 \pm 2.8 | 4.2 \pm 1.0 | 2.7-6.1 | 8.6 \pm 3.3 | 3.3-16.6 |
| Sodium | 0.10 \pm 0.10 | 0.21 \pm 0.02 | 0.004-0.050 | 0.02 \pm 0.02 | 0.002-0.056 |
| Potassium | 0.55 \pm 0.22 | 0.55 \pm 0.22 | 0.26-1.01 | 0.70 \pm 0.34 | 0.42-1.66 |
| Calcium | 0.65 \pm 0.50 | 3.5 \pm 2.3 | 0.08-6.78 | 1.6 \pm 1.1 | 0.11-4.03 |
| Magnesium | 0.04 \pm 0.03 | 0.22 \pm 0.12 | 0.04-0.41 | 0.11 \pm 0.05 | 0.04-0.18 |
| Nitrate | 2.7 \pm 1.7 | 4.6 \pm 2.7 | 2.2-11.8 | 5.6 \pm 2.8 | 2.8-12.6 |
| Sulfate | 10.2 \pm 3.7 | 9.6 \pm 2.3 | 6.6-15.3 | 14.1 \pm 3.9 | 6.9-22.5 |
| Chloride | 1.5 \pm 1.6 | 0.59 \pm 0.42 | 0.07-1.40 | 3.3 \pm 1.7 | 0.44-7.04 |
| Fluoride | 0.05 \pm 0.02 | 0.23 \pm 0.15 | 0.07-0.59 | 0.40 \pm 0.32 | 0.07-1.23 |

std. dev. = standard deviation

Figure S1: Comparison of CMB model performance metrics for the sensitivity tests using different biomass and garbage burning profiles. The R^2 values (a) represent the fraction of the variance measured in the ambient $PM_{2.5}$ explained by the model. The χ^2 values (b) represent differences between the measured and calculated fitting species concentrations. Two garbage burning profiles did not show significant differences in their performance metrics.

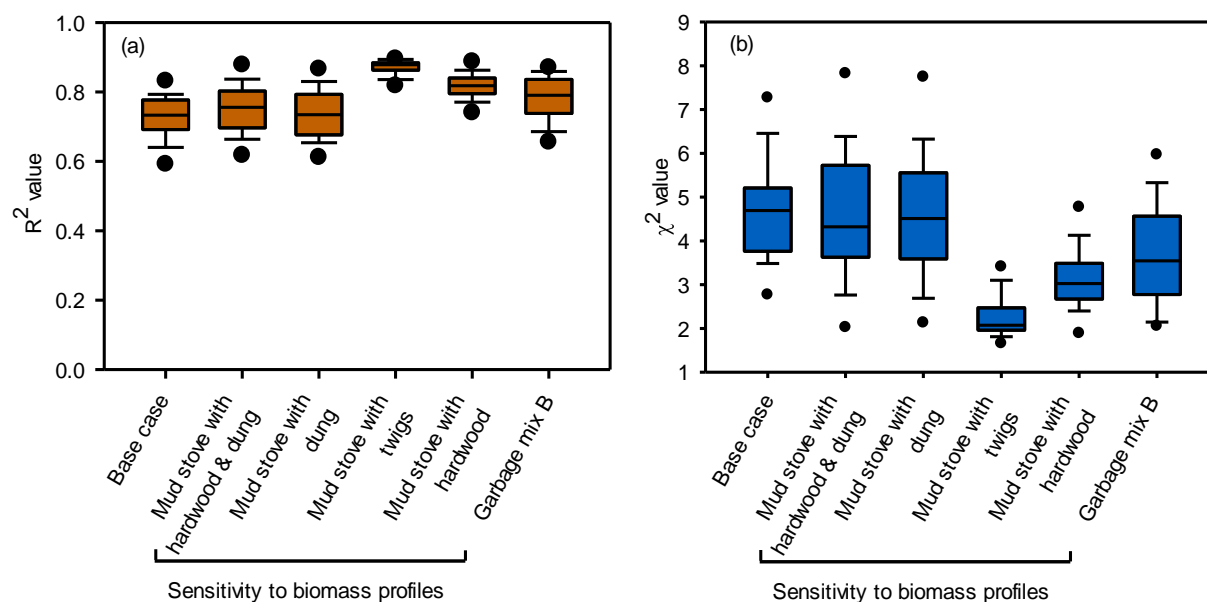


Figure S2: Apportionment of primary and secondary sources for $PM_{2.5}$ EC based on CMB modeling.

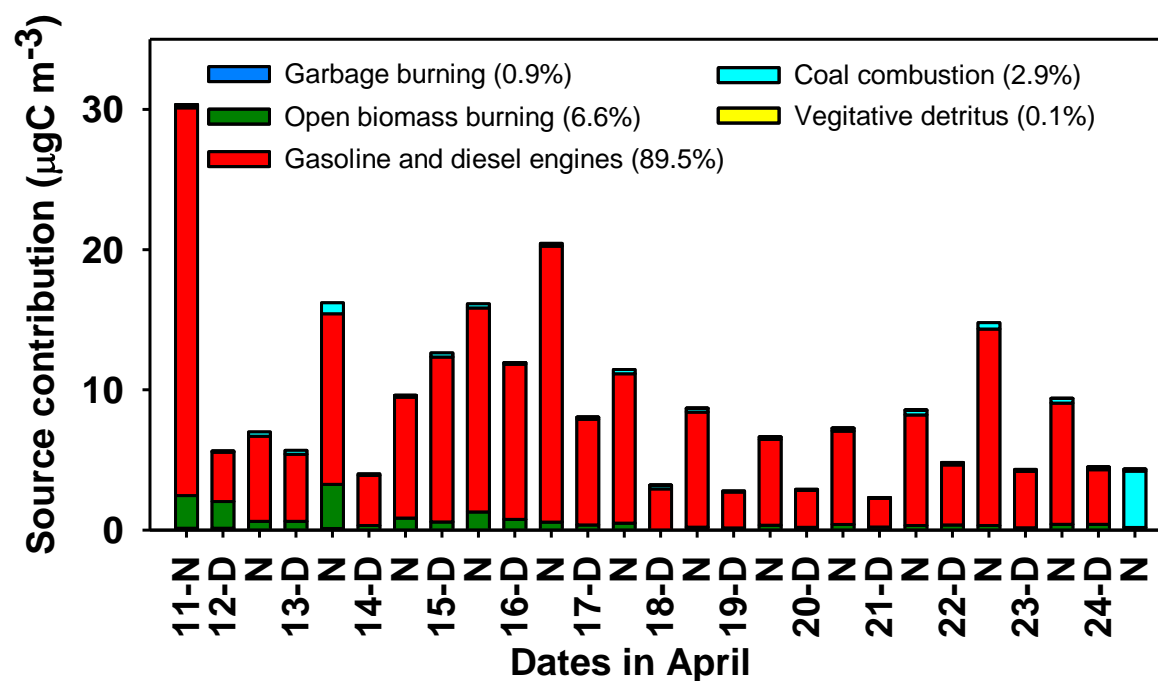


Figure S3: Sensitivity of CMB model results to the input source profiles: (a) sensitivity of garbage burning contributions to $\text{PM}_{2.5}$ EC to the garbage burning profile and (b) sensitivity of biomass burning contributions to $\text{PM}_{2.5}$ EC to biomass burning profiles.

