

Source apportionment in a street canyon: first approach within REMEDIO project

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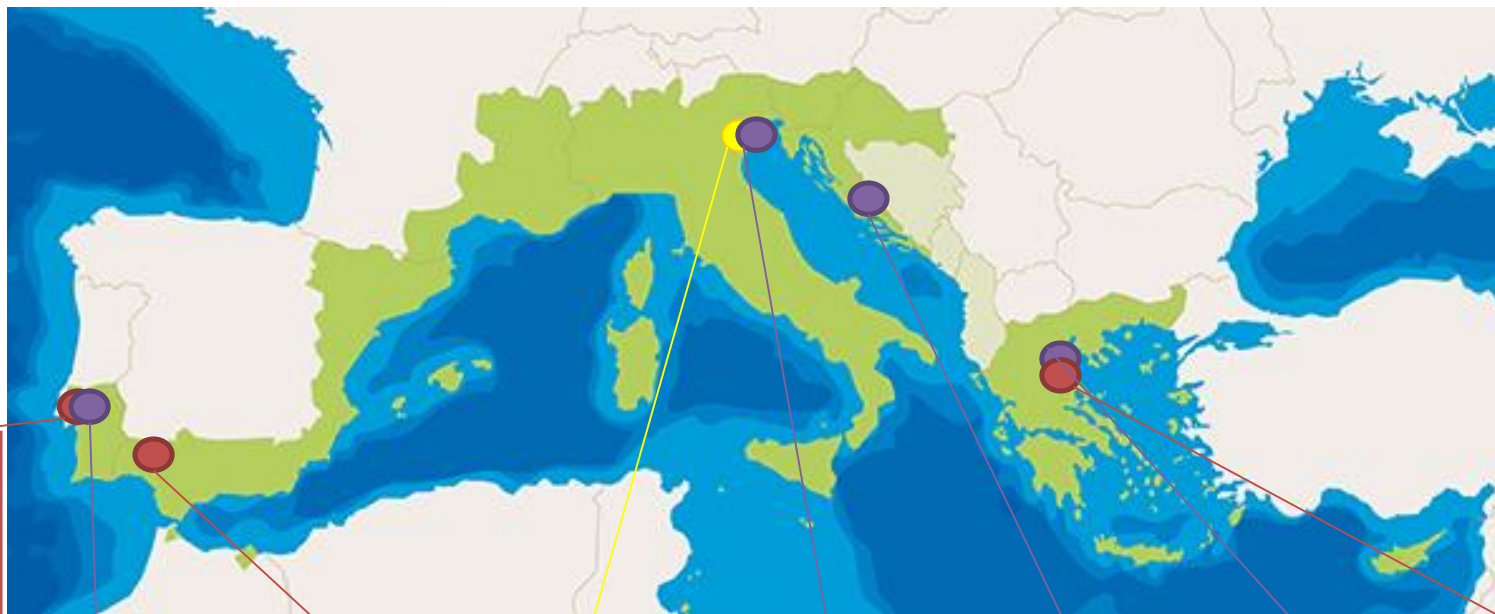
REMEDIO project

REMEDIO stands for **REgenerating mixed-use MED urban communities congested by traffic through Innovative low carbon mobility sOlutions.**

The project aims **at fostering the use of available low carbon transport systems and solutions** through the testing of an operational path in the governance and management of high congested roads, a common issue for many middle-sized Mediterranean cities lacking of proper orbital roads or bypasses.



REMEDIO project



- Coordinator
- Scientific Partners
- Territorial Partners

REMEDIO project



Loures

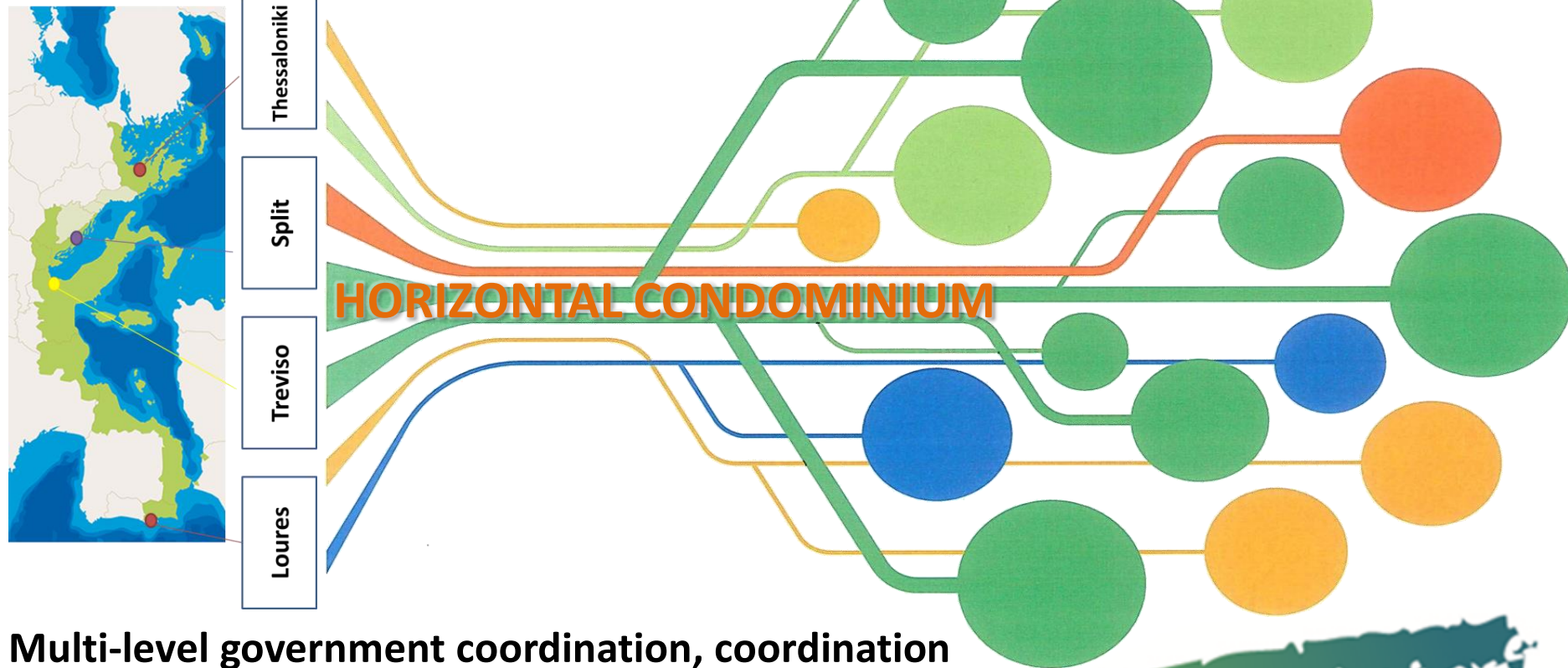
Treviso

Split

Thessaloniki



REMEDIO project



Multi-level government coordination, coordination among local stakeholders, and regulator-operator coordination.

Multimodal integration: PARTNERSHIP or MoU

REMEDIIO project



Loures

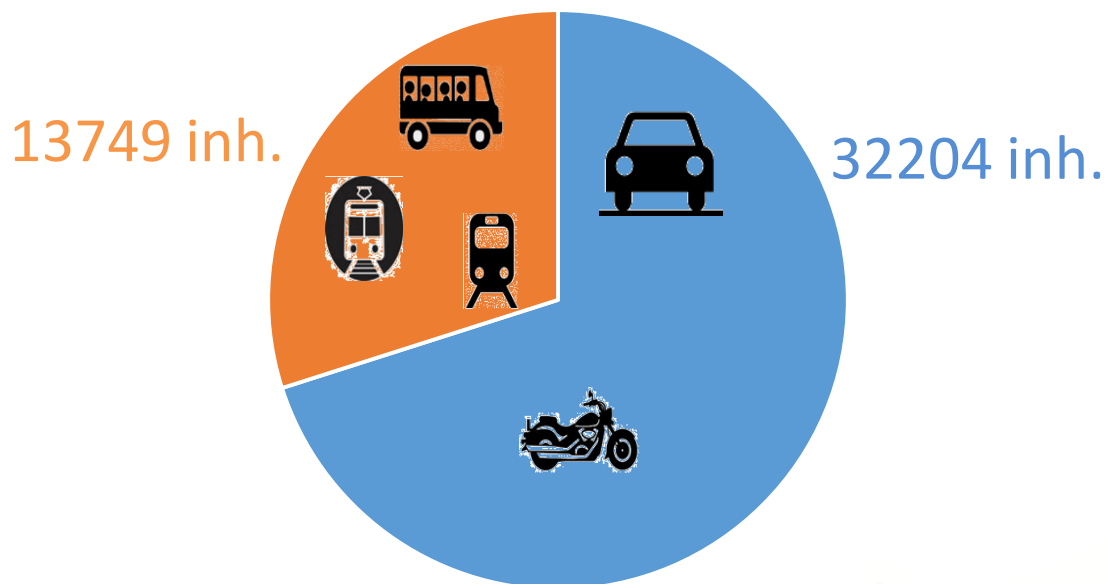


Loures

Pendular Movements

Internal Loures - Loures

Total: 45.953 inh.



Public transport services

Individual transport

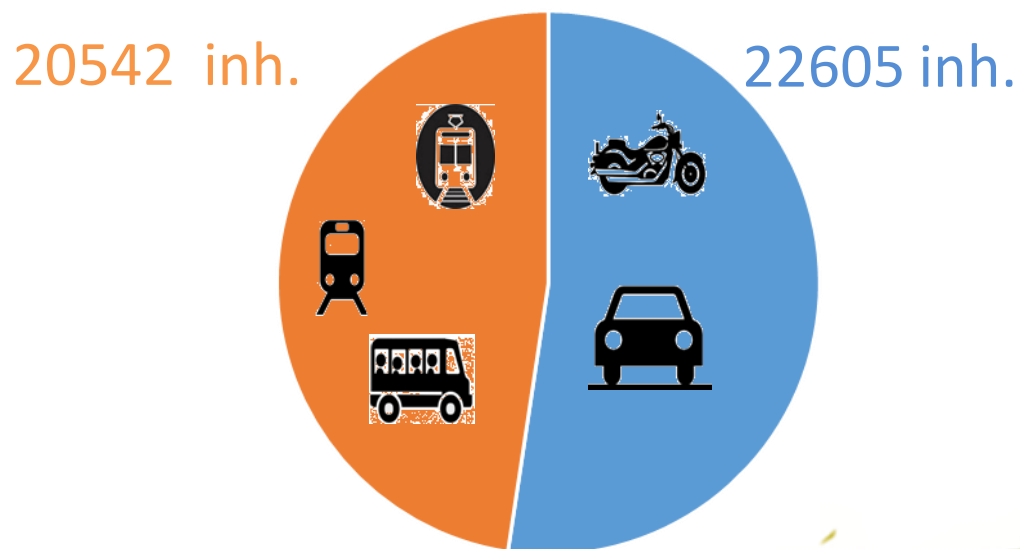


Loures

Pendular Movements

External Loures - Lisboa

Total: 43.147 inh.



Public transport services

Individual transport

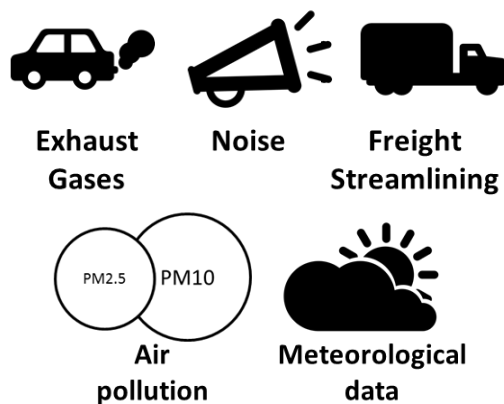


REMEDIO project: Loures methodology

1st Environmental
Campaign – Before
Intervention

Intervention

2nd Environmental
Campaign – After
Intervention

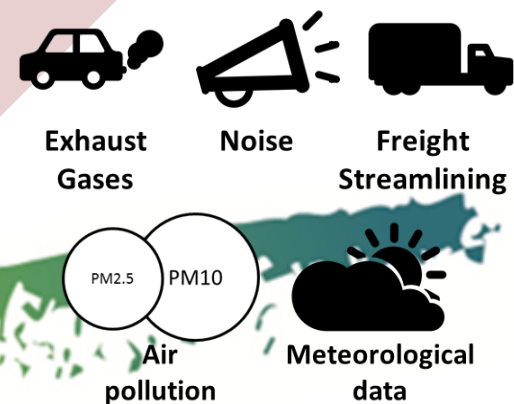


Bike parking areas

Cycling track

Green Areas

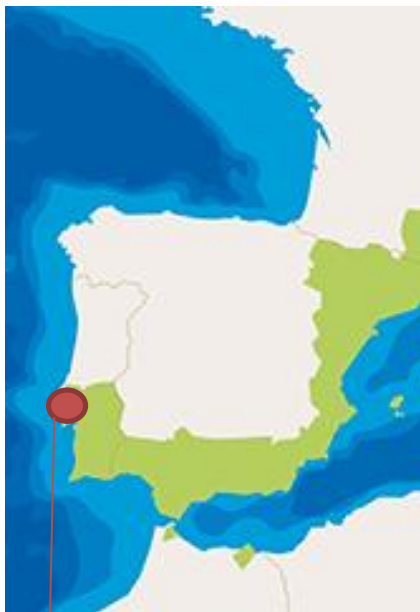
Street Furniture



October/November
2016

October/November
2017

REMEDIO project



Loures





REMEDIO project: Pilot-Area

Loures



Before



After



REMEDIO project

1st Environmental
Campaign – Before
Intervention

Intervention

2nd Environmental
Campaign – After
Intervention



Exhaust
Gases

Noise

Freight
Streamlining



Air
pollution



Meteorological
data

Bike parking areas

Cycling track

Green Areas

Street Furniture



Exhaust
Gases

Noise

Freight
Streamlining



Air
pollution



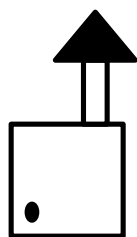
Meteorological
data

**October/November
2016**

**October/November
2017**

REMEDIO project: Environmental Campaign

1 month



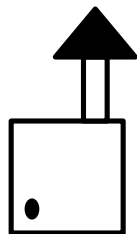
TECORA

Sampling time: 12h

Matrix: Quartz filter

Pollutants:

- PM10 mass
- OC/EC



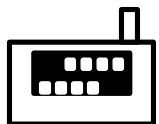
GENT

Sampling time: 12h

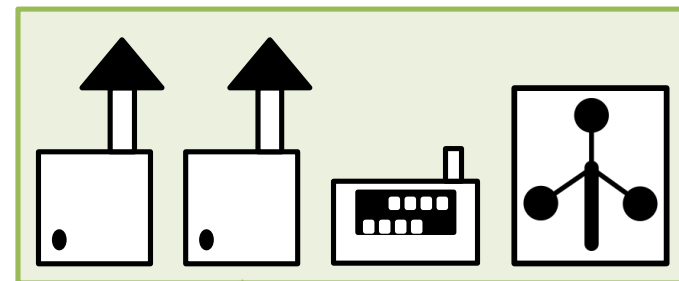
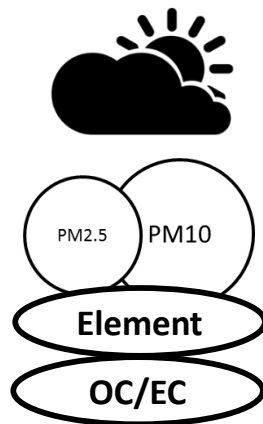
Matrix: Polycarbonate filters

Pollutants:

- PM10 and PM2.5 mass
 - Na, Al, Si, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, Sr, Pb

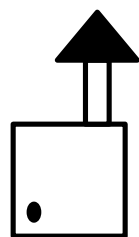


Measuring time: continuous
 24h (integrated time – 1 min)
 PM10, PM5, PM2.5, PM1



REMEDIIO project: Environmental Campaign

1 month



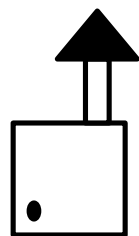
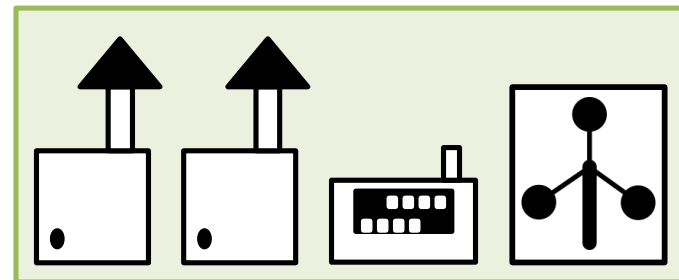
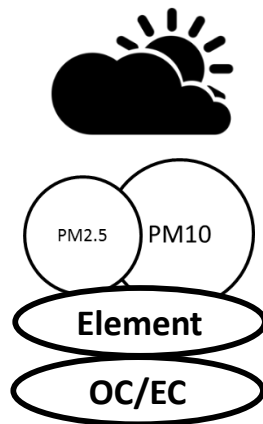
TECORA

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GENT

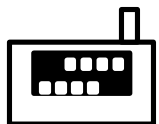
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Thermal optical technique
XRF

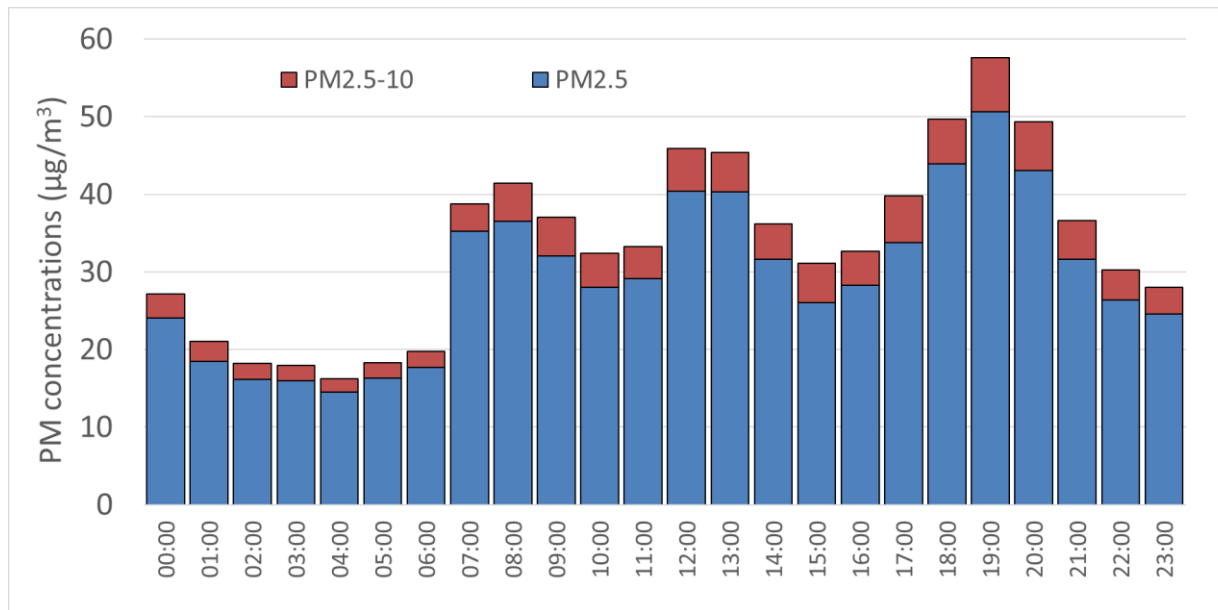


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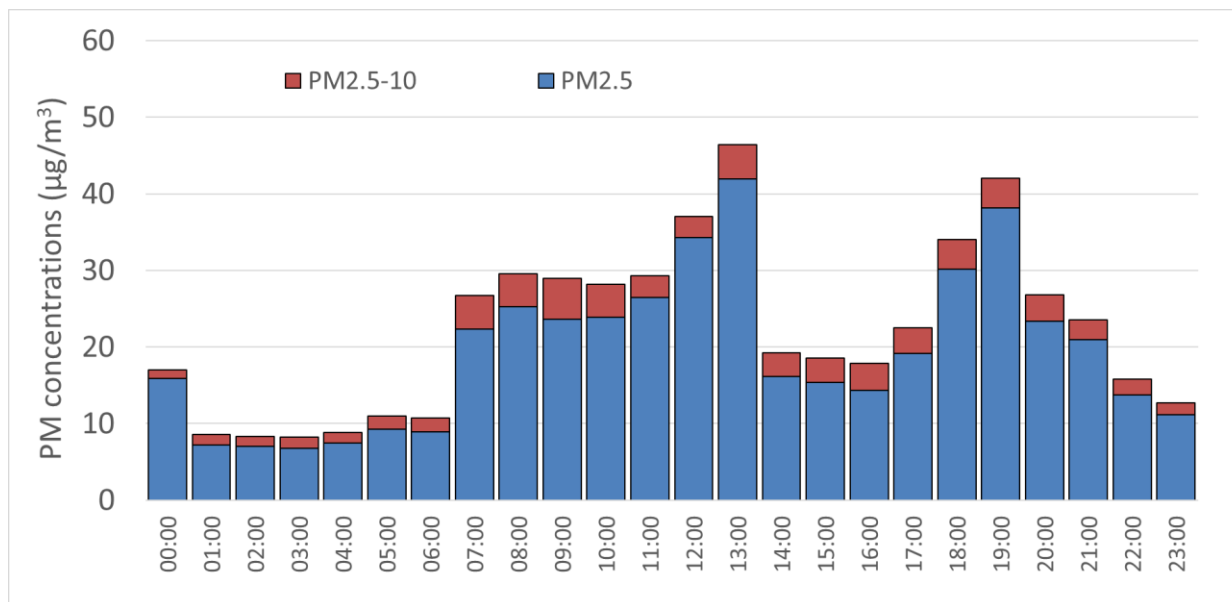


REMEDI0 project: Concentrations

Weekdays

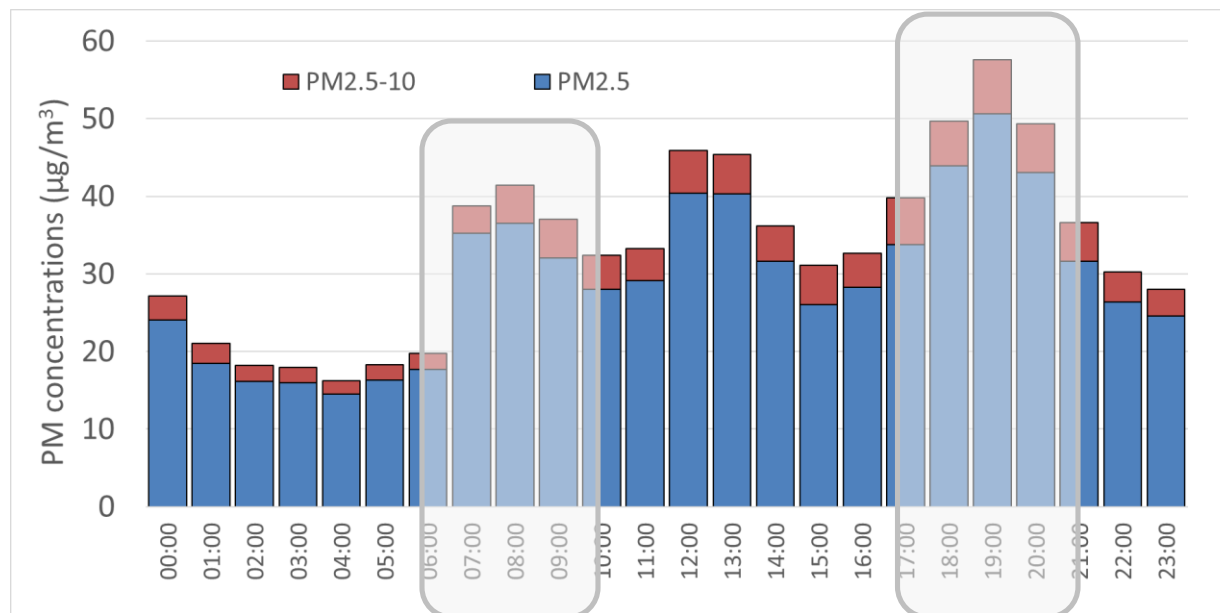


Weekend

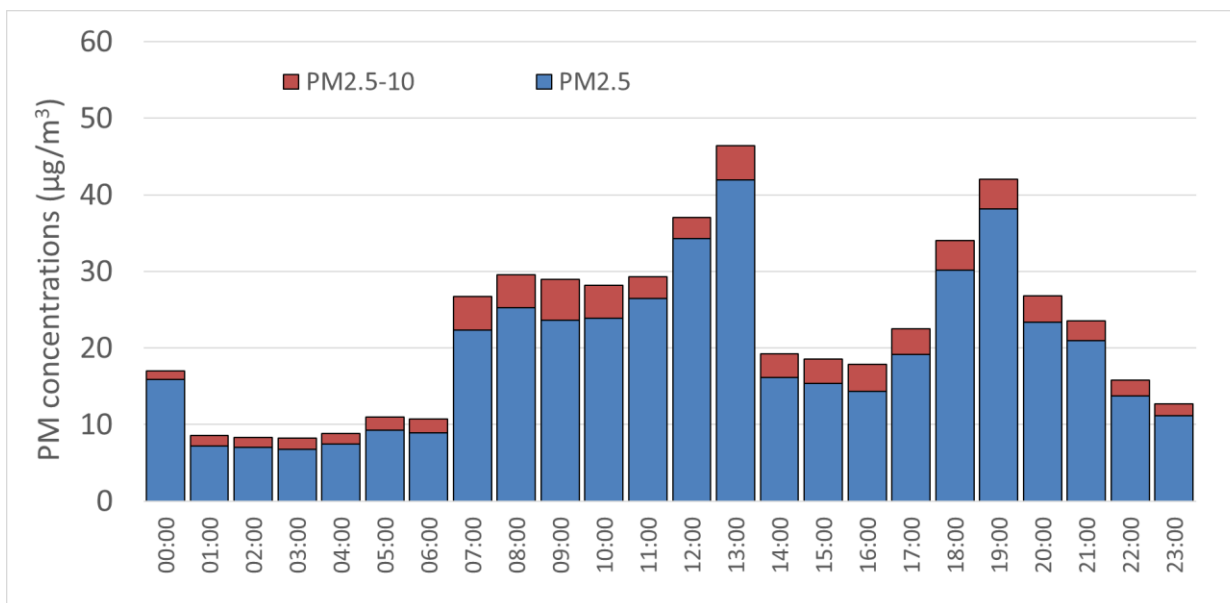


REMEDI0 project: Concentrations

Weekdays

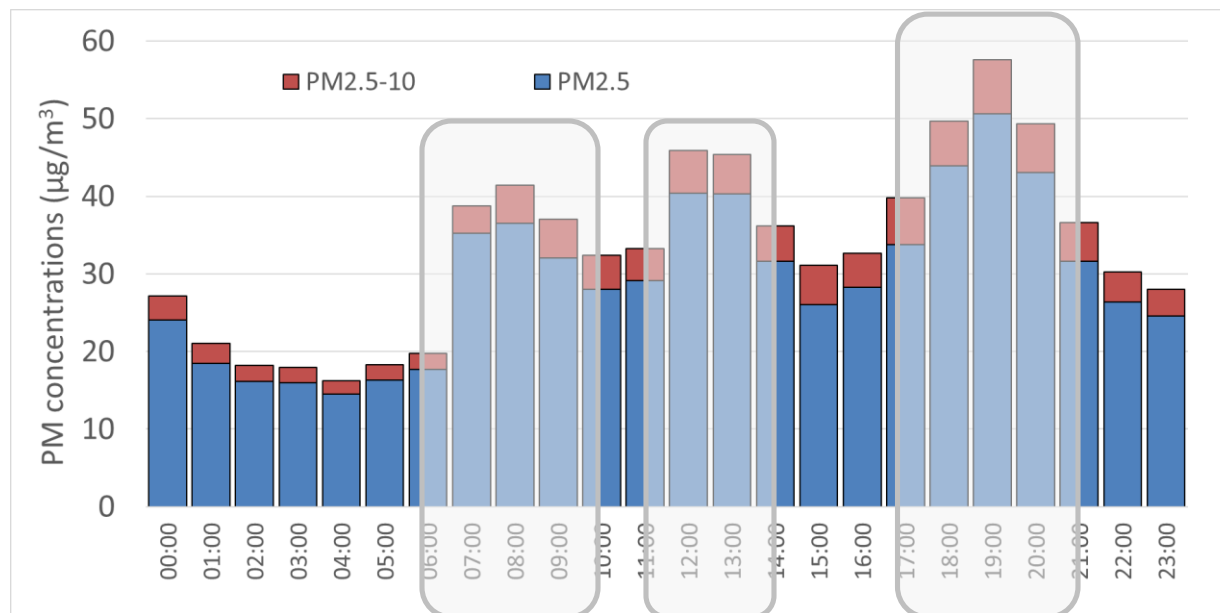


Weekend

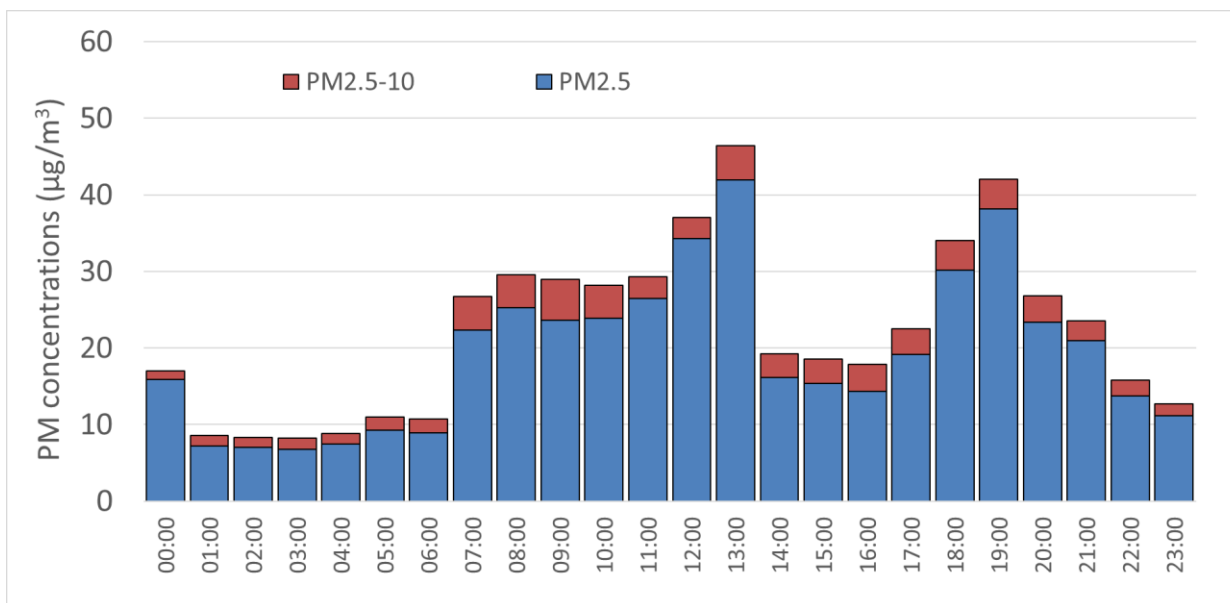


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Weekdays

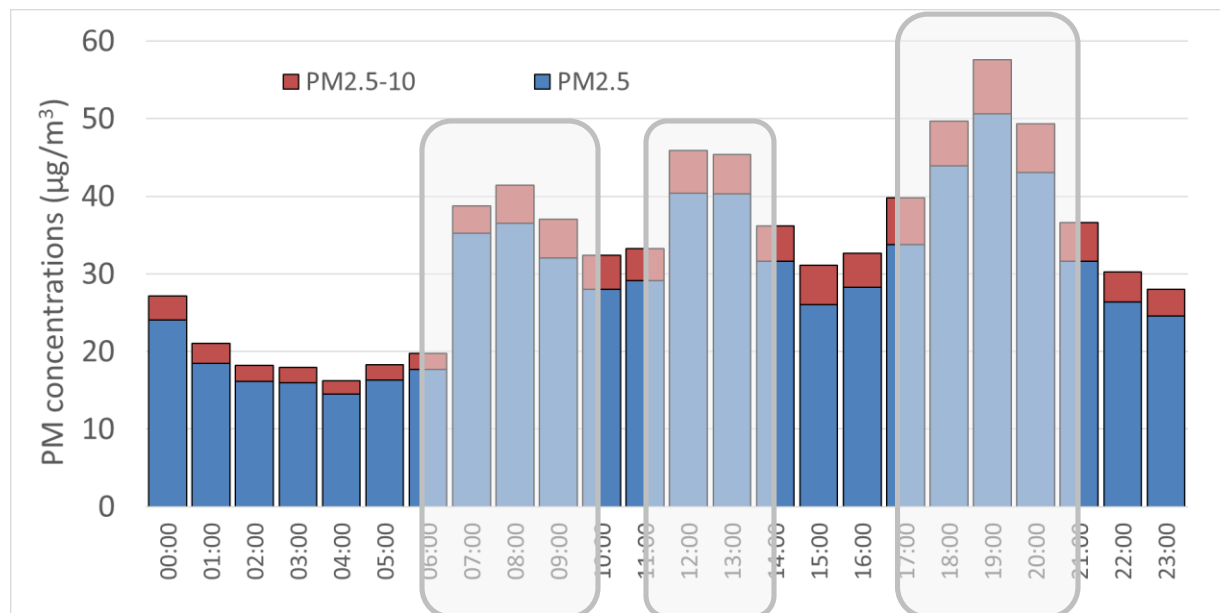


Weekend

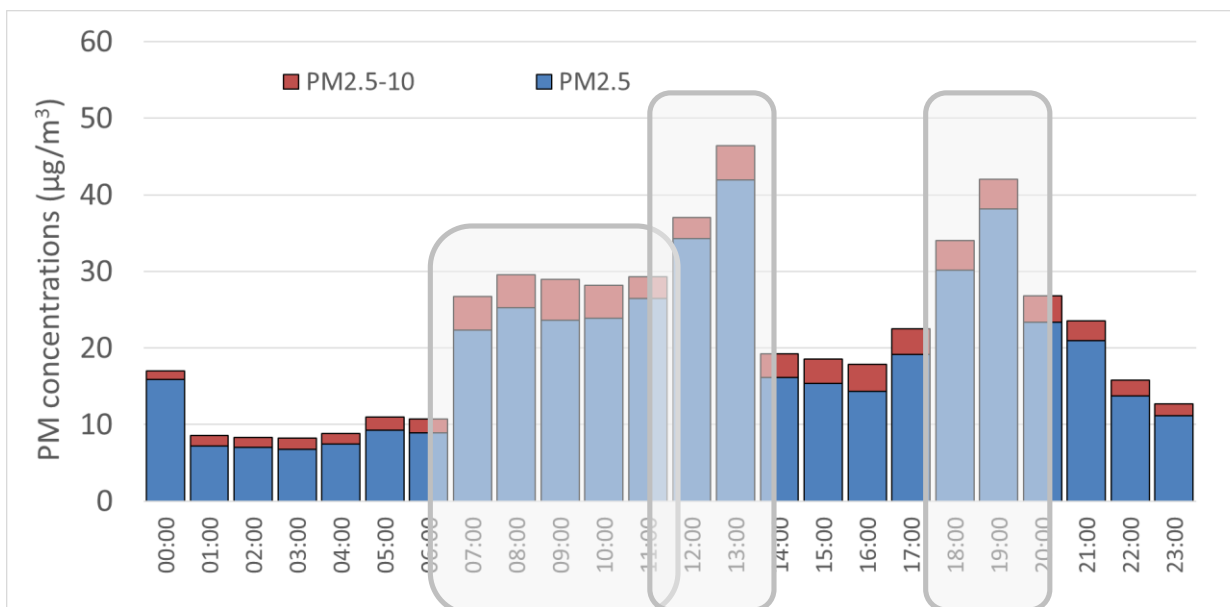


REMEDIO project: Concentrations

Weekdays

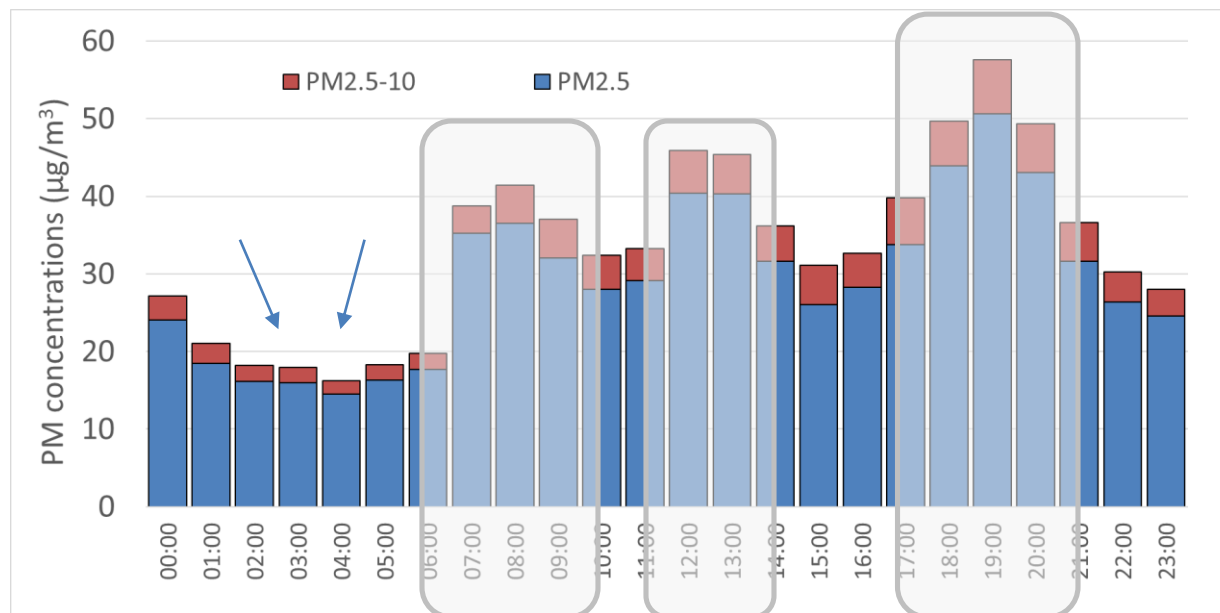


Weekend

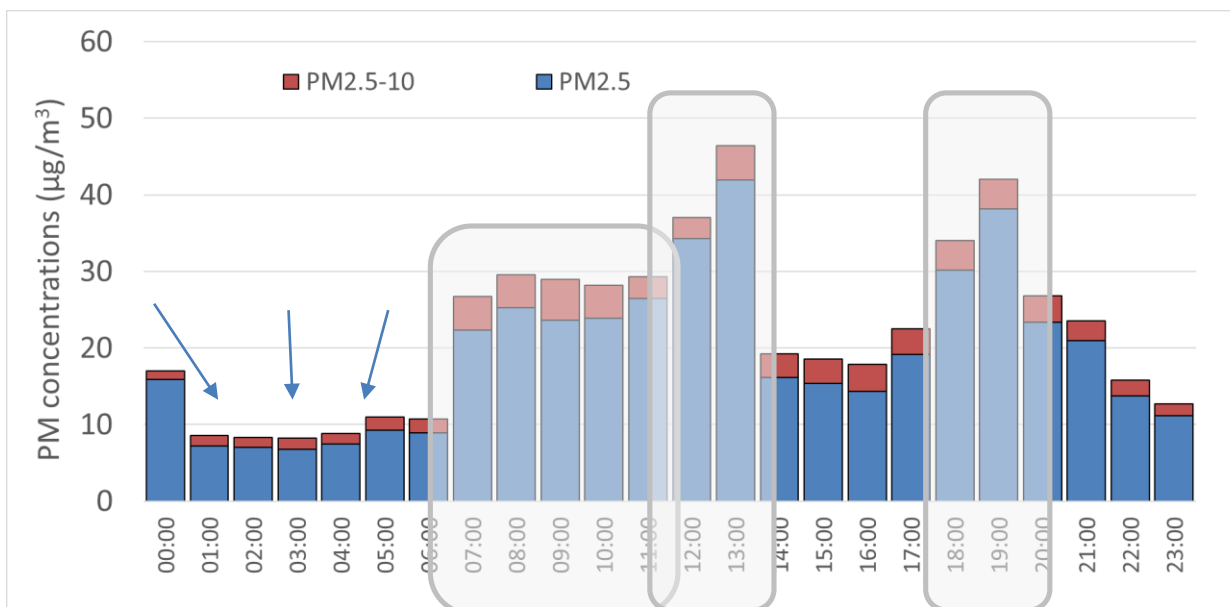


REMEDI0 project: Concentrations

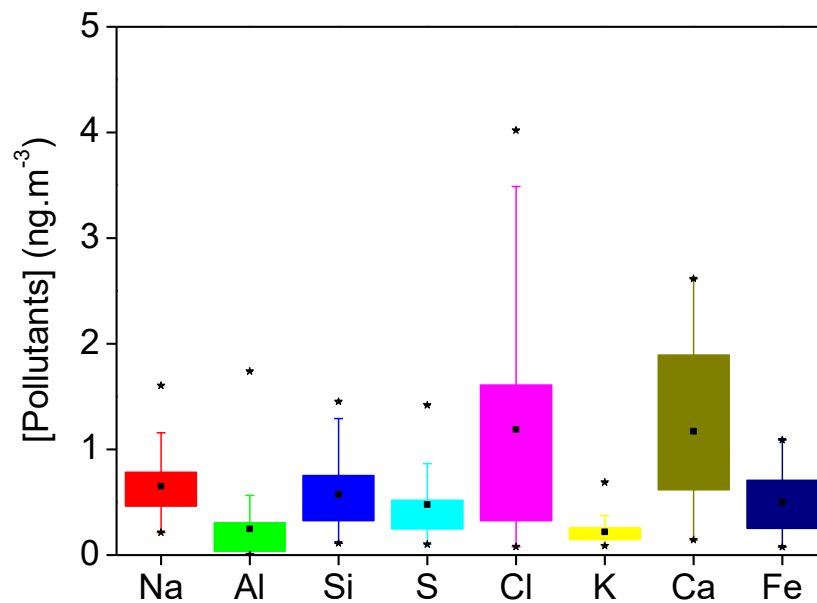
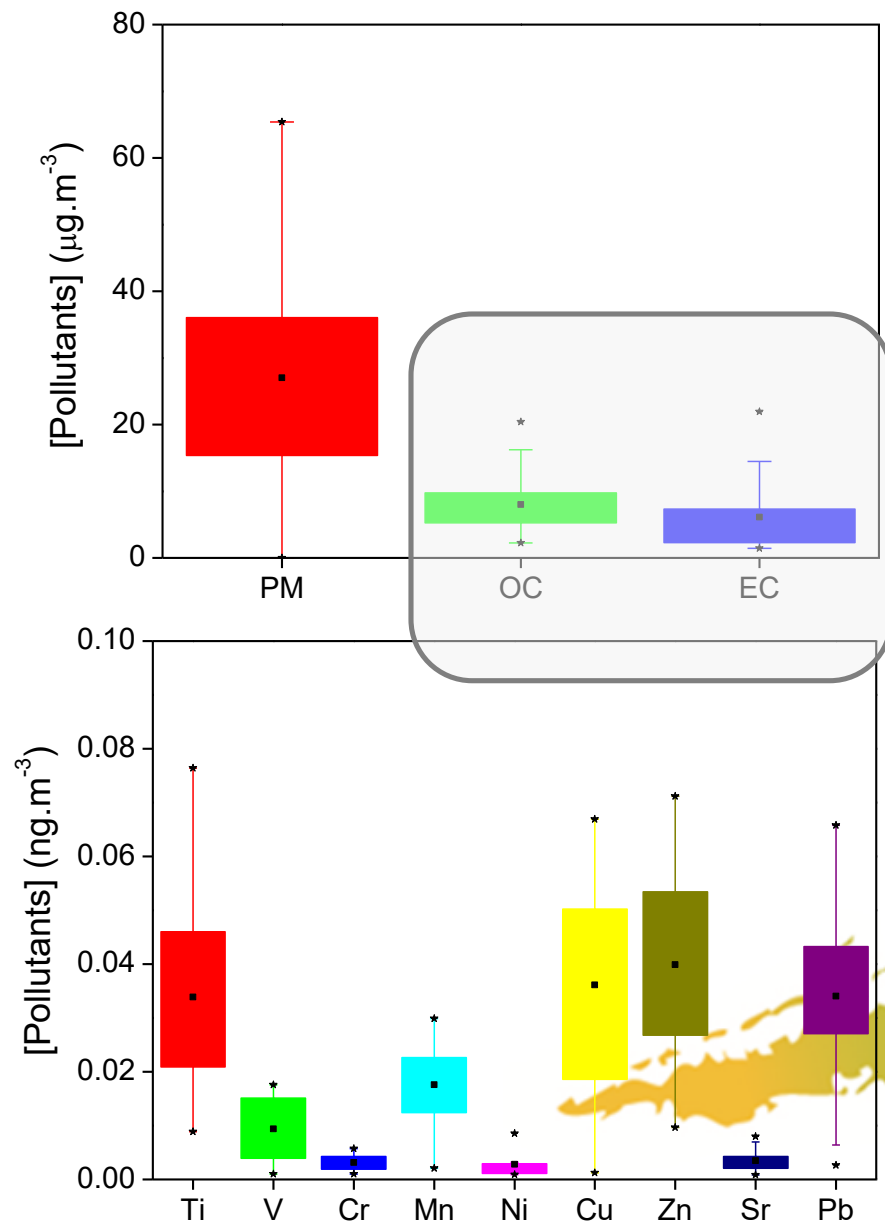
Weekdays



Weekend



REMEDIIO project: Concentrations



Carbonaceous: $\pm 40\%$

Major elements: Ca

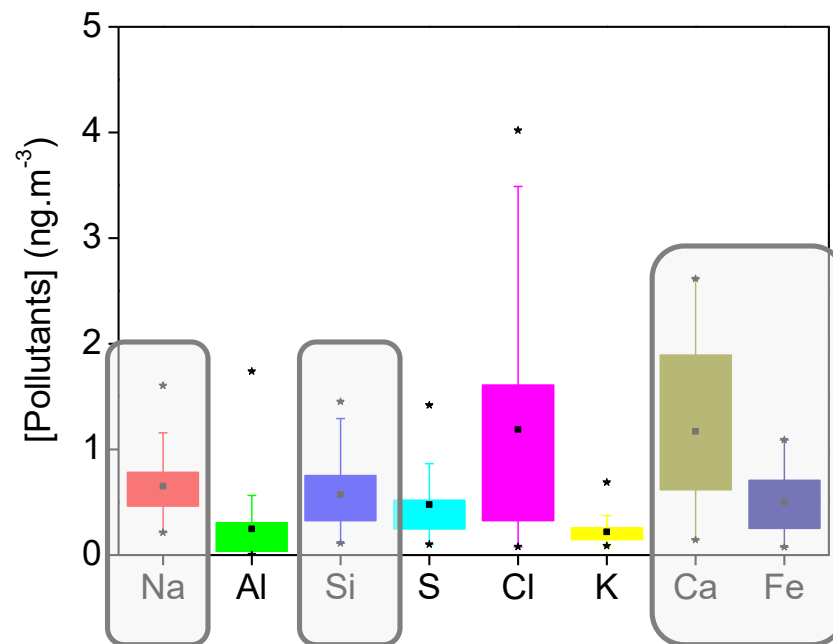
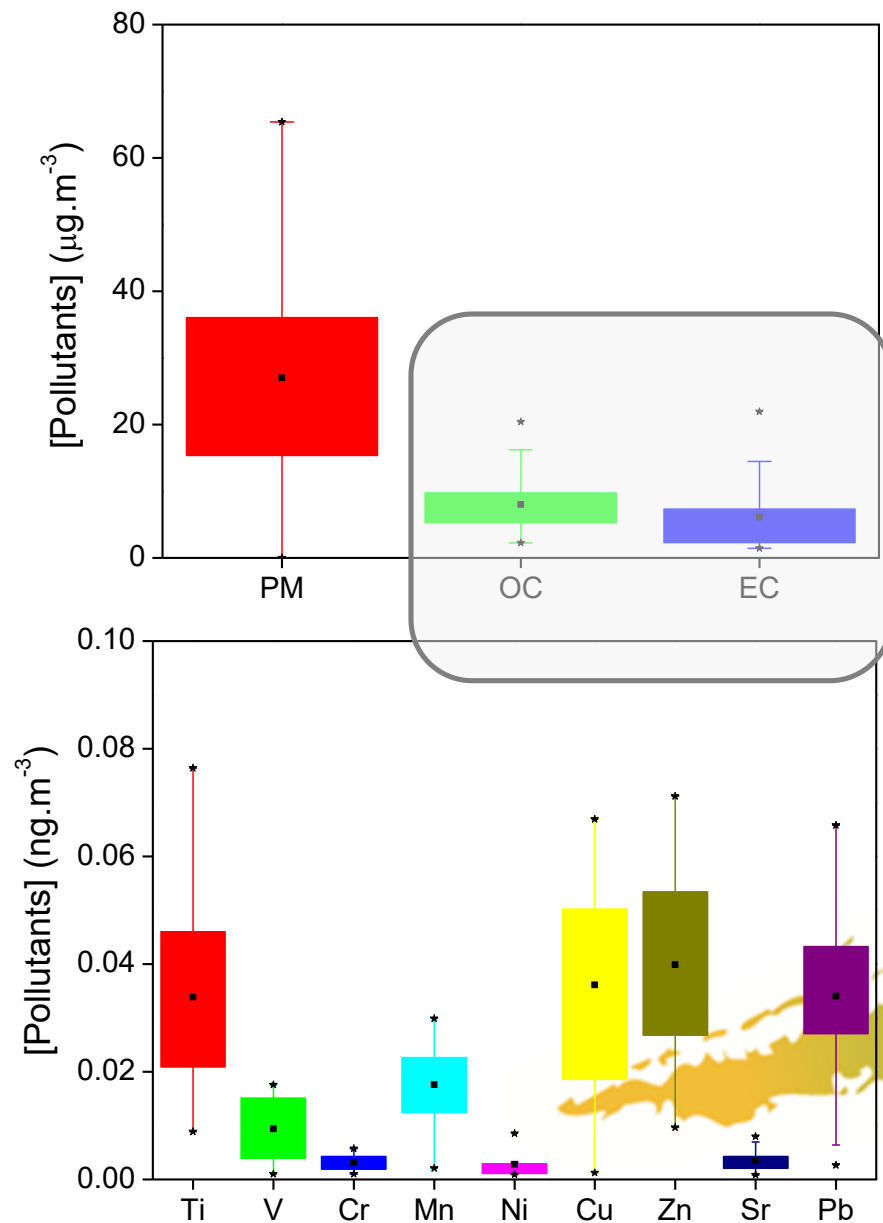
Na

Si

Fe



REMEDIIO project: Concentrations



Carbonaceous: $\pm 40\%$

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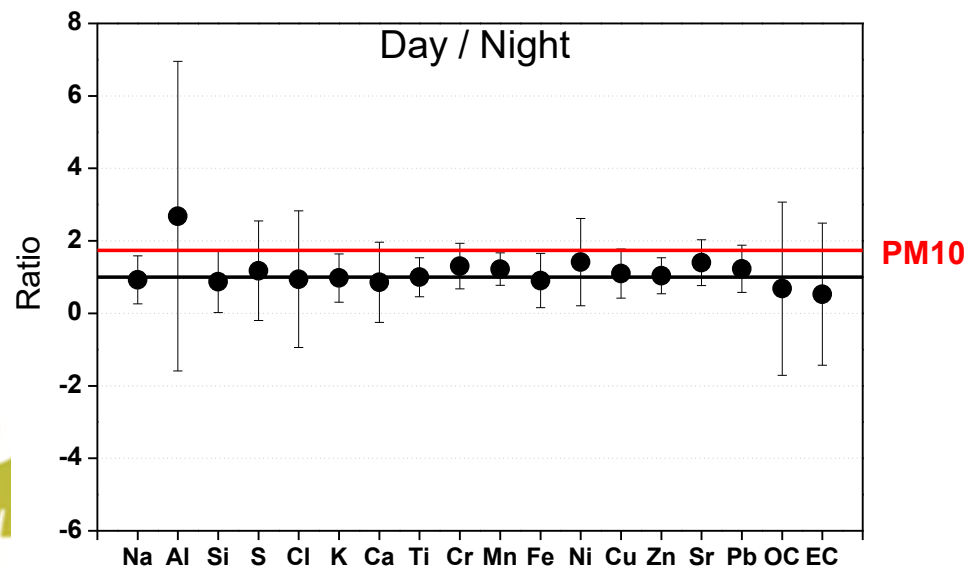
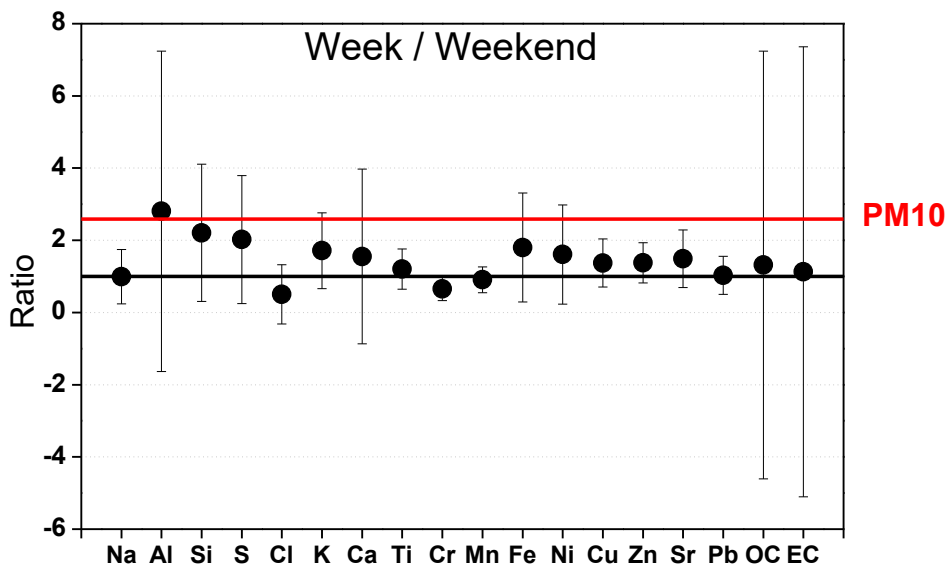
Na

Si

Fe



REMEDIO project: Ratio



REMEDI project: Source Apportionment

1st approach

	SOIL	TRAFFIC EXHAUST	TRAFFIC NON- EXHAUST	SEA	FUEL-OIL
PM	35.58	9.98	25.09	17.35	12.01
Na	2.30	5.68	0.00	77.32	14.70
Al	25.08	74.92	0.00	0.00	0.00
Si	83.07	3.38	4.96	1.83	6.76
S	51.03	0.00	18.93	22.13	7.90
Cl	5.95	0.08	8.26	74.38	11.33
K	49.42	1.80	22.76	16.82	9.19
Ca	58.76	10.27	21.86	9.12	0.00
Ti	66.25	0.00	20.41	4.17	9.16
V	0.00	13.79	1.34	20.63	64.24
Cr	1.93	12.86	0.31	18.50	66.40
Mn	3.44	2.30	64.69	2.89	26.68
Fe	54.23	7.49	20.84	9.46	7.98
Ni	0.84	14.10	5.95	24.08	55.04
Cu	5.30	0.79	66.90	0.78	26.23
Zn	39.33	0.00	45.97	2.76	11.95
Pb	1.60	1.29	73.65	0.81	22.65
OC	6.55	37.99	33.07	12.85	9.55
EC	0.00	57.51	30.87	11.62	0.00

REMEDIATION project: Source Apportionment

Si, S, K, Ca, Ti, Fe

Na, Cl

1st approach

	SOIL	TRAFFIC EXHAUST	TRAFFIC NON-EXHAUST	SEA	FUEL-OIL
PM	35.58	9.98	25.09	17.35	12.01
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Ca	58.76	10.27	21.86	9.12	0.00
Ti	66.25	0.00	20.41	4.17	9.16
V	0.00	13.79	1.34	20.63	64.24
Cr	1.93	12.86	0.31	18.50	66.40
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REMEDIATION project: Source Apportionment

1st approach

V, Cr, Ni

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Ca	58.76	10.27	21.86	9.12	0.00
Ti	66.25	0.00	20.41	4.17	9.16
V	0.00	13.79	1.34	20.63	64.24
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REMEDIATION project: Source Apportionment

1st approach

Al, EC

Mn, Cu, Zn, Pb

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Conclusions

This work presents a **first approach** within a biggest methodology.

REMEDI Project will develop a tool to evaluate the transport, energy and environmental-related performance of low-carbon actions in 4 different MED regions.



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Communication
Dissemination
Population Awareness and Participation
Participatory Governance

Thank you

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