Supplementary Information

Table S1. Instrumentation, observational period and data coverage for main parameters measured at the SORPES station.

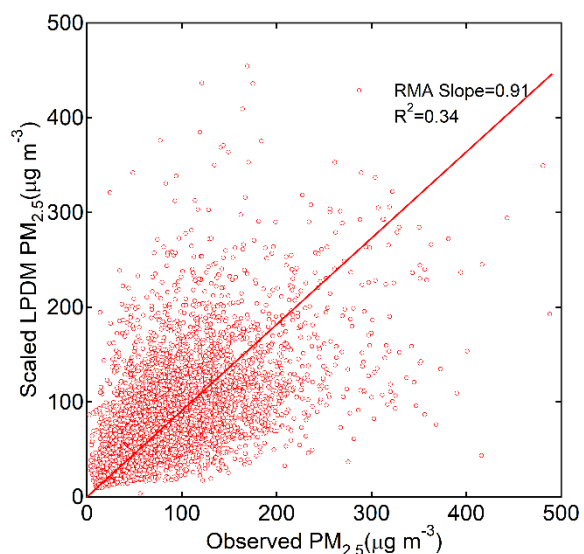| Parameter	Instruments	Resolution	Period	Data coverage
$PM_{2.5}$	Thermo Fisher Scientific SHARP 5030	5 min	August 2011-July 2018	97.8%
SO_2	Thermo Fisher Scientific TEI-43i	5 min	August 2011-July 2018	98.3%
NO_2, NO_x	Thermo Fisher Scientific TEI-42i	5min	August 2011-July 2018	93.9%
BC	Magee Scientific AE31	5min	May 2013-July 2018	91.9%
SO_4^{2-}, NO_3^-, NH_4^+, K^+ etc.	Metrohm, MARGA	1 hr	May-June 2012 May 2013-July 2018	83.7%

Figure S1. Scatter plot of scaled LPDM simulated $PM_{2.5}$ versus observations at the SORPES station for the period of November-January during 2013-2018. Note: Here the "scaled" means for each month the simulation result was adjusted to have the medium value matched with observation.