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DEPARTMENT OF CHEMISTRY,
BIOLOGY AND BIOTECHNOLOGY

Traccianti molecolari dell'aerosol organico al sito EMEP di Monte Martano

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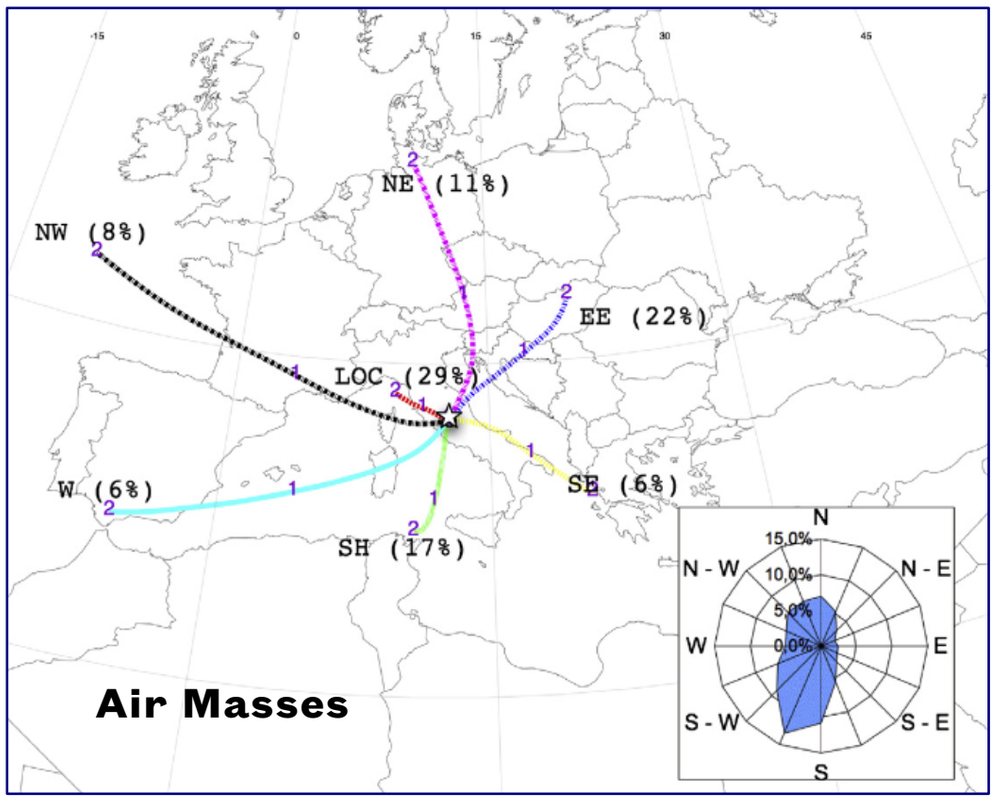
agenzia regionale per la protezione ambientale

ECT Environmental Chemistry & Technology

Monte Martano EMEP station

DC - PM2024 - TORINO

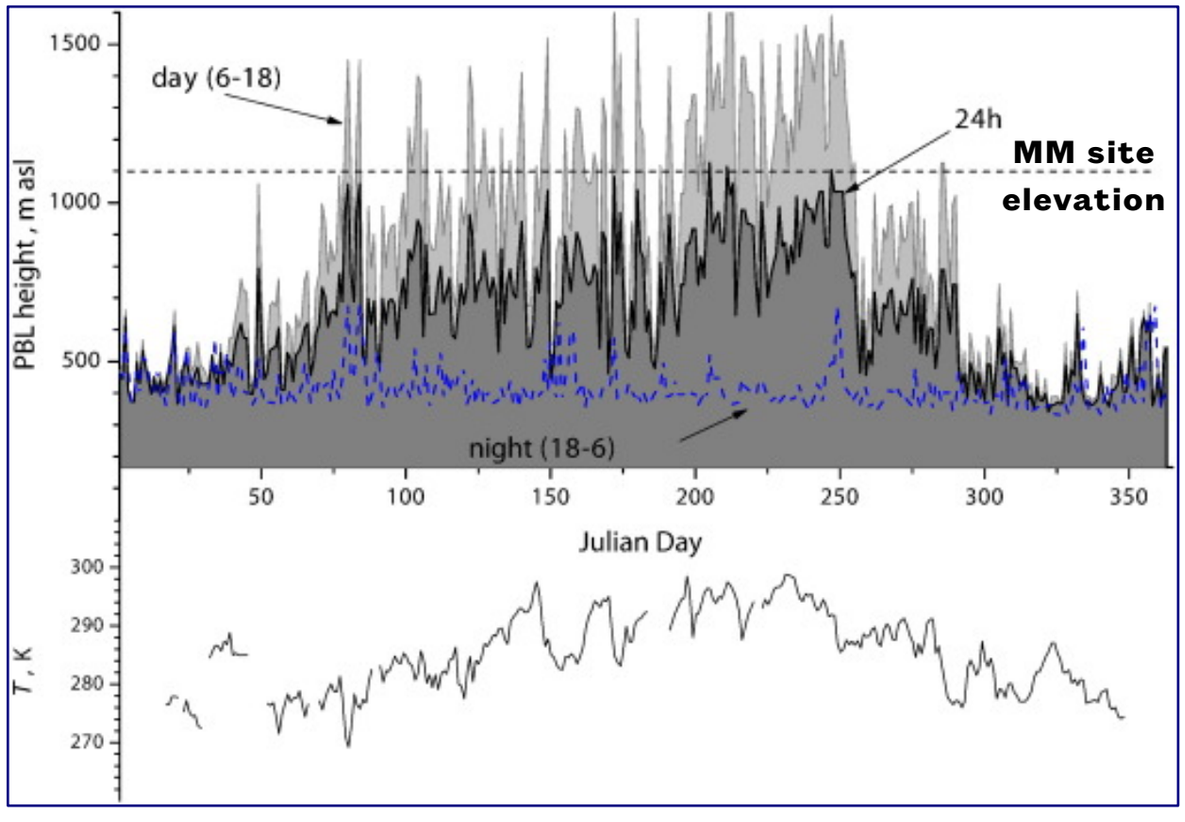
Monte Martano EMEP station



Moroni et al. Atmospheric Research 155 (2015) 26–36

Monte Martano EMEP station

Planetary Boundary Layer



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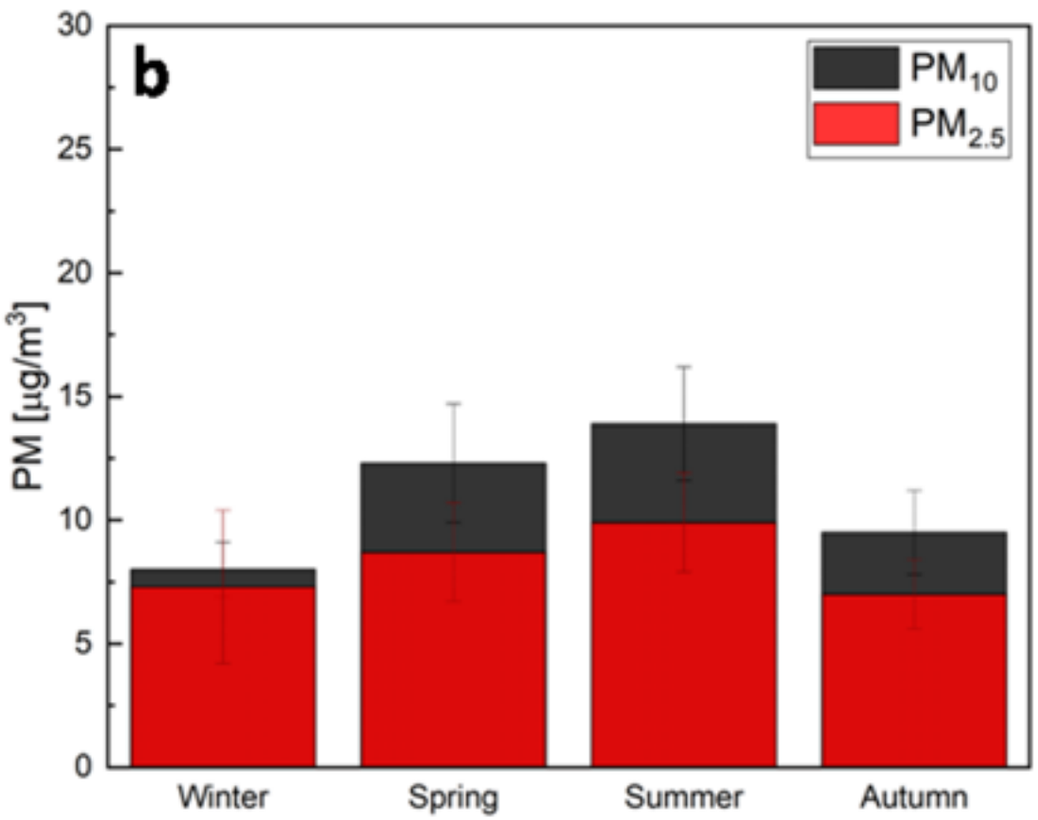
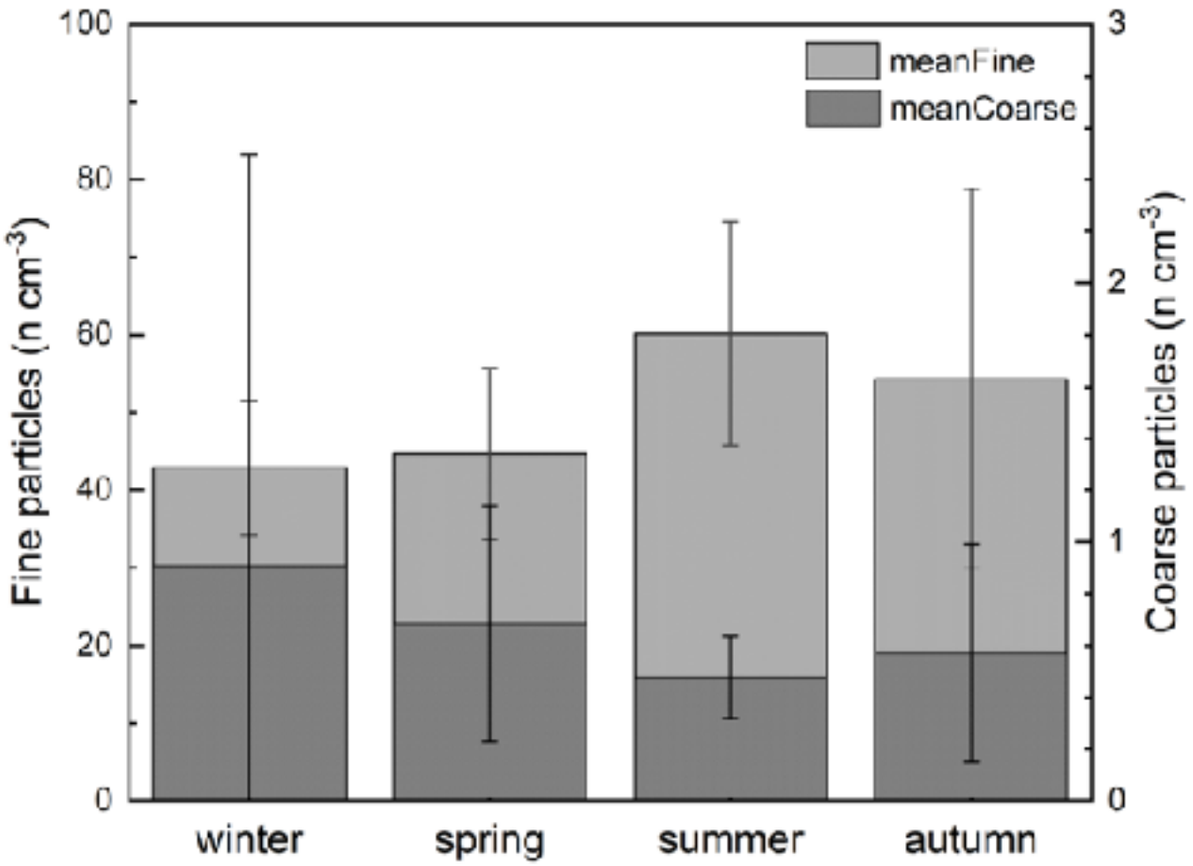


Petroselli et al., Atmospheric Research 304 (2024) 107364

Monte Martano EMEP station



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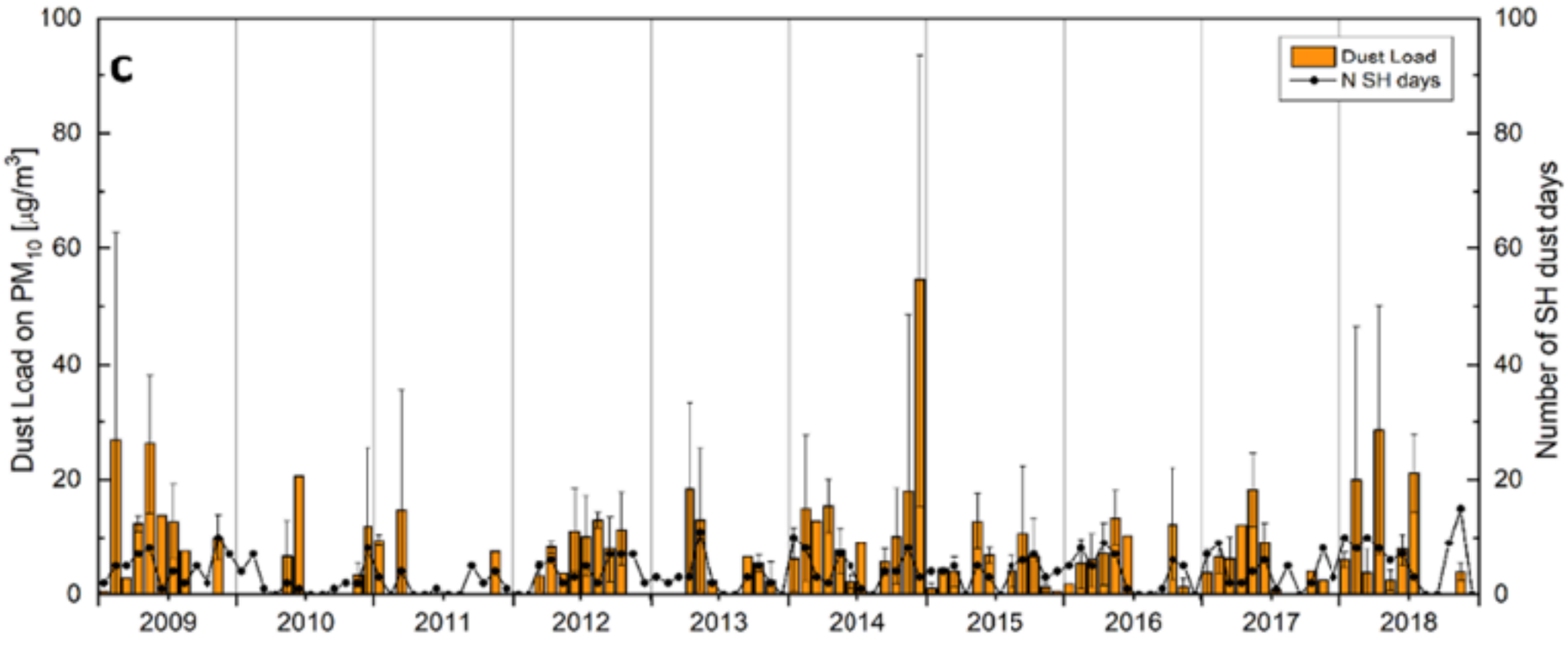
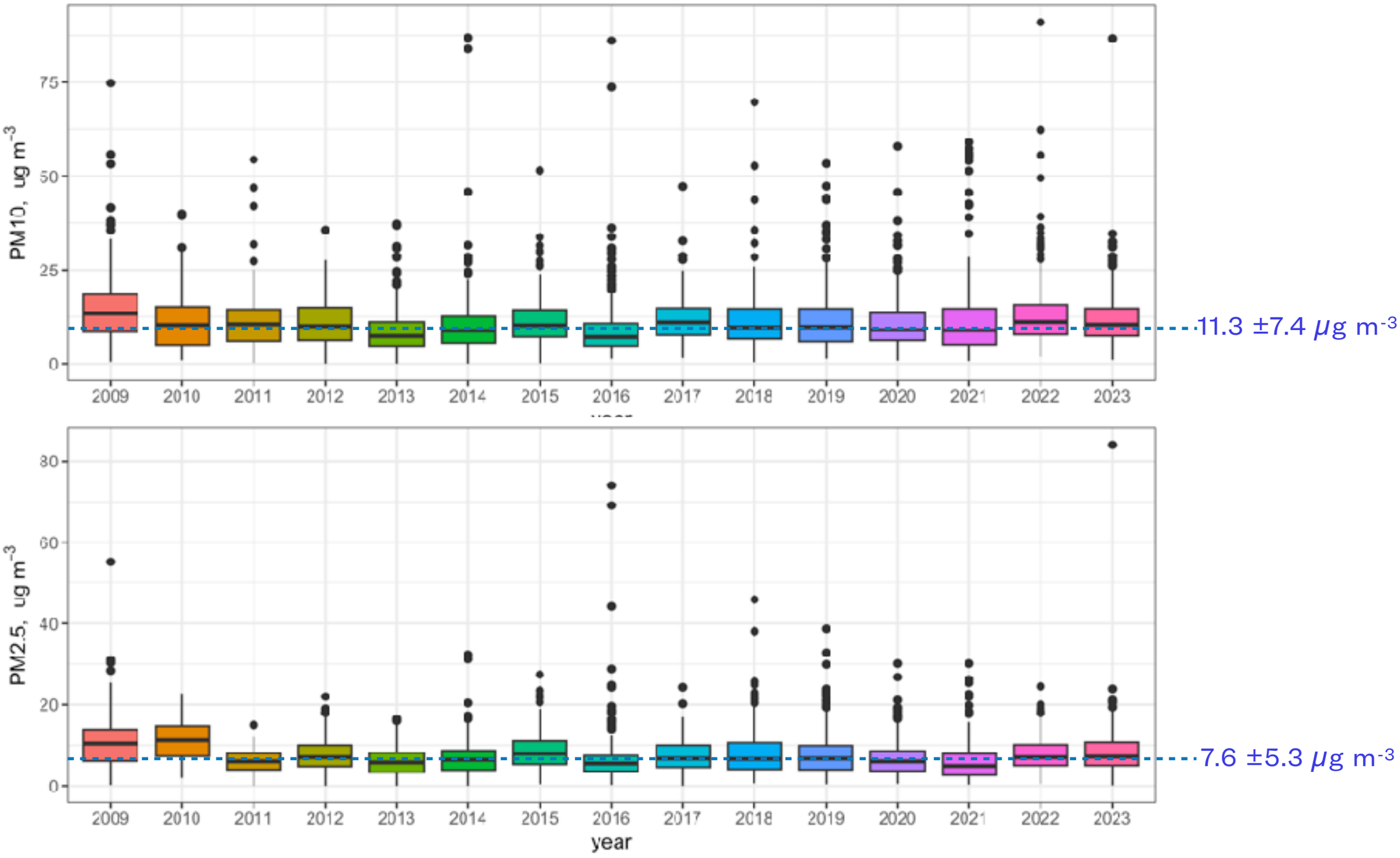


Decadal trends (2009–2018) in Saharan dust transport at Mt. Martano EMEP station, Italy

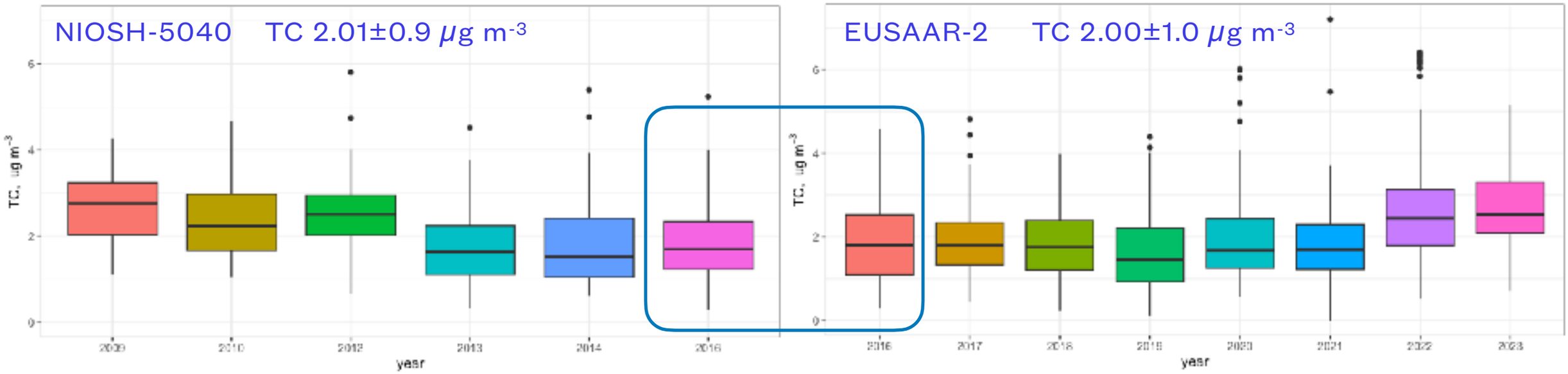
Petroselli et al., Atmospheric Research 304 (2024) 107364

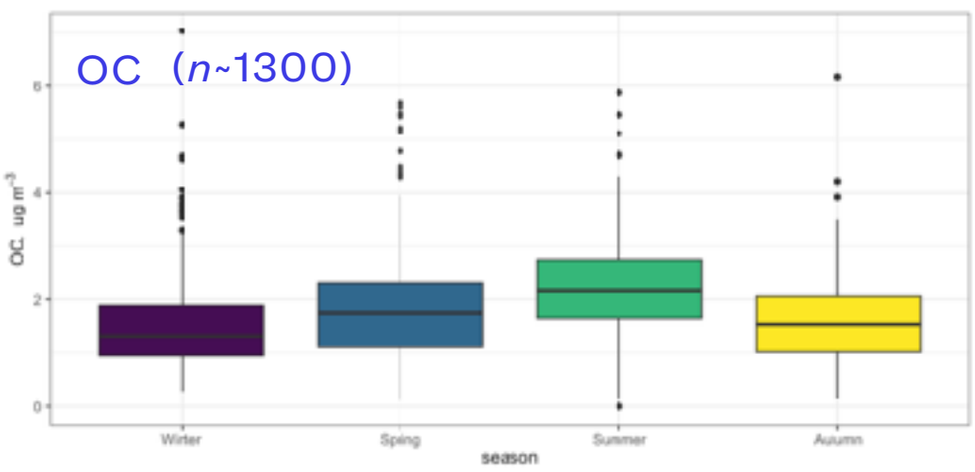
12.6% days/year dust load (daily) ~ 5 μg m^{-3} dust load (year) ~ 0.6 μg m^{-3}

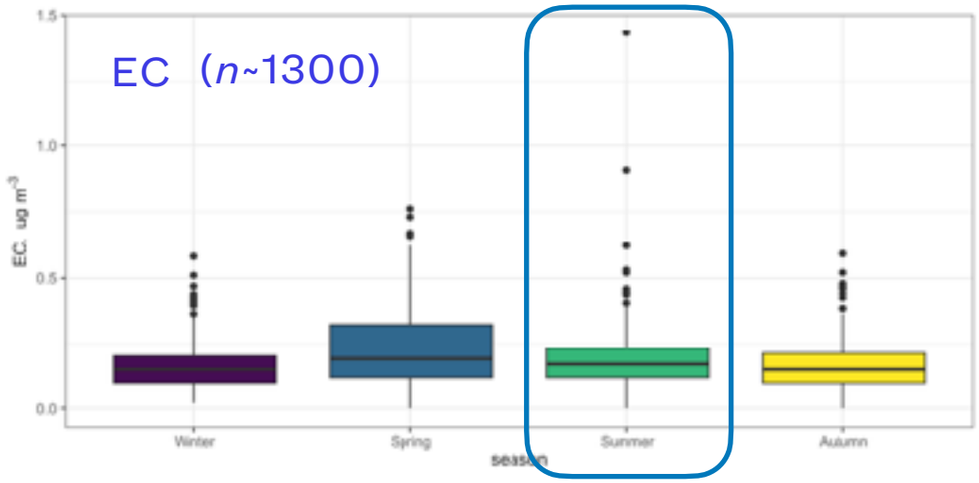
the PM record (daily)



the EC OC record (PM_{10} ~every second day)

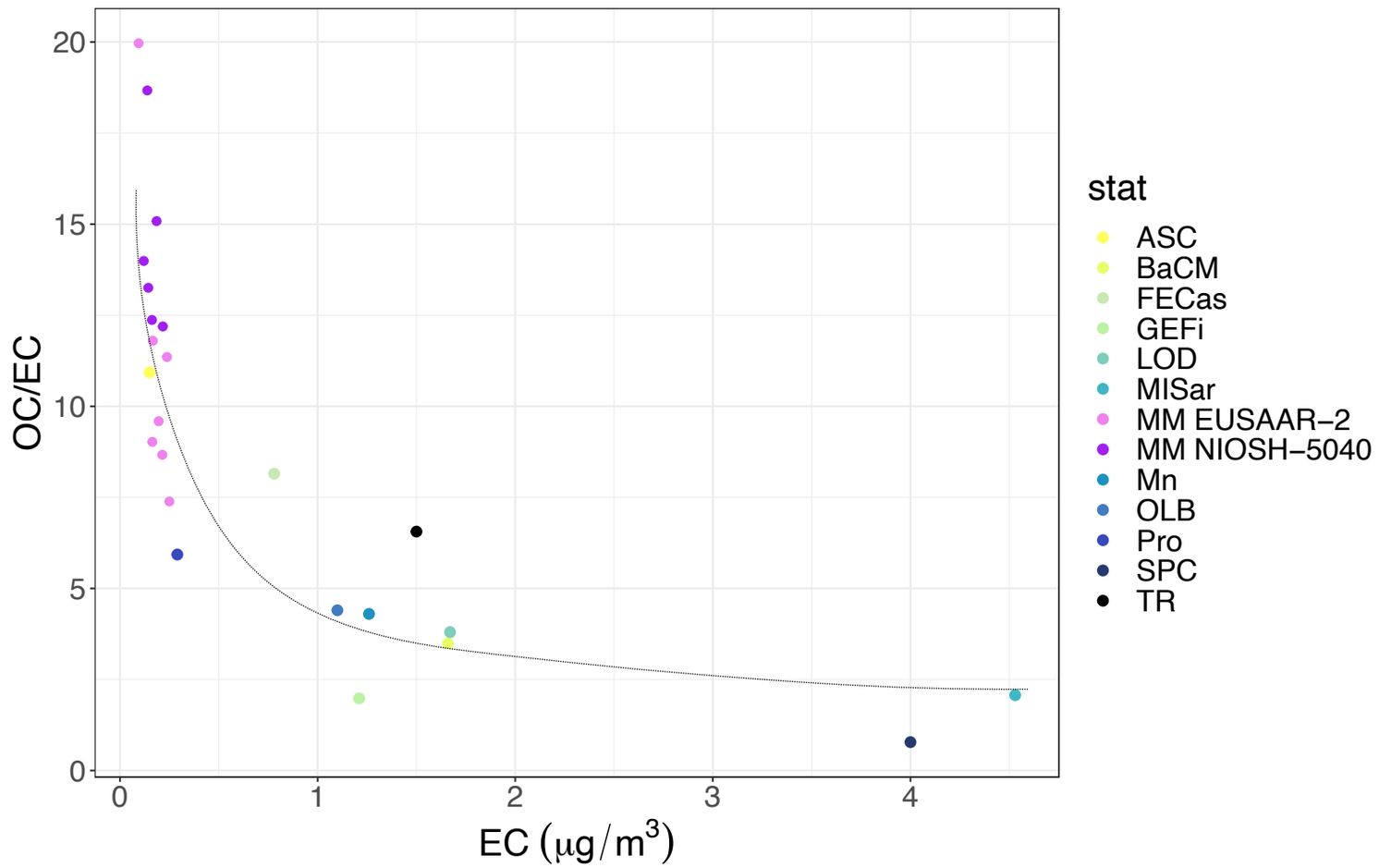


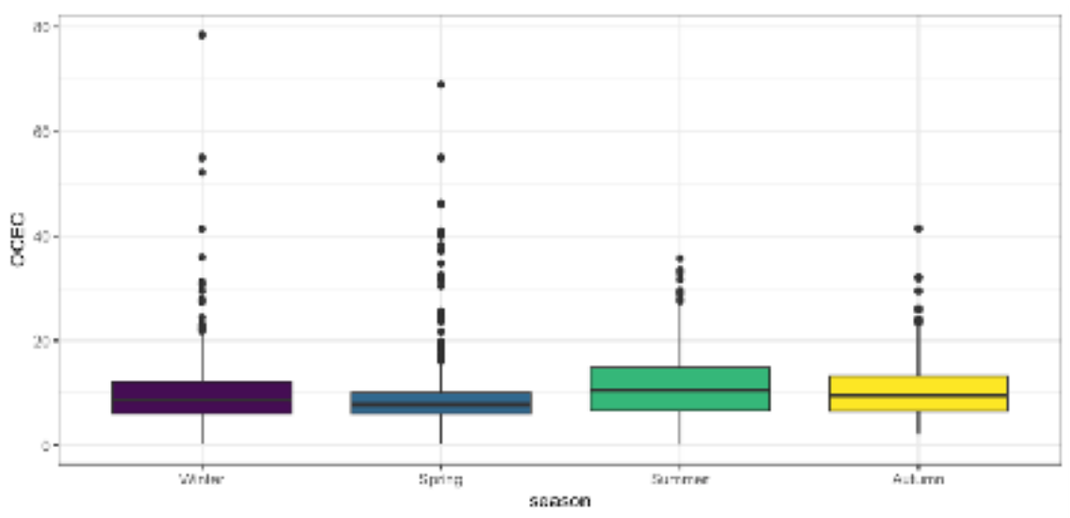




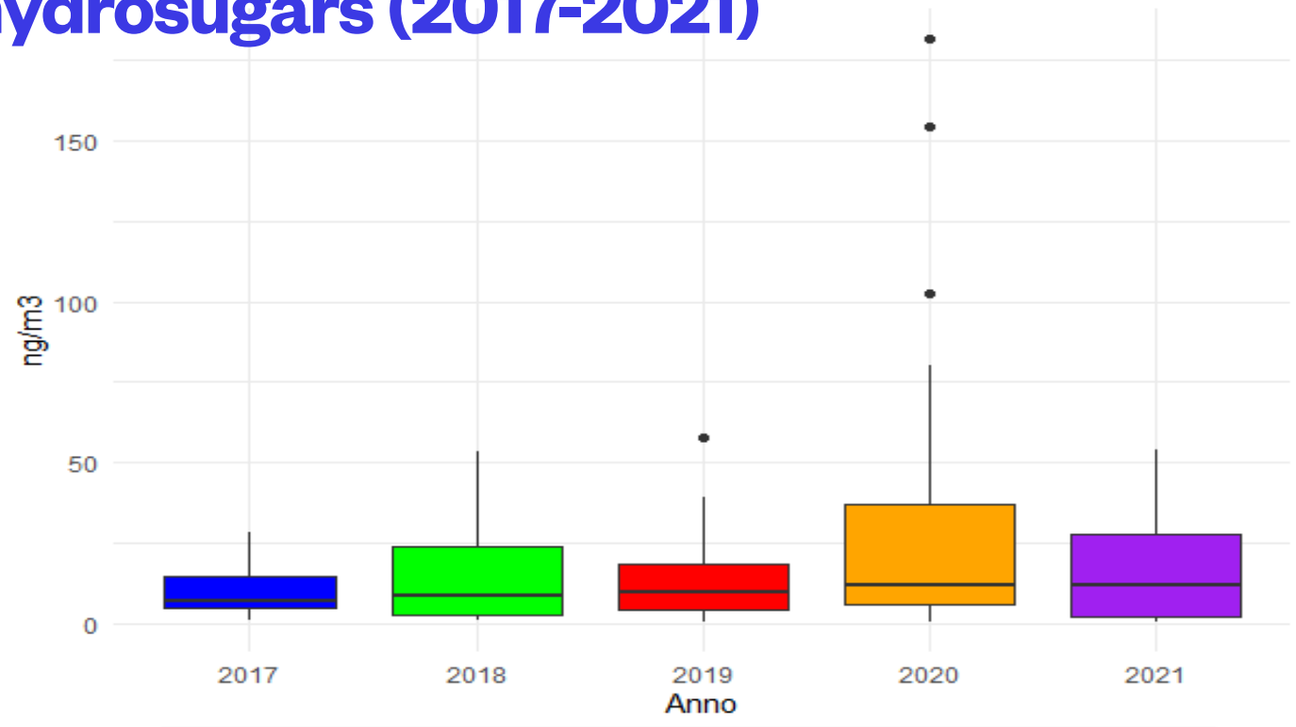
OC/EC ratio

adapted from S. Sandrini et al. / Atmospheric Environment 99 (2014) 587-598



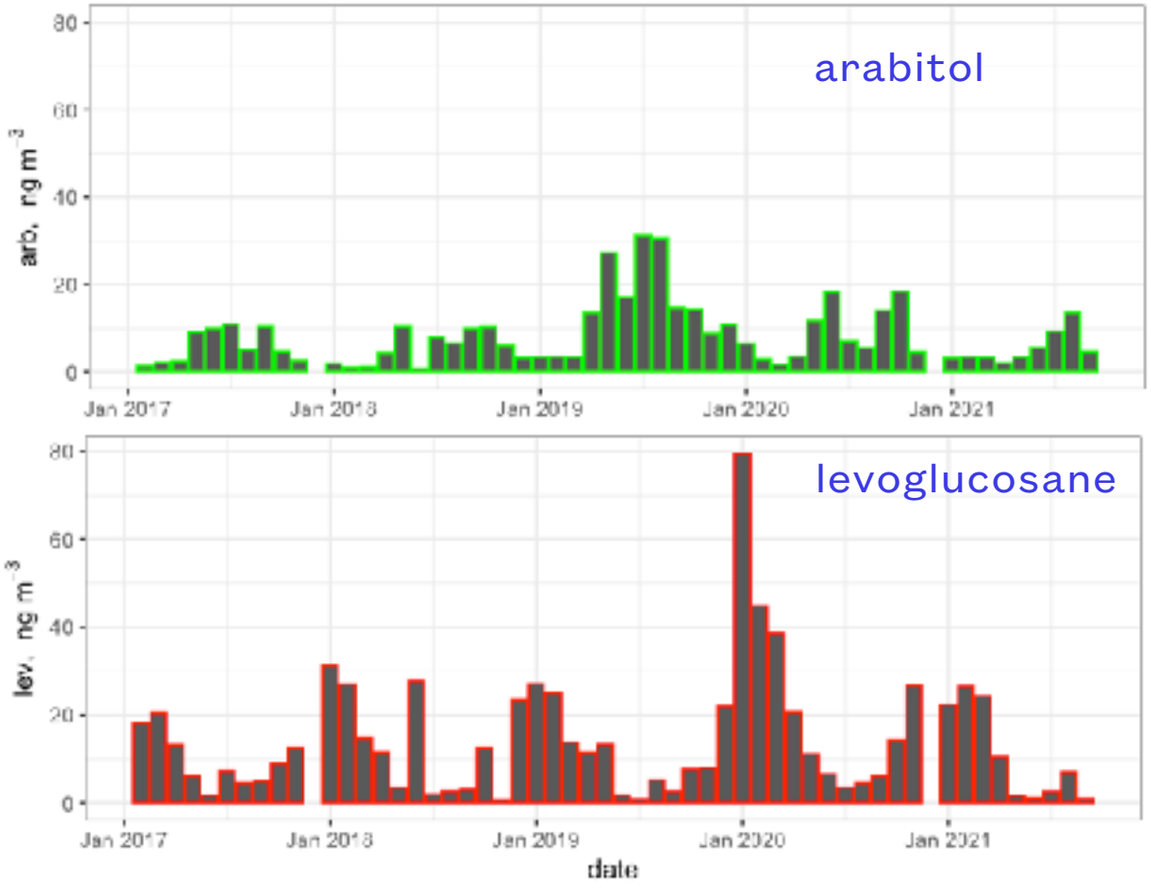


Anhydrosugars (2017-2021)



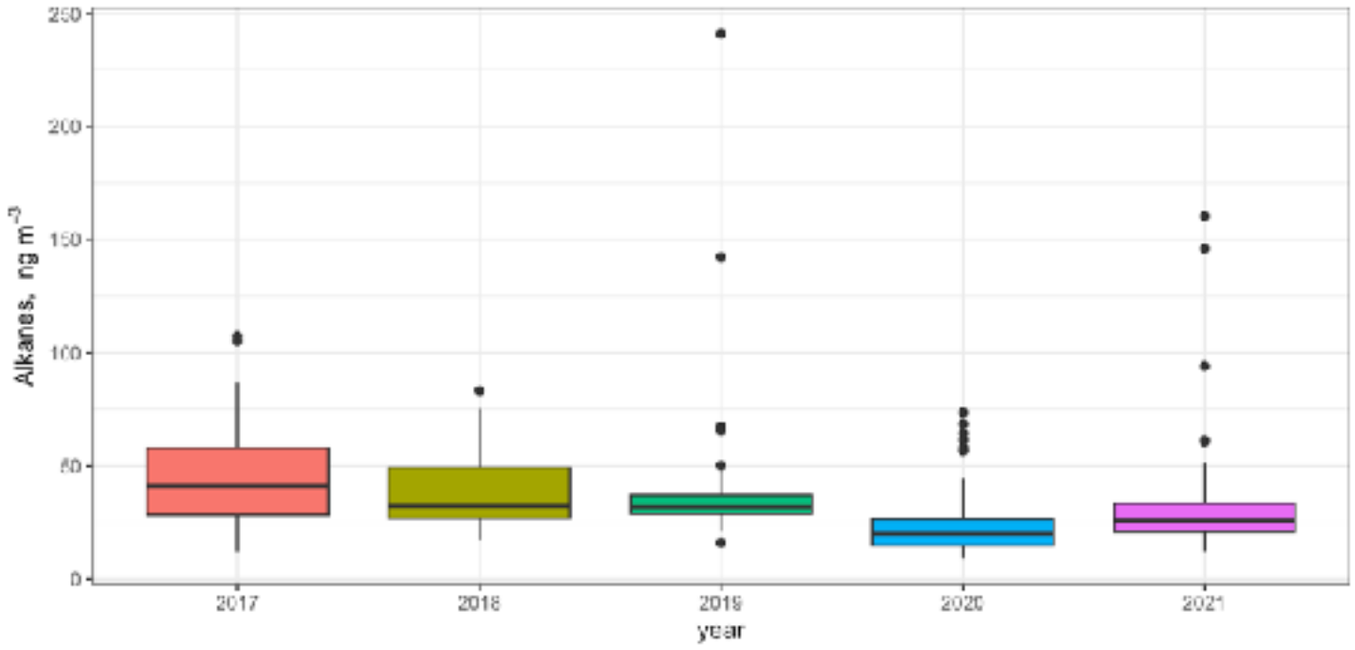
Lev+Man+Gal

	Media ± DS
	ng/m^3
2017*	10 ± 8
2018	13 ± 14
2019	13 ± 12
2020	**27 ± 36**
2021	15 ± 15

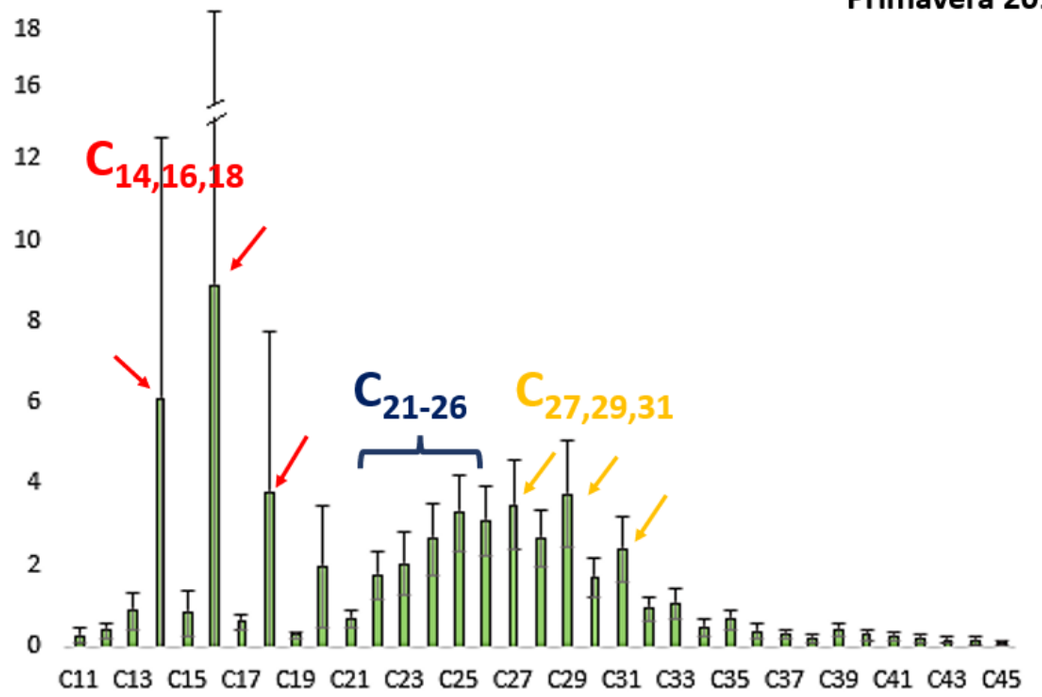


Levoglucosan		biomass burning
Mannosan		soft/hard wood
Galactosan		soft/hard wood
Arabitol		fungal spores
Inositol	} 2017	mixed sources
Mannitol		fungal spores

n-alkanes (C_{11}-C_{45})



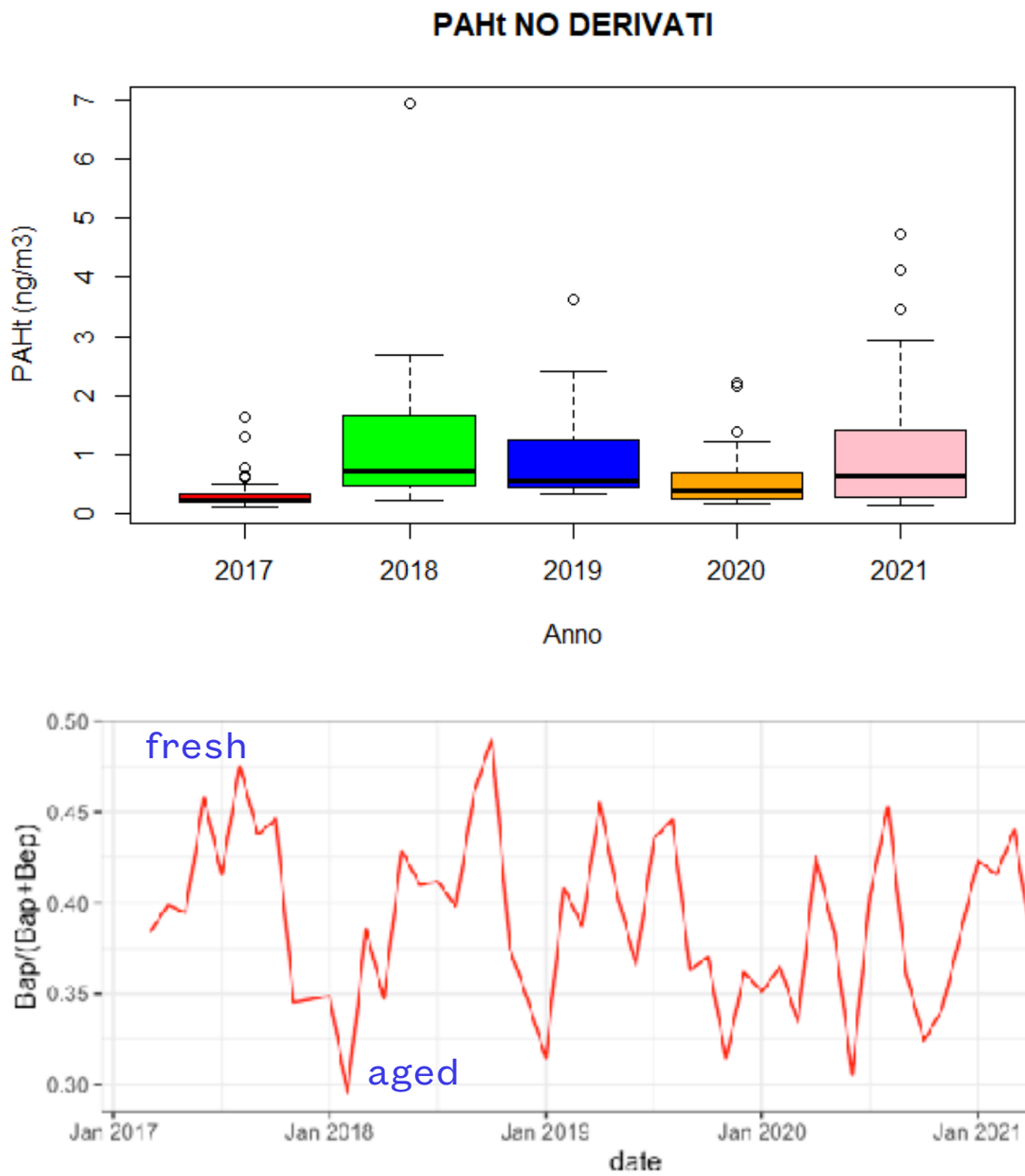
	Media ± DS
	ng/m³
2017*	46 ± 24
2018	40 ± 17
2019	40 ± 36
2020	**23 ± 17**
2021	35 ± 30



	C14,16,18/C27,29,31	CPI_{25}	UCM/R
2017*	1.2 ± 2.1	2.7 ± 0.9	3.8 ± 1.6
2018	2.7± 2.2	2.7 ± 1.1	3.0 ± 2.4
2019	1.3 ± 4.1	3.1 ± 1.8	2.0 ± 0.8
2020	0.9 ± 2.4	3.4 ± 2.0	1.7 ± 1.5
2021	0.5 ± 0.5	2.4 ± 0.9	2.7 ± 2.0

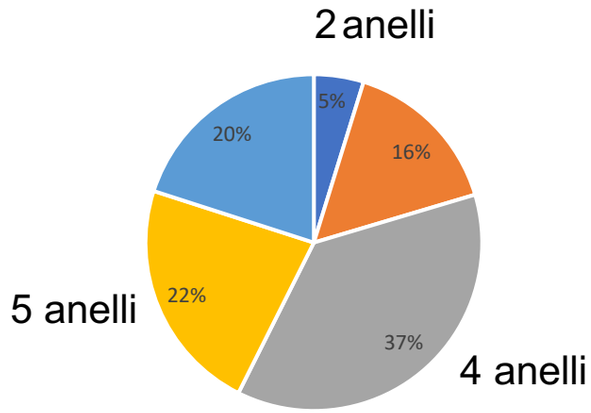
Arabitol

PAH (39 congeners)

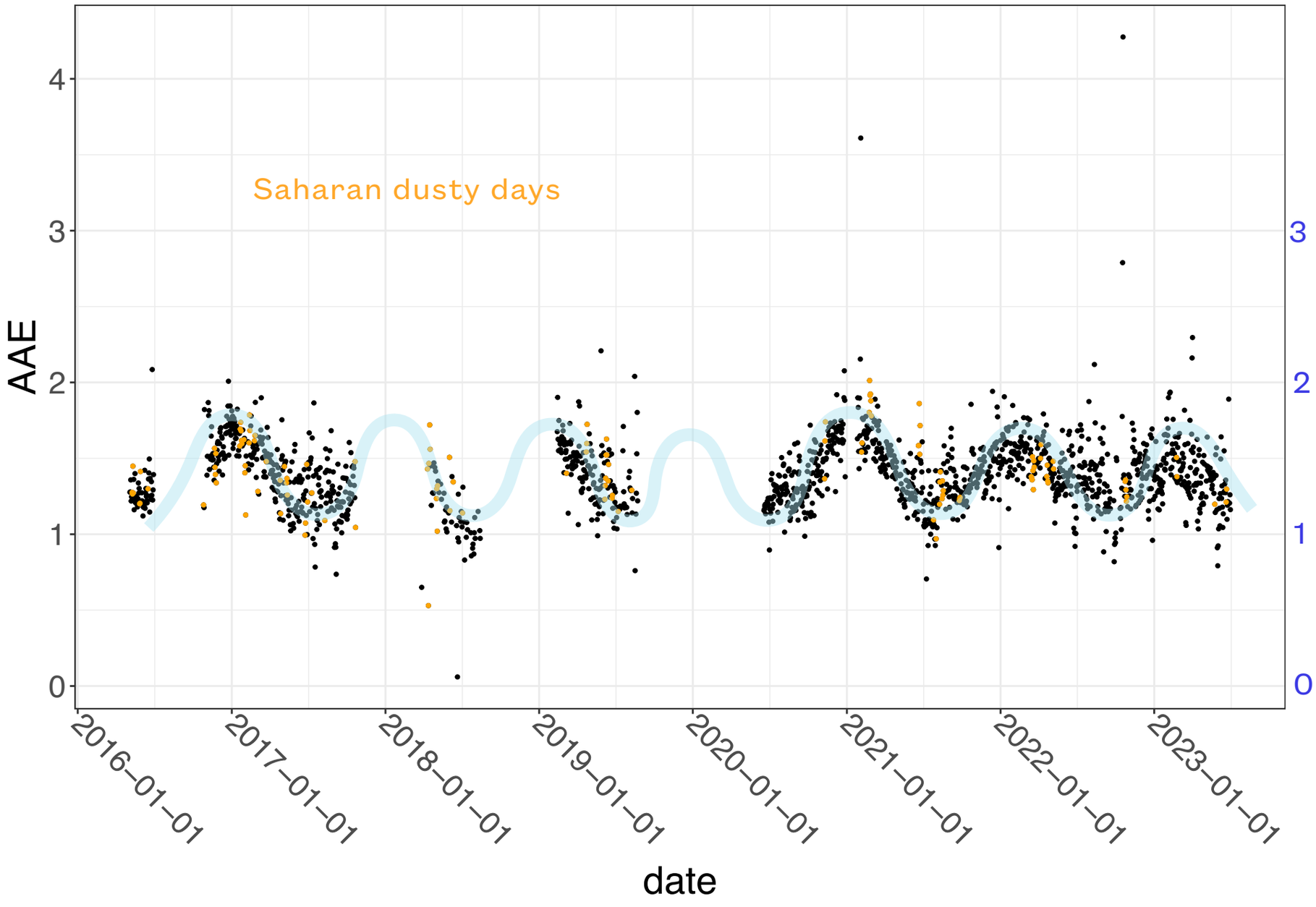


	Media ± DS	HWPAH
	ng/m^3	
2017*	0.34 ± 0.3	0.20
2018	1.2 ± 1.2	0.57
2019	0.89 ± 0.6	0.55
2020	0.58 ± 0.6	0.33
2021	1.1 ± 1.1	0.50

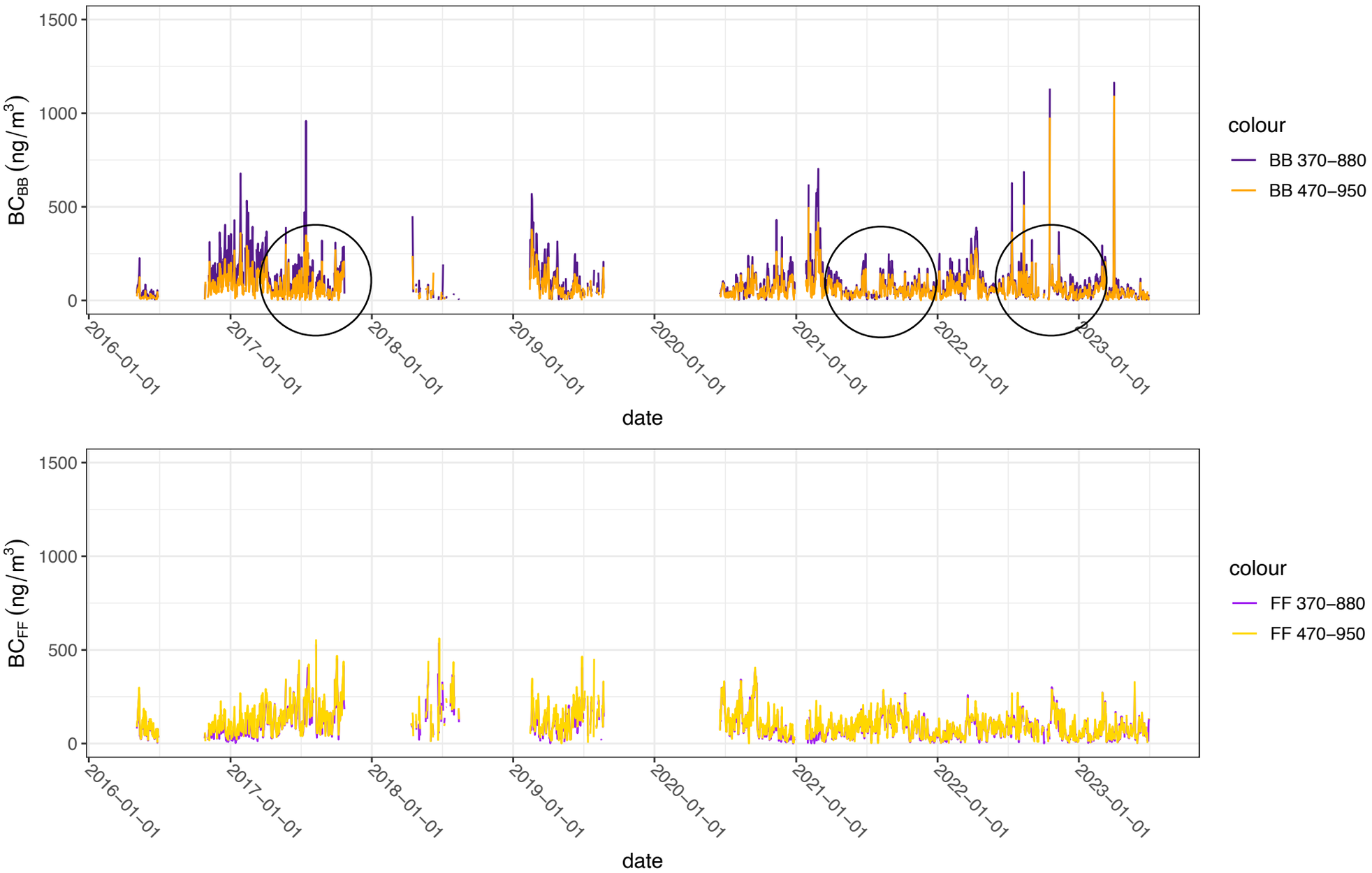
*assente contributo invernale



Source apportionment from optical data (AE33)



the Aethalometer model



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Characterization of long-range transported bioaerosols in the Central Mediterranean

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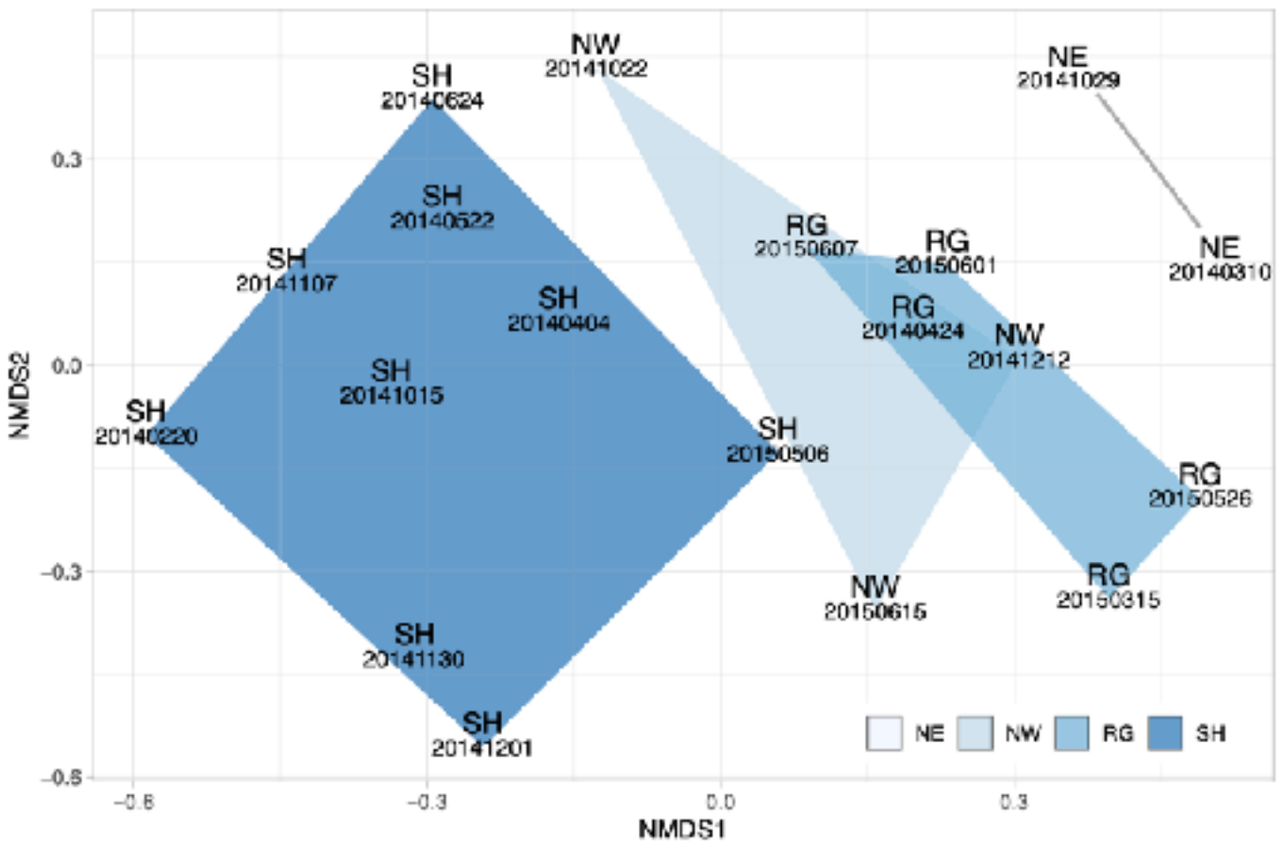

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Summary

- Organic matter is 30% of PM_{10} and and 40% $PM_{2.5}$
- background EC and OC values did not show any significant variations in the (2009-2023) time period;
- specific organic markers (anhydrosugars, alkanes, PAH, PFAS) were influenced (reduced) in spring/summer 2020 (COVID19 lockdown?);
- seasonal dependence of BC (EC) sources;

Perspectives

- complete the anhydrosugars time series at MM;
- include other organic/inorganic markers into the dataset
- compare and interpret thermo-optical and optical data series
- model the transport of BC (but also OC, dust,...) at the site