Table S1. Location of 11 national air monitoring stations in Shenzhen City and their land-use types.

Name of station	Geographic Coordinates	Location	Land Use Type
Liyuan	114.096°E，22.550°N	Litchi Park	Parks and green spaces
Honghu	114.117°E，22.563°N	Honghu Park	Parks and green spaces
Huaqiaocheng	113.987°E，22.542°N	Huaqiaocheng Primary School	Educational land
Nanyou	113.923°E，22.517°N	Nanyou Primary School	Educational land
Yantian	114.263°E，22.591°N	Yangang Primary School	Educational land
Longgang	114.240°E，22.727°N	Longgang Party School	Educational land
Xixiang	113.891°E，22.579°N	Wenhui Middle School	Educational land
Nan'ao	114.494°E，22.542°N	Nan'ao Primary School	Educational land
Kuiyong	114.410°E，22.634°N	Kuiyong No. 2 Primary School	Educational land
Meisha	114.297°E，22.598°N	ZTE Communication College	Educational land
Guanlan	114.085°E，22.750°N	Lane 2, Guihua Road	Industrial land

Table S2. GF-1 WFV images of Shenzhen City used in this study.

Number	Date	Camera	Number	Date	Camera
1	2 Jan. 2015	WFV3	14	27 Mar. 2016	WFV1
2	10 Jan. 2015	WFV3	15	8 July 2016	WFV2
3	18 Jan. 2015	WFV2	16	24 July 2016	WFV1
4	22 Jan. 2015	WFV2	17	29 July 2016	WFV3
5	8 Feb. 2015	WFV4	18	4 Nov. 2016	WFV3
6	12 Feb. 2015	WFV3	19	31 Dec. 2016	WFV1
7	15 Apr. 2015	WFV4	20	1 Jan. 2017	WFV4
8	7 June 2015	WFV4	21	1 Apr. 2017	WFV4
9	5 Sept. 2015	WFV3	22	30 Apr. 2017	WFV4
10	24 Oct. 2015	WFV2	23	28 May 2017	WFV2
11	16 Dec. 2015	WFV2	24	22 Aug. 2017	WFV1
12	1 Jan. 2016	WFV1	25	16 Sept. 2017	WFV4
13	8 Feb. 2016	WFV4			

Table S3. Results comparison of similar studies in the same or neighboring areas. Column 4 and 5 are correlation coefficients between PM concentrations and uncorrected AOD, PM concentrations and vertical and humidity-corrected AOD, respectively.

Study	Study Area	AOD source	Particulate matter type	*R* before corrections	*R* after corrections
He et al. [1]	Hong Kong	MODIS 10-km AOD products	$PM_{2.5}$	0.350	0.560
Zheng et al. [2]	The Pearl River Delta region and Hong Kong	Retrieved MODIS 1-km AOD	PM_{10}	0.147	0.484
Liu et al. [3]	Guangzhou	MODIS 10-km AOD products	$PM_{2.5}$	-0.147	0.145
Zheng et al. [4]	The Pearl River Delta region	Retrieved MODIS 1-km AOD	PM_{10}	0.234	0.458
This study	Shenzhen	DT-derived GF-1 AOD at different spatial scales	$PM_{2.5}$	0.234-0.329	0.340-0.423

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