

Article

Carbonaceous Aerosols Collected at the Observatory of Monte Curcio in the Southern Mediterranean Basin

Mariantonia Bencardino ^{1,*}, Virginia Andreoli ¹, Francesco D'Amore ¹, Francesco De Simone ¹, Valentino Mannarino ¹, Jessica Castagna ², Sacha Moretti ¹, Attilio Naccarato ¹, Francesca Sprovieri ¹ and Nicola Pirrone ¹

¹ Affiliation 1; Institute of Atmospheric Pollution of the National Research Council of Italy (IIA-CNR), Division of Rende, Cosenza 87100, Italy; virginia.andreoli@iia.cnr.it (V.A.), f.damore@iia.cnr.it (F.D.A.), sacha.moretti@iia.cnr.it (F.D.S.), v.mannarino@iia.cnr.it (V.M.), a.naccarato@iia.cnr.it (A.N.), f.sprovieri@iia.cnr.it (F.S.), nicola.pirrone@iia.cnr.it (N.P.)

² Affiliation 2; Institute of methodologies for environmental analysis of the National Research Council of Italy (IMAA-CNR), Tito Scalco, Potenza 85100, Italy; jessica.castagna@imaa.cnr.it

* Correspondence: bencardino@iia.cnr.it

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Table S1. Accuracy proved during the test report at the MCU (Monte Curcio) station for the sensors of: WS (wind speed), WD (wind direction), P (pressure), T (air temperature), and RH (relative humidity).

	Accuracy
WS	± 0.1 m/s
WD	± 5°
P	± 0.5 hPa
T	± 0.3 °C
RH	± 3%

Table S2. Descriptive statistics (min, mean, max) for each meteorological variable: RH, T, WD, WS, and P recorded at MCU during 2016 and 2017 station and split by seasons of our PM measurements: Spring (April, May, June); Summer (July, August, September); Fall (October, November, December).

Seasons		RH (%)	T (°C)	WD (°)	WS (m s ⁻¹)	P (hPa)
Spring	min	0.0	−5.6	0.0	0.0	890.0
	mean	62.0	9.6	165.5	4.5	898.4
	max	100.0	28.1	359.8	17.0	943.0
Summer	min	2.5	4.2	0.1	0.0	890.0
	mean	61.2	15.7	159.5	3.4	898.2
	max	100.0	32.6	359.8	17.7	948.1
Fall	min	0.0	−9.0	0.0	0.0	890.0
	mean	76.8	5.1	147.4	3.9	901.8
	max	100.0	18.8	357.8	16.3	942.4

Table S3. Name, Code, Coordinates, Altitude, Type, and References for those stations in the Mediterranean basin for which there are studies and data on air quality.

Site	Code	Lat.	Long.	Alt.	Type of site	Reference
Alpe San Colombano	ASC	46.27	10.19	2225	High alt. and remote	[Perrone et al, 2012]
Monte Cimone	CMN	44.19	10.7	2165	High alt. and remote	[Marenco et al, 2006] [Cristofanelli et al, 2013]
Montseny	MSY	41.76	2.58	728	Rural Background	
Monagrega	MON	40.94	-0.29	570	Rural Background	[Pey et al, 2013]
Zarra	ZAR	39.08	-1.10	885	Rural Background	[Pey et al, 2013]
Viznar	VIZ	37.23	-3.47	1265	Rural Background	[Pey et al, 2013]
Barcarrota	BAR	38.47	-6.92	393	Rural Background	[Pey et al, 2013]
San Pablo de los Montes	SPM	39.52	-4.35	1241	Rural Background	[Pey et al, 2013]
Genas	GEN	45.73	4.98	235	Rural Background	[Pey et al, 2013]
Drôme Rurale Sud	DRS	44.52	5.09	460	Rural Background	[Pey et al, 2013]
Febbo	FEB	44.75	10.43	1020	Rural Background	[Pey et al, 2013]
Fontechiari	FON	41.68	13.68	393	Rural Background	[Pey et al, 2013]
Lecce	LEC	40.45	18.11	10	Rural Background	[Pey et al, 2013]
Censt	CST	39.06	8.46	270	Rural Background	[Pey et al, 2013]
Finokalia	FKL	35.33	25.66	150	Rural Background	[Pey et al, 2013]
Rojen Peak	ROJ	41.69	24.73	1750	Rural Background	[Pey et al, 2013]
Ayia Marina	AYM	35.03	33.05	532	Rural Background	[Pey et al, 2013]

Table S4. Descriptive statistics (min, mean, max, SD) computed over the whole observing period, and referring to Particulate Matter (PM), Organic Carbon (OC), Elemental Carbon (EC), ratio OC/EC, Secondary Organic Carbon (SOC), and percentage of SOC over OC, all determined for PM₁₀, PM_{fine} and PM_{coarse} size fractions.

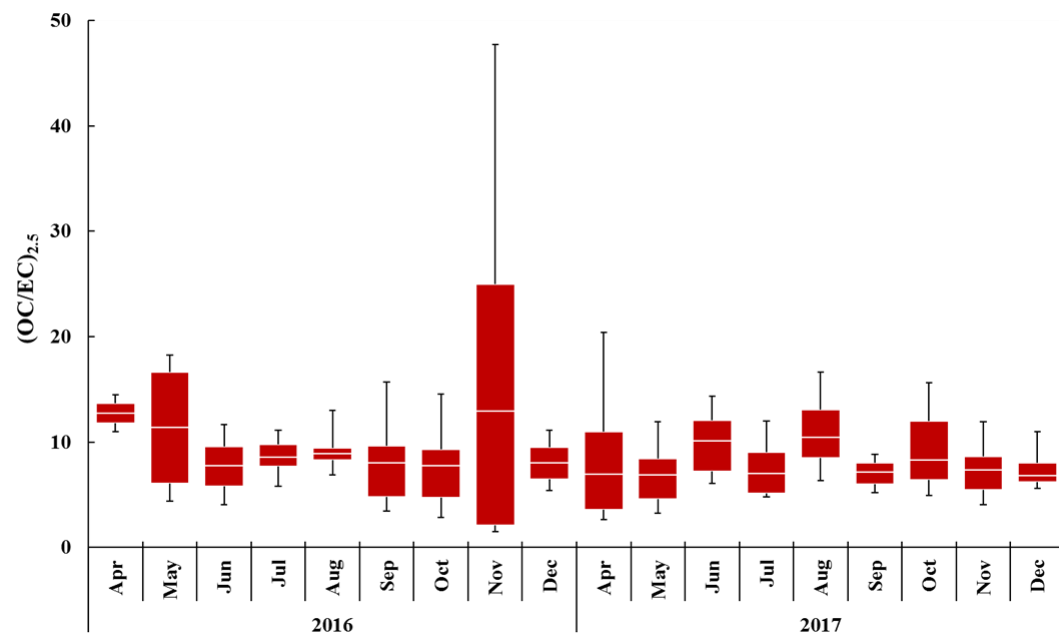
		PM ₁₀	OC ₁₀	EC ₁₀	(OC/EC) ₁₀	SOC ₁₀	%SOC ₁₀	PM _{fine}	OC _{fine}	EC _{fine}	(OC/EC) _{fine}	SOC _{fine}	%SOC _{fine}	PM _{coarse}	OC _{coarse}	EC _{coarse}	OC/EC _{coarse}	SOC _{coarse}	%SOC _{coarse}
Whole Period	min	1.10	0.01	0.00	1.62	0.00	2%	0.50	0.02	0.00	1.33	0.03	27%	0.10	0.00	0.00	0.13	0.00	9%
	mean	16.7	1.7	0.2	9.7	1.5	79%	8.8	1.2	0.14	8.6	1.1	80%	7.9	0.5	0.03	28.1	0.4	97%
	max	210.90	22.28	0.78	68.7	10.6	98%	55.30	20.01	0.70	52.8	10.0	97%	155.60	5.24	0.16	381.8	1.6	99%
	SD	19.0	1.9	0.1	5.5	1.3	11%	6.5	1.6	0.12	5.2	1.2	10%	14.1	0.5	0.03	40.4	0.3	8%

Table S5. Descriptive statistics (min, mean, max, SD)referring to the same parameters and for the same PM size fractions cited in Table S4 and herein discriminated by seasons: Spring, Summer, and Fall.

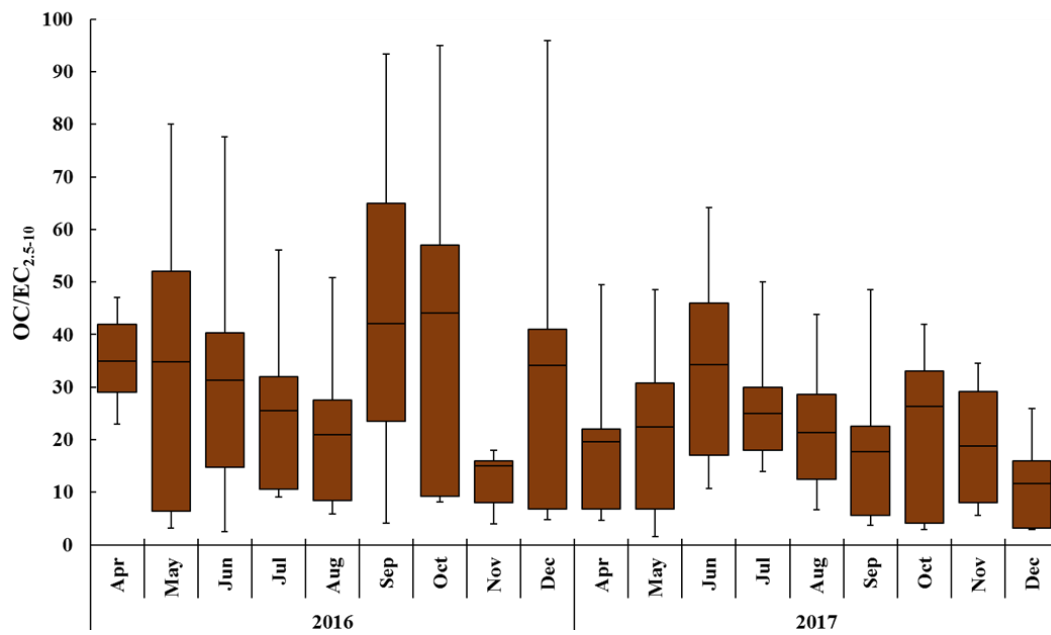
		PM ₁₀	OC ₁₀	EC ₁₀	(OC/EC) ₁₀	SOC ₁₀	%SOC ₁₀	PM _{fine}	OC _{fine}	EC _{fine}	(OC/EC) _{fine}	SOC _{fine}	%SOC _{fine}	PM _{coarse}	OC _{coarse}	EC _{coarse}	OC/EC _{coarse}	SOC _{coarse}	%SOC _{coarse}
Spring	min	1.9	0.1	0.04	1.8	0.0	2%	1.9	0.1	0.00	2.3	0.1	20%	0.4	0.0	0.00	0.9	0.1	0%
	mean	21.6	1.7	0.2	10.0	1.2	52%	10.1	1.0	0.13	8.5	0.7	66%	11.7	0.7	0.03	26.0	0.7	89%
	max	210.9	7.9	0.4	22.5	7.9	81%	55.3	5.9	0.4	31.7	2.3	93%	155.6	5.2	0.2	155.7	5.2	99%
	SD	25.7	1.2	0.1	4.3	1.1	20%	6.7	0.7	0.1	4.5	0.5	17%	19.9	0.7	0.0	27.0	0.7	19%
		PM ₁₀	OC ₁₀	EC ₁₀	(OC/EC) ₁₀	SOC ₁₀	%SOC ₁₀	PM _{fine}	OC _{fine}	EC _{fine}	(OC/EC) _{fine}	SOC _{fine}	%SOC _{fine}	PM _{coarse}	OC _{coarse}	EC _{coarse}	OC/EC _{coarse}	SOC _{coarse}	%SOC _{coarse}
Summer	min	1.1	0.01	0.00	3.1	0.05	40%	0.6	0.0	0.00	2.5	0.0	0%	0.2	0.0	0.00	2.6	0.0	0%
	mean	17.8	2.6	0.3	9.8	1.8	67%	11.2	2.0	0.2	12.5	1.6	75%	6.7	0.6	0.04	30.9	0.5	85%
	max	61.2	22.3	0.8	17.7	9.5	82%	47.0	20.0	0.7	339.0	20.0	100%	36.4	2.3	0.1	381.8	2.3	100%
	SD	11.5	2.7	0.2	2.6	1.6	9%	7.0	2.5	0.1	35.7	2.3	18%	6.4	0.3	0.0	47.7	0.3	19%
		PM ₁₀	OC ₁₀	EC ₁₀	(OC/EC) ₁₀	SOC ₁₀	%SOC ₁₀	PM _{fine}	OC _{fine}	EC _{fine}	(OC/EC) _{fine}	SOC _{fine}	%SOC _{fine}	PM _{coarse}	OC _{coarse}	EC _{coarse}	OC/EC _{coarse}	SOC _{coarse}	%SOC _{coarse}
Fall	min	1.2	0.09	0.00	1.6	0.00	0%	0.5	0.0	0.00	1.3	0.02	27%	0.1	0.0	0.00	0.1	0.01	49%
	mean	9.4	0.8	0.1	9.0	0.7	83%	4.9	0.5	0.07	8.6	0.4	87%	4.6	0.3	0.03	24.7	0.3	97%
	max	110.1	4.1	0.4	68.7	4.1	100%	23.9	2.3	0.3	52.8	1.8	100%	86.2	2.9	0.2	196.1	2.9	100%
	SD	12.1	0.7	0.1	8.9	0.6	19%	3.2	0.4	0.1	8.1	0.4	15%	9.8	0.4	0.0	41.0	0.4	7%

Table S6. Descriptive statistics (min, mean, max, SD)referring to the same parameters and for the same PM size fractions cited in Table S4 and herein discriminated by the events: North African Saharan Dust (NAF), Wildfire (WF), and Background (BKG) conditions.

		PM ₁₀	OC ₁₀	EC ₁₀	(OC/EC) ₁₀	SOC ₁₀	%SOC ₁₀	PM _{fine}	OC _{fine}	EC _{fine}	(OC/EC) _{fine}	SOC _{fine}	%SOC _{fine}	PM _{coarse}	OC _{coarse}	EC _{coarse}	OC/EC _{coarse}	SOC _{coarse}	%SOC _{coarse}
NAF	min	5.00	0.12	0.10	6.06	0.09	4%	3.00	0.09	0.00	3.10	0.03	9%	1.70	0.09	0.00	5,47	0,14	31%
	mean	50.6	2.1	0.2	9.4	0.7	33%	15.0	0.8	0.15	5.8	0.4	43%	35.6	1.3	0.041	155,1	0,8	75%
	max	210.90	6.46	0.43	14.5	1.9	58%	55.30	1.60	0.42	9.8	1.0	68%	155.60	5.24	0.16	1591,3	1,9	97%
	SD	41.7	1.4	0.1	2.9	0.7	19%	10.4	0.4	0.1	2.0	0.3	18%	31.7	1.1	0.0	415,9	0,6	21%
		PM ₁₀	OC ₁₀	EC ₁₀	(OC/EC) ₁₀	SOC ₁₀	%SOC ₁₀	PM _{fine}	OC _{fine}	EC _{fine}	(OC/EC) _{fine}	SOC _{fine}	%SOC _{fine}	PM _{coarse}	OC _{coarse}	EC _{coarse}	OC/EC _{coarse}	SOC _{coarse}	%SOC _{coarse}
WF	min	1.10	0.11	0.00	3.76	0.07	16%	0.70	0.03	0.00	2.32	0.14	35%	0.20	0.08	0.00	2.83	0.00	0%
	mean	19.0	2.7	0.3	9.9	1.6	59%	11.7	2.2	0.2	9.0	1.5	72%	7.3	0.6	0.037	25.1	0.4	77%
	max	66.80	22.28	0.78	19.2	9.0	80%	46.98	20.01	0.70	18.7	9.3	88%	36.40	2.27	0.13	194.0	1.2	99%
	SD	11.9	2.7	0.2	3.0	1.4	13%	7.0	2.4	0.1	2.9	1.5	9%	7.0	0.3	0.0	26.6	0.2	21%
		PM ₁₀	OC ₁₀	EC ₁₀	(OC/EC) ₁₀	SOC ₁₀	%SOC ₁₀	PM _{fine}	OC _{fine}	EC _{fine}	(OC/EC) _{fine}	SOC _{fine}	%SOC _{fine}	PM _{coarse}	OC _{coarse}	EC _{coarse}	OC/EC _{coarse}	SOC _{coarse}	%SOC _{coarse}
BKG	min	1.20	0.01	0.00	1.62	0.02	11%	0.50	0.02	0.00	1.33	0.03	27%	0.10	0.00	0.00	0.13	0.01	49%
	mean	10.1	1.1	0.1	9.5	1.0	78%	6.3	0.7	0.1	8.5	0.6	79%	3.9	0.4	0.03	25.9	0.3	97%
	max	44.30	3.69	0.33	68.7	3.3	98%	18.00	2.73	0.30	52.8	2.5	97%	30.30	2.52	0.15	203.6	1.6	99%
	SD	6.8	0.7	0.1	6.9	0.7	13%	3.5	0.5	0.1	6.6	0.5	12%	4.4	0.4	0.0	35.9	0.3	6%

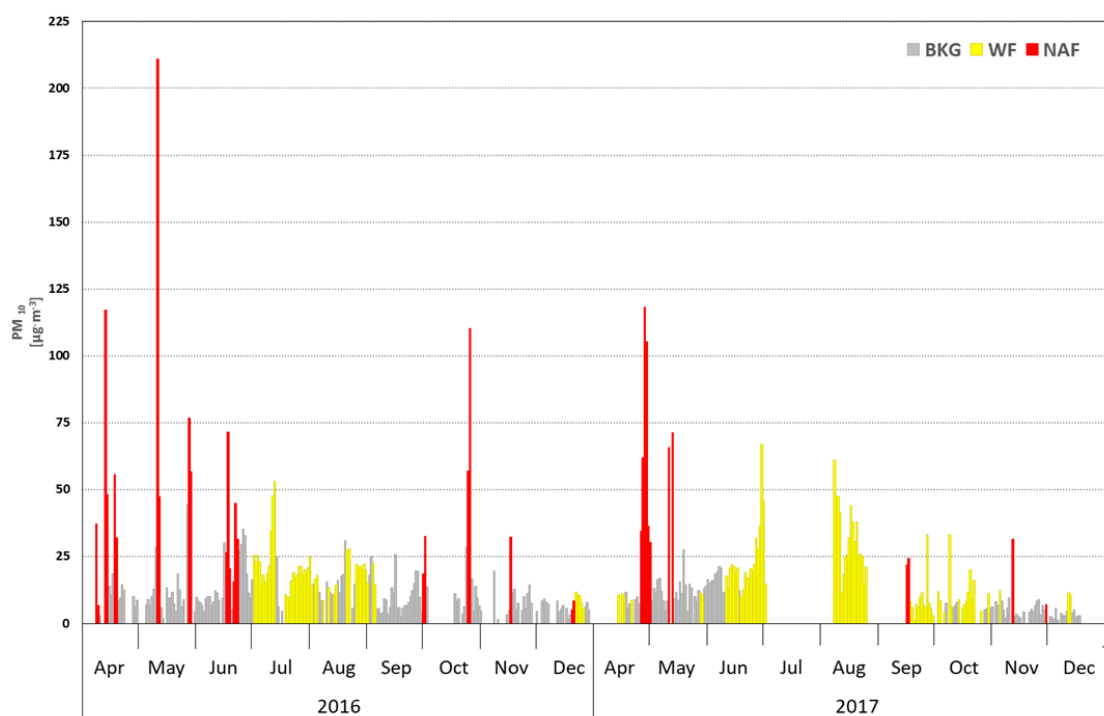


(a)

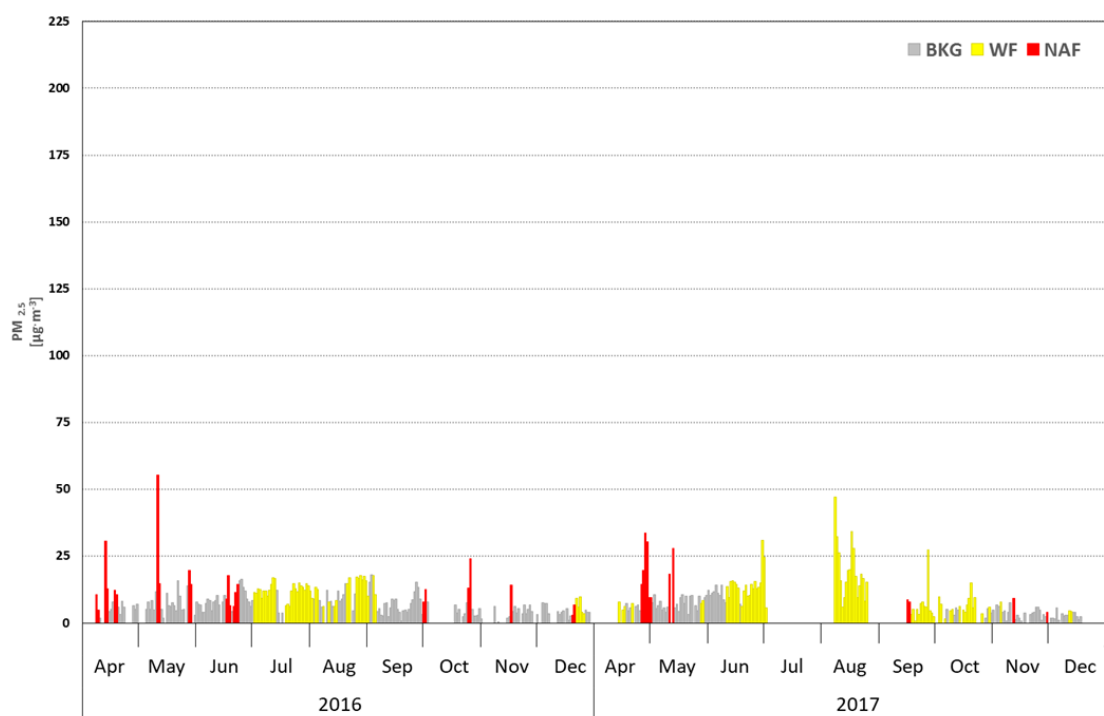


(b)

Figure S1. Monthly trend of (a) OC/EC_{2.5} ratio for the fine fraction, and (b) OC/EC_{2.5-10} ratio for the coarse fraction recorded at the MCU Observatory since April to December 2016 and from April to December 2017. Each box includes the mean (midline), 25th and 75th percentiles (box edges), 5th and 95th percentiles (whiskers).

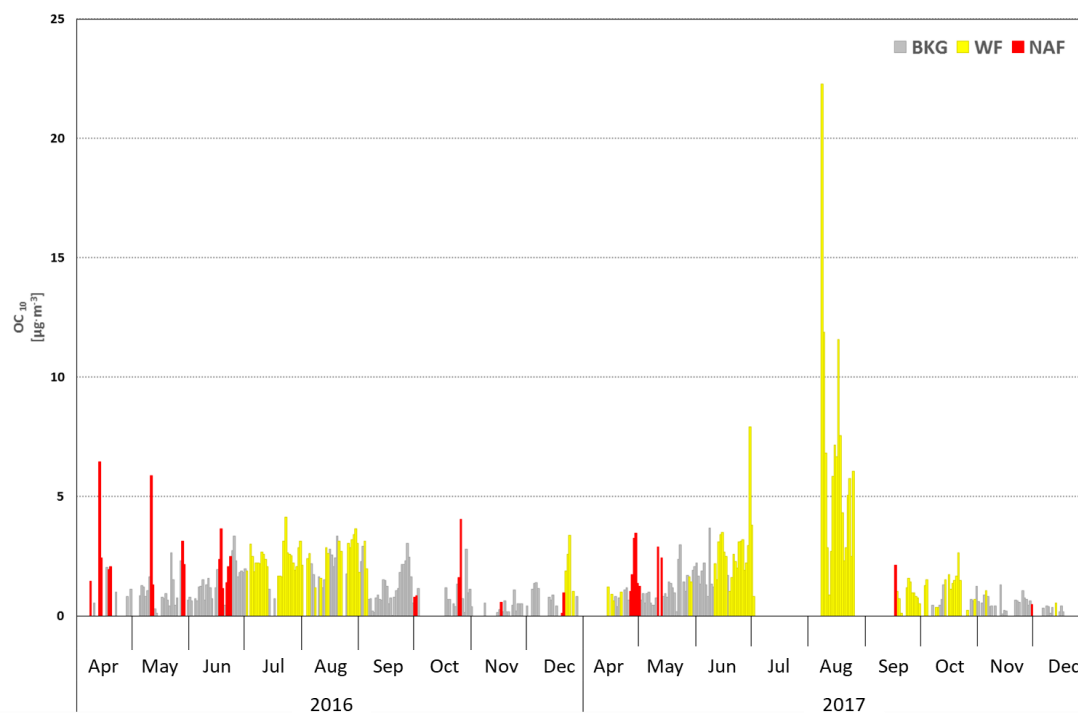


(a)

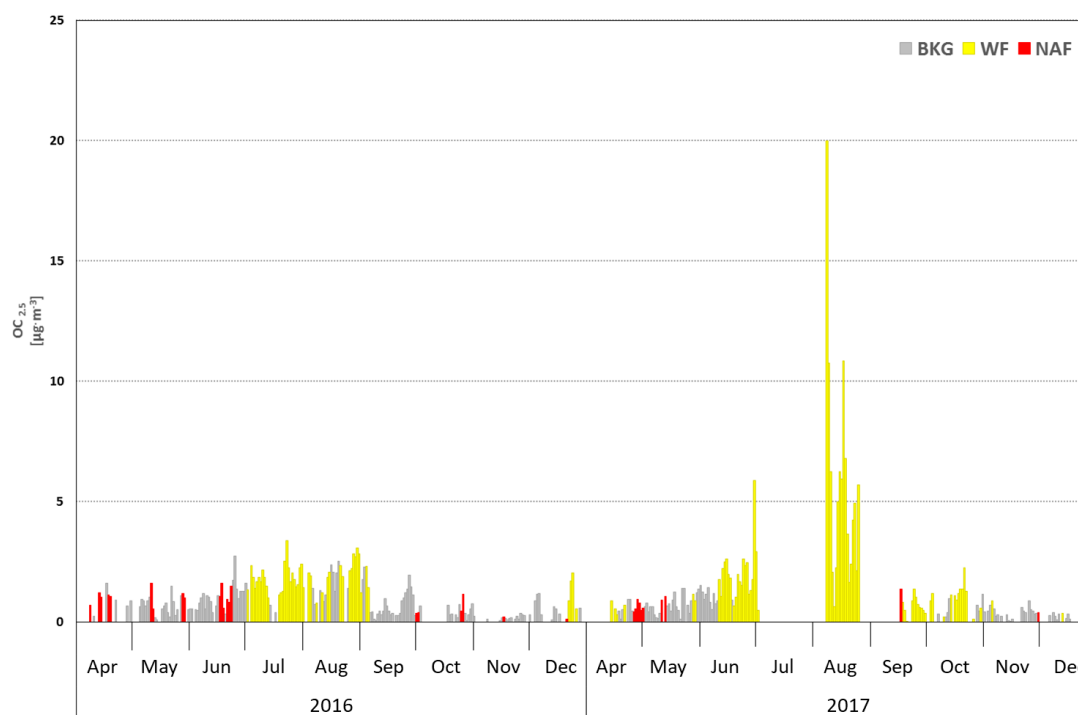


(b)

Figure S2. Time-series recorded at the MCU station (a) PM_{10} and (b) $PM_{2.5}$ observed over the whole sampling period and discriminated by the influencing events: Background (BKG–grey), Wildfire (WF–yellow), and North African Saharan Dust (NAF–red).

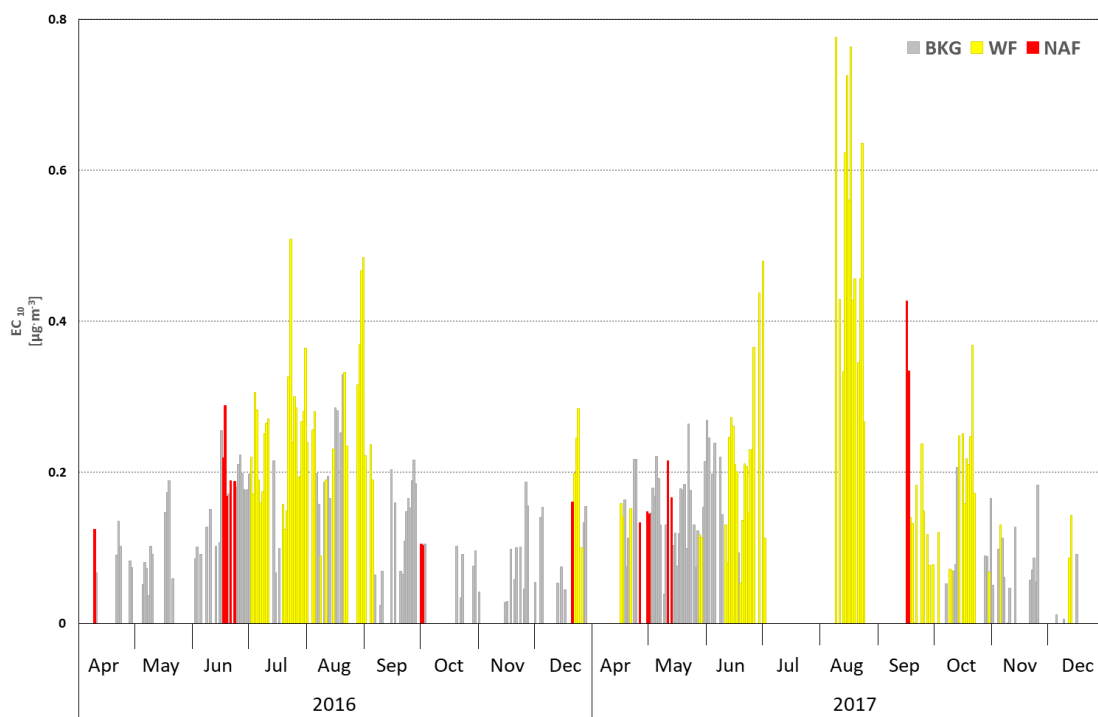


(a)

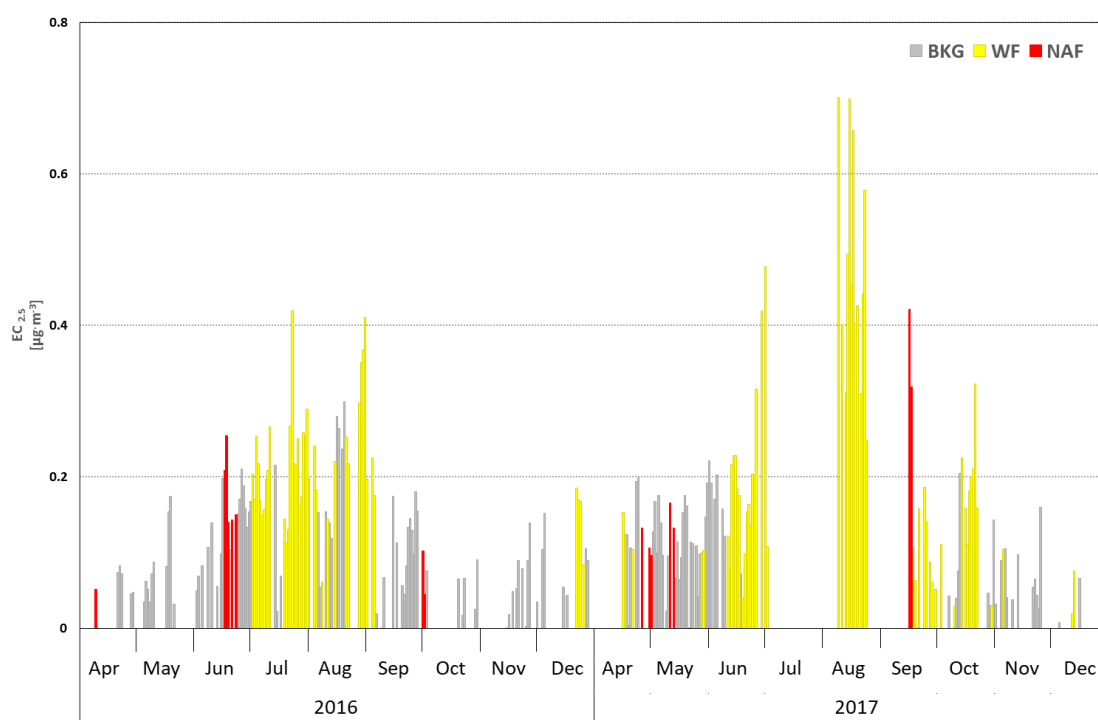


(b)

Figure S3. Time-series recorded at the MCU station (a) OC_{10} and (b) $OC_{2.5}$ observed over the whole sampling period and discriminated by the influencing events: Background (BKG–grey), Wildfire (WF–yellow), and North African Saharan Dust (NAF–red).



(a)



(b)

Figure S4. Time-series recorded at the MCU station (a) EC_{10} and (b) $EC_{2.5}$ observed over the whole sampling period and discriminated by the influencing events: Background (BKG–grey), Wildfire (WF–yellow), and North African Saharan Dust (NAF–red).