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Supplement of

Sources of organic aerosols in Europe: a modeling study using CAMx with modified volatility basis set scheme

Jianhui Jiang et al.

Correspondence to: Sebnem Aksoyoglu (sebnem.aksoyoglu@psi.ch) and Jianhui Jiang (jianhui.jiang@psi.ch)

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**Table S1** Description of semi-volatile organic compounds (SVOC) and intermediate-volatility organic compounds (IVOC). The same calculations were adopted for IVOC emissions in BASE and NEW. GV: Gasoline Vehicles; DV: Diesel Vehicles; BB: Biomass Burning; OthA: Other anthropogenic sources.

<table>
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<tr>
<th>Species</th>
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<th>Calculations</th>
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<th>References</th>
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<td>SVOC</td>
<td>GV</td>
<td>= POA_GV</td>
<td>3 * POA_GV</td>
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<td>POA emissions of each source were calculated from TNO PM$_{2.5}$ emissions</td>
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*The units in the brackets are only for MB, MGE and RMSE. IOA is unitless.*
Table S3. Evaluation of the model performance for the chemical species. MB: mean bias; MGE: mean gross error; RMSE: root-mean-square error; MFB: mean fractional bias; MFE: mean fractional error; IOA: index of agreement. DJF: December-January-February, MAM: March-April-May, JJA: June-July-August, SON: September-October-November.

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* Units are ppb, except for PM\textsubscript{2.5} which is \( \mu g \) m\(^{-3}\).

Table S4. Performance criteria and goals for model results on PM\textsubscript{2.5} and ozone (Boylan and Russell, 2006; EPA, 2007).

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<td>( \leq 30% )</td>
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Table S5. Seasonal statistical analysis of daily average organic aerosols at nine ACSM/AMS stations. MB: mean bias; MGE: mean gross error; RMSE: root-mean-square error; MFB: mean fractional bias; MFE: mean fractional error. Spring: March-April-May, summer: June-July-August, autumn: September-October-November, winter: December-January-February.

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**Figure S1:** Model domain and spatial distribution of the ACSM/AMS stations.
**Figure S2:** Temporal variations of modelled and measured organic aerosol concentrations together with some meteorological parameters available at Bologna, Marseille and Mace Head.
Figure S3: Comparison between modelled relative contribution of OA components and positive matrix factorization (PMF) analysis results. GV: Gasoline Vehicles; DV: Diesel Vehicles; BB: Biomass Burning; OthA: Other anthropogenic sources; BIO: Biogenic sources.
Figure S4: Spatial distributions of primary and secondary OA from different sources in winter (a, b) and summer (c, d). The winter and summer results are the averages of December – January – February and June – July – August, respectively. Note that different scales are used for biomass burning and biogenic source to facilitate visualization.
Figure S5: Relative contributions of different anthropogenic sources to total PM$_{2.5}$ and NMVOC emissions in 2011. The 8 sub-regions are the Iberian Peninsula (IP), the Mediterranean (MD), Po Valley (PV), eastern Europe (EE), central Europe (CE), Benelux (BX), Ireland and Great Britain (IG), and Scandinavia (SC).