

Lo studio delle sorgenti di PM_{10} attraverso la rappresentatività spaziale delle campagne temporanee coniugata con la continuità temporale dei siti fissi nel complesso contesto lombardo.

E. Cuccia , C. Colombi, U. Dal Santo, B. Biffi, P. Carli, L. Carroccio, L. Corrente, L. D'Angelo, G. De Stefani, M. Franciosa, L. La Gaccia, A. Marongiu, G. Mognaschi, F. Petrosino, G. Siliprandi, D. Vincenzi, G. Lanzani.

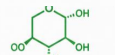
SPECIAZIONE CHIMICA COMPLETA



Elementi
(XRF)



Ioni
(IC)

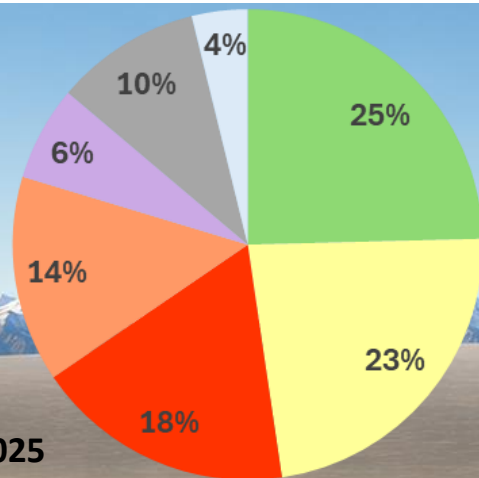


Levoglucosano
(IC)

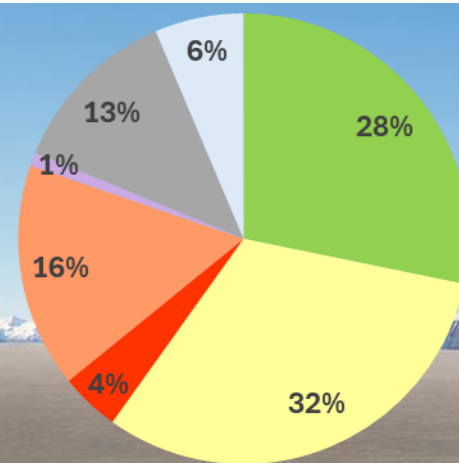


OC\EC
(TOT)

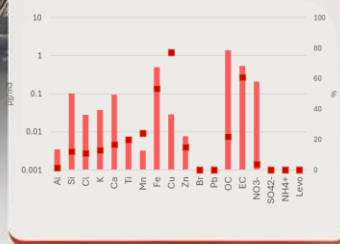
Milano Pascal
 1.1.2016 – 31.12.2025



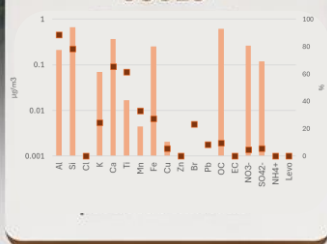
Schivenoglia
 1.1.2016 – 31.12.2025



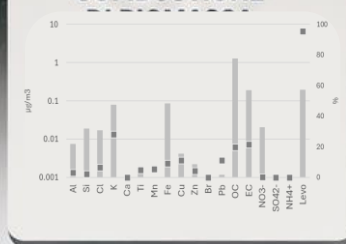
TRAFFICO



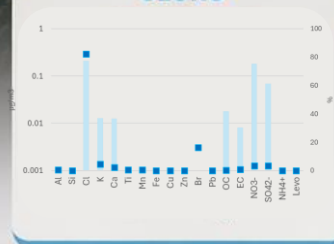
SUOLO



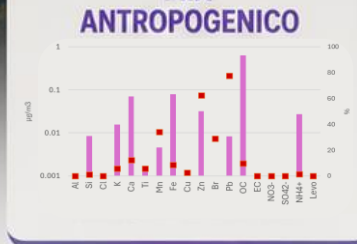
COMBUSTIONE



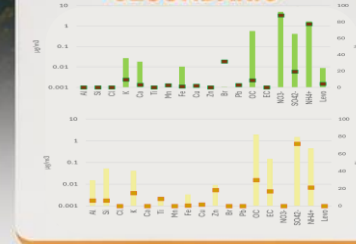
CLORO



MIX ANTROPOGENICO



SECONDARIO





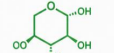
SPECIAZIONE CHIMICA COMPLETA



Elementi
(XRF)



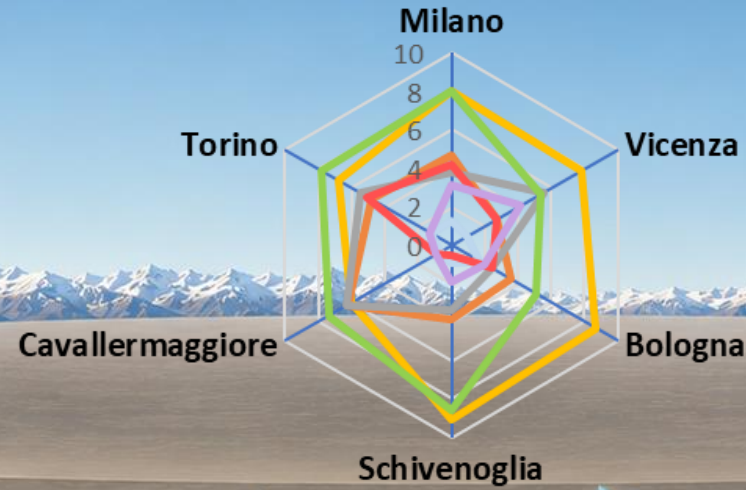
Ioni
(IC)

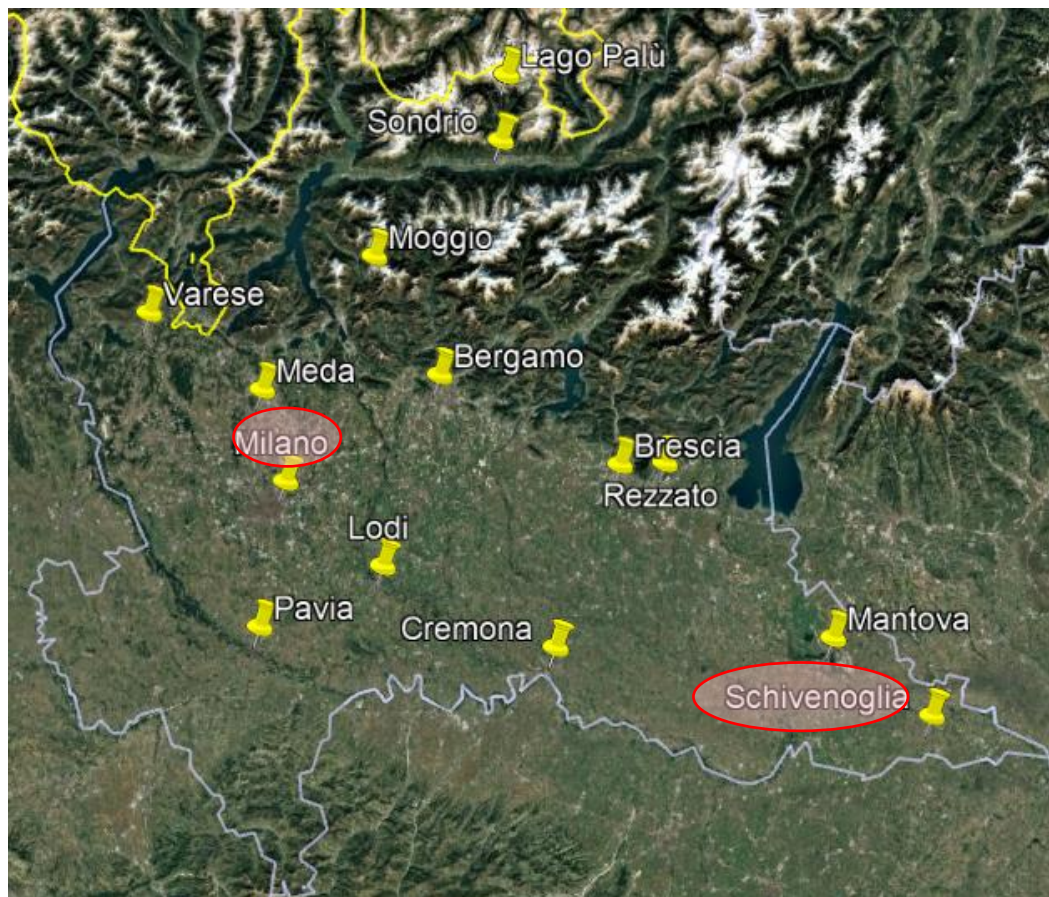


Levoglucosano
(IC)

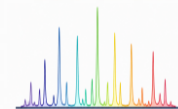


OC/EC
(TOT)





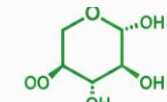
SPECIAZIONE CHIMICA COMPLETA



Elementi
(XRF)



Ioni
(IC)



Levoglucosano
(IC)



OC\EC
(TOT)

Milano
dal 2013 a oggi

Schivenoglia
dal 2013 a oggi



* Elementi (XRF) tutti i giorni + BaP un giorno su tre

* BaP un giorno su tre

Fondo secondario



Secondario Invernale



Analisi PMF -> tutti i siti trattati separatamente.
Sono state risolte 7 sorgenti.

«tratti» comuni -> la
separazione non è sempre
facile

Mix antropogenico:
tracciato da Zn e Pb.

Il profilo di questo
fattore raccoglie le
eventuali specificità
locali

Traffico



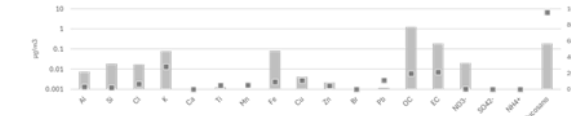
Suolo



Mix antropogenico



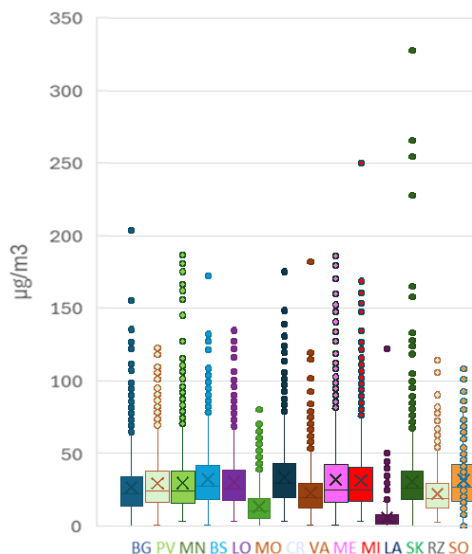
Combustione di Biomassa



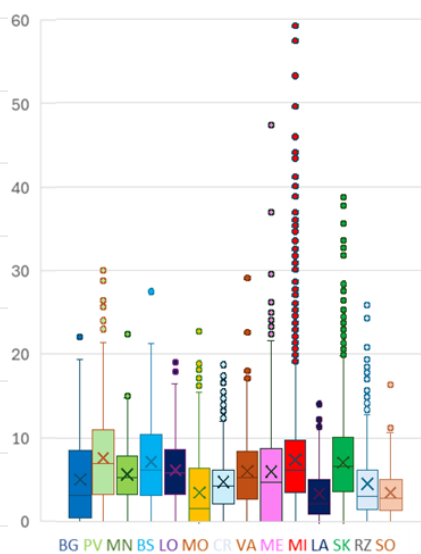
Cloro



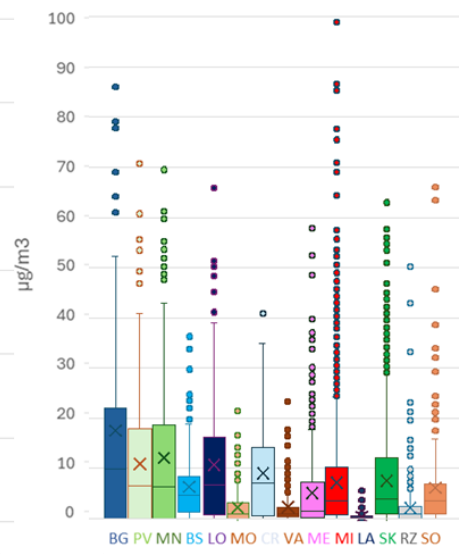
PM10



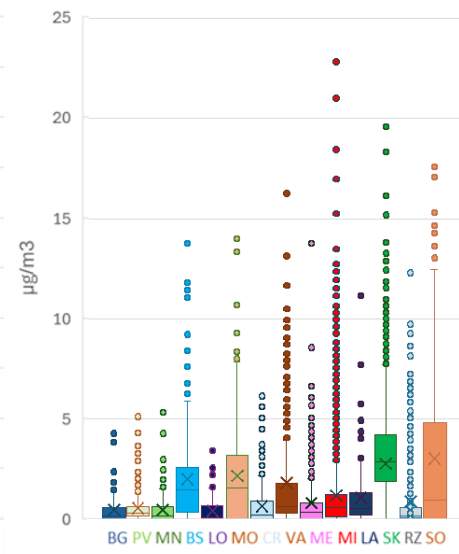
Fondo secondario



Secondario invernale



Cloro



Per poter confrontare
tutti i siti

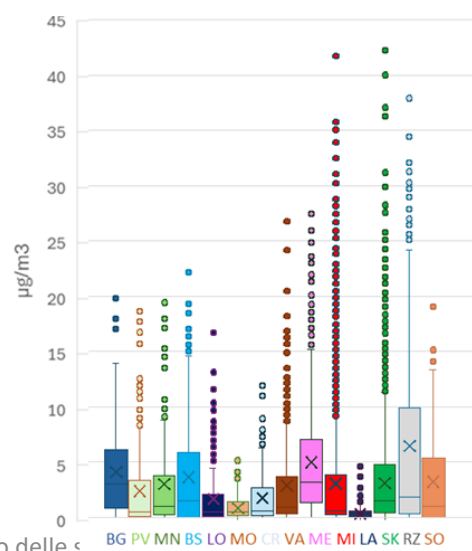


Riscalato rispetto
a Milano

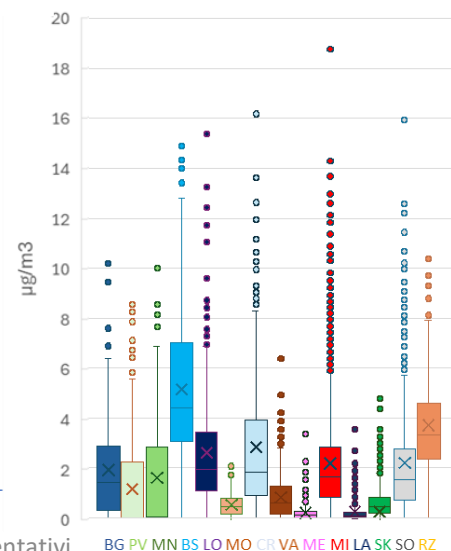
Il territorio si conferma
abbastanza **uniforme**,
soprattutto per quanto
riguarda le **componenti
secondarie**.

Sono comunque presenti
**diverse delle specificità
locali**.

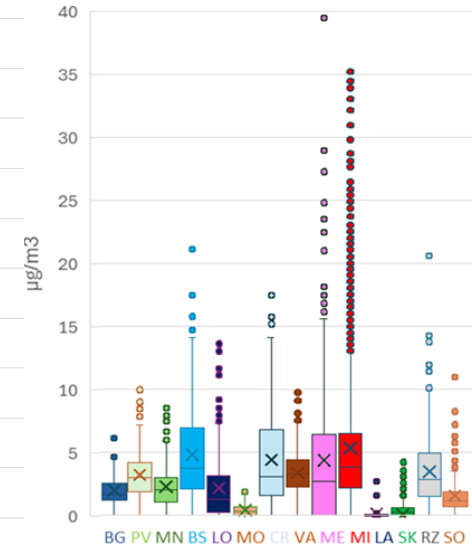
Combustione di Biomassa



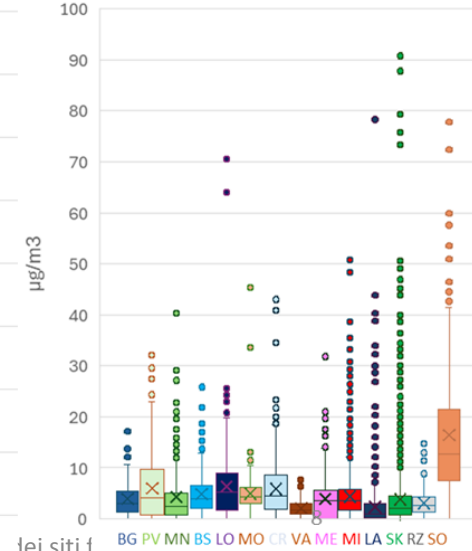
Mix Antropogenico



Traffico



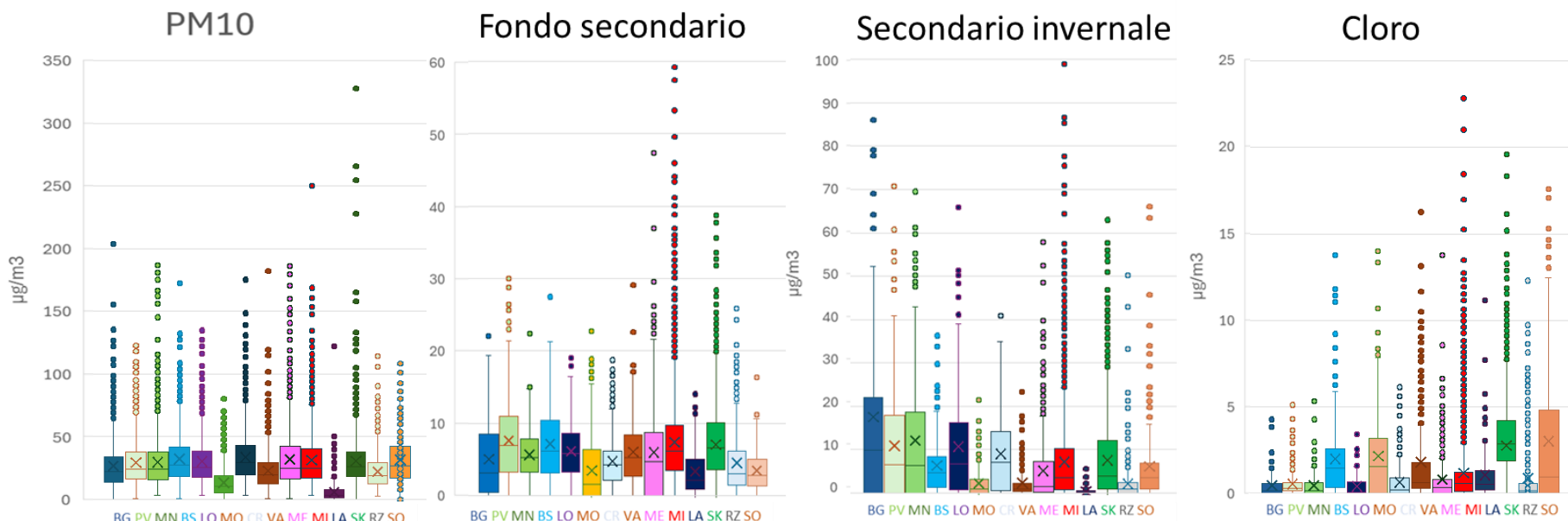
Polvere crostale



Per poter confrontare
tutti i siti

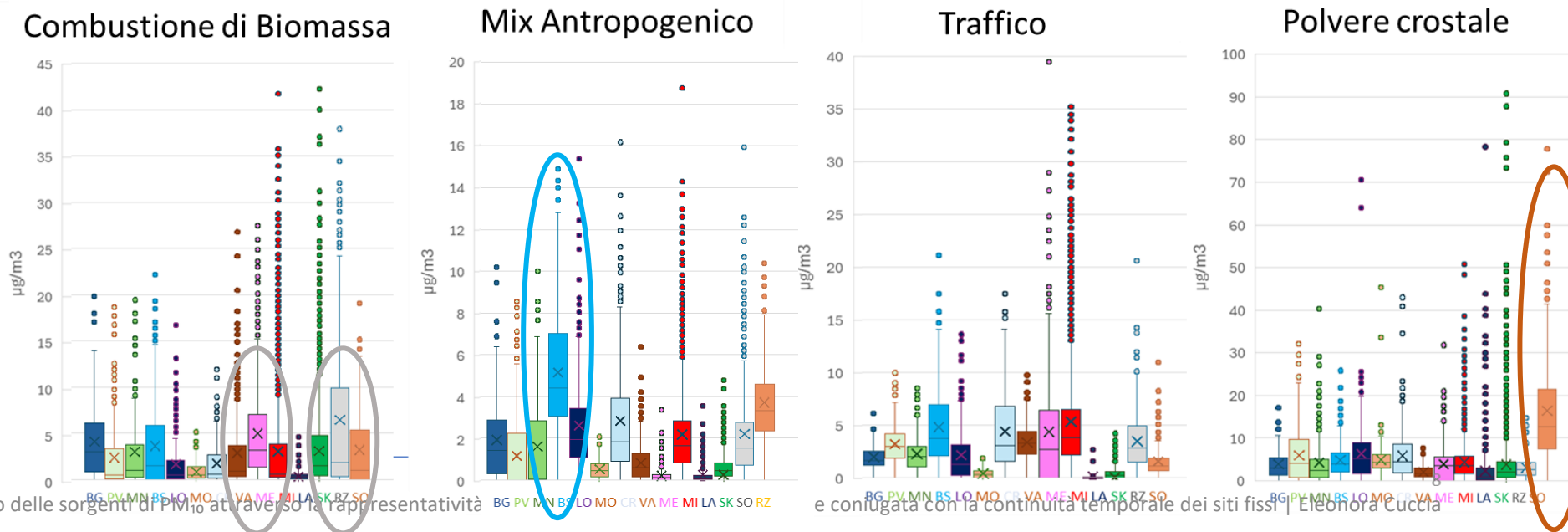


Riscalato rispetto
a Milano

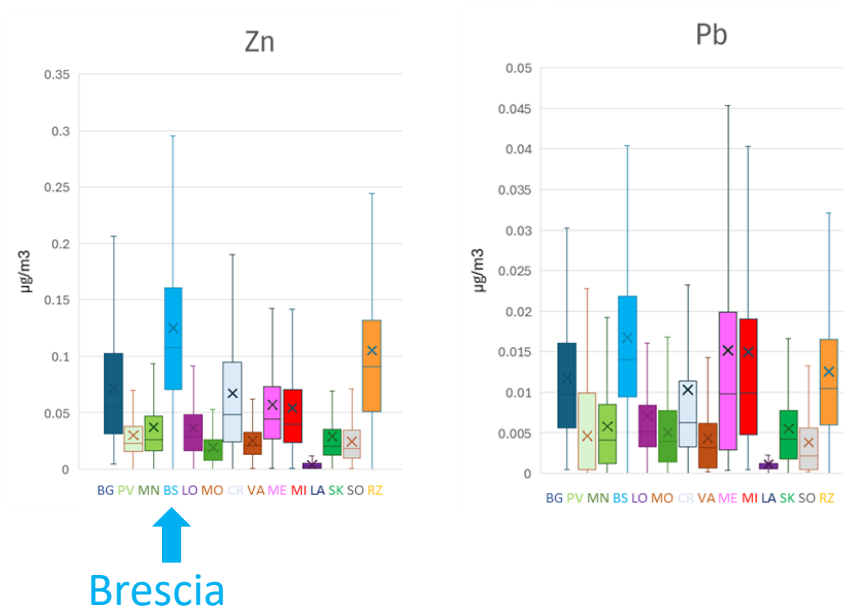
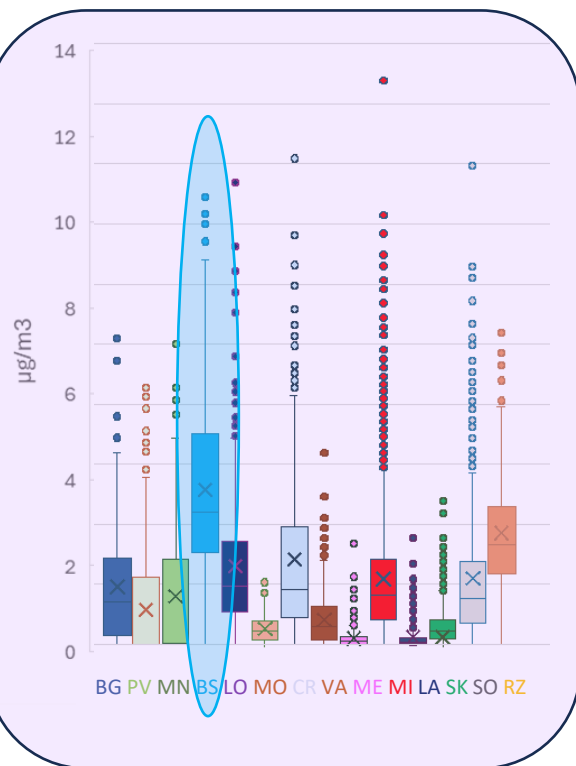


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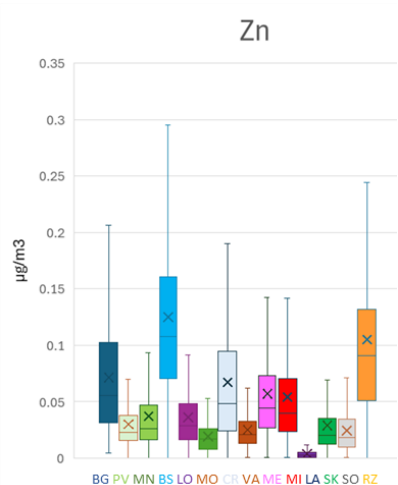
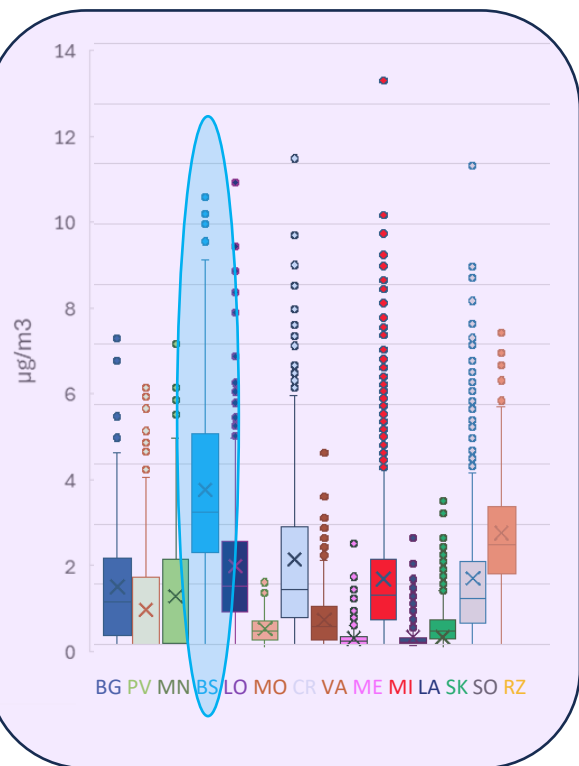


Lo zinco è presente a Brescia in
concentrazioni significativamente superiori.
Il Pb presenta a Brescia concentrazioni
confrontabili con Milano.

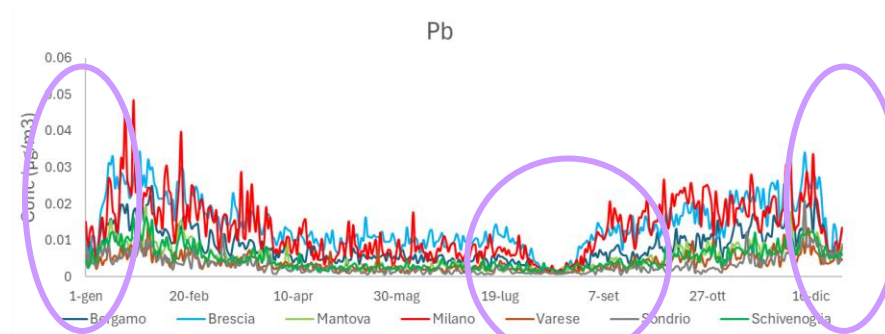
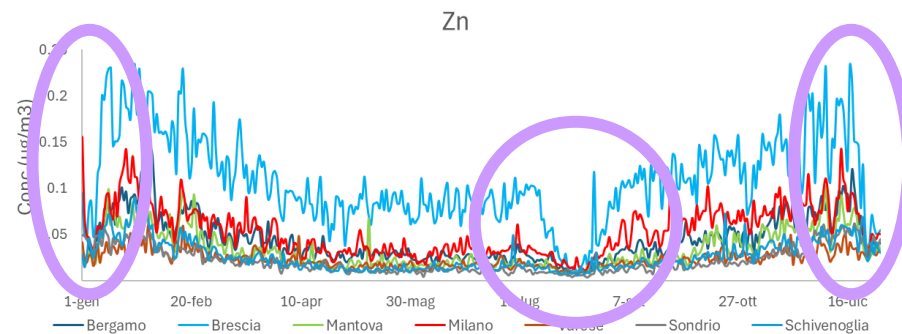
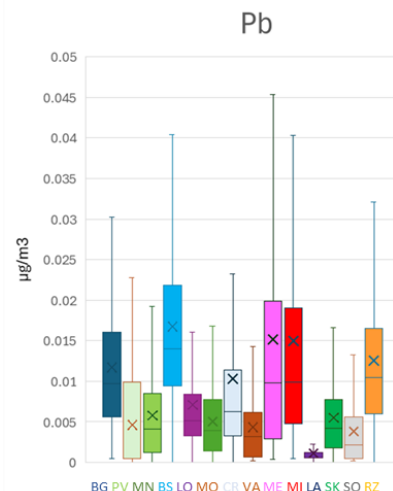


Mix antropogenico

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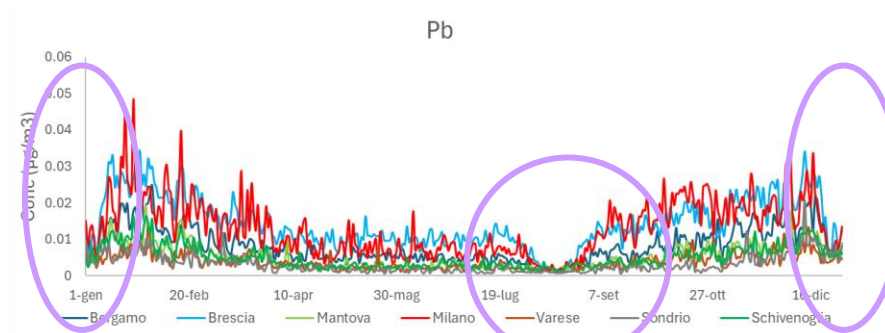
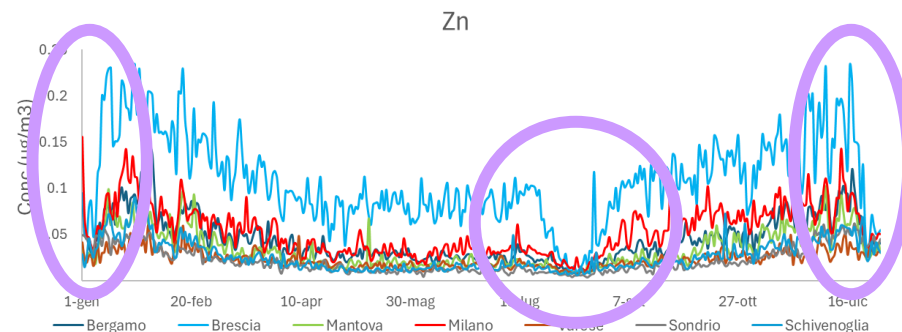
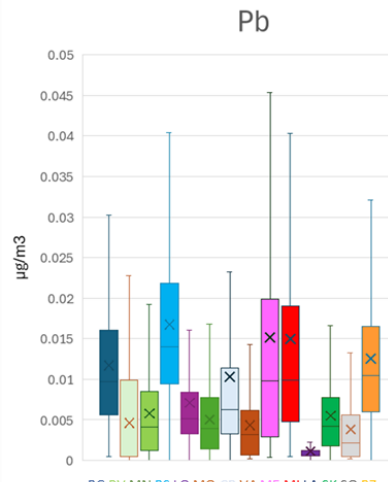
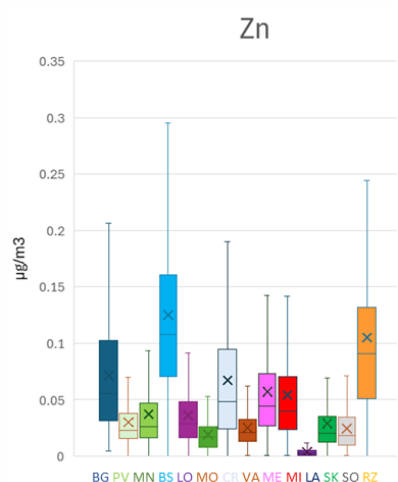
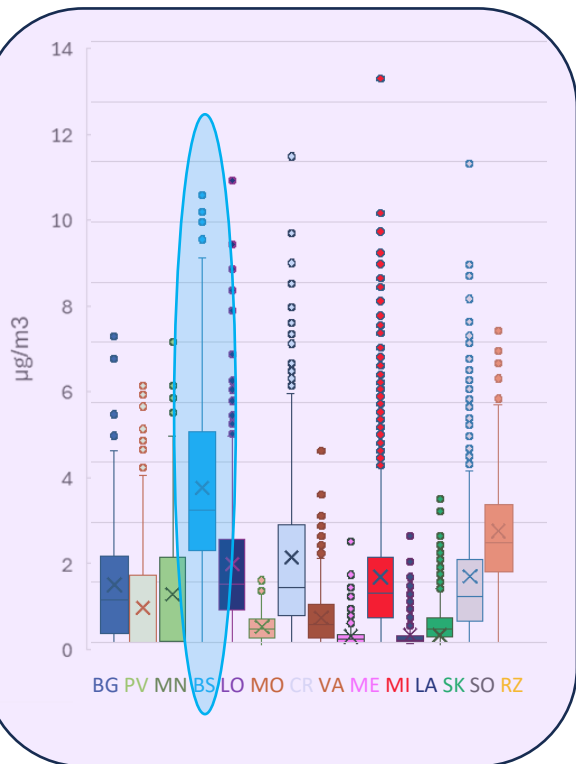


↑
Brescia



Diminuzione della concentrazioni nel mese di agosto e nel periodo di Natale

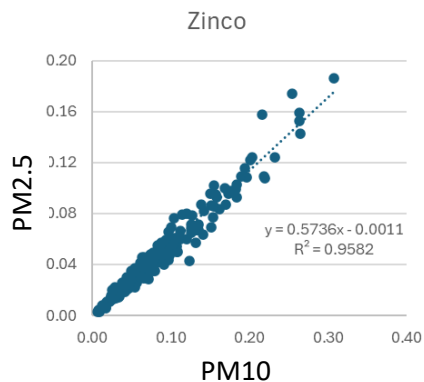
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Diminuzione della concentrazioni nel mese di agosto e nel periodo di Natale

Anche altri siti come Rezzato e in parte Cremona presentano concentrazioni superiori rispetto a Milano

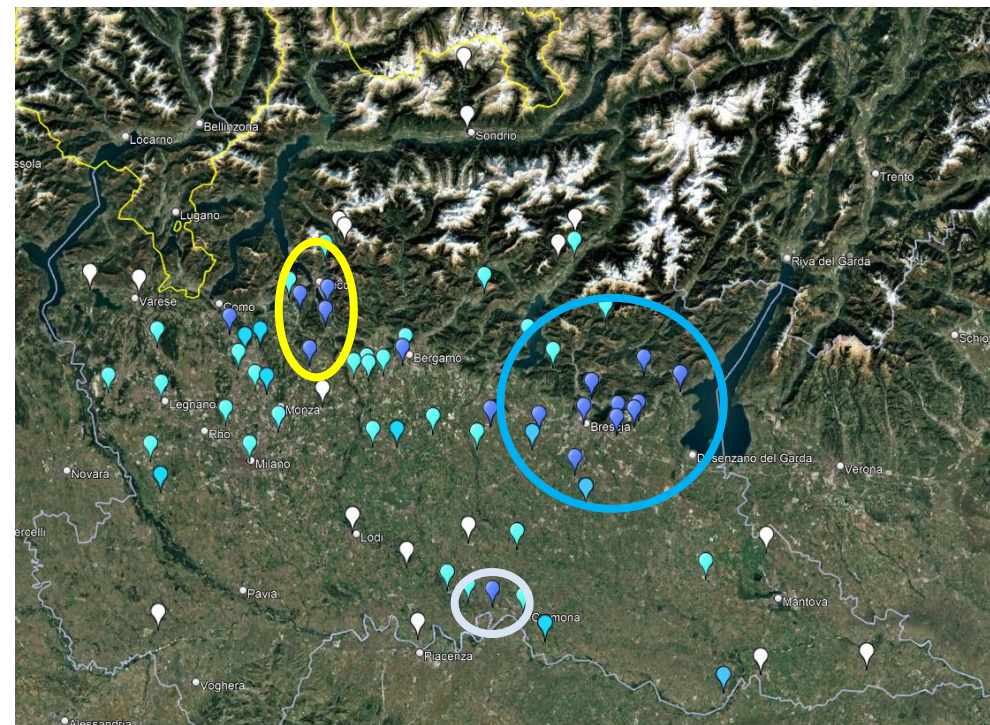
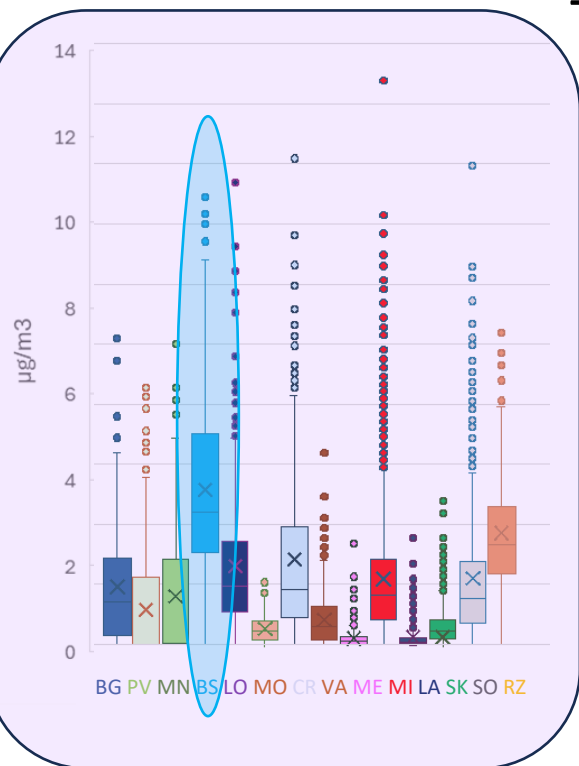
Rapporto Zn (PM₁₀/PM_{2.5}) in provincia di Brescia è pari a circa 0.5



Mix antropogenico

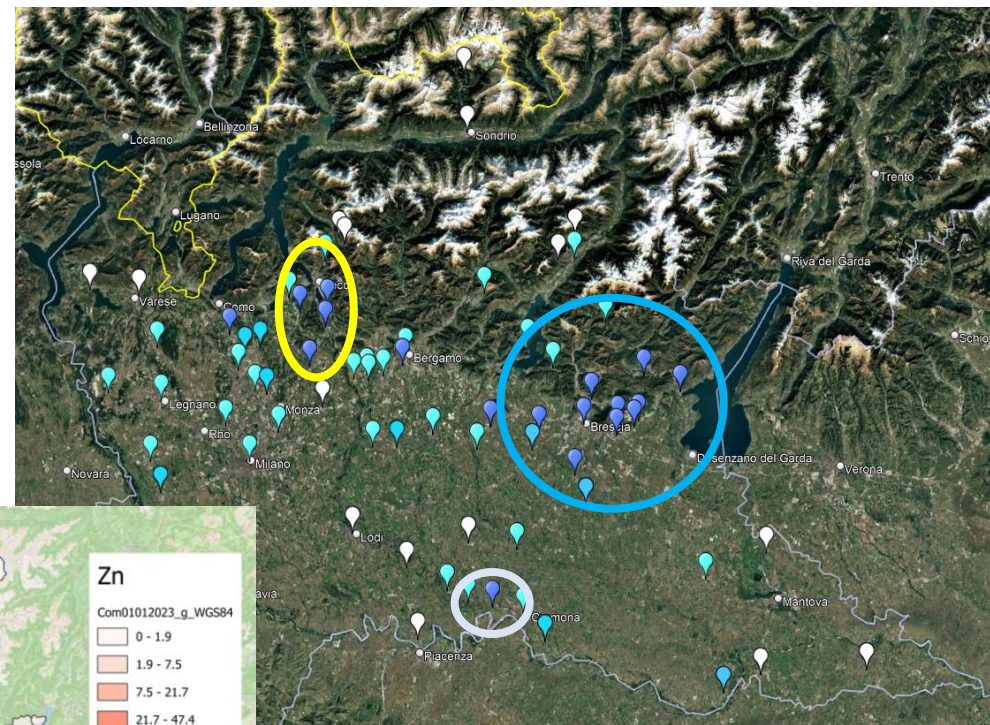
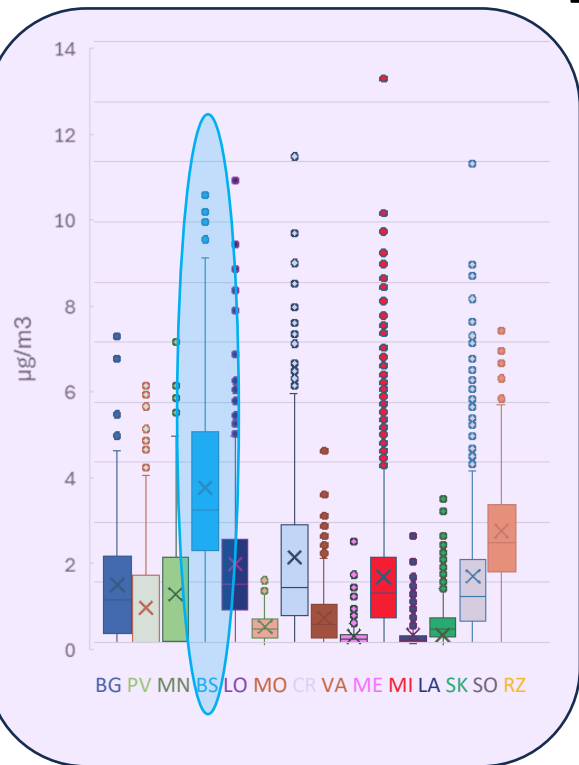
Tra il 2016 ed il 2025 sono state effettuate **oltre 60 campagne temporanee** sul territorio regionale nelle quali sono state effettuate analisi XRF

L'intorno di **Brescia** presenta concentrazioni elevate di Zn. Anche l'intorno di Lecco e di Cremona presentano concentrazioni di Zn superiori alla media regionale.

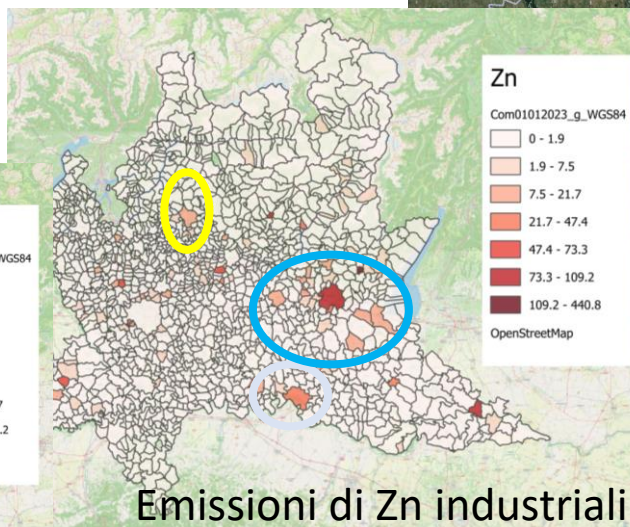
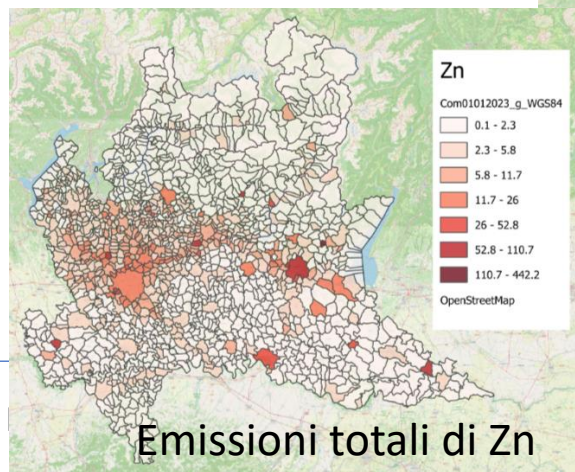


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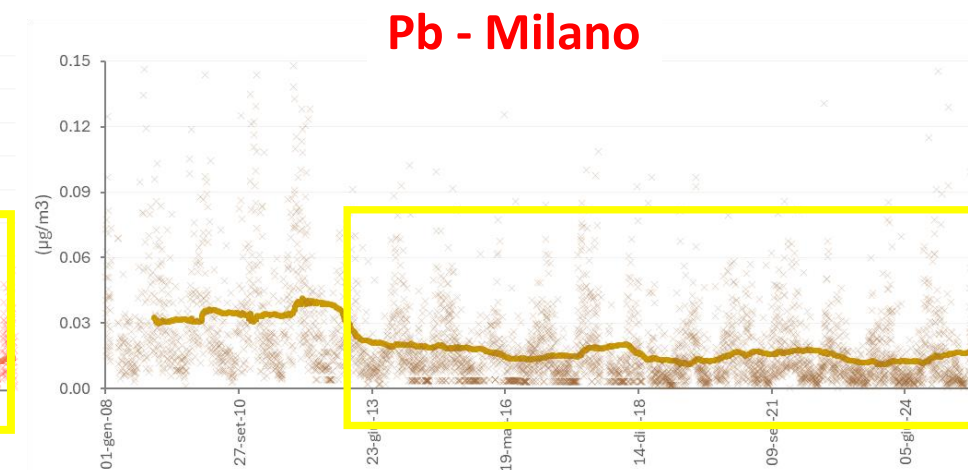
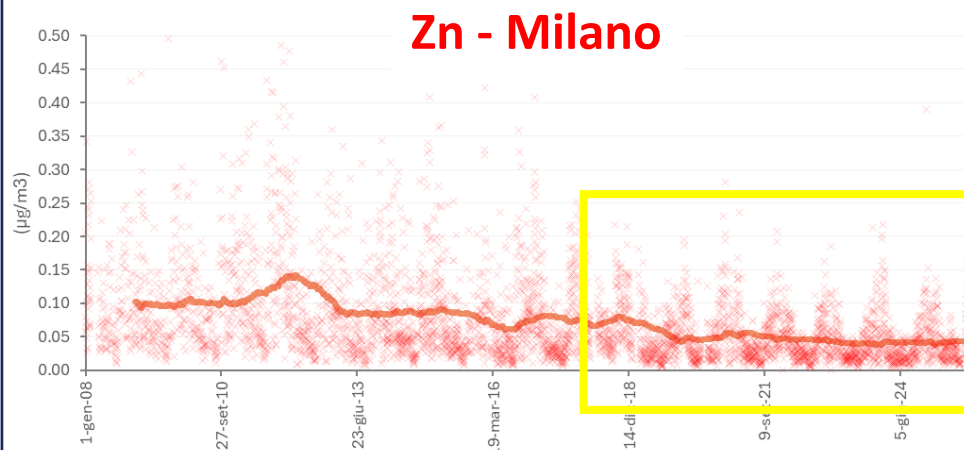
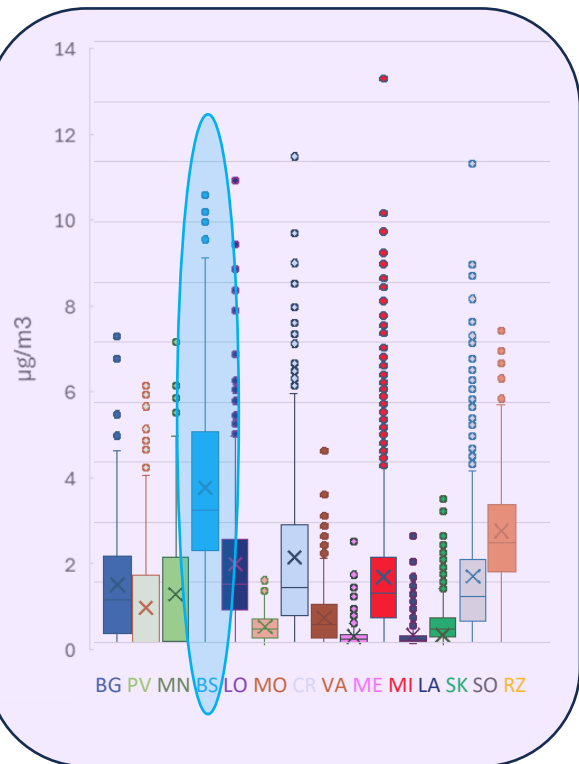


INEMAR

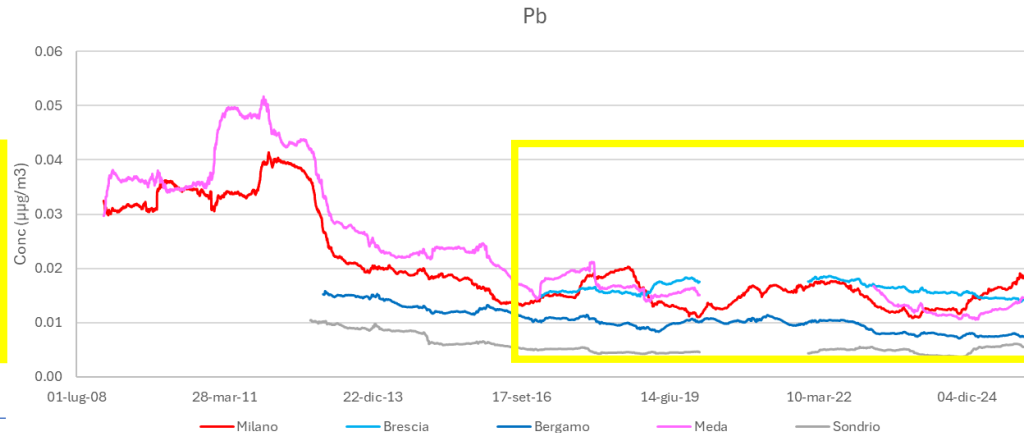
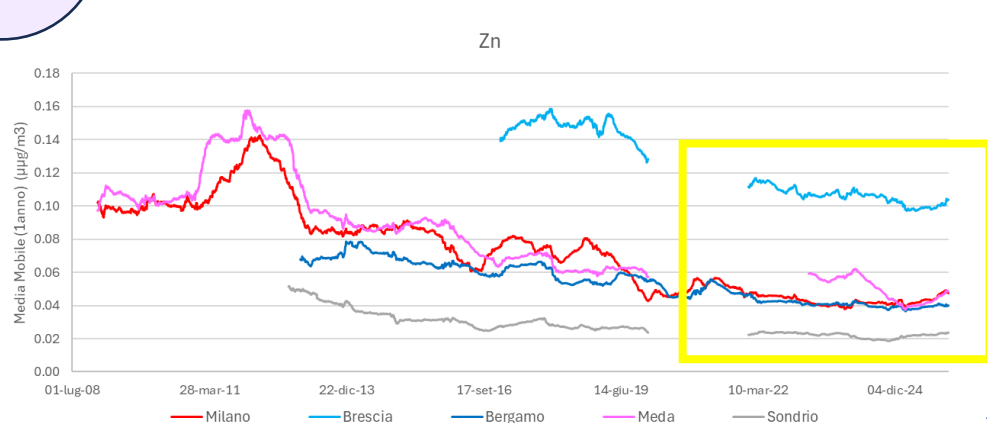


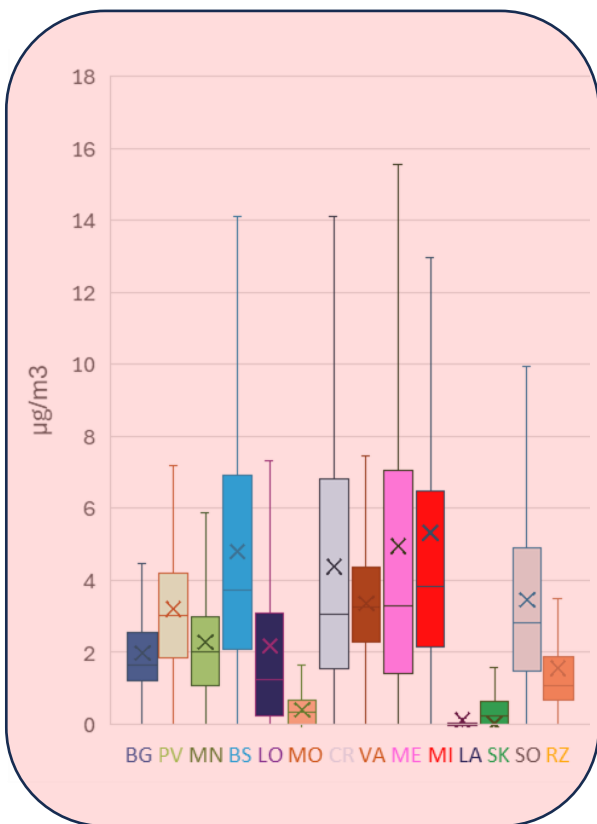
Mix antropogenico

Andamento dello Zn nel tempo: diminuzione degli anni
A Milano: andamento dello Zn dal 2008

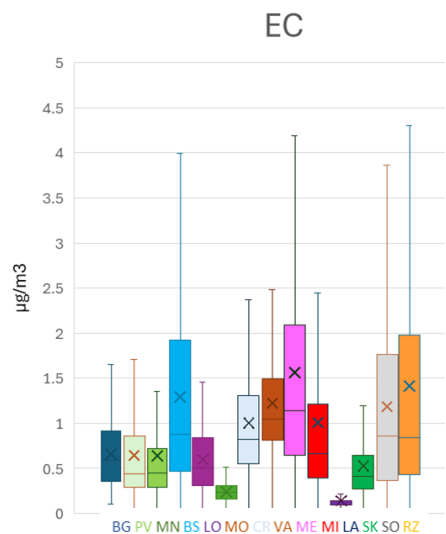
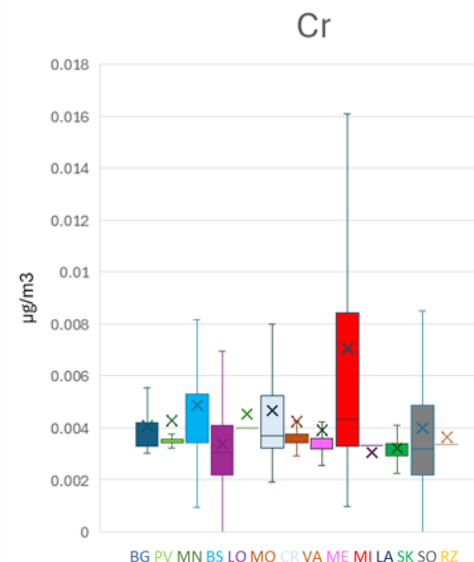
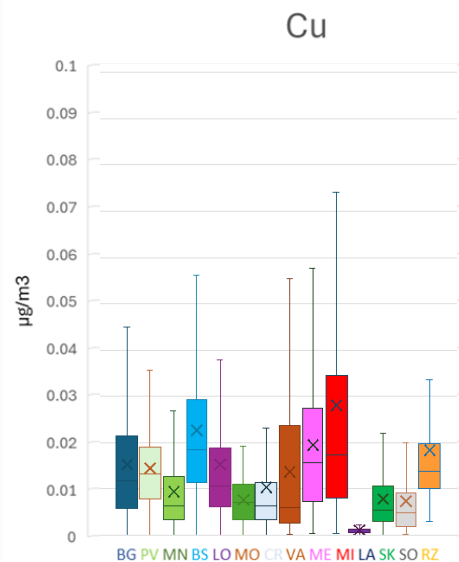


Nell'ultimo decennio non si nota una diminuzione delle concentrazioni di Pb, mentre si assiste ad una diminuzione dello Zn sia a Brescia sia nel resto della regione.

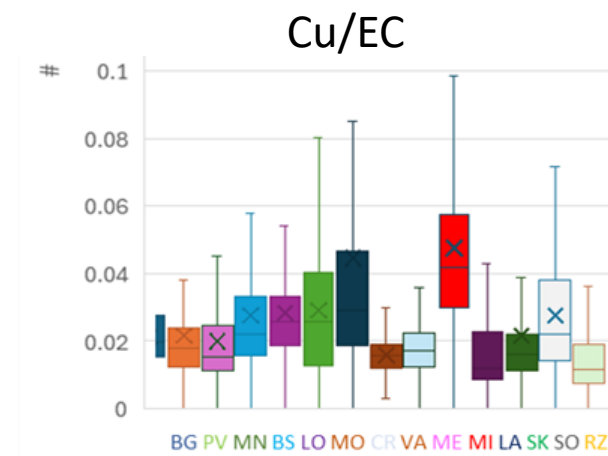
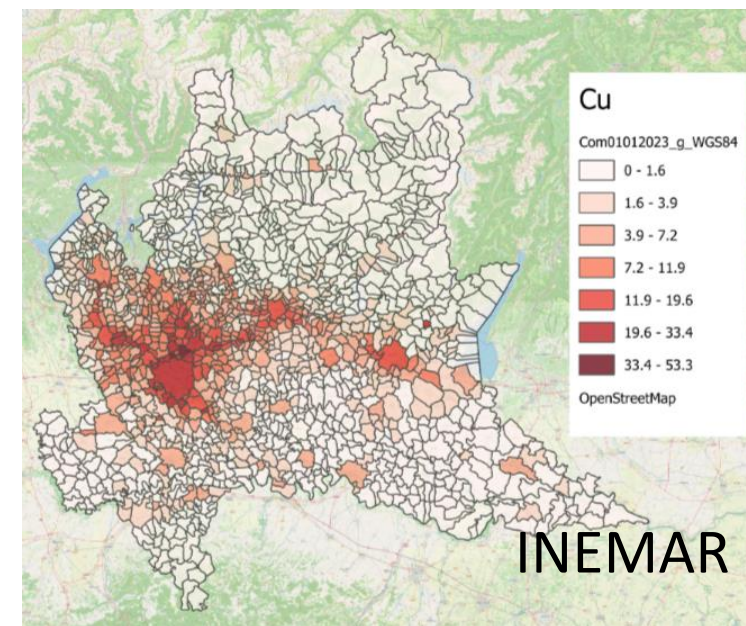


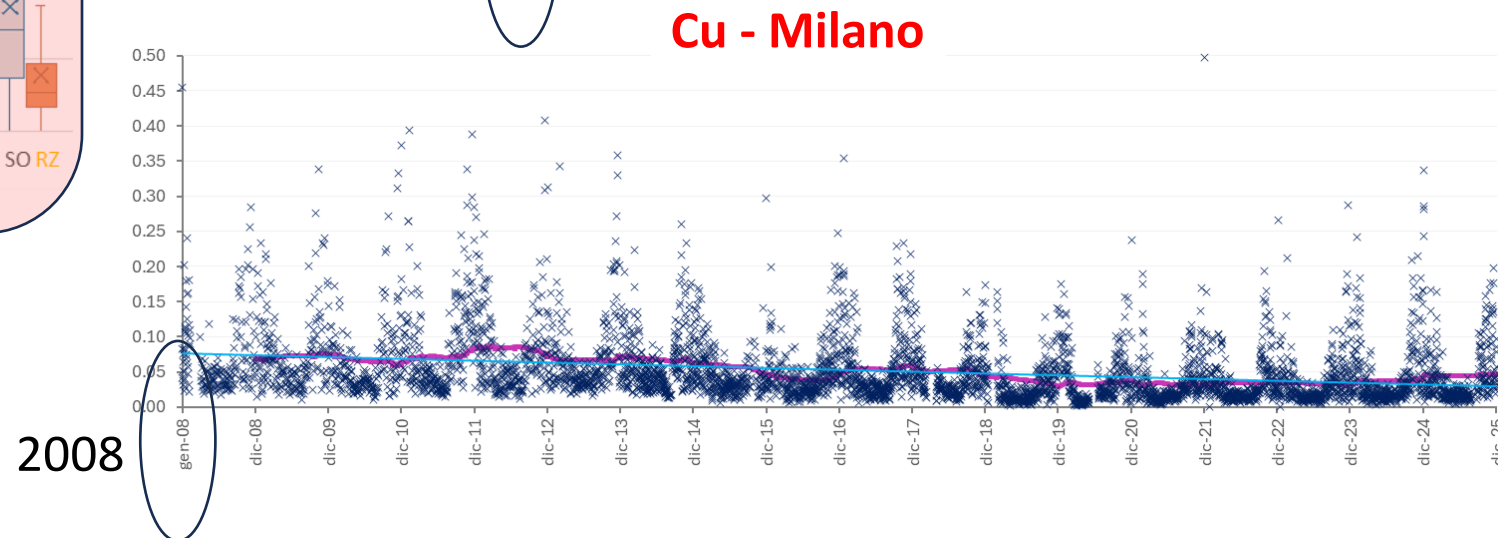
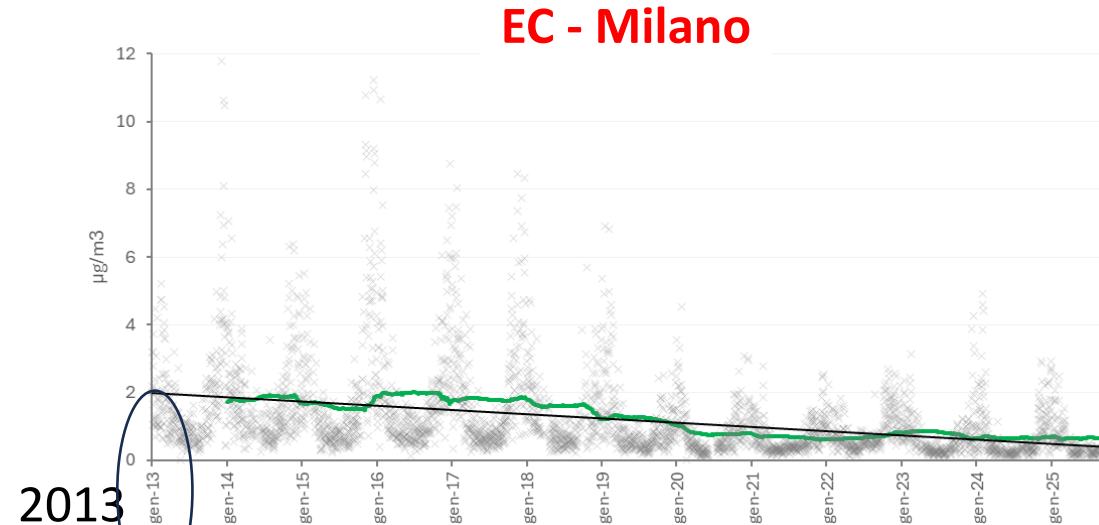
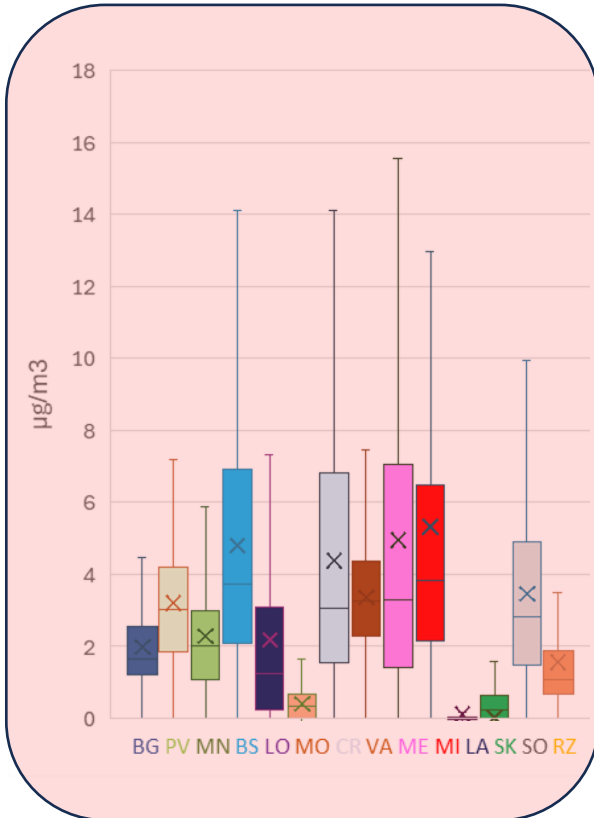


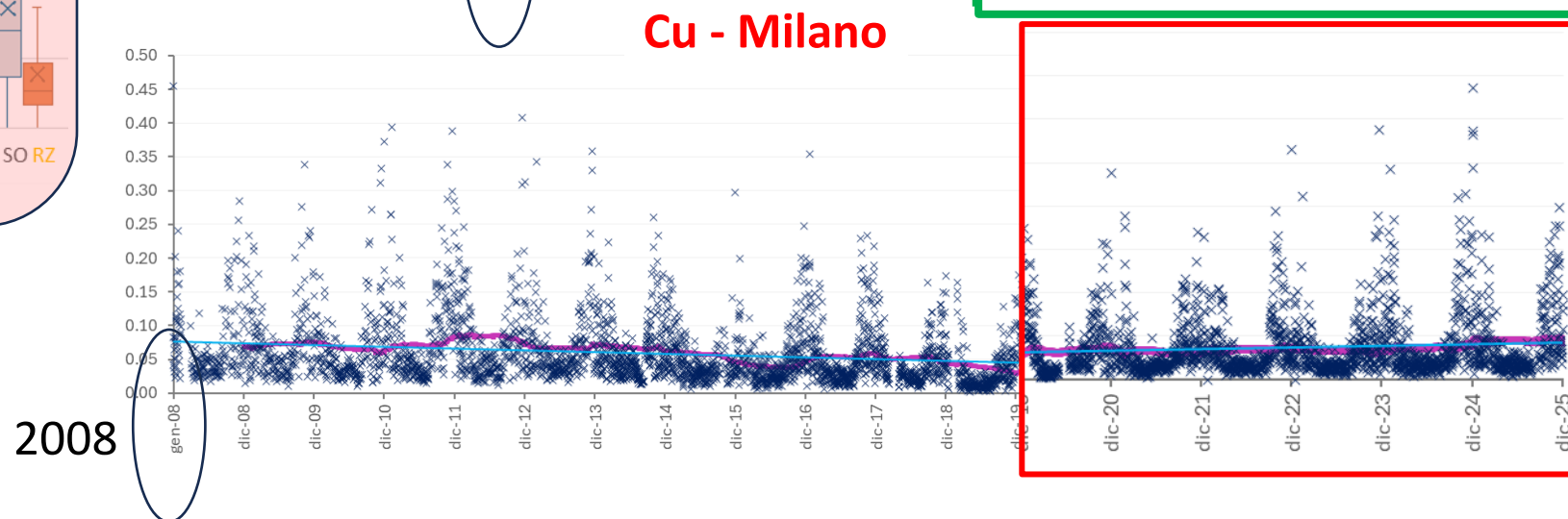
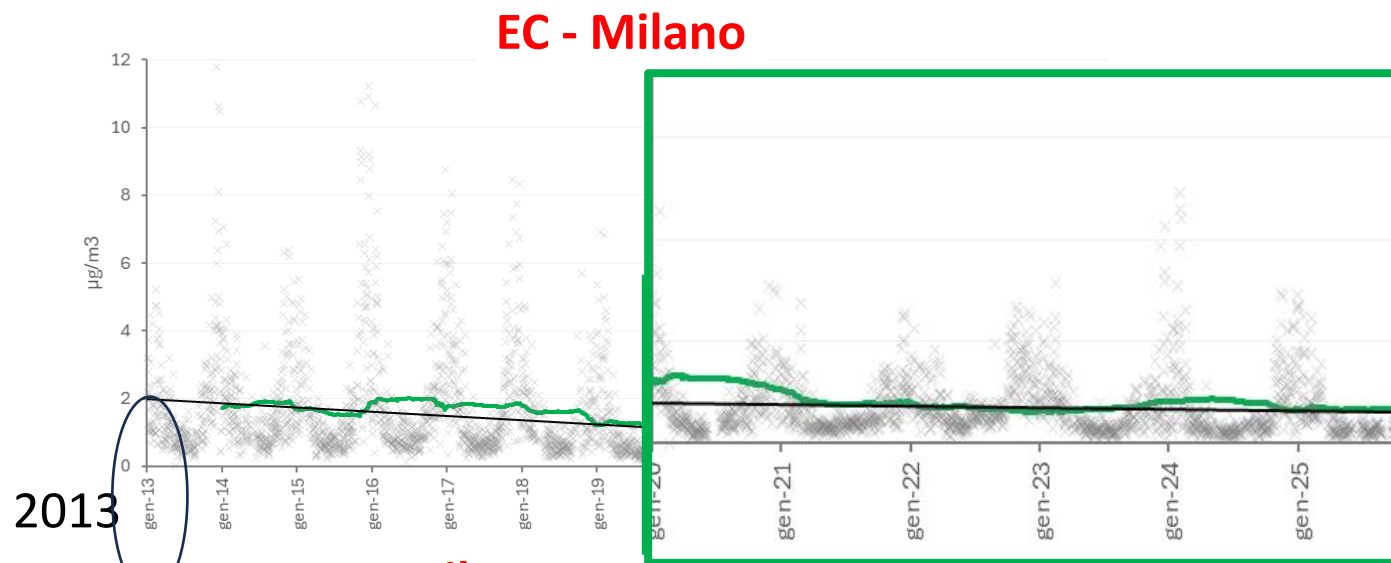
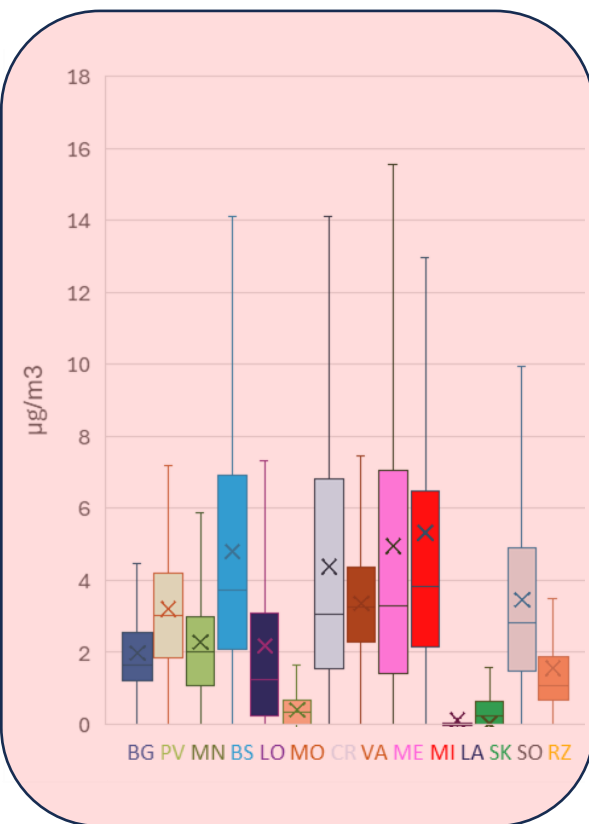
Milano presenta concentrazioni mediamente più elevate di Cu e di Cr degli altri centri urbani lombardi.



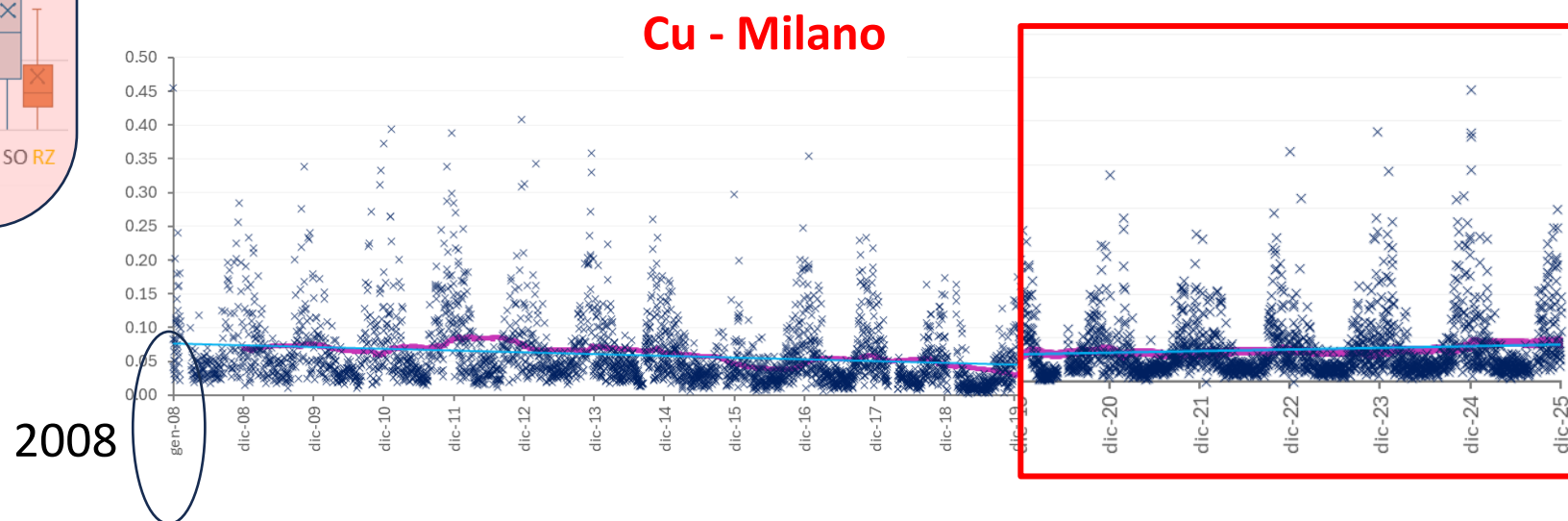
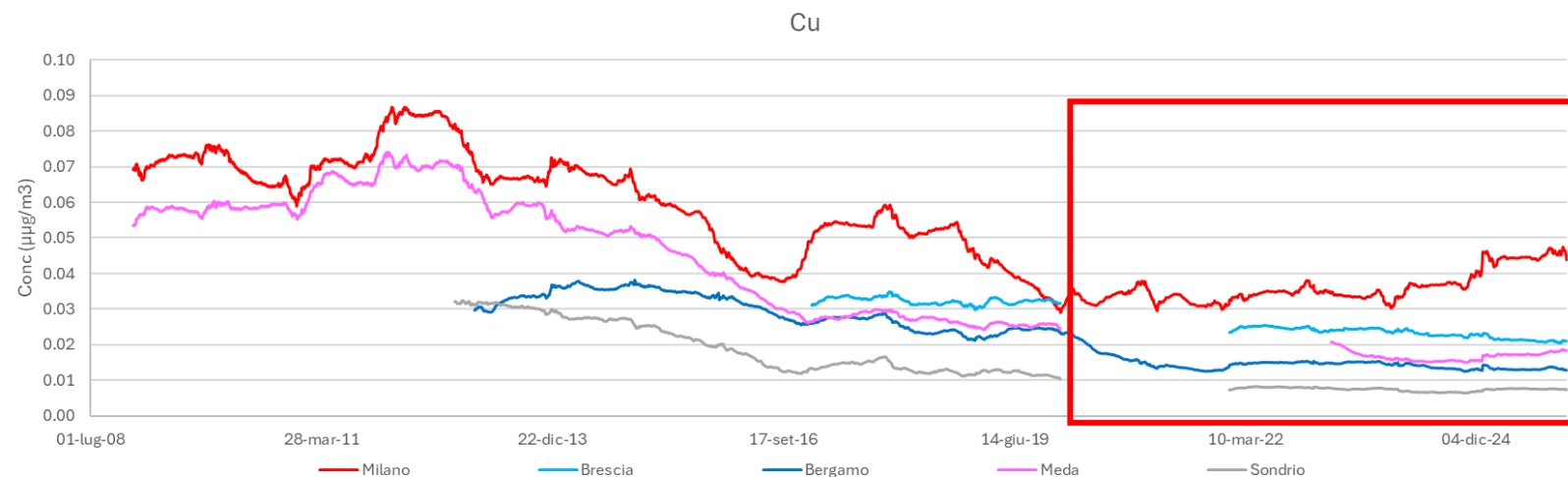
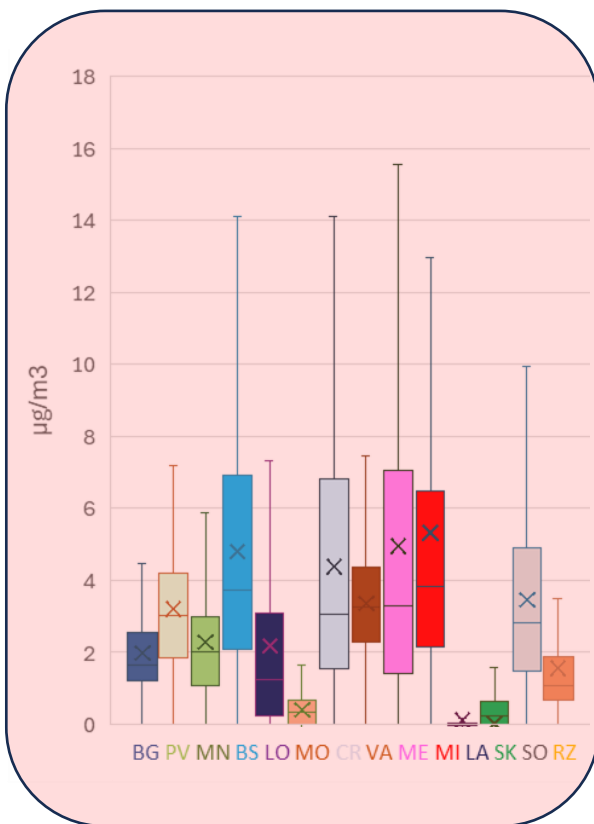
Il contributo del traffico, così come le concentrazioni di Rame sono maggiori nei centri urbani del nord della regione, in accordo con l'inventario delle emissioni



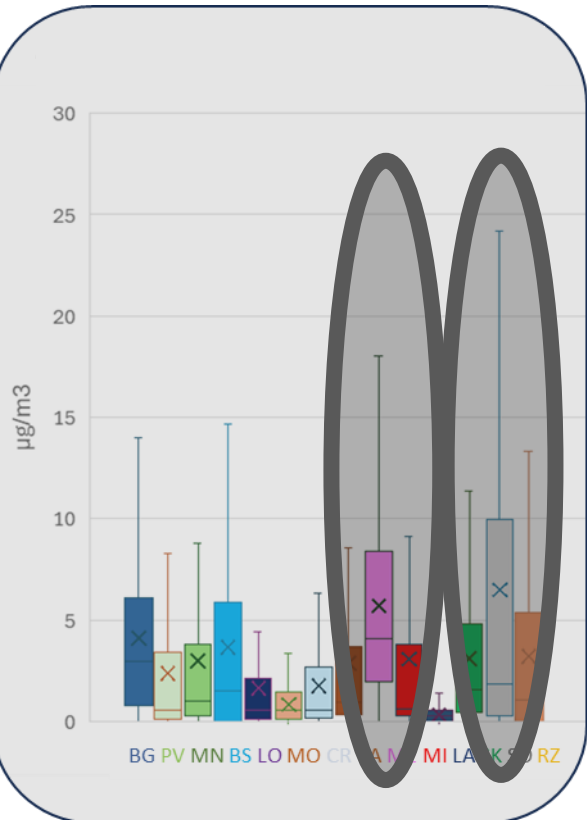




Nell'ultimo
quinquennio
non sembra
essere
presente un
trend



Nell'ultimo
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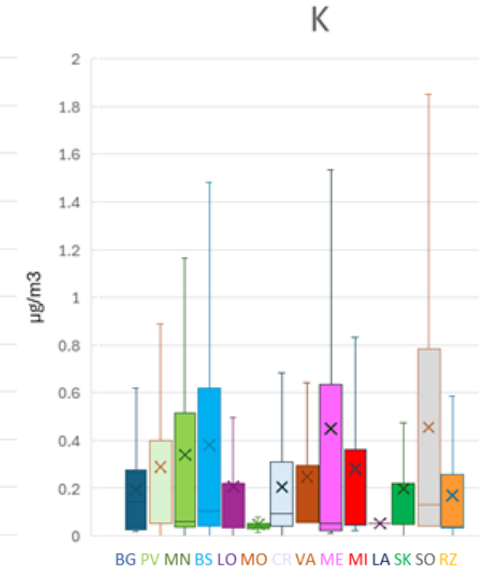
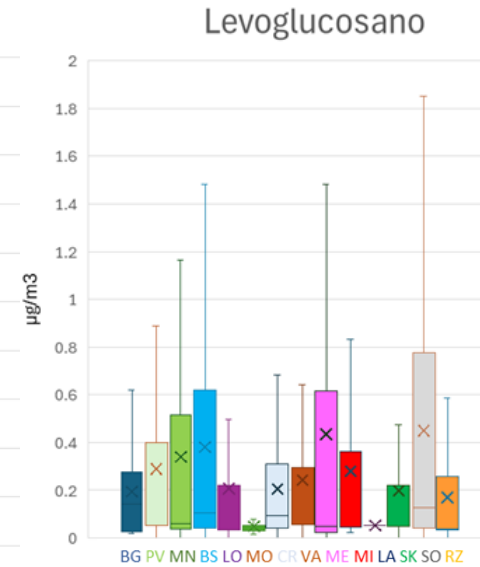
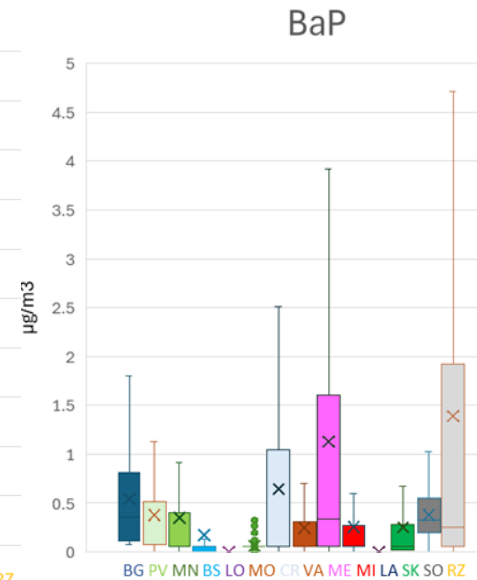
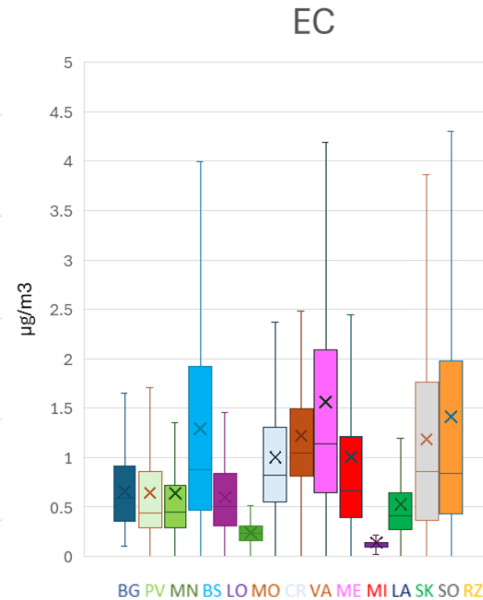
Composizione chimica e sorgenti del PM₁₀ nel distretto lombardo dei mobilifici caratterizzato da elevate concentrazioni di benzo(a)pirene

U. Dal Santo, *, B. Biffi, L. Carroccio, C. Colombi, E. Cuccia, L. D'Angelo, A. Di Leo, M. Franciosa, A. Marongiu, F. Radrizzani, G. Lanzani.

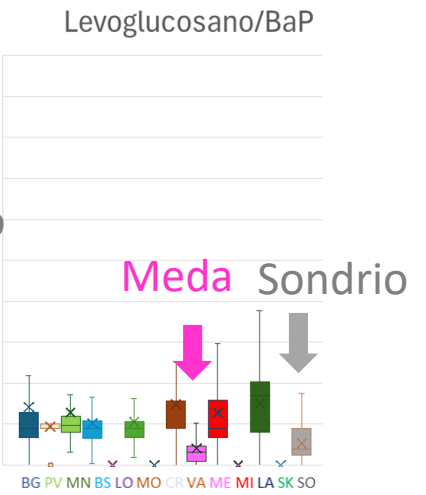
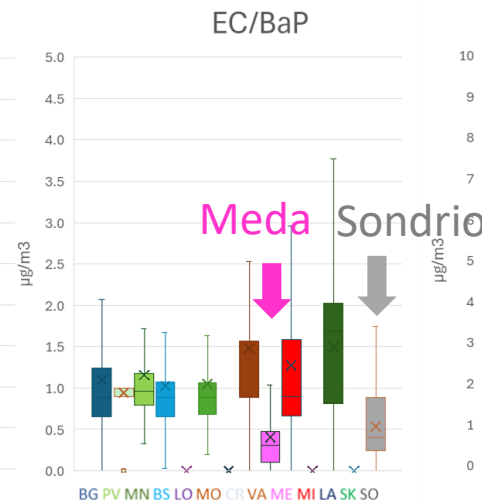
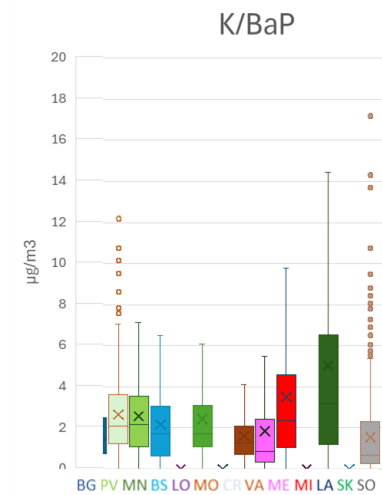
ARPA Lombardia

Milano, via Taramelli 26

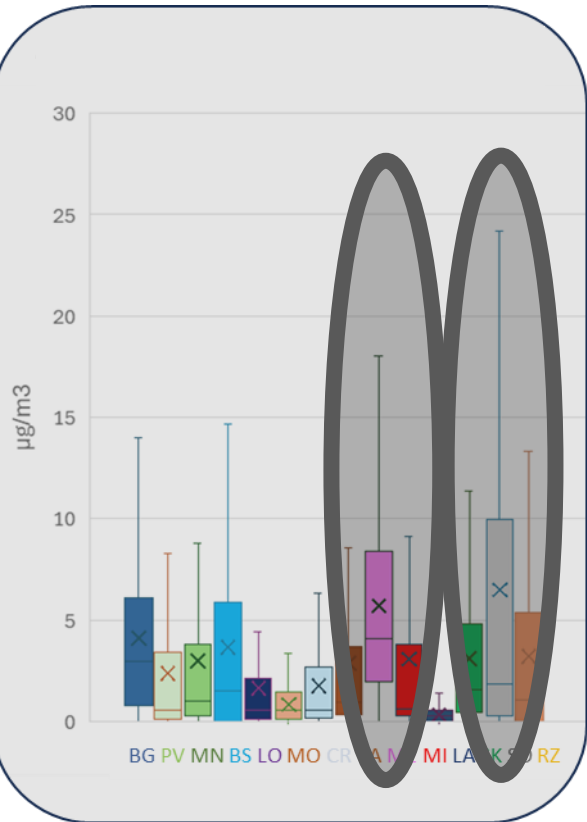
*Corresponding author; e-mail: u.dalsanto@arpalombardia.it



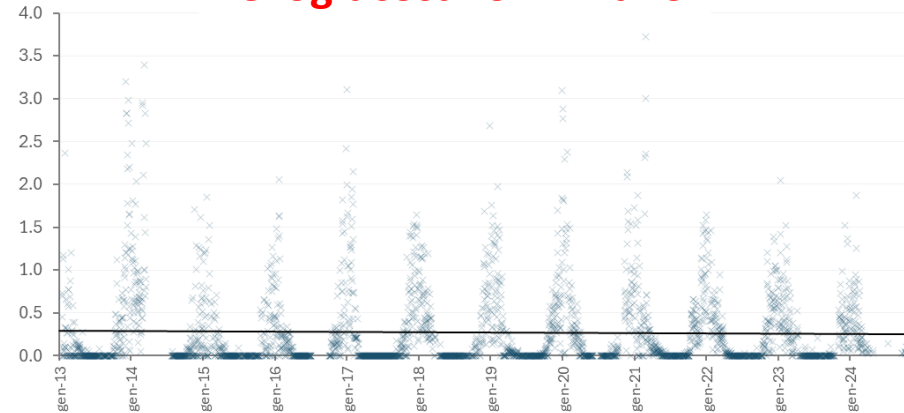
Il rapporto tra BaP e Levo varia in base al sito. Sembra che dove ho più combustione di biomassa ho più BaP a parità di Levoglucosano



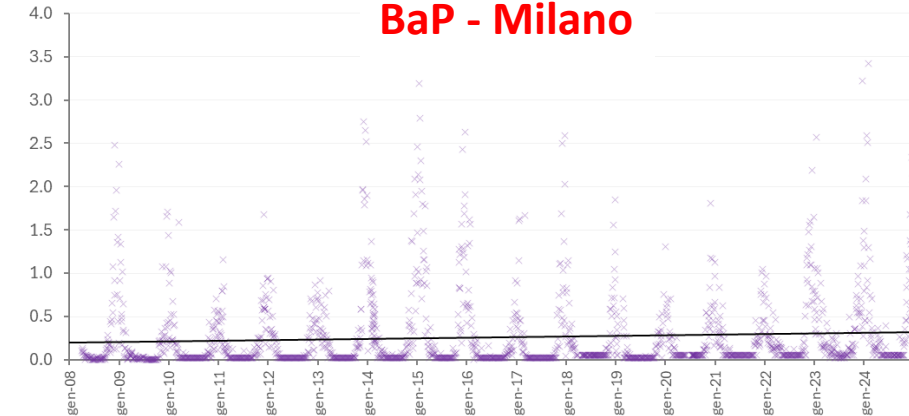
Combustione di biomassa



Levoglucosano - Milano

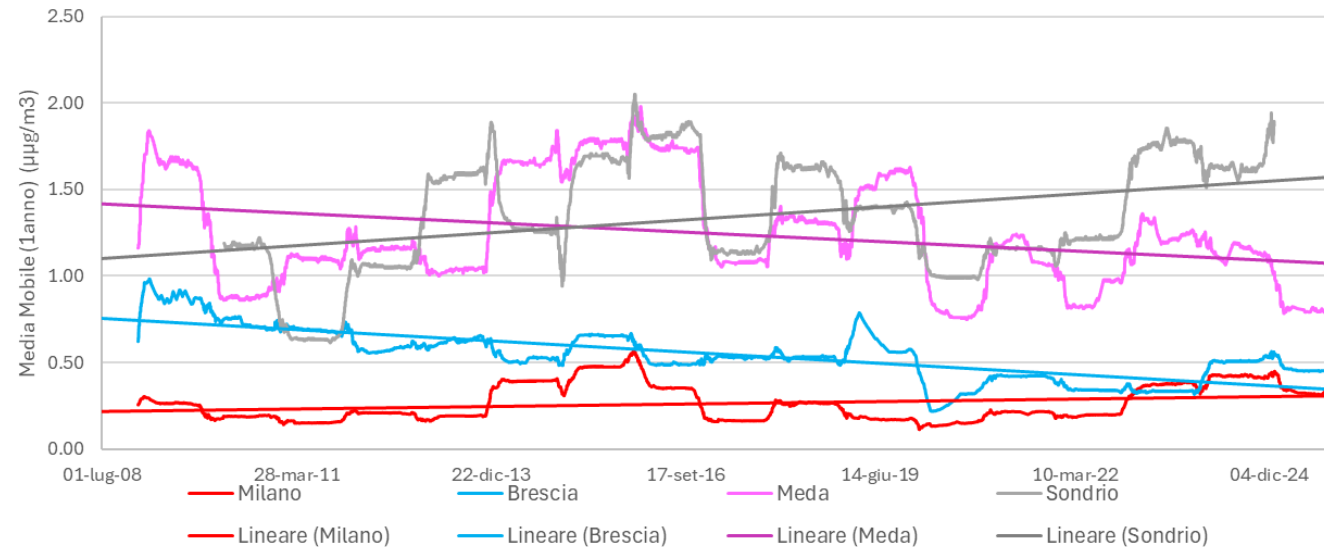


BaP - Milano

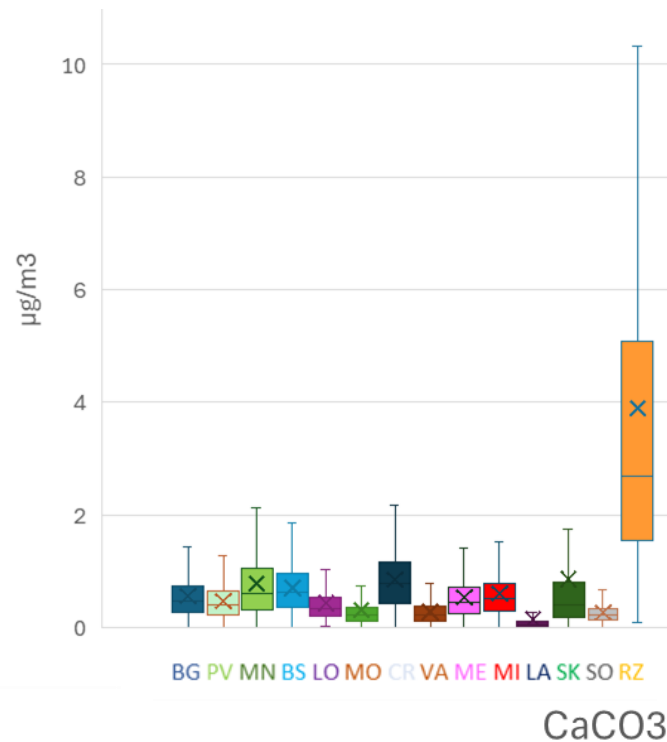
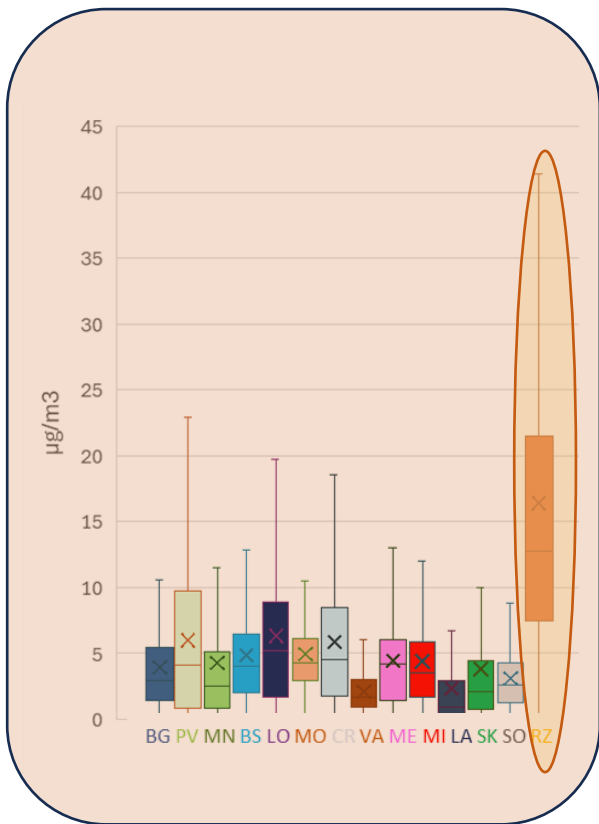


A Milano il levoglucosano non sembra presentare alcun trend in valore assoluto.

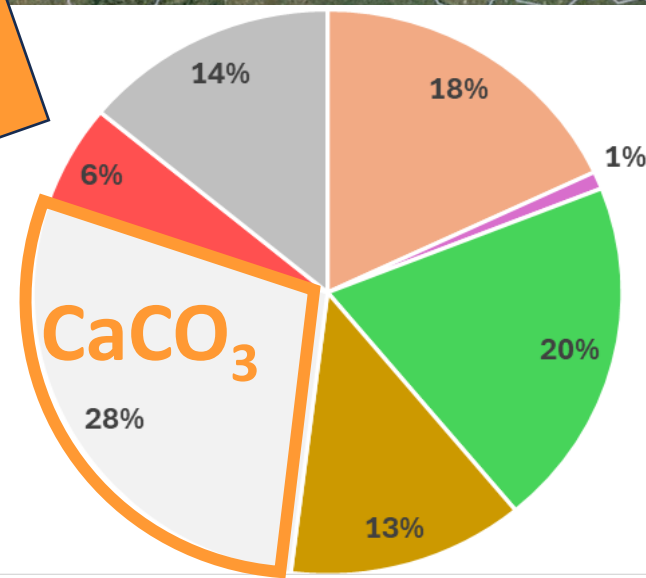
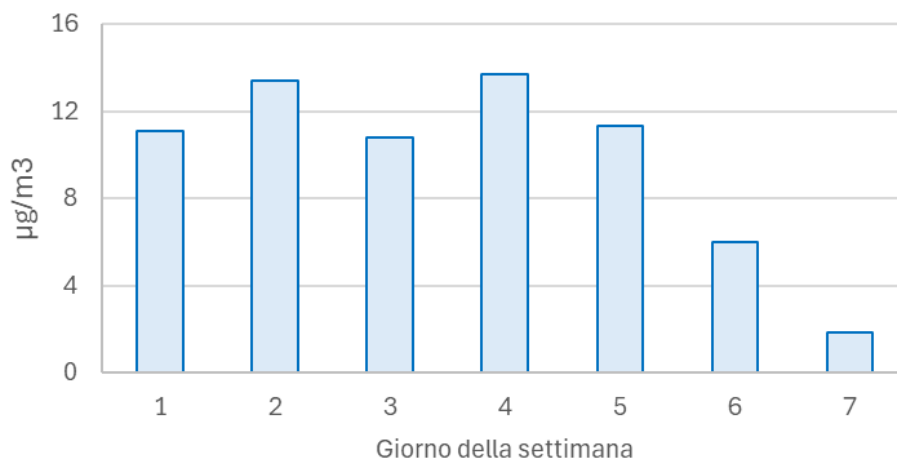
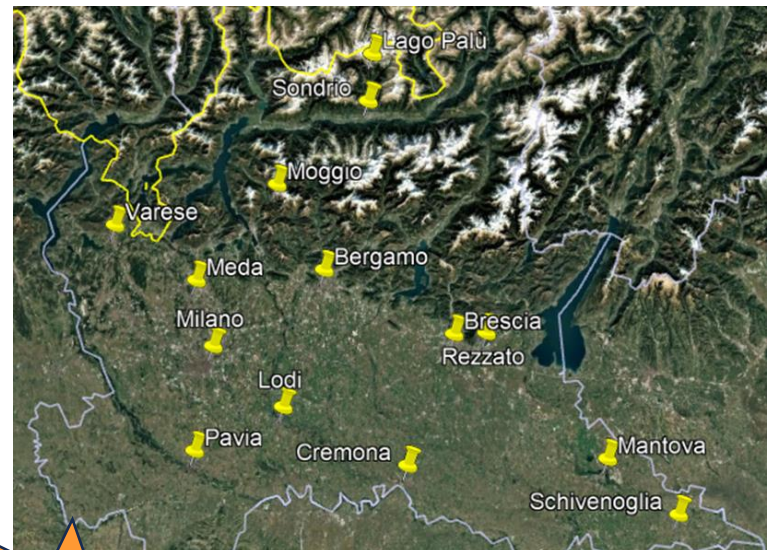
BaP



BaP mostra trend differenti nelle diverse realtà.

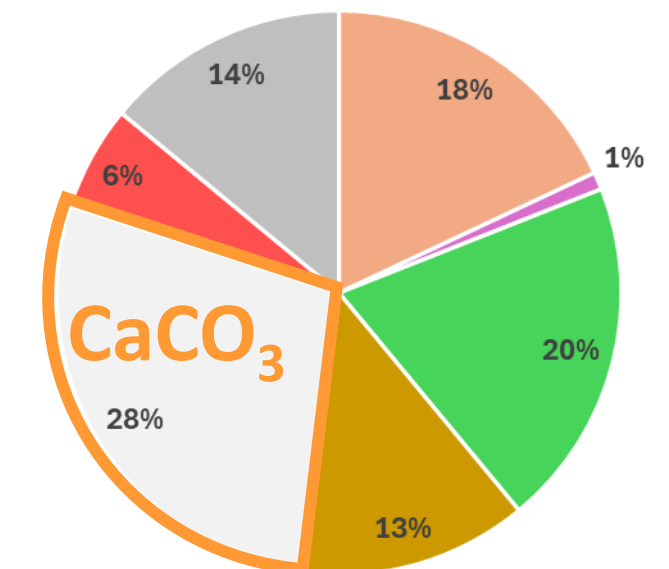
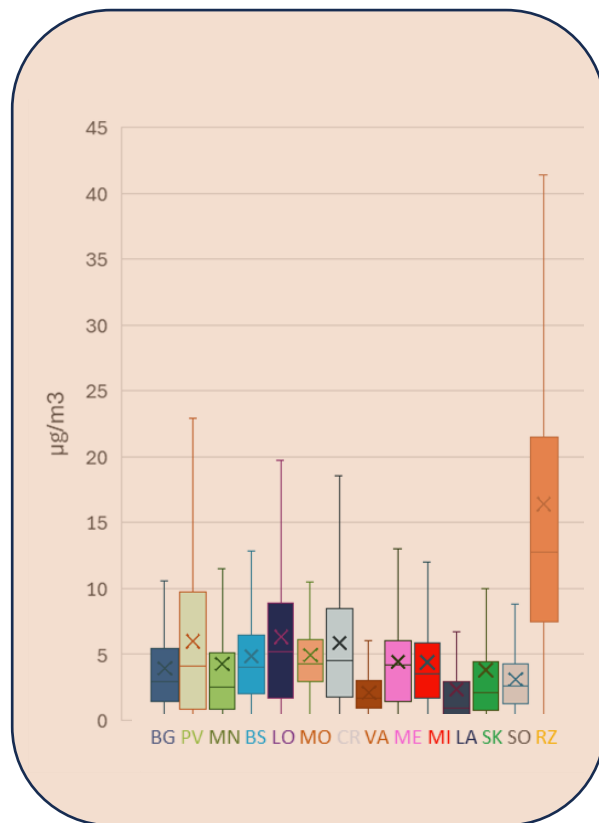


Rezzato

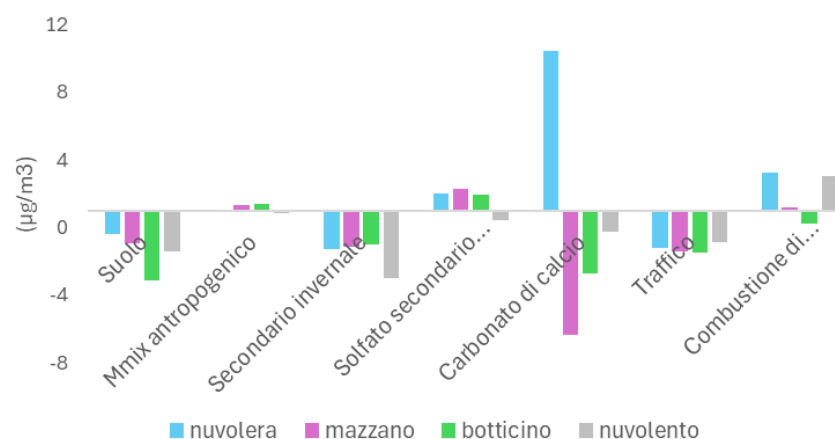


Il carbonato di calcio è stato ricostruito a partire dalla misura di Ca e della frazione di OC che evolve nell'ultima rampa di T della fase inerte dell'analisi TOT

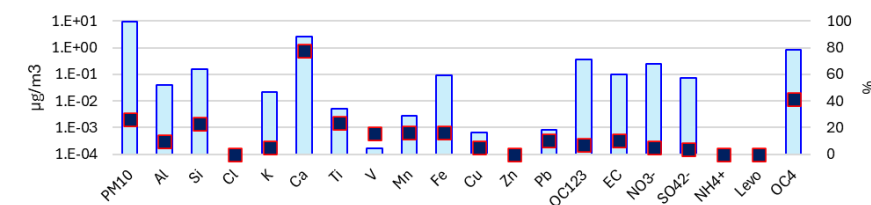
Bacino del Marmo



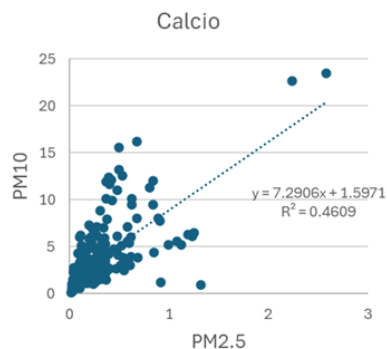
Bacino del Marmo



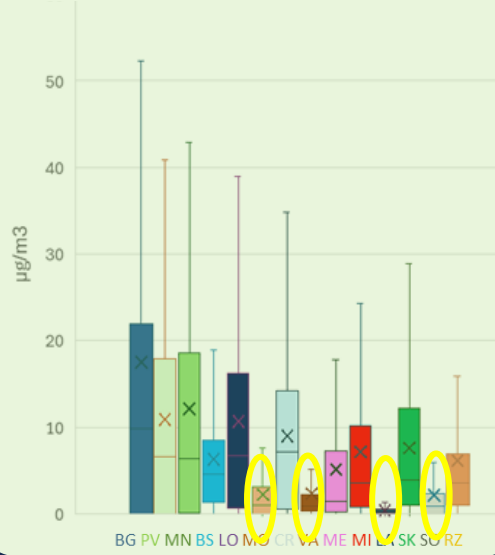
carbonato di calcio



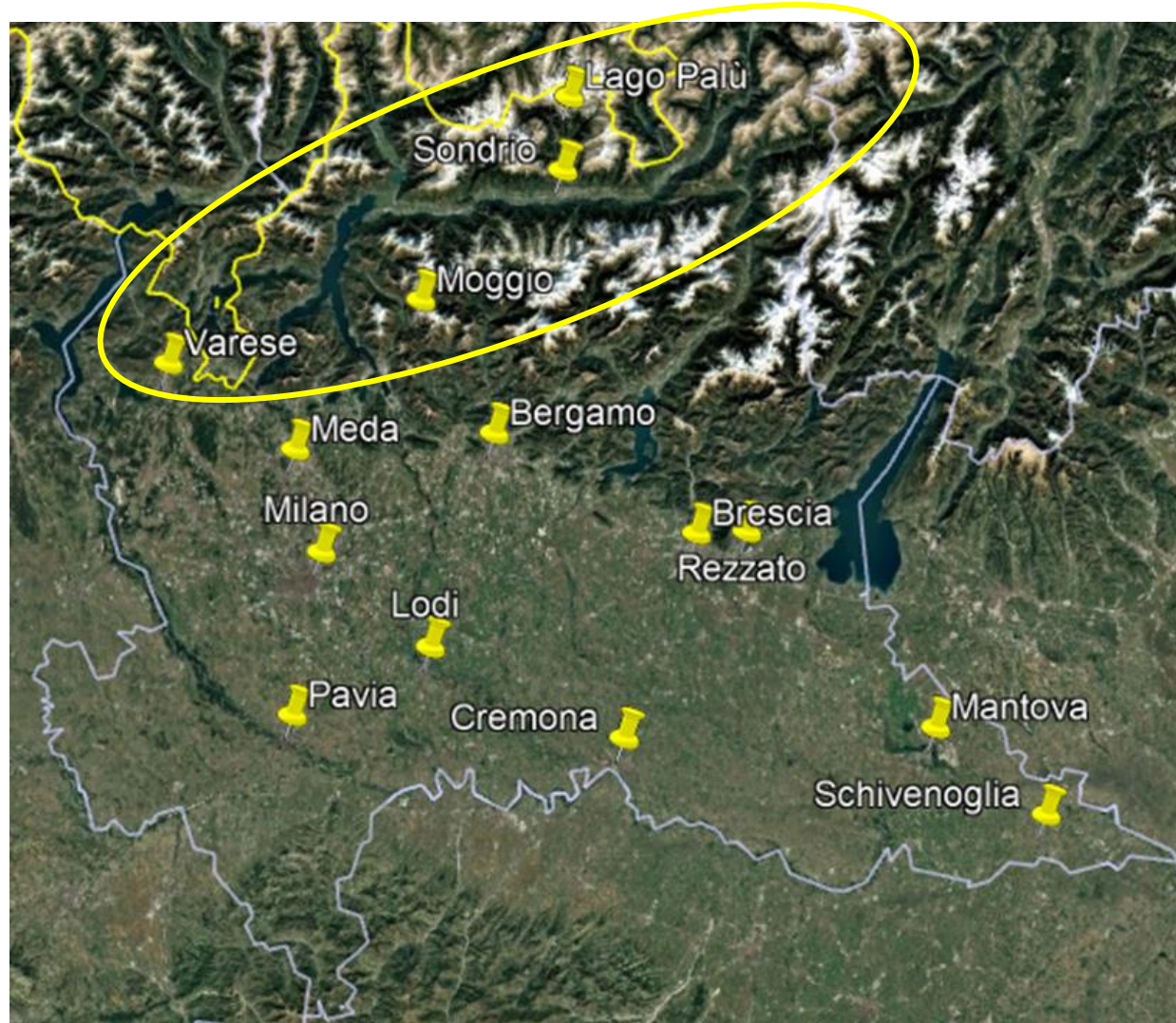
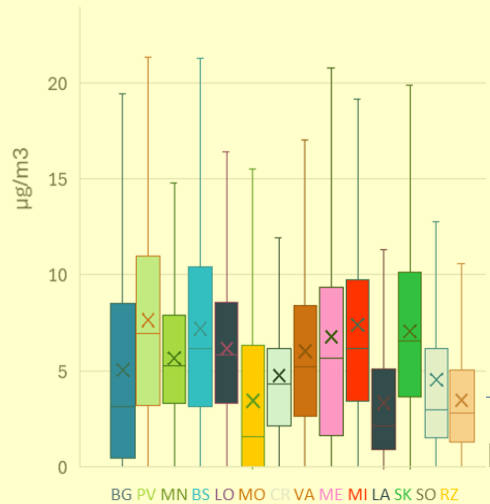
L'analisi PMF condotta sui dati raccolti a Rezzato e nei diversi siti del bacino del marmo risolve una 8 sorgente CaCO_3 .



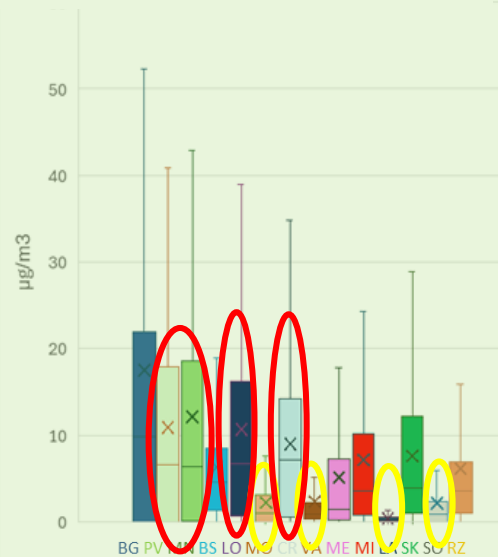
Secondario Invernale



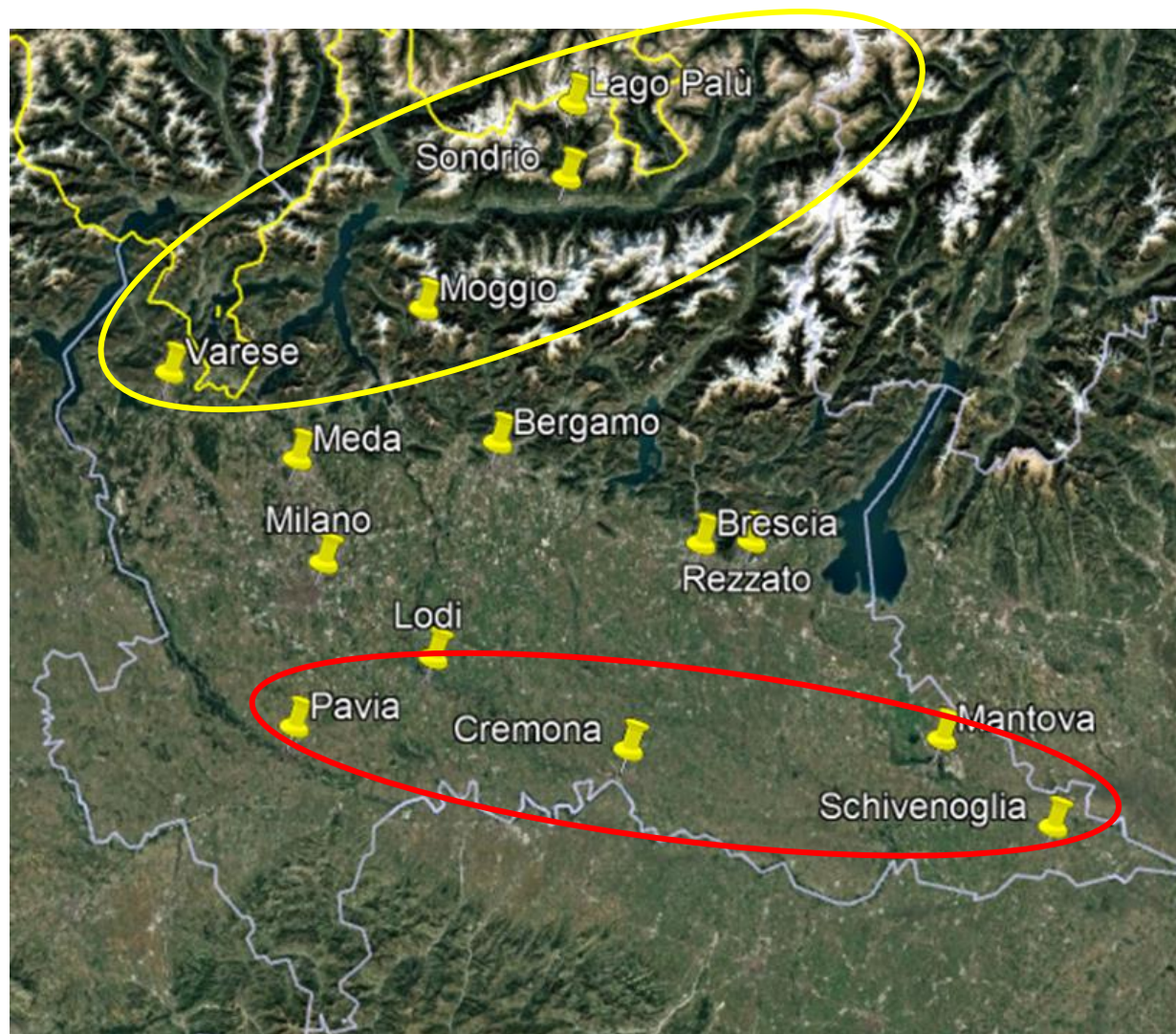
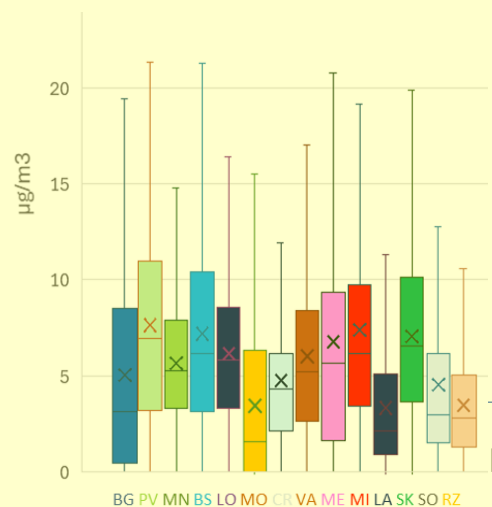
Fondo Secondario



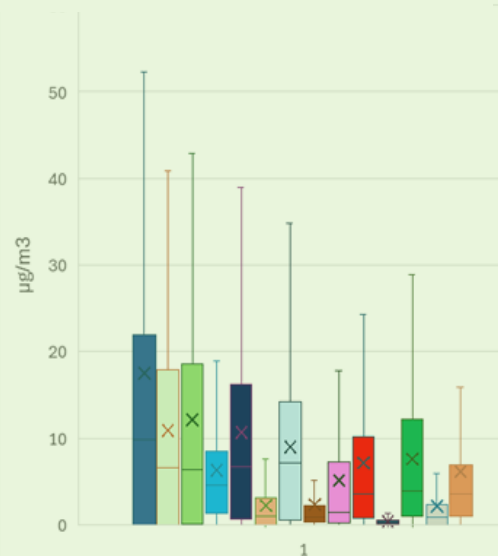
Secondario Invernale



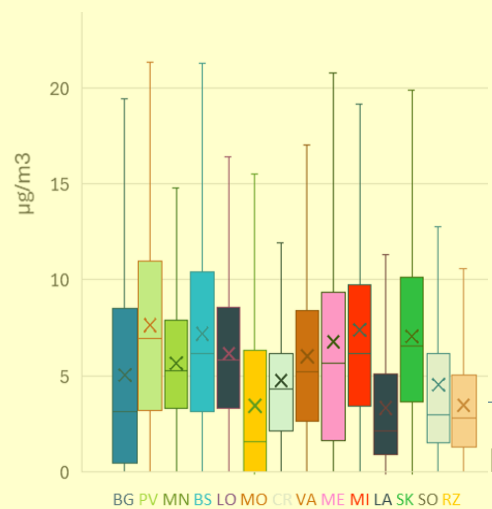
Fondo Secondario



Secondario Invernale

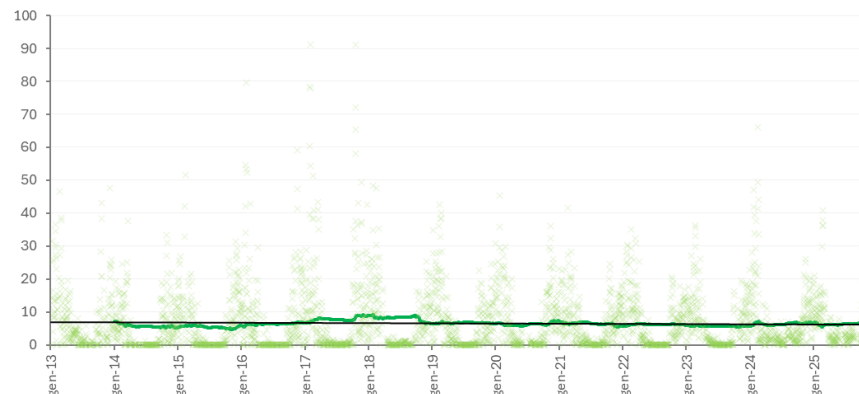


Fondo Secondario

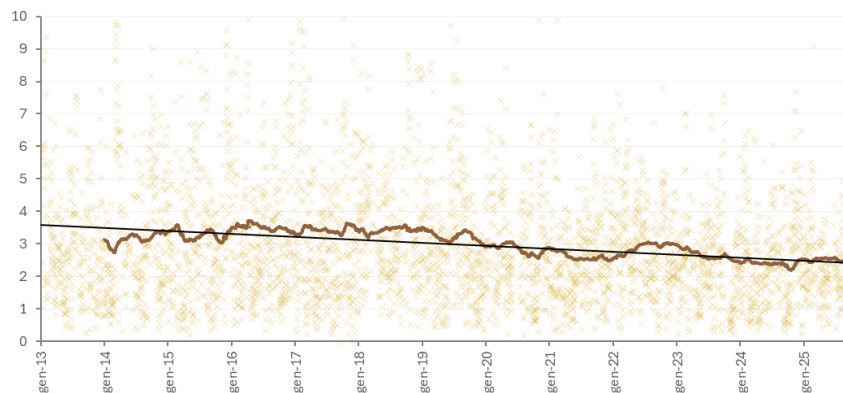


studio delle sc

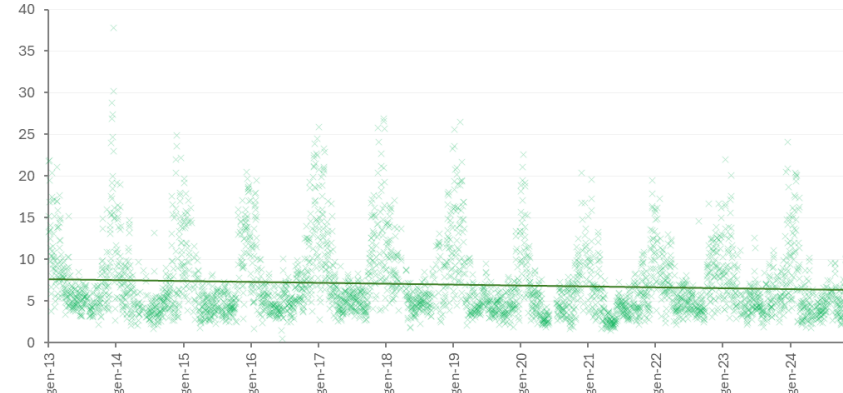
Nitrato d'ammonio



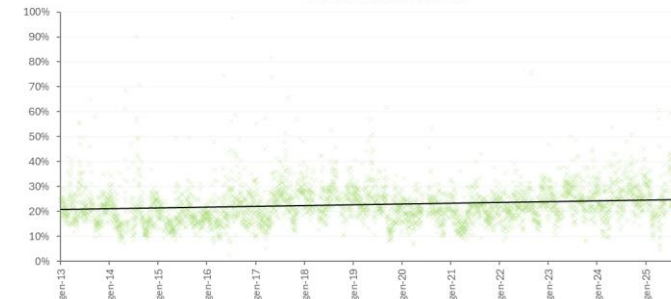
Solfato d'ammonio



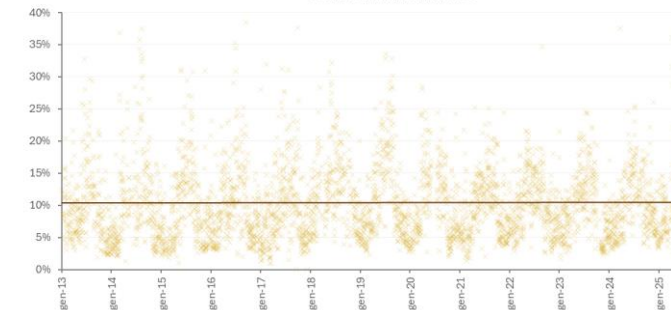
OC



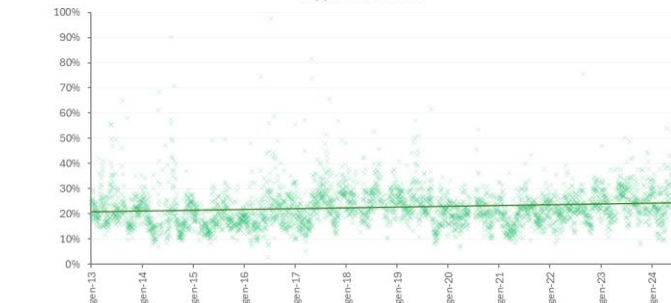
Nitrato d'Ammonio/PM10



Solfato d'Ammonio/PM10



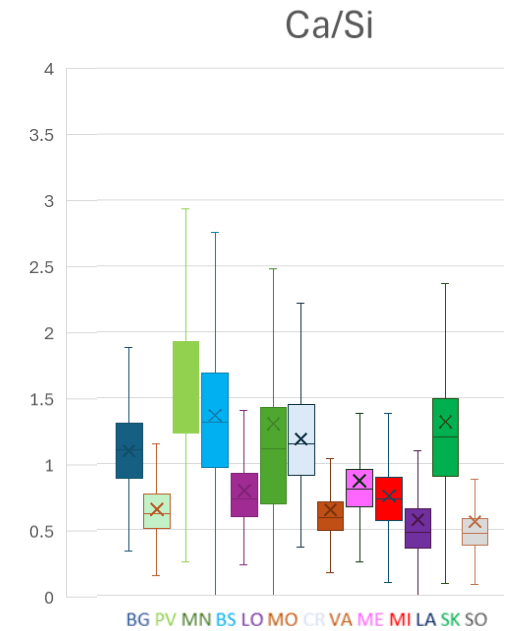
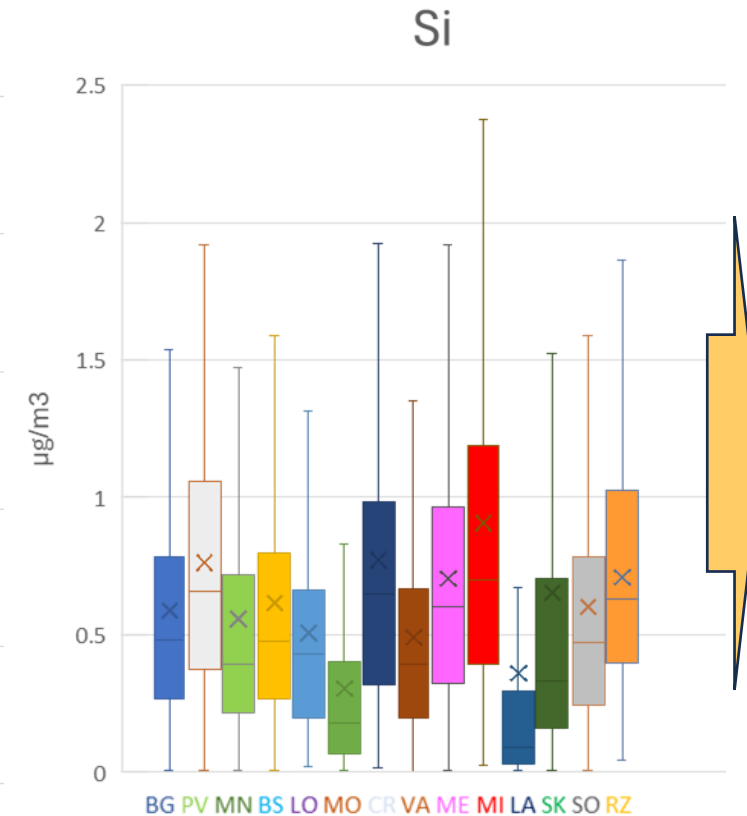
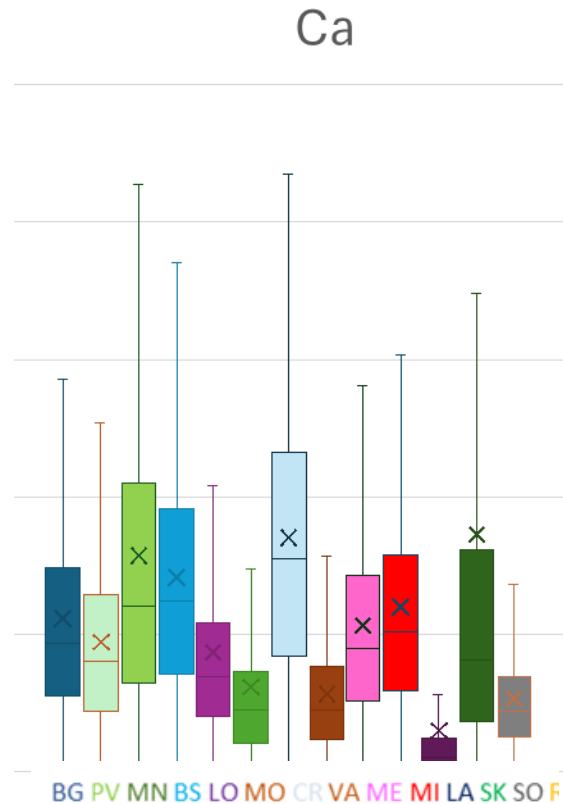
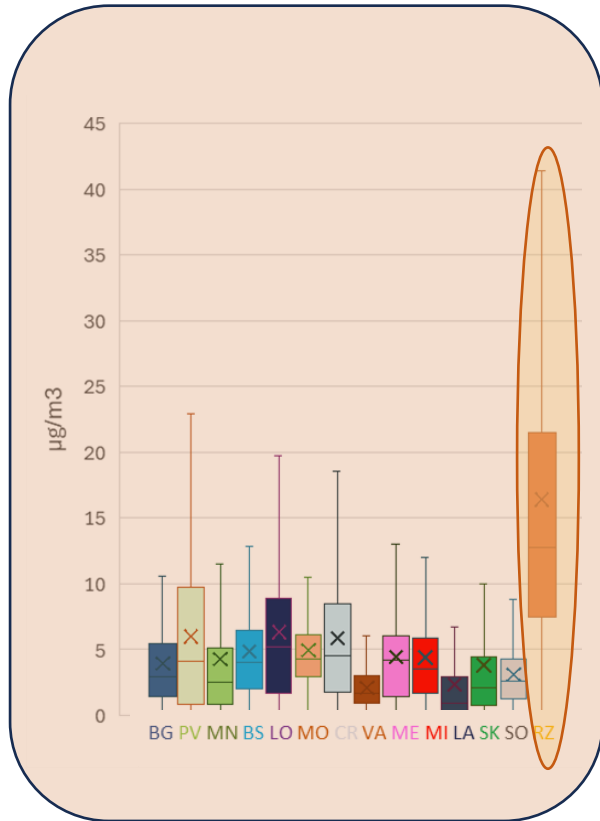
Rapporto OC/PM10



ee coniugata con la continuità temporale dei siti fissi | Eleonora Cuccia

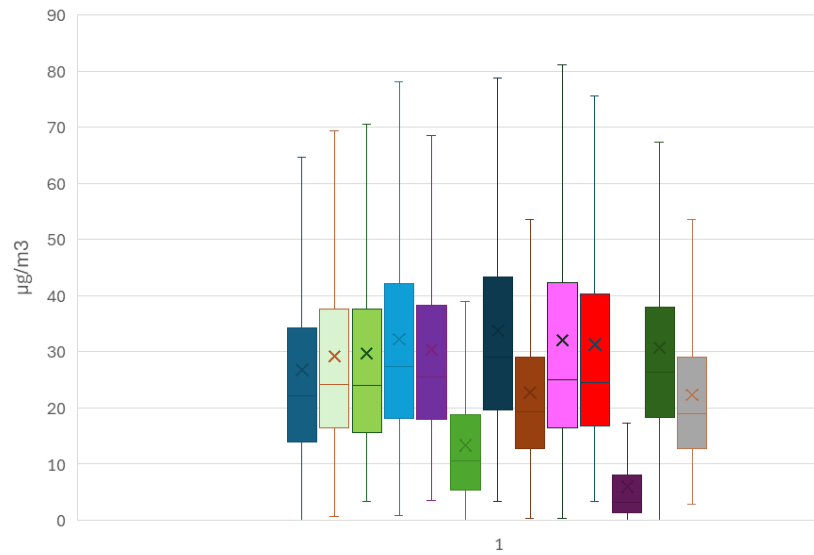
- Il confronto dei siti delle campagne annuali del progetto supersiti dove è stata effettuata la speciazione chimica completa per un anno con Milano dove la speciazione chimica viene effettuata quotidianamente dal 2013 ha permesso una valutazione organica delle specificità lombarde e l'individuazione di eventuali criticità;
- Le serie storiche della componente elementare nei capoluoghi di provincia hanno permesso di estendere le valutazioni sui trend effettuate per Milano al resto della regione;
- L'analisi delle serie storiche permette il supporto alla valutazione dei risultati delle misure adottate per il miglioramento della qualità dell'aria;

Il suolo



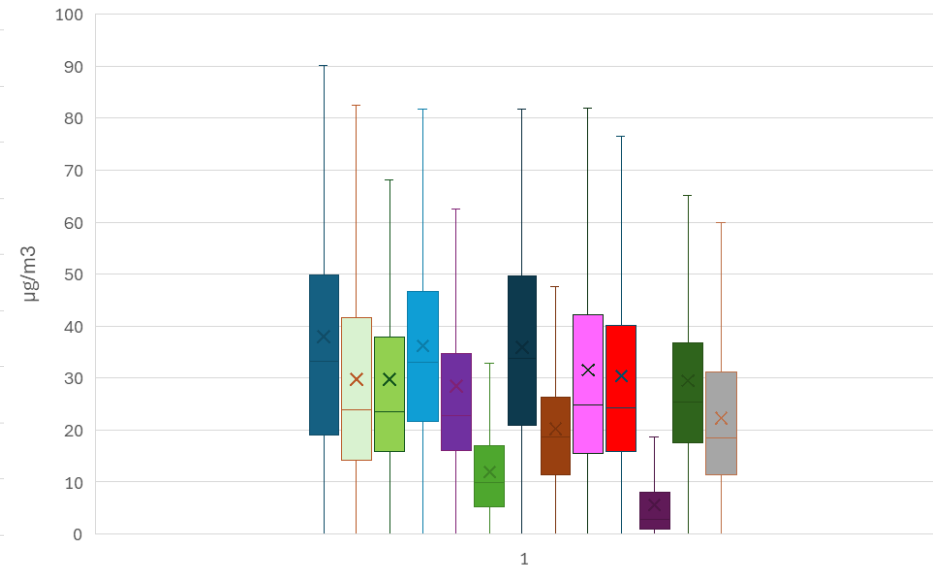
PM10 con tutti i giorni

PM10

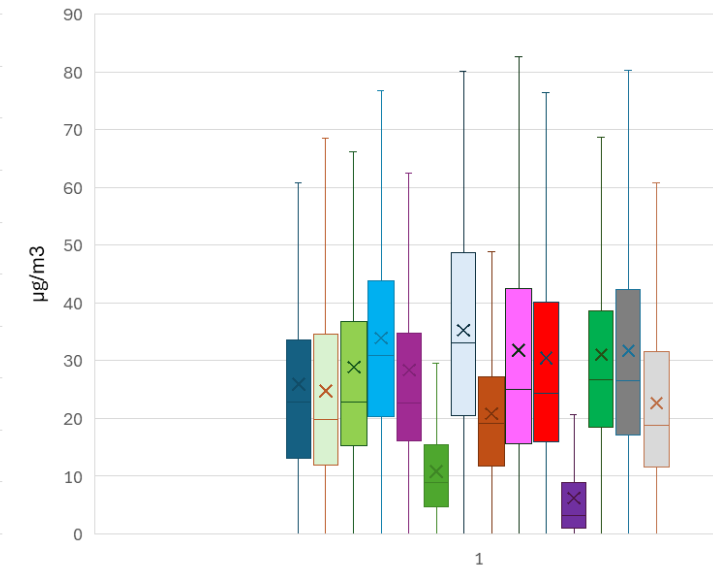


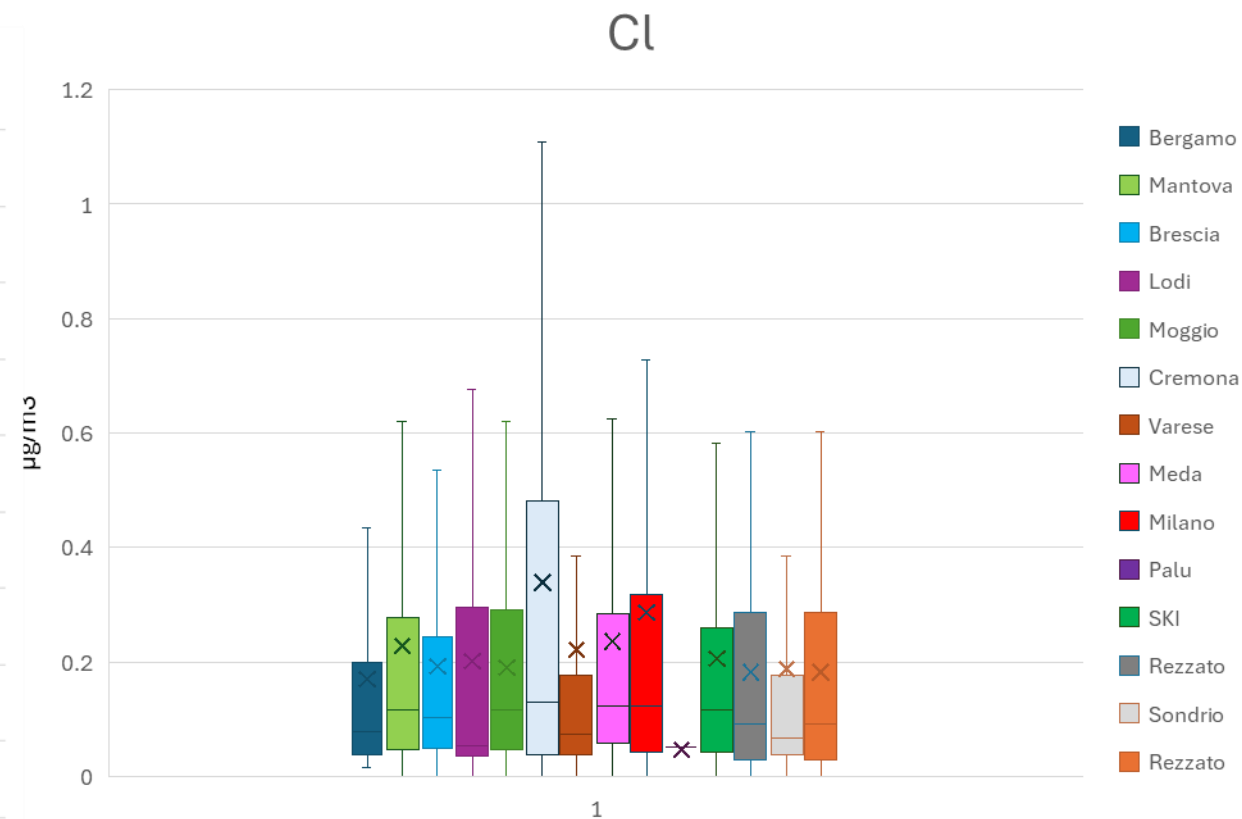
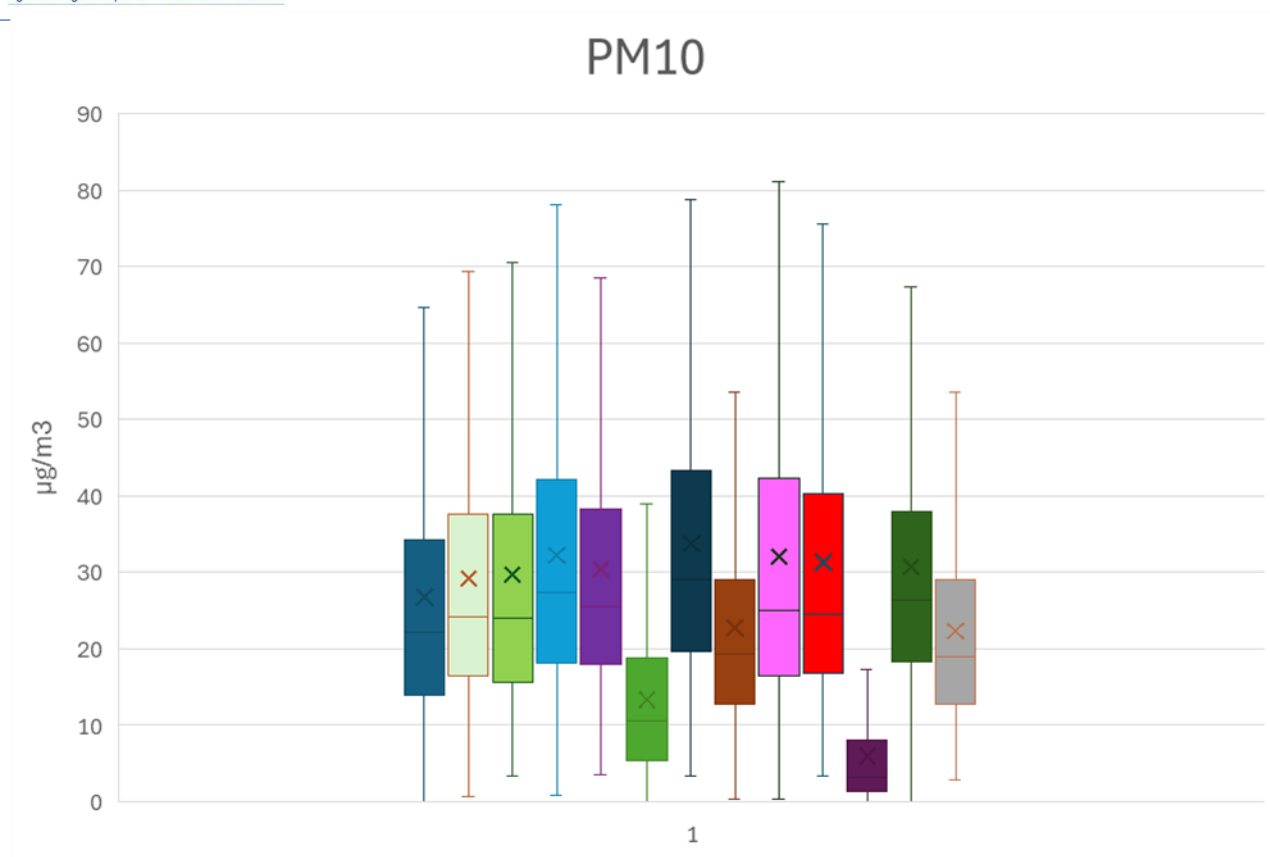
PM10 con solo i giorni delle campagne

PM10



PM10 con solo i giorni delle campagne PM10 riscaldato





Il suolo

