

Table S1. Monitoring sites of the Apulia Region Air Quality Agency (ARPA Puglia) considered in this study, with the corresponding geographical coordinates, monitoring area/type, and monitored pollutants during the analyzed periods. The geographical coordinates of the AERONET photometer site at the University of Salento in Lecce (Site 11) have also been reported.

Site	Site Name	Coordinates		Monitoring area/type	Parameters				
					PM10	PM2.5	NO ₂	CO	SO ₂
1	Maglie	40°12' N	18°29' E	Urban / traffic		X	X	X	X
2	Galatina	40°16' N	18°17' E	Sub-urban	X	X	X	X	
3	Arnesano	40°34' N	18°09' E	Sub-urban / traffic	X				
4	Lecce - Libertini	40°35' N	18°17' E	Urban / traffic	X	X	X	X	
5	Lecce - Garigliano	40°36' N	18°17' E	Urban / traffic	X	X	X	X	
6	Surbo	40°41' N	18°12' E	Rural / industrial	X		X		X
7	Campi	40°39' N	18°02' E	Sub-urban	X	X	X		
8	Guagnano	40°41' N	17°96' E	Sub-urban / traffic	X		X		
9	Cerrate	40°45' N	18°11' E	Rural / background	X	X	X		
10	San Pancrazio	40°42' N	17°84' E	Background	X		X		
11	Lecce_University	40°33' N	18°11' E						

Table S2. Comparison of columnar aerosol parameters (Aerosol Optical Depth AOD at 440 and 870 nm, Ångström Exponent \AA at the wavelength pair 440–870 nm, and Ångström Exponent difference $\Delta\text{\AA}$) among the Pre-LD (before lockdown), LD (during lockdown), and Post-LD (after lockdown) periods in 2020 using the Kruskal-Wallis and the Dunn’s pairwise comparison tests. Statistically significant differences at the p-level ≤ 0.05 , ≤ 0.01 , and ≤ 0.001 are indicated by *, **, and ***, respectively, while ns indicates not-significant differences.

Optical Parameter	Kruskall-Wallis test	Dunn's test		
	Pre-LD, LD, Post-LD	Pre-LD vs LD	Pre-LD vs Post-LD	LD vs Post-LD
AOD (440 nm)	**	**	ns	ns
AOD (870 nm)	*	ns	*	ns
\AA	**	ns	**	ns
$\Delta\text{\AA}$	***	ns	**	**

Table S3. Comparison of columnar aerosol parameters (Aerosol Optical Depth AOD at 440 nm, Ångström Exponent \AA at the wavelength pair 440–870 nm, and Ångström Exponent difference $\Delta\text{\AA}$) among the months of the reference years (2017, 2018, and 2019) and the year 2020 using the Mann-Whitney test. Statistically significant differences at the p-level ≤ 0.05 , ≤ 0.01 , and ≤ 0.001 are indicated by *, **, and ***, respectively, while ns indicates not-significant differences.

Optical Parameter	Janua ry	Febr uary	Marc h	April	May	June	July	Augu st	Septe mber	Octo ber	Nove mber	Dece mber
AOD (440 nm)	*	***	ns	ns	ns	***	***	***	ns	***	ns	*
\AA	ns	ns	ns	ns	ns	*	*	ns	**	ns	ns	ns
$\Delta\text{\AA}$	**	***	ns	ns	ns	***	***	***	ns	*	*	ns

Table S4. Comparison of PM10 and PM2.5 mass concentrations, PM2.5/PM10 mass ratio, and (PM10 – PM2.5) mass concentrations in Site 4 (Lecce – Libertini), Site 7 (Campi Salentina), and Site 9 (Cerrate) among Pre-LD (before lockdown), LD (during lockdown), and Post-LD (after lockdown) periods in 2020 using both the Kruskal-Wallis and the Dunn’s pairwise comparison tests. Statistically significant differences at the p-level ≤ 0.05 , ≤ 0.01 , and ≤ 0.001 are indicated by *, **, and ***, respectively, while ns indicates not-significant differences.

Site	Pollutant	Kruskall-Wallis test	Dunn's test		
		Pre-LD, LD, Post-LD	Pre-LD vs Post-LD	Pre-LD vs LD	LD vs Post-LD
4	PM10	***	***	*	ns
	PM2.5	***	***	ns	*
	PM2.5/PM10	*	ns	ns	*
	(PM10 - PM2.5)	*	ns	*	ns
	NO ₂	***	***	***	***
	CO	***	***	***	ns
7	PM10	***	***	***	***
	PM2.5	***	***	**	***
	PM2.5/PM10	***	***	*	**
	(PM10 - PM2.5)	***	***	***	ns
	NO ₂	***	***	***	ns
9	PM10	ns	ns	ns	ns
	PM2.5	ns	ns	ns	ns
	PM2.5/PM10	*	*	ns	ns
	(PM10 - PM2.5)	ns	ns	ns	ns
	NO ₂	***	***	***	*

Table S5. Comparison of PM10 and PM2.5 mass concentrations, PM2.5/PM10 mass ratio, (PM10 – PM2.5) mass concentrations, NO₂ and CO concentration in Site 4 (Lecce – Libertini), Site 7 (Campi Salentina), and Site 9 (Cerrate) using the Mann-Whitney test. Statistically significant differences at the p-level ≤ 0.05 , ≤ 0.01 , and ≤ 0.001 are indicated by *, **, and ***, respectively, while ns indicates not-significant differences.

Site	Pollutant	January	February	March	April	May	June	July	August	September	October	November	December
4	PM10	**	ns	ns	ns	ns	***	***	*	*	***	ns	*
	PM2.5	*	ns	ns	ns	ns	***	***	**	ns	***	**	*
	PM2.5/PM10	ns	ns	ns	***	ns	**	ns	*	**	ns	***	*
	(PM10 - PM2.5)	***	ns	**	***	ns	ns	ns	ns	***	ns	*	ns
	NO ₂	ns	ns	***	***	***	**	*	ns	**	ns	ns	ns
7	PM10	*	ns	ns	ns	ns	***	**	ns	**	***	**	ns
	PM2.5	ns	*	*	*	***	***	***	***	**	***	*	ns
	PM2.5/PM10	***	**	*	*	***	***	***	***	***	***	ns	*
	(PM10 - PM2.5)	***	ns	ns	ns	*	ns	***	***	***	**	ns	ns
	NO ₂	ns	*	ns	**	ns	ns	ns	ns	ns	ns	ns	ns
9	PM10	*	*	*	ns	ns	***	***	*	ns	***	ns	*
	PM2.5	ns	*	ns	ns	ns	***	***	***	ns	***	ns	*
	PM2.5/PM10	ns	ns	ns	ns	***	*	ns	*	ns	**	*	***
	(PM10 - PM2.5)	ns	ns	ns	ns	ns	*	ns	ns	***	*	ns	ns
	NO ₂	ns	ns	**	***	***	**	*	ns	**	ns	ns	ns

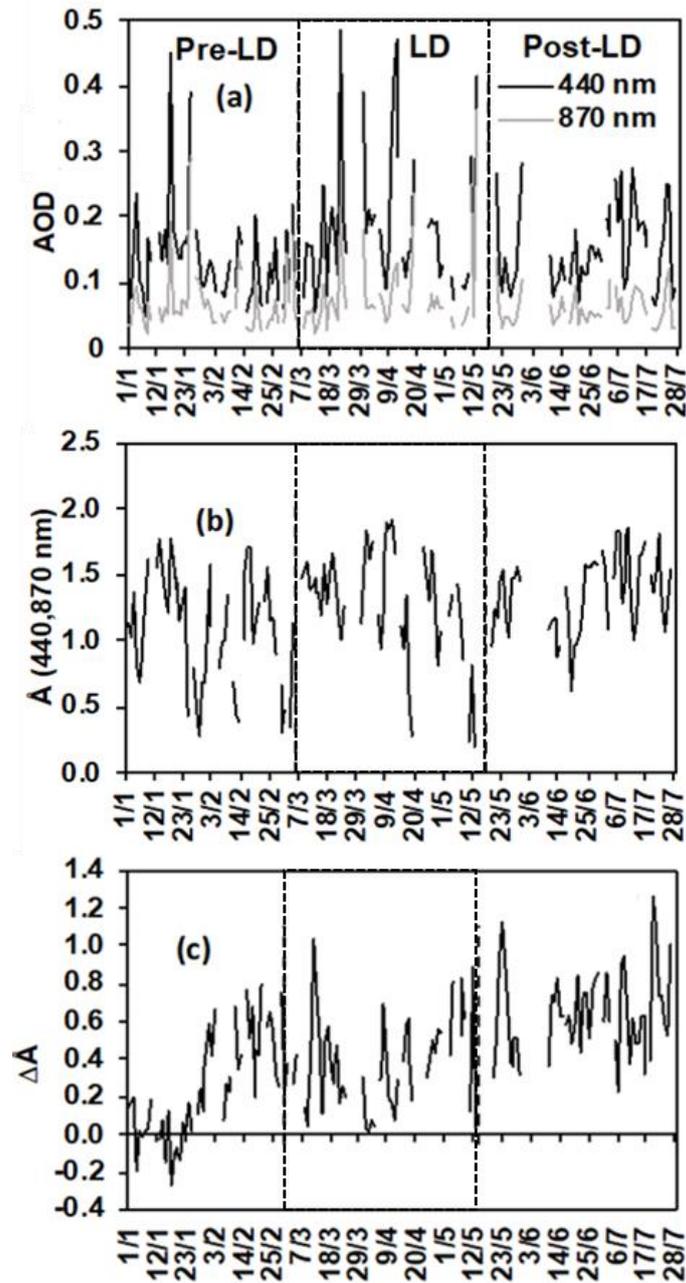


Figure S1. (a) Time series of the daily means of the Aerosol Optical Depth AOD at 440 nm (black line) and 870 nm (grey line), (b) Ångström Exponent \AA at the wavelength pair 440–870 nm, and (c) Ångström Exponent difference $\Delta\text{\AA}$ in the period from January 1st to 26 July 2020. Vertical dashed lines identify Pre-LD (before lockdown), LD (during lockdown), and Post-LD (after lockdown) time intervals.

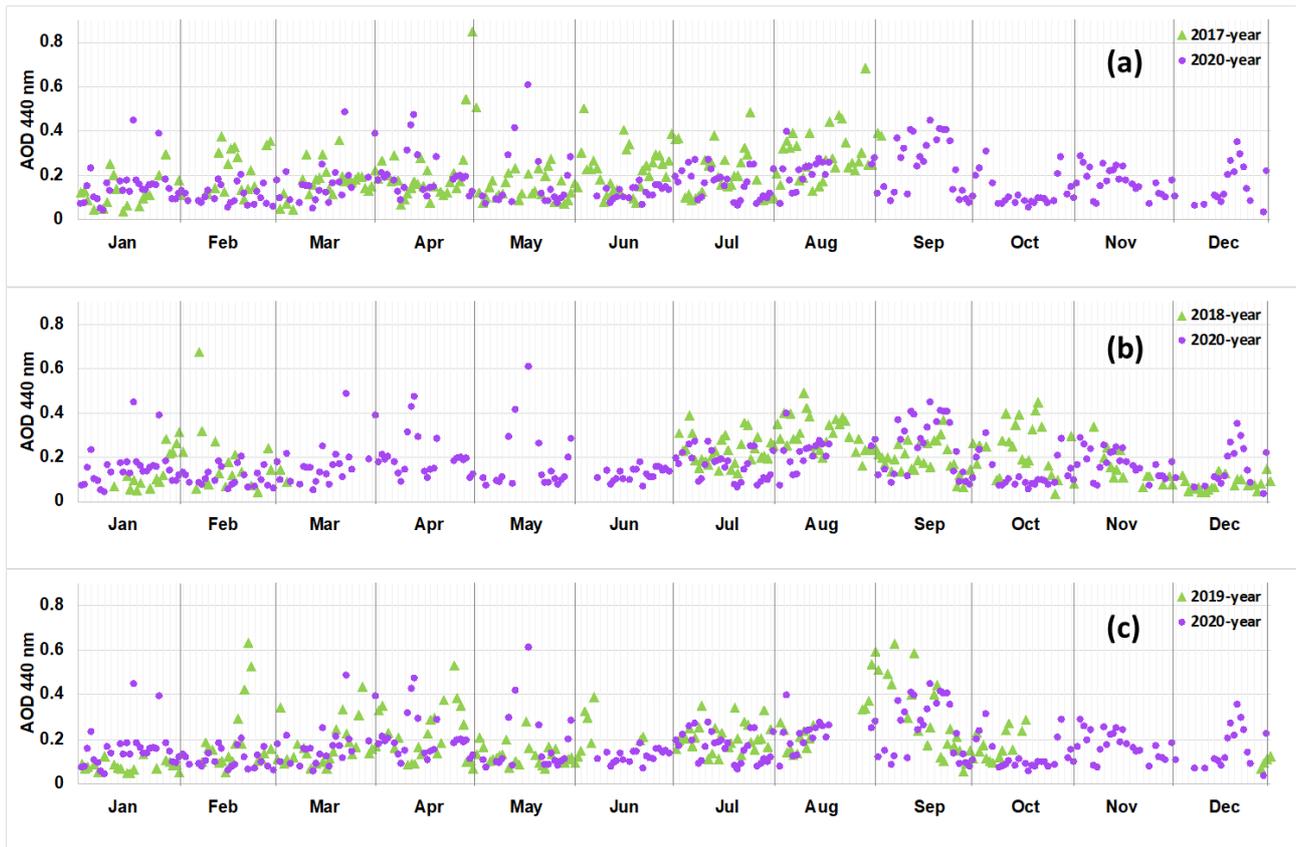


Figure S2. Overview of the comparison between the AOD (440 nm) daily means retrieved at the study site in 2020 (purple dots) and the corresponding ones of the years (a) 2017, (b) 2018, and (c) 2019 (green triangles).

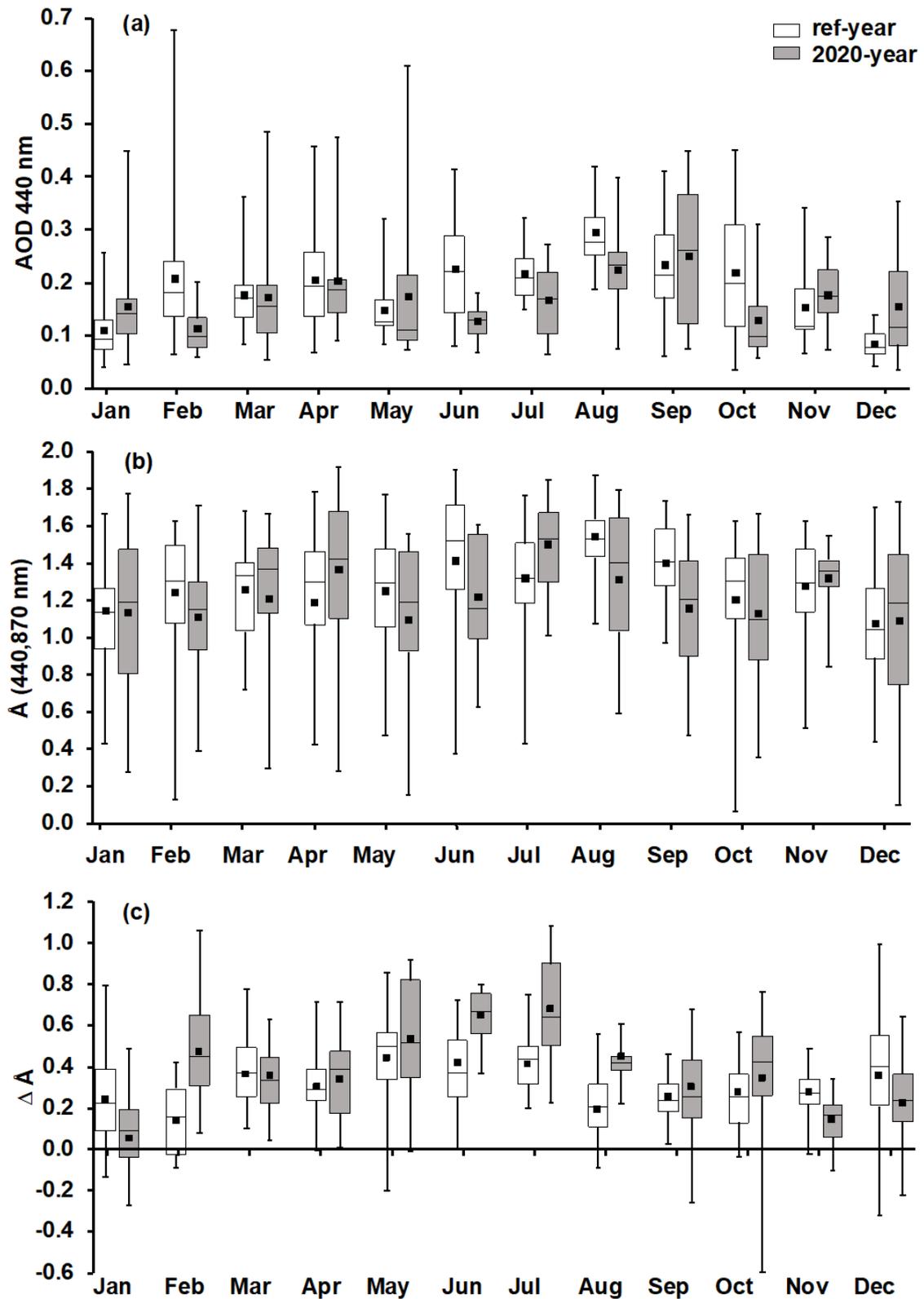


Figure S3. Monthly box plots of the reference years (2017, 2018, and 2019; white boxes) and year 2020 (grey boxes) for (a) Aerosol Optical Depth AOD at 440 nm, (b) Ångström Exponent \mathring{A} at the wavelength pair 440–870 nm, and (c) Ångström Exponent difference ΔA . Horizontal lines and dots in each box are the median and mean values, respectively. The 25th and the 75th percentiles are indicated by the lower and upper boundaries of the box, respectively. The lower and upper whiskers represent the 5th and the 95th percentiles, respectively.

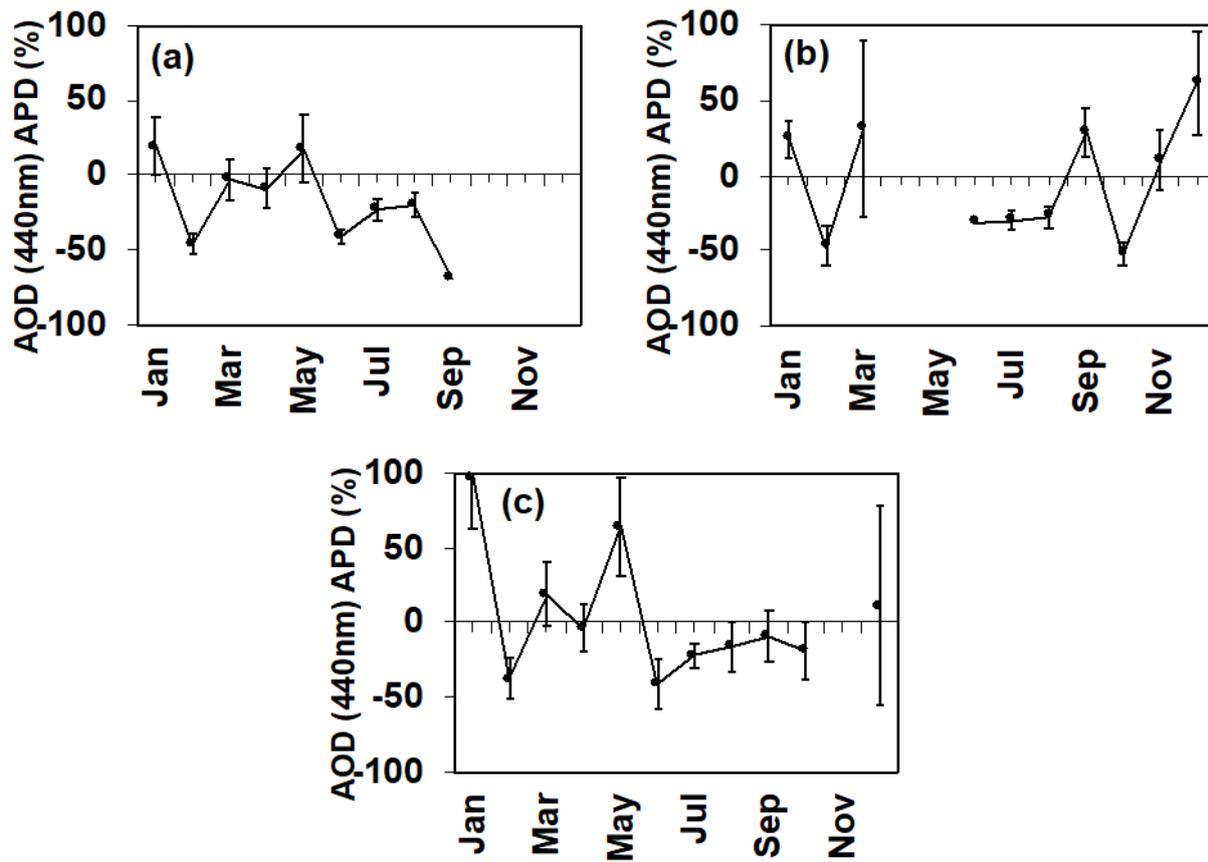


Figure S4. Time series of monthly average percent departure (APD%) in the year 2020 with respect to the reference year (a) 2017, (b) 2018, and (c) 2019 for the Aerosol Optical Depth AOD at 440 nm. Error bars represent the corresponding uncertainty estimated by the propagation of error on the APD%.

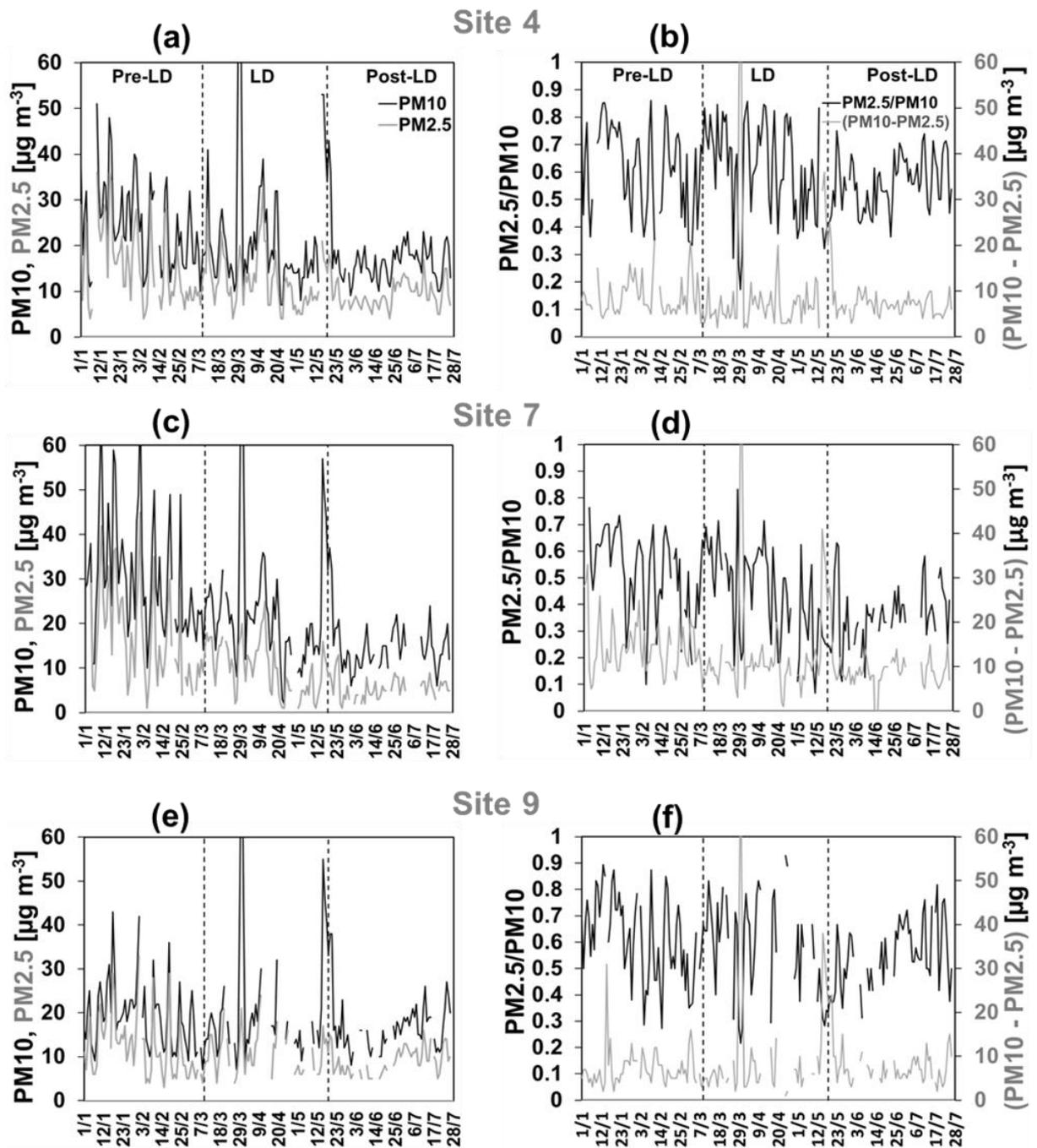


Figure S5. Time series of daily-averaged PM10 (black line) and PM2.5 (grey line) mass concentrations in the Pre-LD (before the lockdown), LD (during the lockdown), and Post-LD (after the lockdown) periods for (a) Site 4 (Lecce – Libertini), (b) Site 7 (Campi Salentina), and (c) Site 9 (Cerrate). Time series of daily-averaged PM2.5/PM10 ratio (black line) and (PM10 – PM2.5) (coarse PM fraction, grey line) mass concentrations in the Pre-LD, LD, and Post-LD periods for (d) Site 4, (e) Site 7, and (f) Site 9.

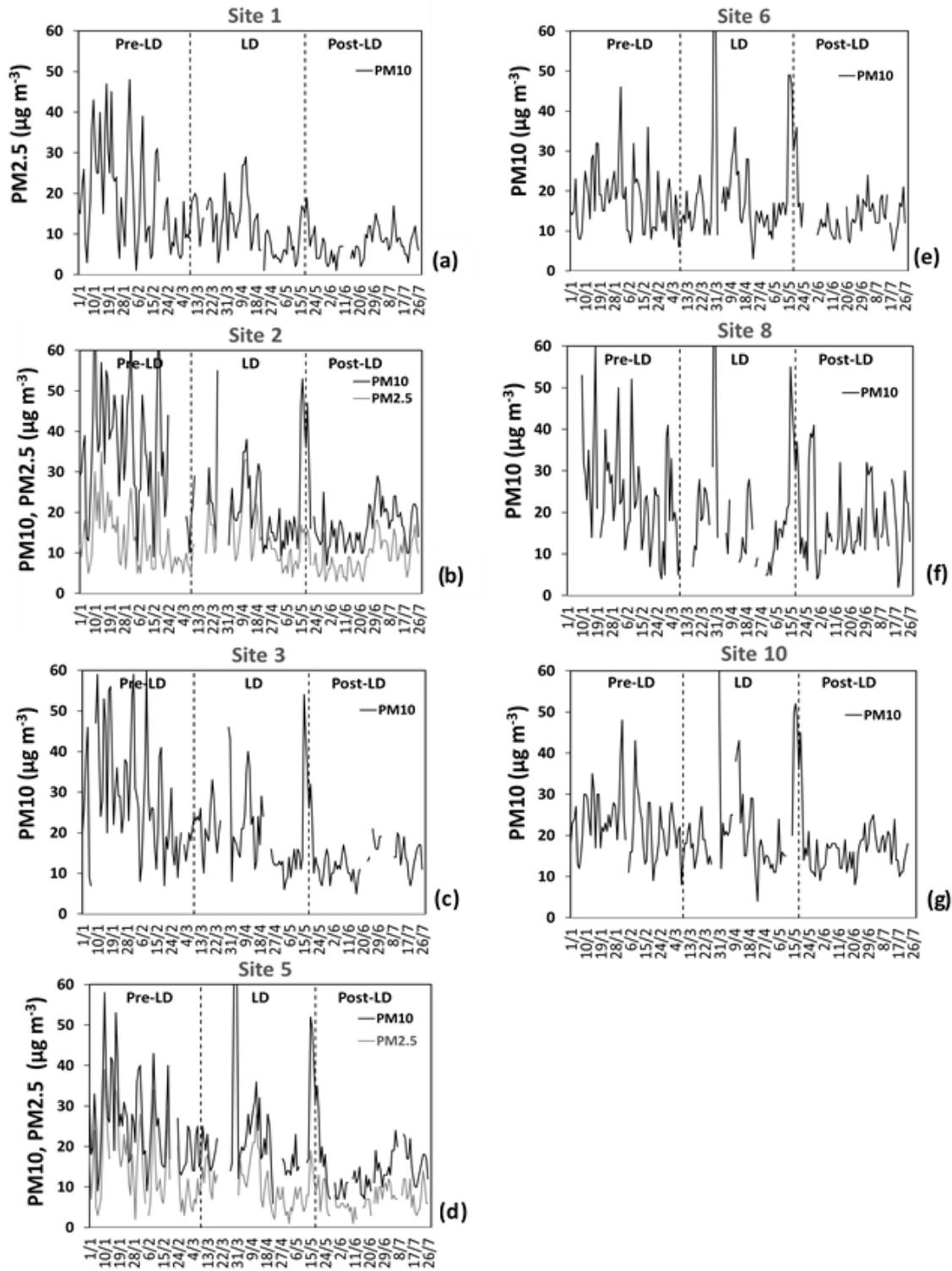


Figure S6. Time series of daily-averaged PM10 (black line) and PM2.5 (grey line) mass concentrations in the Pre-LD (before the lockdown), LD (during the lockdown), and Post-LD (after the lockdown) periods for (a) Site 1 (Maglie), (b) Site 2 (Galatina), (c) Site 3 (Arenasano), (d) Site 5 (Lecce – Garigliano), (e) Site 6 (Surbo), (f) Site 8 (Guagnano), and (g) Site 10 (San Pancrazio).

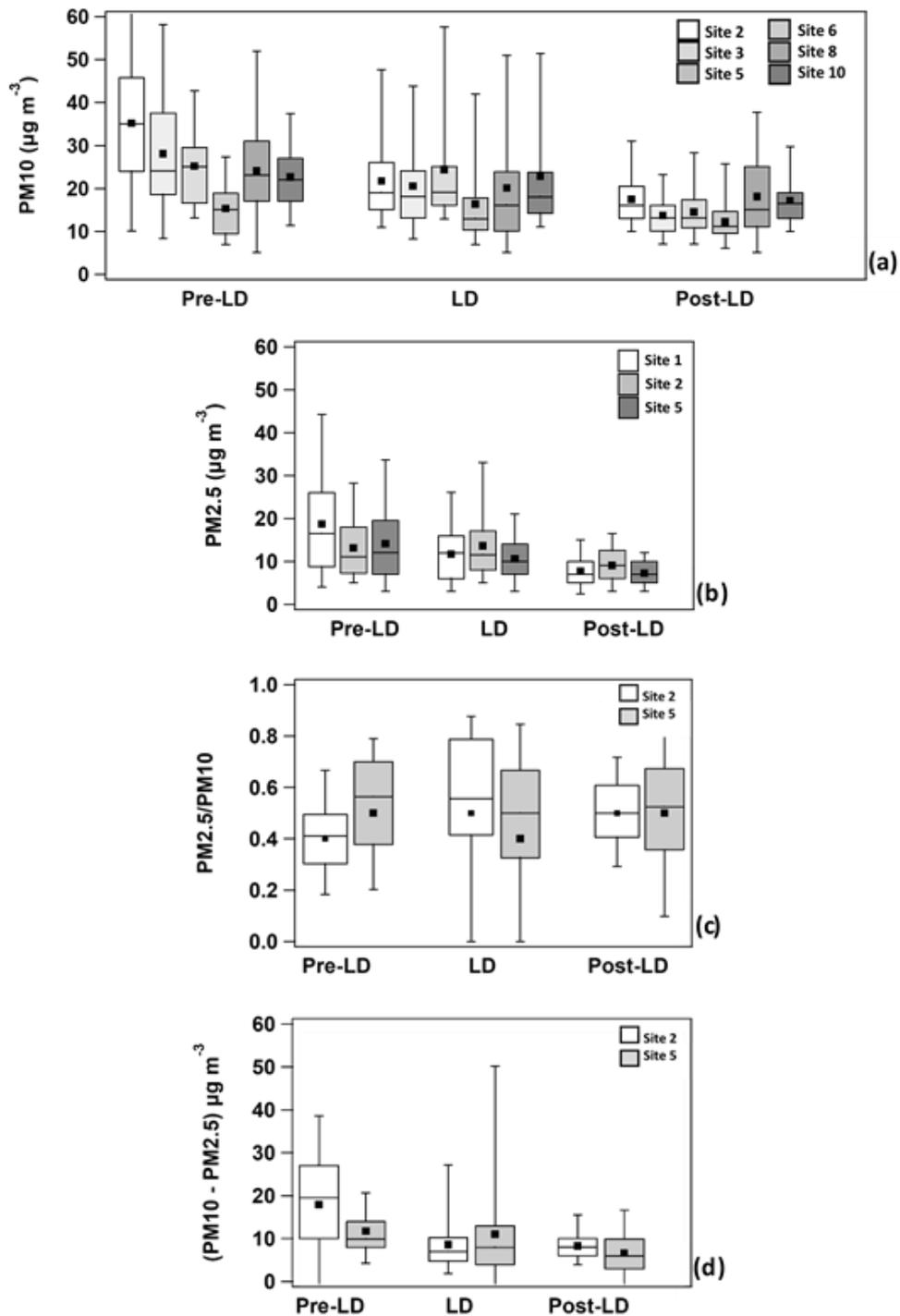


Figure S7. Boxplots of (a) PM10 and (b) PM2.5 mass concentrations, (c) PM2.5/PM10 mass ratio, and (d) (PM10 – PM2.5) mass concentrations for Site 1 (Maglie), Site 2 (Galatina), Site 3 (Arnesano), Site 5 (Lecce - Garigliano), Site 6 (Surbo), Site 8 (Guagnano), and Site 10 (San Pancrazio) in the Pre-LD (before lockdown), LD (during lockdown), and Post-LD (after lockdown) periods. Horizontal lines and dots in each box are the median and mean values, respectively. The 25th and the 75th percentiles are indicated by the lower and the upper boundaries of each box, respectively. The lower and upper whiskers represent the 5th and the 95th percentiles, respectively.

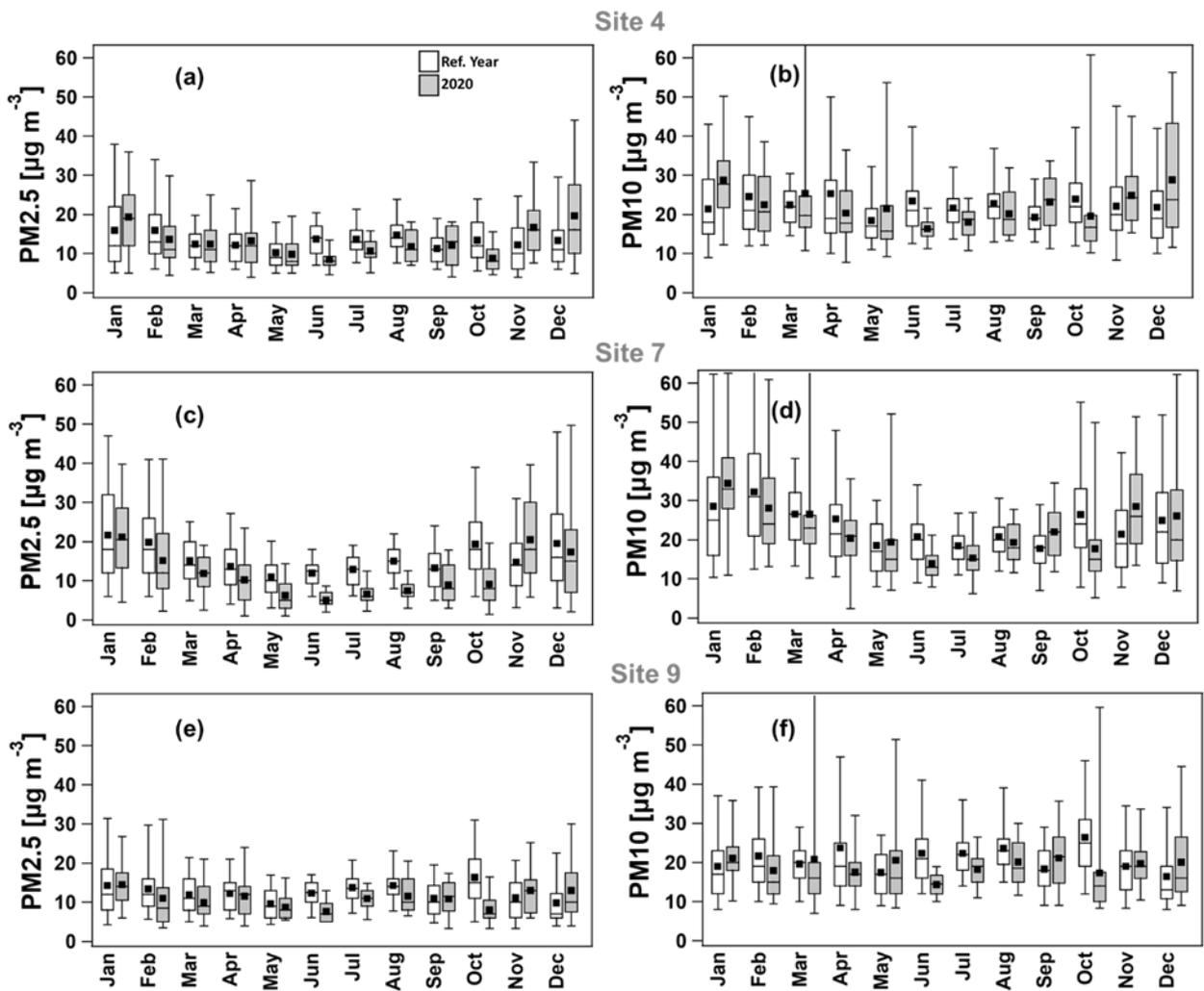


Figure S8. Monthly box plots of the reference years (2017, 2018, and 2019; white boxes) and year 2020 (grey boxes) for PM_{2.5} and PM₁₀ mass concentrations in Site 4 (Lecce – Libentini; (a) and (b), respectively), in Site 7 (Campi Salentina; (c) and (d), respectively), and Site 9 (Cerrate; (e) and (f), respectively). Horizontal lines and dots in each box are the median and mean values, respectively. The 25th and the 75th percentiles are then indicated by the lower and upper boundaries of the box, respectively. The lower and upper whiskers represent the 5th and the 95th percentiles, respectively.

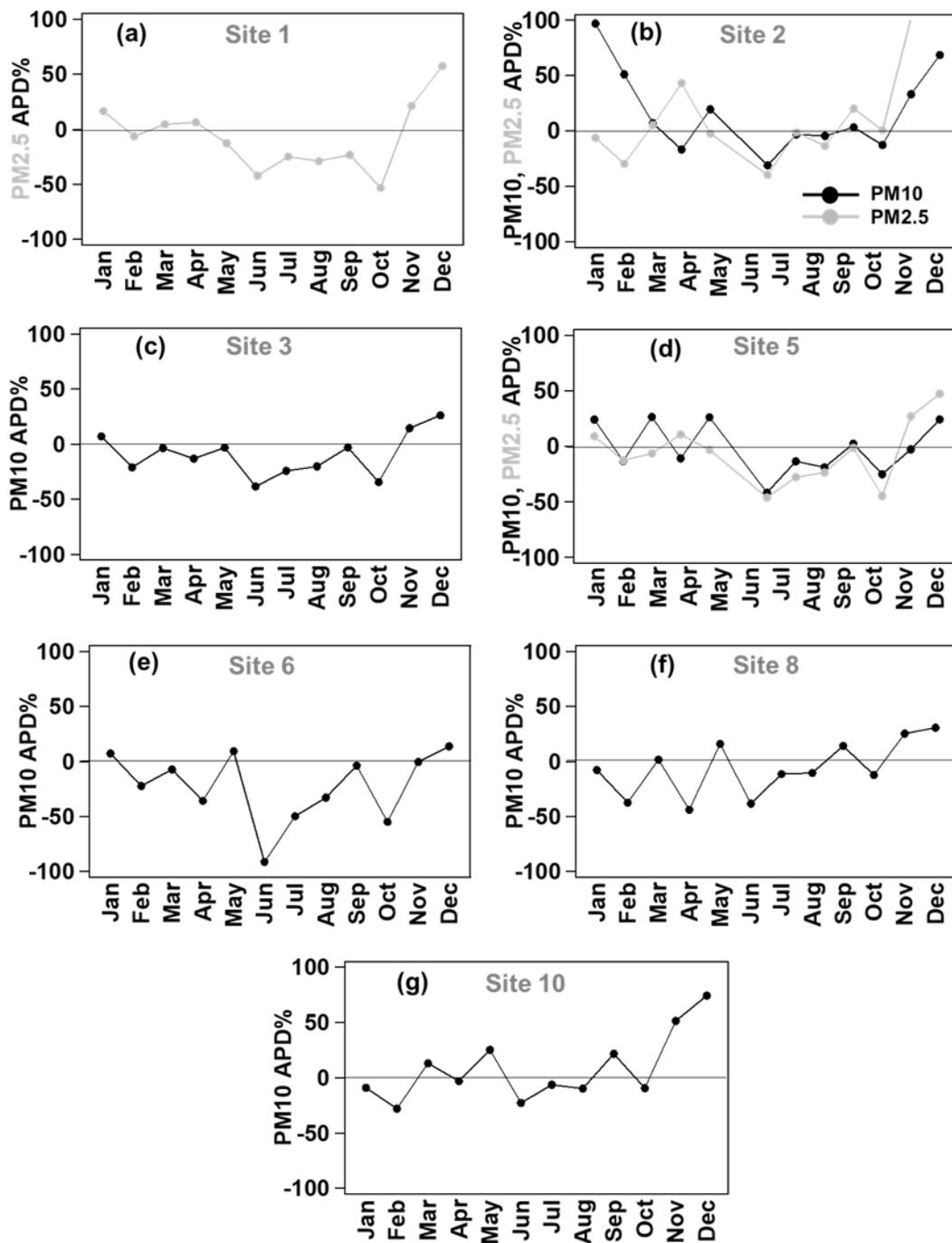


Figure S9. Monthly evolution of Average Percent Departure (APD%) of PM10 (black) and PM2.5 (grey) mass concentration for (a) Site 1 (Maglie), (b) Site 2 (Galatina), (c) Site 3 (Arnesano), (d) Site 5 (Lecce – Garigliano), (e) Site 6 (Surbo), (f) Site 8 (Guagnano), and (g) Site 10 (San Pancrazio).

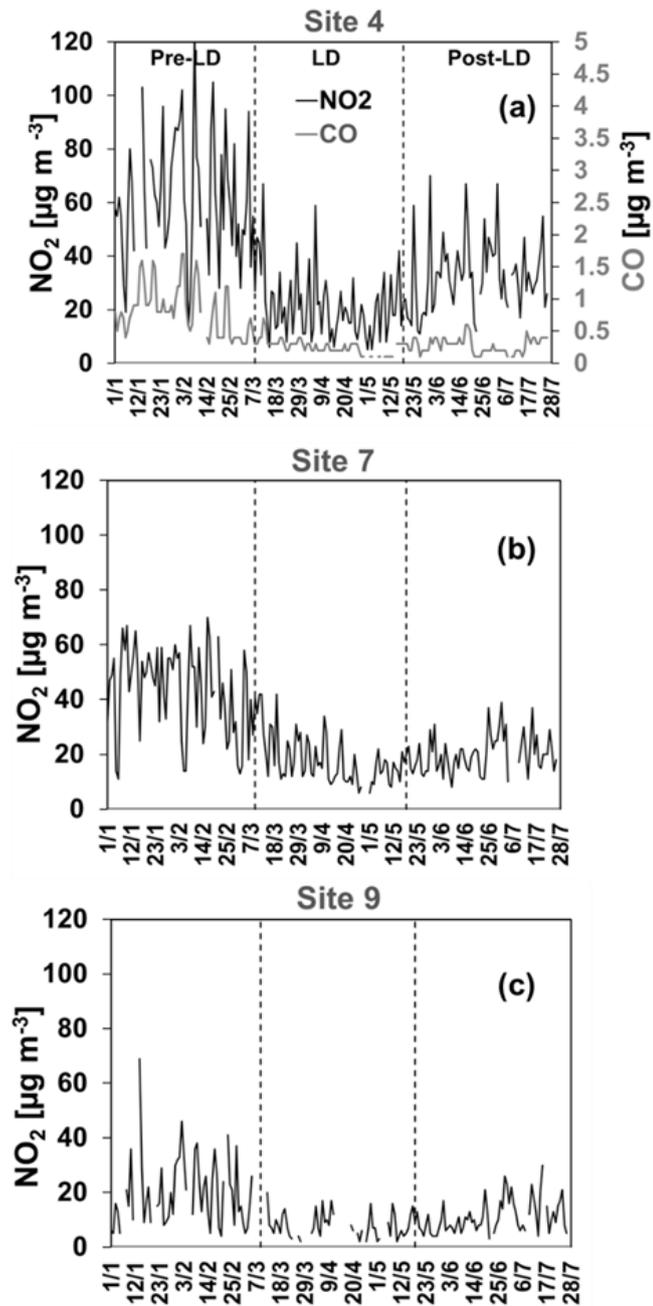


Figure S10. (a) Time series of daily-averaged NO₂ (black) and CO (grey) mass concentrations for Site 4 (Lecce – Libertini) in the Pre-LD (before the lockdown), LD (during the lockdown), and Post-LD (after the lockdown) periods. Time series of daily average of NO₂ mass concentrations for (b) Site 7 (Campi Salentina) and (c) Site 9 (Cerrate) in the Pre-LD, LD, and Post-LD period.

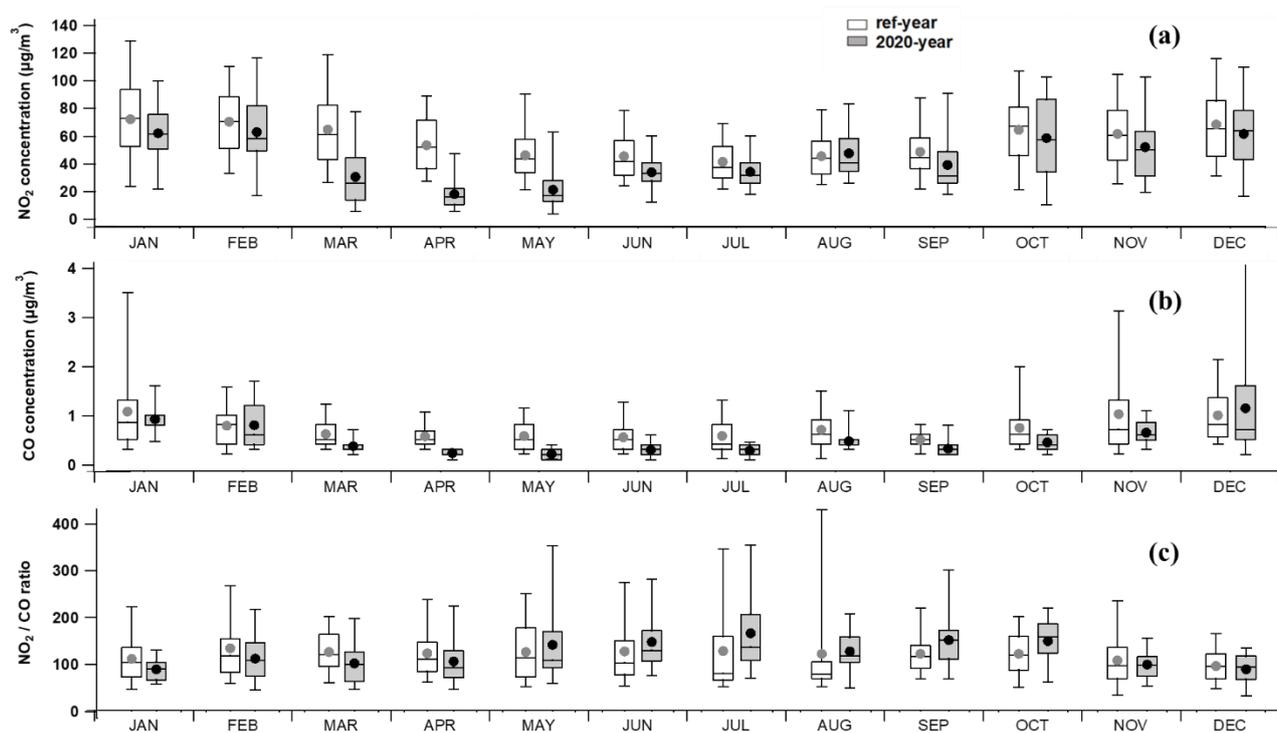


Figure S11. Monthly box plots of the reference years (2017, 2018, and 2019; white boxes) and year 2020 (grey boxes) for (a) NO₂ concentration, (b) CO concentration, and (c) NO₂/CO ratio in Site 4 (Lecce – Libertini). Horizontal lines and dots in each box are the median and mean values, respectively. The 25th and the 75th percentiles are then indicated by the lower and upper boundaries of the box, respectively. The lower and upper whiskers represent the 5th and the 95th percentiles, respectively.