Supplement of

Measurement Report: Unraveling PM_{10} Sources and Oxidative Potential Across Chinese Regions Insights Analysis Based on CNN-LSTM and Receptor Model

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S1 Comparison between Northern and Southern sites of OP_v (nmol H_2O_2 ·m^{-3})

Due to the non-normal distribution of the data, a non-parametric Mann-Whitney U test was conducted to examine regional differences in ROS concentrations. The analysis revealed that OP_v levels were significantly higher in the Northern sites compared to the Southern sites ($U = 168517.0$, $p = 0.025$), with the difference exceeding the threshold for statistical significance ($p < 0.05$).

Table S1. The geographical division corresponding to the station.

Geographic region	Station name
Northern sties	LFS, DL, GC, DH, XA, ZZ
Southern sites	LA, CD, JS, NN, CHD

S2 Source profiles from the PMF

Table S2. Specific tracers used in PM_{10} source appointment in this study.

Identified factor	Specific tracers
Sea Salt	Na^+、Mg^{2+}、Cl^-
Dust	Na^+、Mg^{2+}、Ca^{2+}
Traffic	OC，EC
Biomass burning	K^+、Cl^-
Secondary aerosol	NH_4^+、NO_3^-、SO_4^{2-}
Agricultural activities	K^+、Mg^{2+}、Ca^{2+}
Coal combustion	Mg^{2+}、SO_4^{2-}、OC

Table S3. Summary of error estimation diagnostic with PM_{10}-PMF at NN, LFS, ZZ and GC station.

Diagnostics	NN	LFS	ZZ	GC
Number of base run	20	20	20	20
Q_{robust}	2338	2658.86	2043.86	2066.75
Q_{true}	2521.1	3160.89	2341.26	2249.16
Q_{true}/Q_{robust}	1.08	1.18	1.14	1.09

DISP % dQ	< 0.1 %	< 0.1 %	< 0.1 %	< 0.1 %
DlSP swaps	0	0	0	0
Number of BS run	100	100	100	100
Min. Correlation R-Value:	0.6	0.6	0.6	0.6