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Receptor modelling of both particle composition and size distribution from a background site in London, UK – a two-step approach

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Table S1. Setup of TSI SMPS.

EC 3080	
Neutraliser	Kr-85 radioactive source
Drier	✓ EUSAAR/ACTRIS Drier
DMA	TSI 3081 long DMA
Aerosol Flow	0.3 lpm
Sheath Flow	3.0 lpm
Impactor Type	0.0508 cm
HV Polarity	Neg
AIM version	9.0
Scans per Sample	6
Number of Samples	1
Total Sample Time	14 min 0 sec
Multiple charge	✓
Diffusion loss correction	✓
Particle Density	1.2 g/cc
Gas Density	0.0012 g/cc
Nano Aggregate Mobility Analysis	×
CPC3775	
Inlet flow	0.3 lpm
Data Coverage	72.5 % over the 2 years 2011/2012
Service and Calibration Date	February 2011 and February/March 2012

Table S2. Miscellaneous PMF-PMF details for the PM_{10}-NSD data set.

INPUT DATA	$({}^{1}\boldsymbol{G}_1 \ldots {}^{1}\boldsymbol{G}_6, \boldsymbol{NSD}_1^{16nm} \ldots \boldsymbol{NSD}_{52}^{640nm})$
Input Settings	
PMF2 version number	4.2
Number of Factors	6
FPEAK	0.1
Input dimensions: Row x Columns	590 x 58
Number of Repeats	1
Outlier Distance	4
Robust Analysis	✓
Error Model	-12
Seed	3
Initially Skipped	0
Uncertainty Matrices T/U/V	✓/×/×
Normalization of factor vectors before output	None
Optional parameter lines	missingneg 10
Output values	
Q in the robust mode	30333
Q when not down weighting outliers	32568
POS-Outlier limit (4.0) exceeded by	221 positive residuals
NEG-Outlier limit (4.0) exceeded by	38 negative residuals

Table S3. Miscellaneous PMF-PMF details for the NSD-PM_{10} data set.

INPUT DATA	([$^1\boldsymbol{G}_1$…$^1\boldsymbol{G}_4$],$\mathbf{PM_{10}}$[$\boldsymbol{PM}$,$\boldsymbol{PM}_{carbon}$,$\boldsymbol{PM}_{ions}$,$\boldsymbol{PM}_{metals}$]).
Input Settings	
PMF2 version number	4.2
Number of Factors	4
FPEAK	0.1
Input dimensions: Row x Columns	591 x 34
Number of Repeats	1
Outlier Distance	4
Robust Analysis	✓
Error Model	-12
Seed	3
Initially Skipped	0
Uncertainty Matrices T/U/V	✓/×/×
Normalization of factor vectors before output	None
Optional parameter lines	missingneg 10
Output values	
Q in the robust mode	17652
Q when not down weighting outliers	18089
POS-Outlier limit (4.0) exceeded by	19 positive residuals
NEG-Outlier limit (4.0) exceeded by	3 negative residuals

Table S4. Summary of the regression results, comparing $^1\boldsymbol{G}_k$ with $^2\mathbf{G}_k$ for *k* in 1 to 6.

		const in $^1\boldsymbol{G}_k$ = *const* x $^2\boldsymbol{G}_k$	R^2
Diffuse Urban	$^1G_1$ vs $^2G_1$	1.2	0.72
Marine	$^1G_2$ vs $^2G_2$	0.73	0.94
Secondary	$^1G_3$ vs $^2G_3$	0.56	0.71
NET & Crustal	$^1G_4$ vs $^2G_4$	0.54	0.96
Fuel Oil	$^1G_5$ vs $^2G_5$	2.9	0.41
Traffic	$^1G_6$ vs $^2G_6$	15.5	0.40

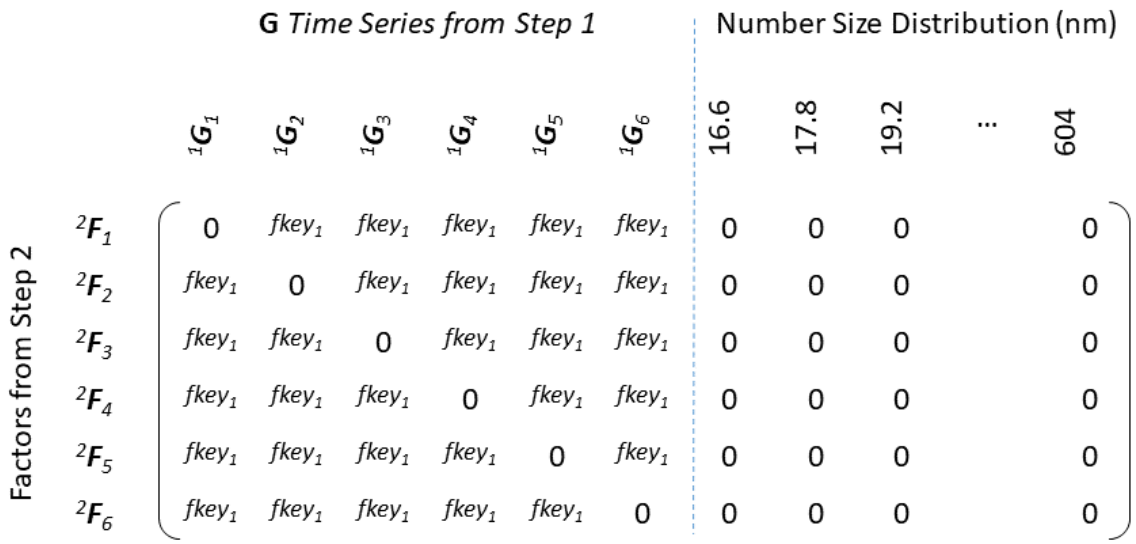


Figure S1. Entries in the **FKEY** matrix used in step 2 of the PMF-PMF analysis using (a) 6 factors and (b) 7 factors. An extremely strong value of 24 was chosen for $fkey_1$ and 20 for $fkey_2$.

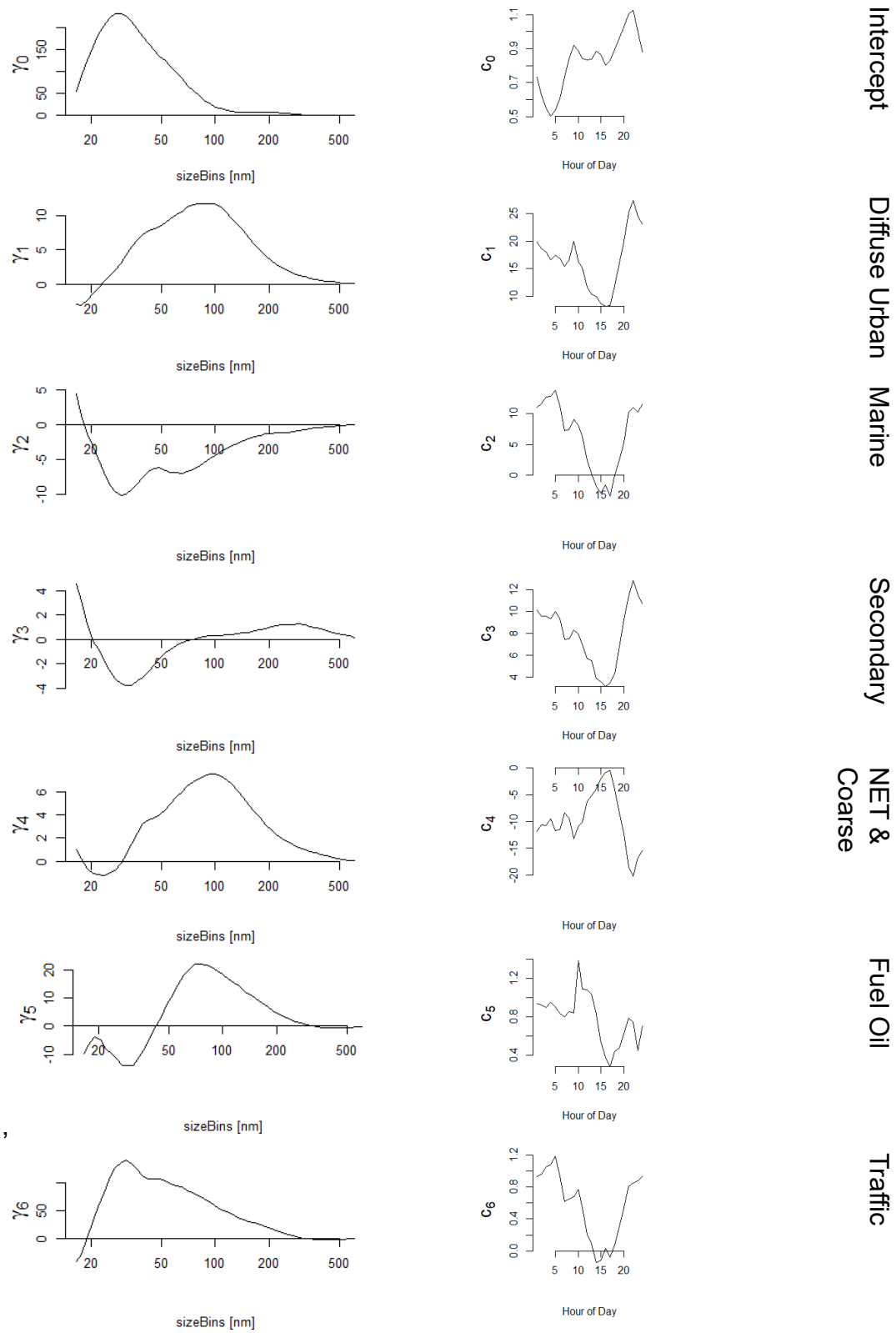
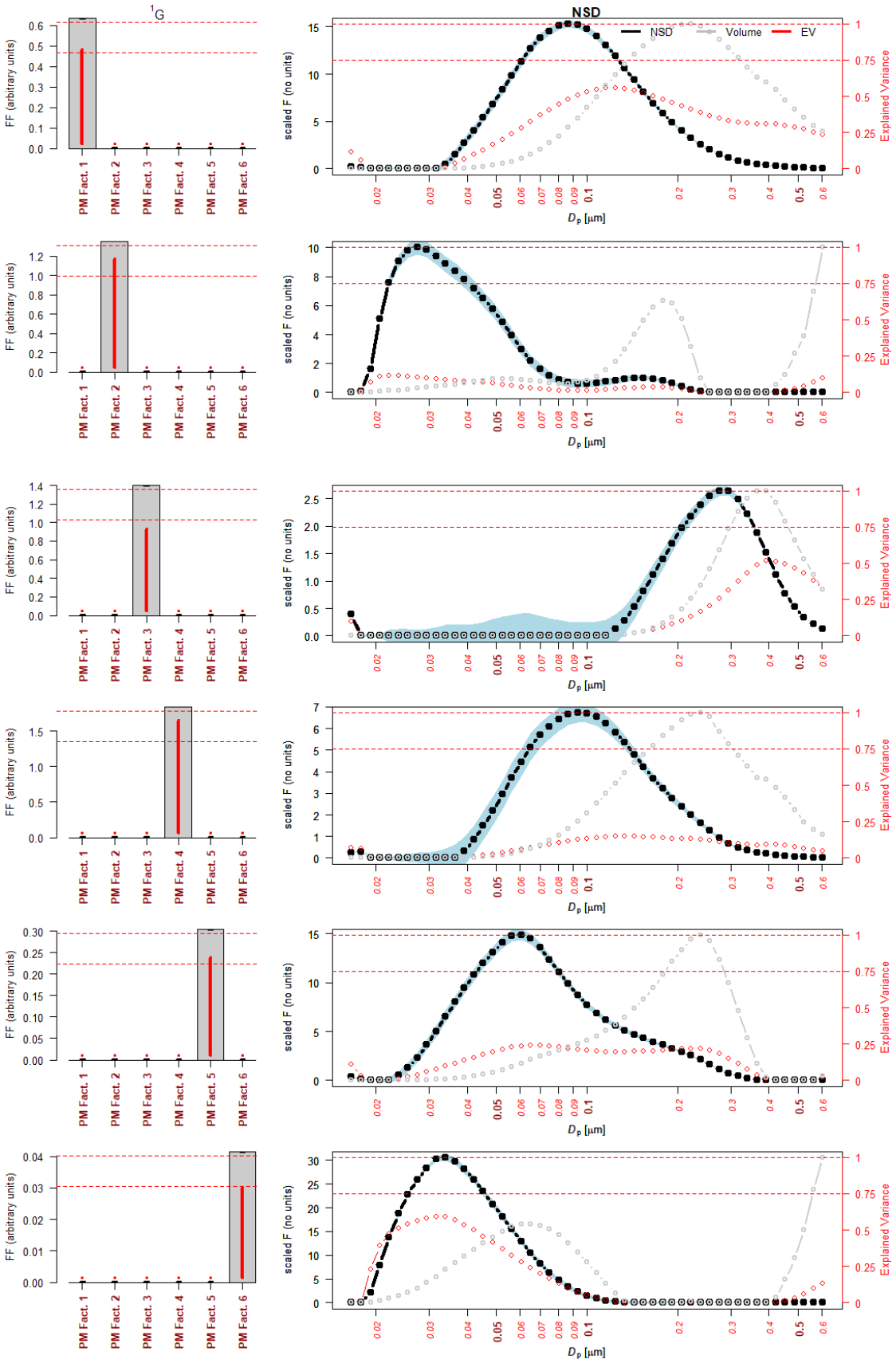


Figure S2. Daily regression source profiles (γ_k vs d_p) obtained from regressing the NSD data against ${}^1\boldsymbol{G}_k$ (left hand panels) as in equation 4 and diurnal trends of the fit parameter c_k resulting from the fit of the daily regression source profiles to the hourly NSD data.



Diffuse Urban

$^2F_1$

Marine

$^2F_2$

Secondary

$^2F_3$

NET & Coarse

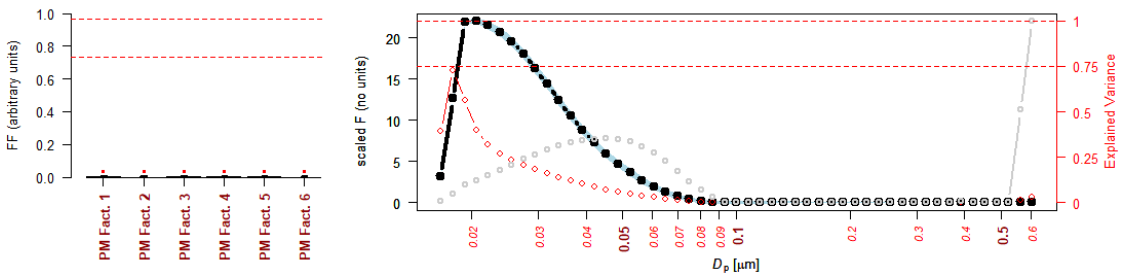
$^2F_4$

Fuel Oil

$^2F_5$

Traffic

$^2F_6$

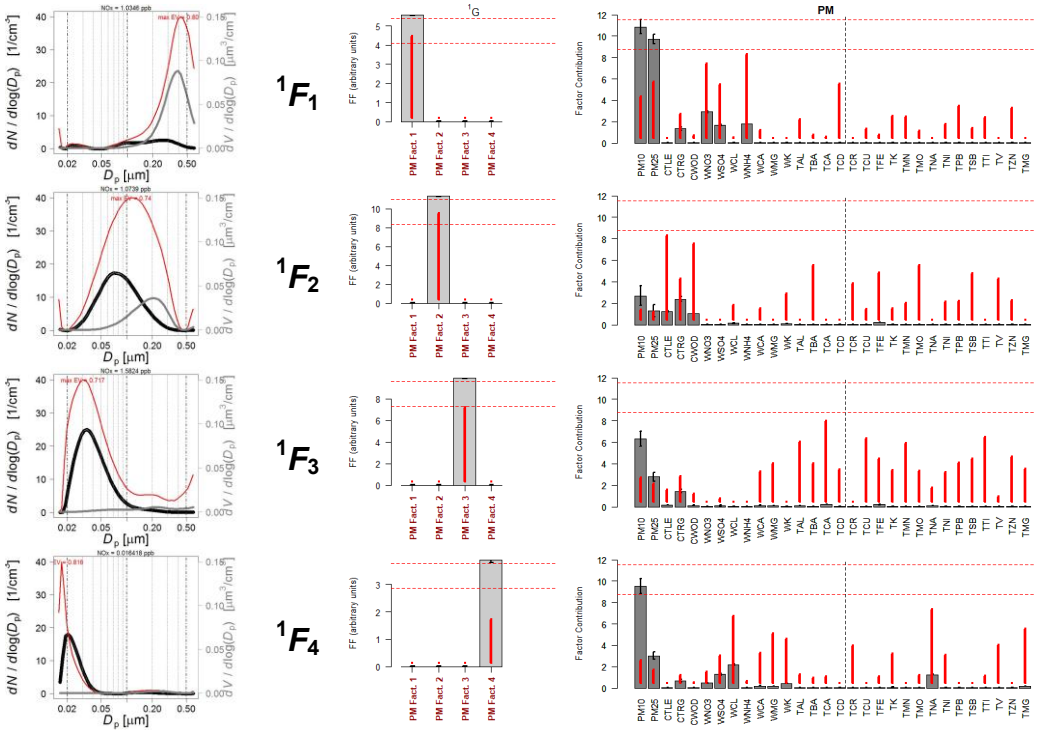


Nucleation

$^2F_7$

Figure S3. Source profiles ^1F and ^2F from both the first and second PMF step using 7 factors. [Grey bars and black line indicates the values of **F**; red lines and dots indicated the explained variation; and grey dotted line indicates the dV/dlogDp values.]

66
67 .
68
69



Secondary

$^2F_1$

Diffuse Urban

$^2F_2$

Traffic

$^2F_3$

Nucleation

$^2F_4$

Figure S4. PMF-PMF 4 factor analysis of NSD data followed by PM_{10}. Each plot is divided into 2 showing the output ^1F_k and ^2F_k. [Grey bars and black line indicates the values of **F**; red lines and dots indicated the explained variation; and grey dotted line indicates the dV/dlogDp values.]

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