

Table S-1. Description of the Quartz and EUSAAR2 thermal protocols for the Sunset analyzer

Step	Carbon peak	QUARTZ	EUSAAR2
		Temperature (° C), Time (s)	Temperature (° C), Time (s)
He 1	OC1	310, 80	200, 120
He 2	OC2	475, 60	300, 150
He 3	OC3	615, 60	450, 180
He 4	OC4	870, 90	650, 180
He 5		0, 45	0, 33
He/O <sub>2</sub> 1	EC1	550, 45	500, 120
He/O <sub>2</sub> 2	EC2	625, 45	550, 120
He/O <sub>2</sub> 3	EC3	700, 45	700, 70
He/O <sub>2</sub> 4	EC4	850, 60	850, 80
He/O <sub>2</sub> 5	EC5	870, 90	

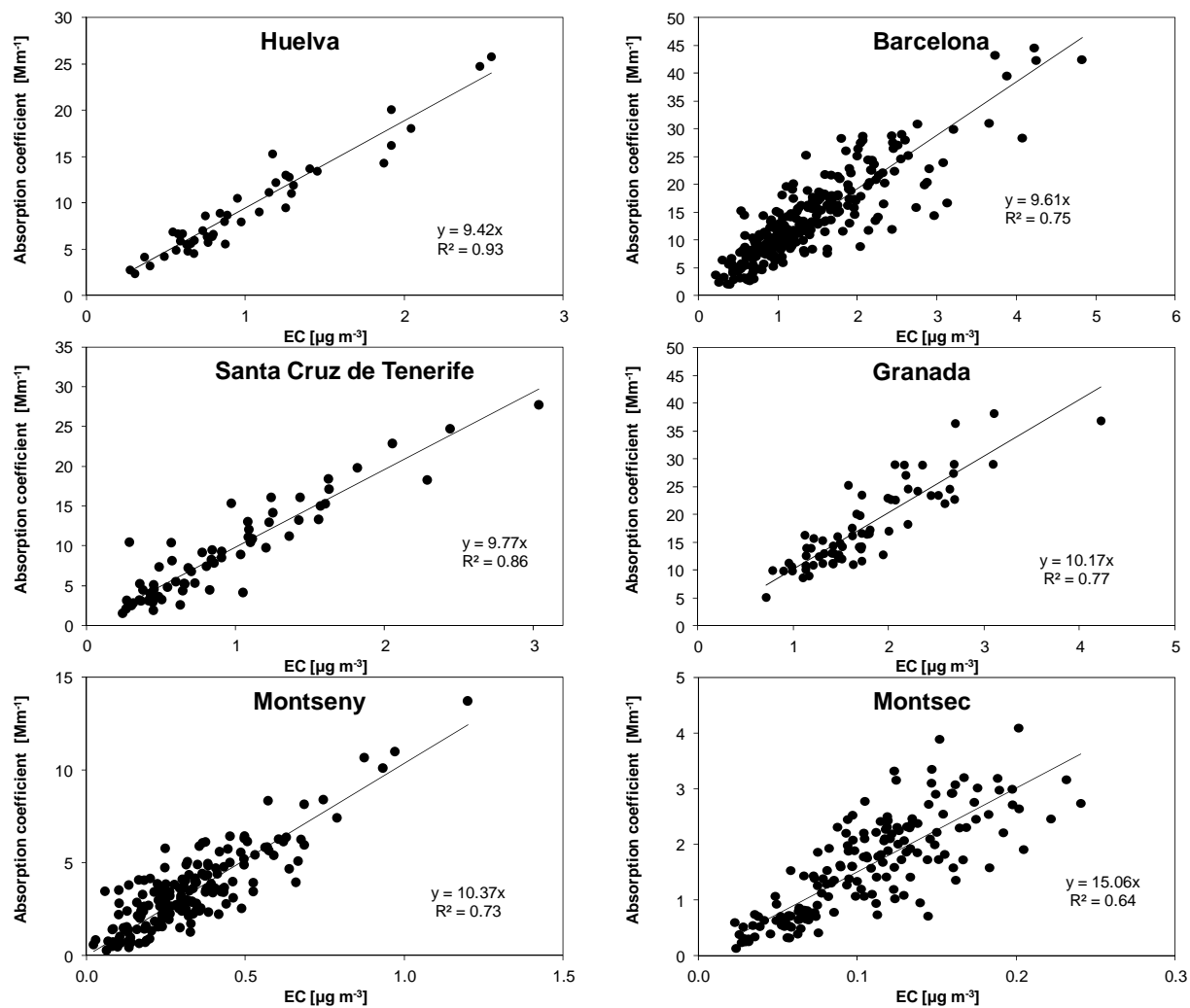


Figure S1. Correlation plots of EC concentrations measured with the thermo-optical method and simultaneously measured absorption coefficients with MAAP instruments at 6 study sites.

## S1

Sites from which nmC, OC and EC, and EBC concentrations were obtained:

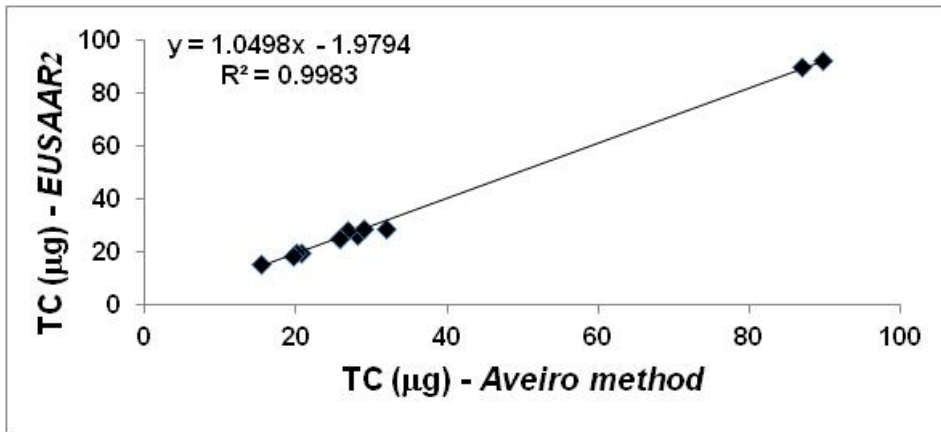
- 2 remote sites including Montsec in NE of IP (Iberian Peninsula) and Izaña in the Canary Islands.
- 10 rural/regional background sites in the IP and the Balearic Islands, including Montseny, Monagrega, Bemantes, and El Perdón in the N of the IP; Cortijo Endrinales, and San Jorge in the central IP; Matalascañas, Valverde and Campillos in SW of IP; and Can Llompart in the Balearic Islands.
- 10 industrial-rural or industrial-suburban sites including Ponferrada, Plaza Castillo-Almeria and Poblado-Córdoba (all three for power generation) in N and S of IP, Torrelavega (chemical industry) in N of IP, Monzón (metal and agro-industry) in NE of IP, Alacant (cement manufacturing) in E of IP; Onda, influenced by ceramic and glass manufacture emissions form a large industrial estate in the E of IP; Arenosillo (metallurgy, petrochemical plants and fertilizers) and Punta Umbria (metallurgy and fertilizers) in SW of IP and Santa Cruz (shipping and petrochemical emissions) in the Canary Islands.
- 20 industrial urban sites including Tarragona, Puertollano (both with large chemical and petrochemical estates), Huelva, La Línea, Puente Mayorga and Los Barrios (with petrochemical and metallurgical estates, and shipping emissions), Bailén (manufacture of bricks and pottery), and Alcalá de Guadaira (smelter), all in S of IP; L'Alcora, Vila-real, Borriana, Almassora and Agost (influenced by the ceramic and glass manufacture emissions), in the E of IP; Llodio, Bajo Cadagua and Zabalgardi (metallurgy), Alsasua (cement manufacturing), Avilés (coke production), in the N of IP; Torredonjimeno and Montcada (cement production) in S and NE Spain, respectively.
- 7 suburban sites including Palma de Mallorca (Balearic Islands), Chapineria (Central IP), Burgos (Central-N IP), Badajoz (Central-SW IP), Santa Ana-Cartagena (SE IP), El Vacar-Córdoba (Central-S IP), Nerva-Huelva (SW IP). These are stations located in the outskirts of cities or villages.
- 19 urban background sites, including Granada, Moguer, Cádiz, Córdoba, Sevilla and Jaén in S of IP; Melilla in N Africa, Las Palmas de Gran Canaria in Canary Islands, Albacete in SE of IP; Alcobendas and Madrid in Central IP, Barcelona, Sabadell, Girona, and Zaragoza in NE of IP; 2 sites in Bilbao, 1 site in Pamplona and 1 in Santander, in N of IP.
- 10 road traffic sites in Sabadell, Girona, Barcelona (in NE of IP); Madrid (Central IP); Granada, Almería, Málaga-Carranque (S of IP); Cartagena (SE of IP); Barreda-Torrelavega, Pamplona and Bilbao (N of IP).

For the categorization of urban background, traffic and industrial sites we used the same category as the one used for the Spanish air quality data repository that follows the criteria of classification by Larssen et al (1999). This uses a combination of:

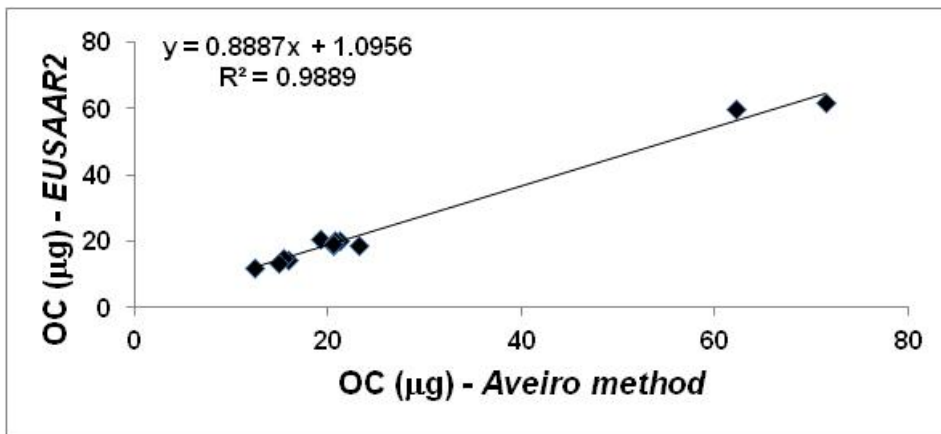
- Type of station; traffic, industrial, background,
- Type of zone: urban, suburban, rural

Larssen S, Sluyter R, Helmig C. 1999. Criteria for EUROAIRNET. The EEA Air Quality and Information Network. Technical Report No. 12. European Environment Agency, Copenhagen. <http://www.eea.europa.eu/publications/TEC12>

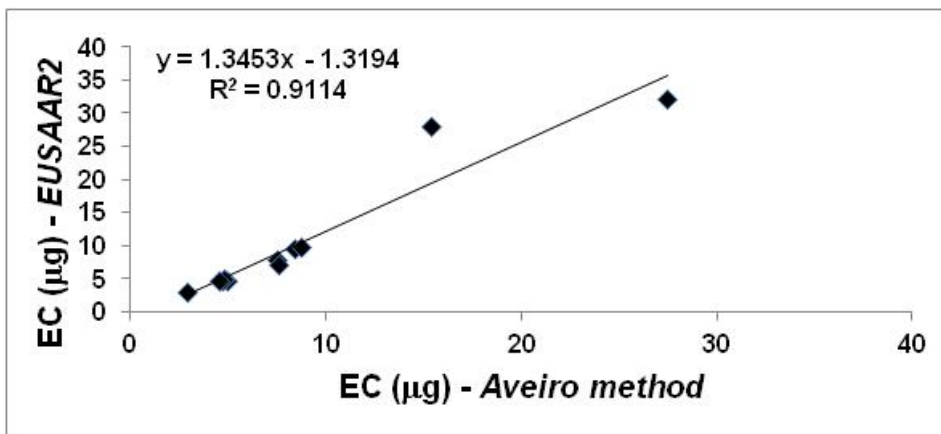
Figure S2. Intercomparison results for PM2.5 urban aerosol samples for TC (a), OC (b) and EC (c) of the Aveiro University method and the EUSAAR2 thermal protocol



(a)



(b)



(c)