Prediction of potentially high $PM_{2.5}$ concentrations in Chengdu, China

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Table S1: Person correlation analysis of $PM_{2.5}$ concentration in the monitoring sites.

	USE	LJX	JQLH	CTS	SLD	SHP	SWY	RMGY
USE	1	0.939**	0.916**	0.892**	0.944**	0.934**	0.928**	0.940**
LJX		1	0.957**	0.971**	0.964**	0.957**	0.935**	0.962**
JQLH			1	0.954**	0.948**	0.929**	0.915**	0.938**
CTS				1	0.956**	0.959**	0.948**	0.947**
SLD					1	0.961**	0.937**	0.949**
SHP						1	0.956**	0.947**
SWY							1	0.961**
RMGY								1

Note: ** P<0.01. USE: US Embassy and Consulate station; LJX: Liangjiaxiang station; JQLH: JinquanLianghe station; CTS: Caotangsi station; SLD: Shilidian station; SHP: Shahepu station; SWY: Sanwayao station; RMGY: People's Park station.

Table S2: List of meteorological parameters used in this study.

NO.	Data source	Variables	Description
1	1	Year	Year
2	1	Mon	Month
3	1	TEM	Average daily (24-hour) temperature (℃)
4	1	TMAX	Daily maximum air temperature (℃)
5	1	TMIN	Daily minimum air temperature (℃)
6	1	RH	Average daily (24-hour) relative humidity (%)
7	1	RHMAX	Daily maximum relative humidity (%)
8	1	RHMIN	Daily minimum relative humidity (%)
9	1	WD	Average daily (24-hour) wind direction (degree)
10	1	WS	Average daily (24-hour) wind speed (m/s)
11	1	PRC	Daily total precipitation (mm)
12	1	SLP	Sea level pressure (hPa)
13	1	SLP_{5d}	Sea level pressure 5 days earlier (hPa)
14	2	WD8/20	Vector wind direction (degrees) in lowest 1000 meters height at 8 am and 8 pm local time
15	2	WS8/20	Wind speed in the lowest 1000 meters height at 8 am and 8 pm local time (m/s)
16	2	T1km8/20	Air temperature (℃) in the lowest 1000 meters at 8 am and 8 pm local time
17	2	RH1km8/20	Relative humidity in the lowest 1000 meters height at 8 am and 8 pm local time (%)
18	2	Mix1km8/20	Water vapor mixing ratio in the lowest 1000 meters height at 8am and 8pm local time (g/kg)
19	2	CAPE8/20	Convective available potential energy at 8am and 8pm local time
20	2	LCLP8/20	Lifting condensation level pressure in hPa at 8 am and 8 pm local time
21	2	MLTheta8/20	Mean mixed layer potential temperature in K at 8 am and 8 pm local time
22	2	MLMR8/20	Mean mixed layer mixing ratio in g/kg at 8am and 8pm local time
23	2	Thick	1000 mb to 500 mb thickness in meters at 8am and 8pm local time
24	3	TrajDist	Endpoint distant (point to point) after 12 hours (a) / 24 (b) hours of transport for a back trajectory initialized at 10 am and 10 pm local time (Km)
25	3	TrajQ	Endpoint quadrant after 12 hours (a) / 24 (b) hours of transport for a back trajectory initialized at 10 am and 10 pm local time
26	3	TrajDegs	Endpoint degrees after 12 hours (a) / 24 (b) hours of transport for a back trajectory initialized at 10 am and 10 pm local time (degree)

Data source:

1. China Meteorological Administration
2. Radiosonde (balloon) data (http://weather.uwyo.edu/upperair/sounding.html)
3. HYSPLIT model (v4.9)

The effect of each meteorological factor on the $PM_{2.5}$ concentration. All the selected meteorological factors have a non-linear relationship with $PM_{2.5}$ concentration.

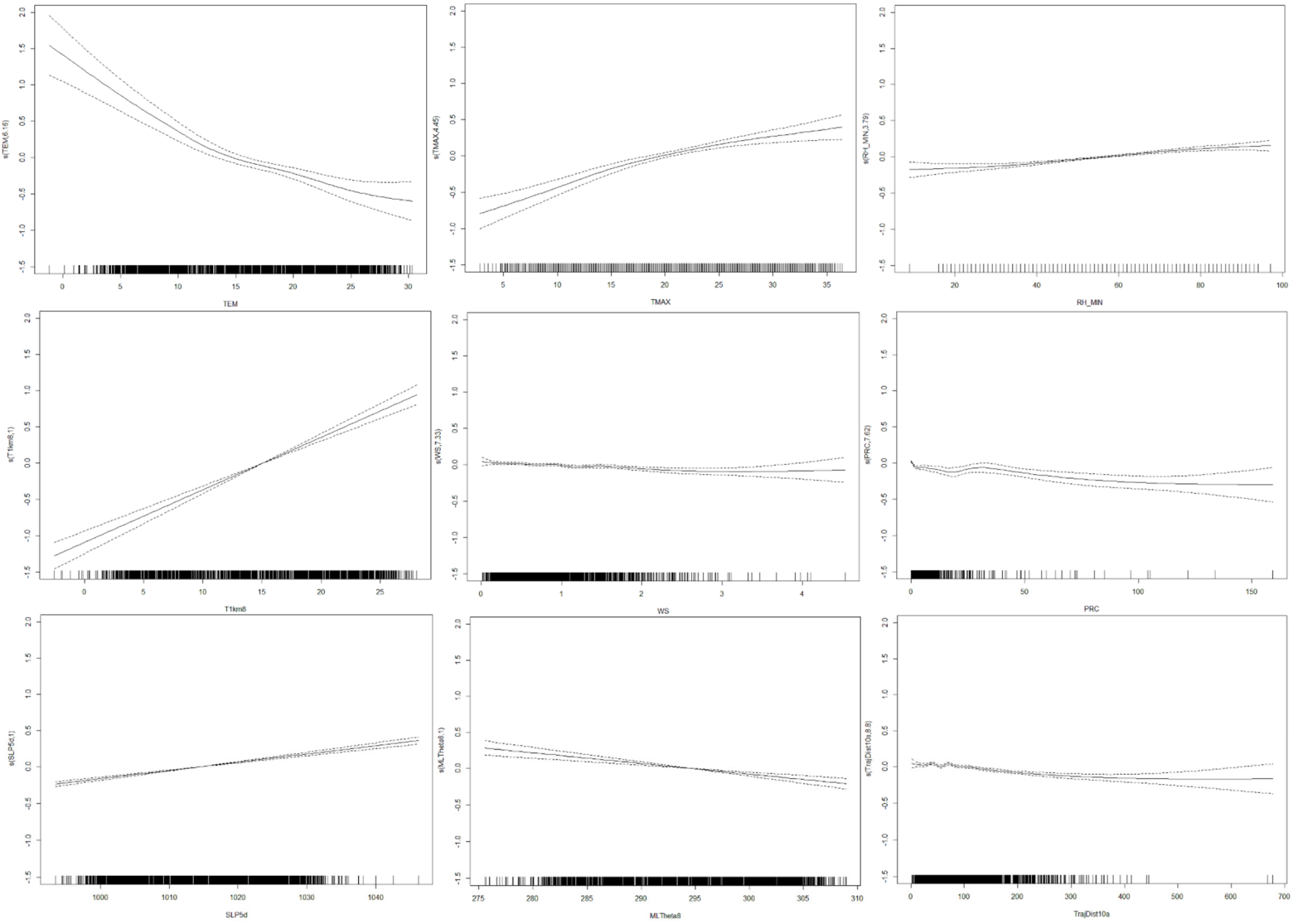

Fig. S1 Partial response plots for daily $PM_{2.5}$. The dashed line represents the point-by-point standard deviation of the fitting function (i.e., the upper and lower limits of the confidence interval); the solid line represents the smooth fitting of the explanatory variable to $PM_{2.5}$ concentration. The x-axis is the observed value of the explanatory variable, the y-axis is the smooth fitting value of the explanatory variable to $PM_{2.5}$ concentration.

Mean ΔSLP did not show a significant difference on randomly selected days.

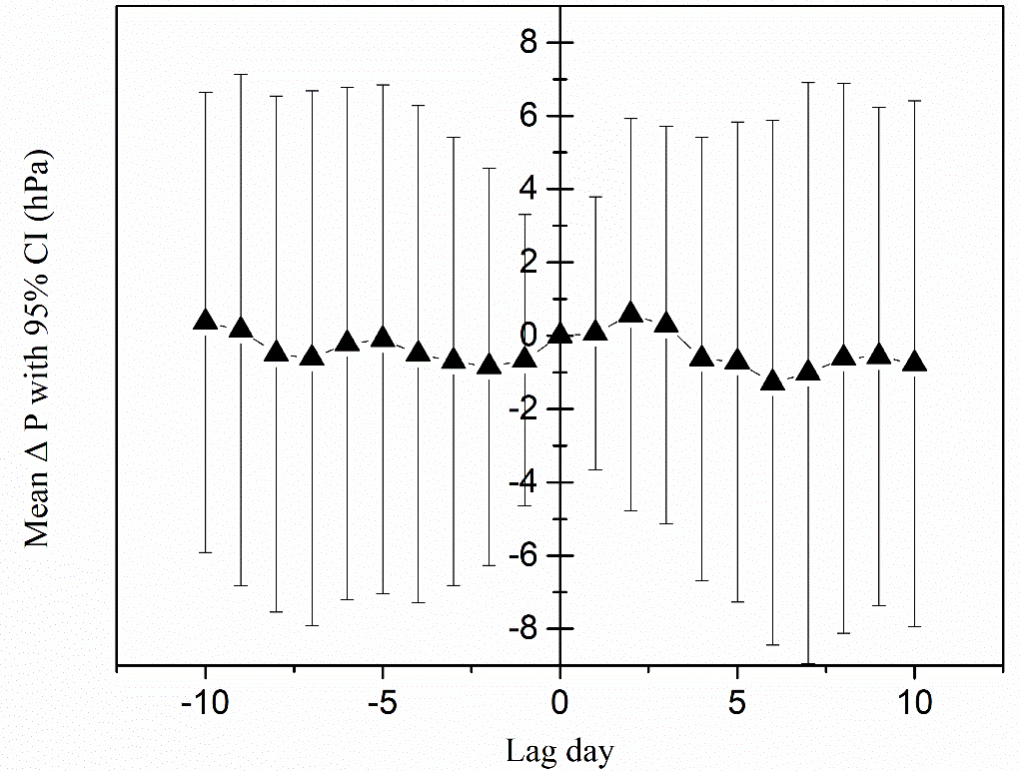

Fig.S2 Mean ΔSLP (±95% CI) on randomly selected days in each year (2013-2017).