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Supplement of

Frequency of new particle formation events in the urban Mediterranean climate

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Table S1: Exact locations of the selected SMPS sampling sites, their elevation and site type.

City	Site	Latitude	Longitude	Elevation (m.a.s.l.)	Site type
Barcelona, Spain	Palau Reial	41°23'14"N	2°6'56"E	78 m	Urban background
Madrid, Spain	CIEMAT	40°27'30"N	3°43'30"W	655 m	Suburban background
Rome, Italy	Montelibretti	42°06'38"N	12°38'05"E	47 m	Regional background
Brisbane, Australia	QUT	27°28'43"S	153°1'44"E	10 m	Urban background
Los Angeles, USA	USC	34°1'9"N	118°16'39"W	61 m	Urban background

Table S2: Sampling period of the SMPS instruments and their characteristics and size range at each selected city.

City	Sampling period	SMPS model	SMPS size range	Size bins
Barcelona (BCN)	30/07/2012-04/08/2013 (7295 h)	TSI (DMA 3081, CPC 3772)	11.3-358.7 nm	97
Madrid (MAD)	10/01/2007-12/12/2008 (12482 h)	TSI (DMA 3071, CPC 3022)	17.5-572.9 nm	34
Rome (ROM)	26/09/2007-07/05/2009 (3373 h)	TSI (DMA 3081, CPC 3775)	15.1-224.7 nm (10.2-615.3 nm)	76 (87, 93, 104)
Brisbane (BNE)	01/01/2009-31/12/2009 (6227 h)	TSI (EC 3080, CPC 3781)	10.2-101.8 nm	65
Los Angeles (LA)	04/09/2009-10/12/2009 (2184 h)	TSI (DMA 3081, CPC 3022A)	15.7-371.8 nm	89

Table S3: Summary of the measurements and sampling period at the selected cities. V^+ indicates the measurement site is different to the SMPS site.

City	Ancillary data site	Meteorological data					Gaseous Pollutants					Particulate Matter				Other	
		T	RH	ws/wd	Rain	SR	NO	NO_2	O_3	CO	SO_2	PM_{10}	$PM_{2.5}$	PM_1	NO_3^-	N	BC
Barcelona (BCN)	Palau Reial, Fac. of Physics$^+$	V^+	V^+	V^+	V^+	V^+	V	V	V	V	V	V	V	V		V	V
Madrid (MAD)	CIEMAT, Casa de Campo$^+$	V	V	V	V	V	V	V	V	V^+	V	V^+	V^+		V		
Rome (ROM)	Buf$^+$	V^+	V^+	V^+	V^+	V^+	V^+	V^+	V^+		V^+						
Brisbane (BNE)	Rocklea$^+$	V^+	V^+	V^+	V^+	V^+	V^+	V^+	V^+			V^+	V^+			V^+	
Los Angeles (LA)	South Coast AQMD$^+$	V^+	V^+	V^+	V^+		V^+	V^+	V^+	V^+	V^+		V^+			V	

Table S4: Overall occurrence (%) of each cluster at each site, classified into different categories (Traffic, Background, Nucleation and Specific case).

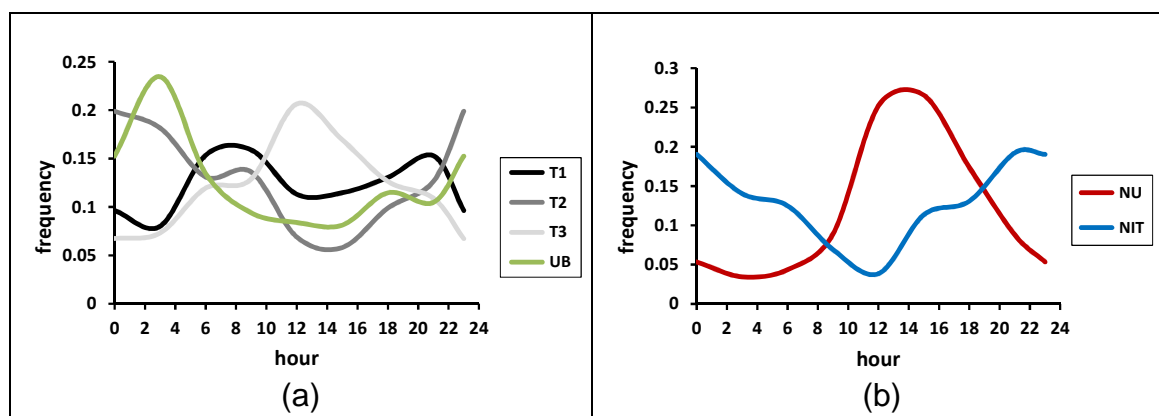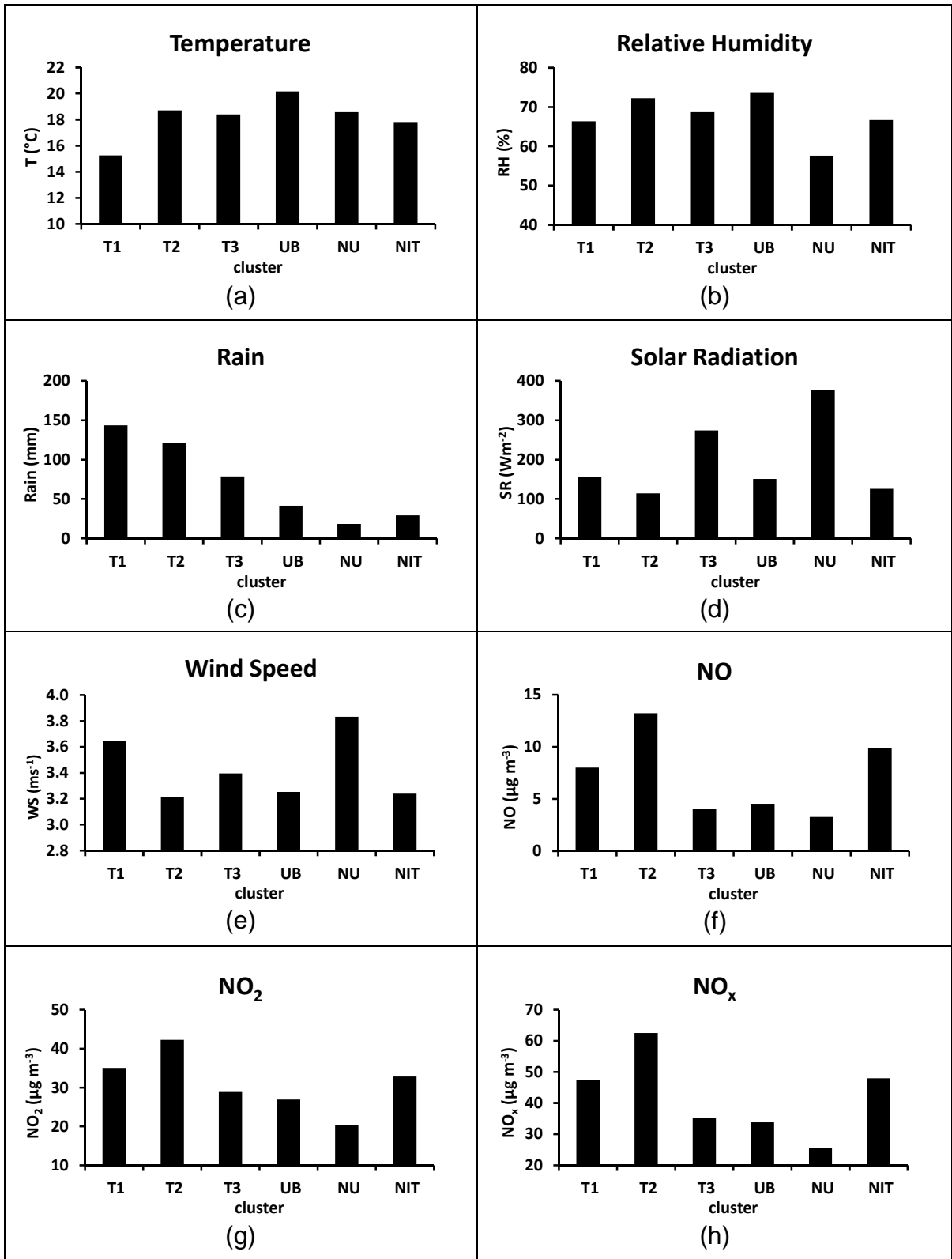| Category	Subcategory	Barcelona	Madrid	Rome	Brisbane	Los Angeles
Traffic	Traffic 1 (T1)	27%	25%	7%	24%	36%
	Traffic 2 (T2)	24%	22%	27%	-	-
	Traffic 3 (T3)	12%	11%	7%	20%	25%
Background	Urban Background (UB)	15%	6%	25%	22%	6%
	Summer Background (SB)	-	7%	-	-	-
	Regional Background (RB)	-	-	28%	-	-
Nucleation	Nucleation (NU)	15%	19%	6%	14%	33%
Specific case	Nitrate (NIT)	7%	10%	-	-	-
	Growth 1 (G1)	-	-	-	10%	-
	Growth 2 (G2)	-	-	-	10%	-
Total		100%	100%	100%	100%	100%

Figure S1: Diurnal trends for the main clusters: a) Traffic1 (T1), Traffic2 (T2), Traffic3 (T3) and Urban Background (UB); b) Nucleation (NU) and Nitrate (NIT). Although they are extracted from the results for Barcelona, they are representative of the rest of the cities.
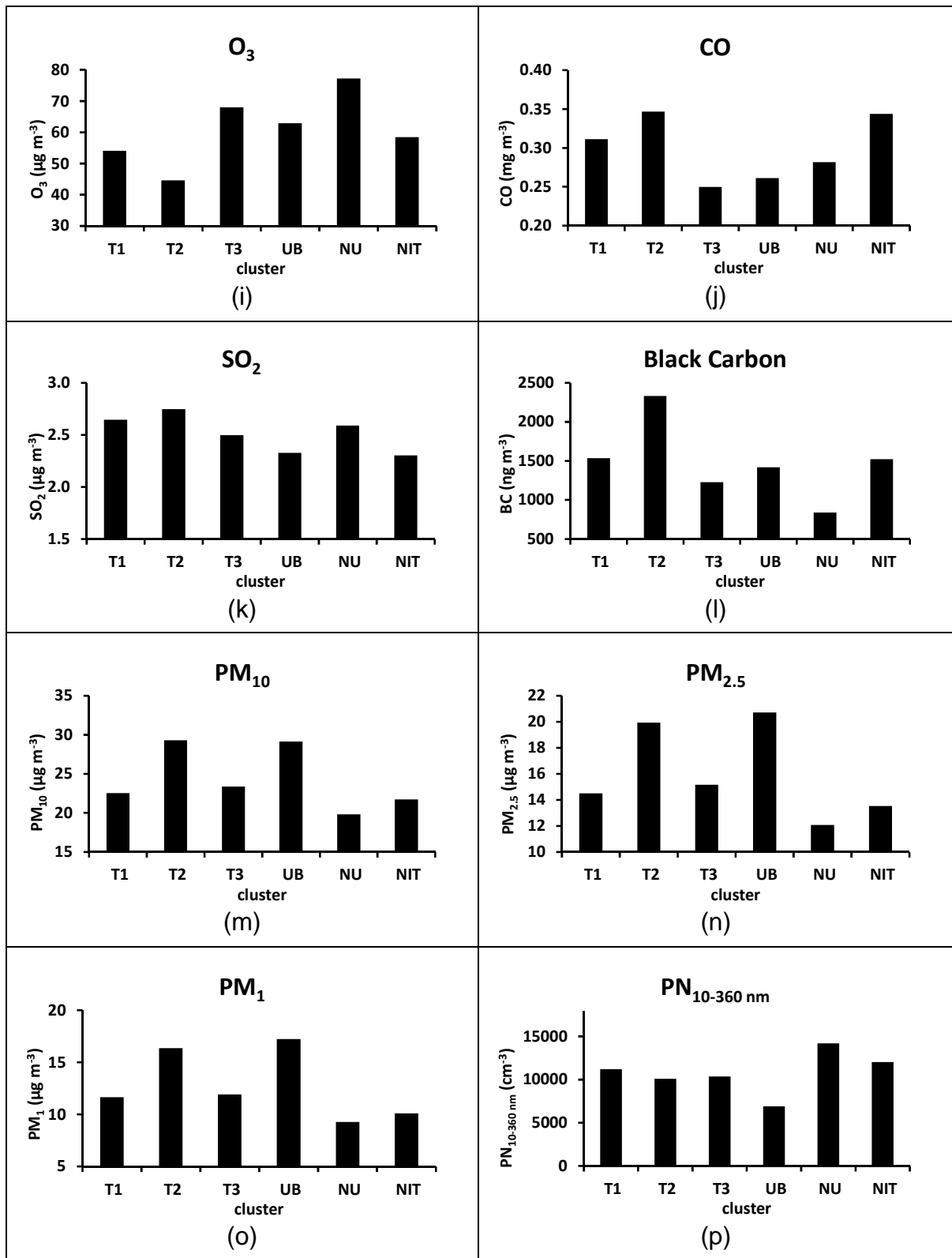
(a) Temperature — T (°C) vs cluster (T1, T2, T3, UB, NU, NIT)

(b) Relative Humidity — RH (%) vs cluster (T1, T2, T3, UB, NU, NIT)

(c) Rain — Rain (mm) vs cluster (T1, T2, T3, UB, NU, NIT)

(d) Solar Radiation — SR (Wm^{-2}) vs cluster (T1, T2, T3, UB, NU, NIT)

(e) Wind Speed — WS (ms^{-1}) vs cluster (T1, T2, T3, UB, NU, NIT)

(f) NO — NO ($\mu g\ m^{-3}$) vs cluster (T1, T2, T3, UB, NU, NIT)

(g) NO_2 — NO_2 ($\mu g\ m^{-3}$) vs cluster (T1, T2, T3, UB, NU, NIT)

(h) NO_x — NO_x ($\mu g\ m^{-3}$) vs cluster (T1, T2, T3, UB, NU, NIT)

Figure S2: Meteorological parameters and gaseous pollutants for the main clusters: a) Temperature, b) Relative Humidity, c) Rain, d) Solar Radiation, e) Wind Speed, f) NO, g) NO_2, h) NO_x, i) O_3, j) CO, k) SO_2, l) Black carbon, m) PM_{10}, n) PM $_{2.5}$, o) PM_1, p) PN_{10-360}. Although they are extracted from the results for Barcelona, the trend followed by clusters is representative of the rest of the cities.
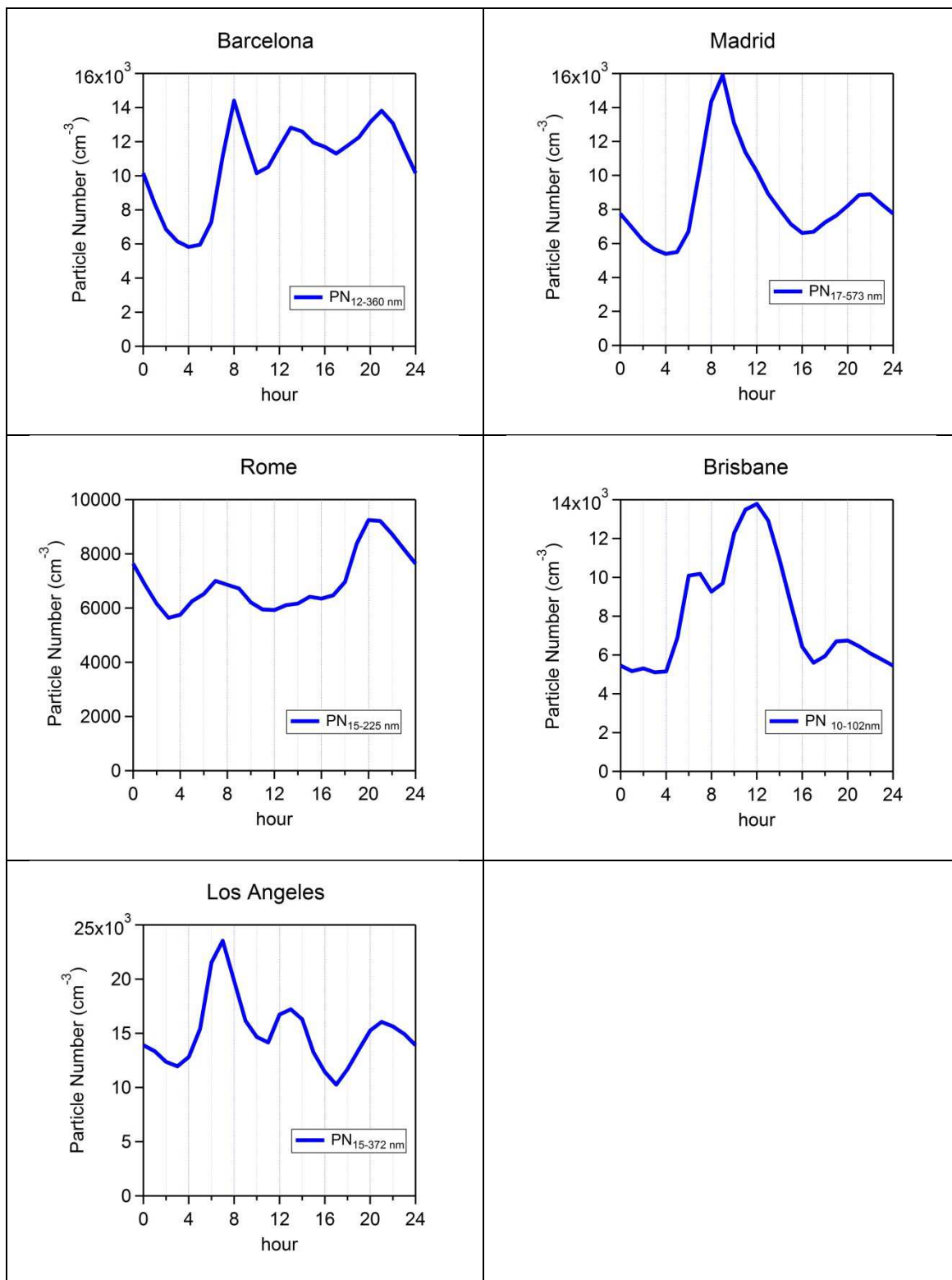
Figure S3: Average daily particle number concentration for the study periods at each city.