RI-URBANS

Research Infrastructures Services Reinforcing Air Quality Monitoring Capacities in European Urban & Industrial AreaS

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PRESENTING FINAL GUIDANCE DOCUMENTS FOR SERVICE TOOLS

European Commission

HORIZON 2020

RI-URBANS (101036245), Webinar on the Service Tools 16/04/2025

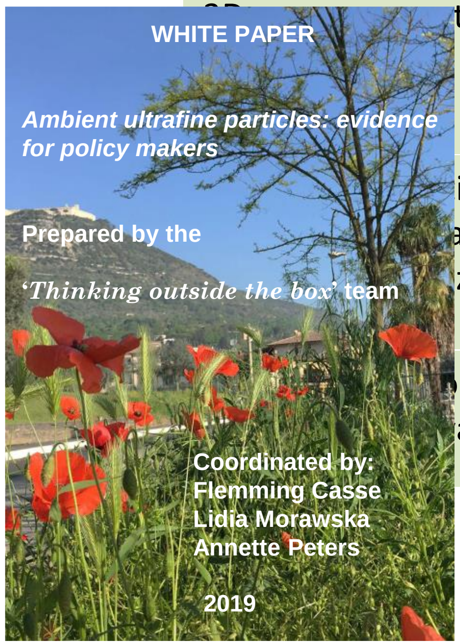
HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

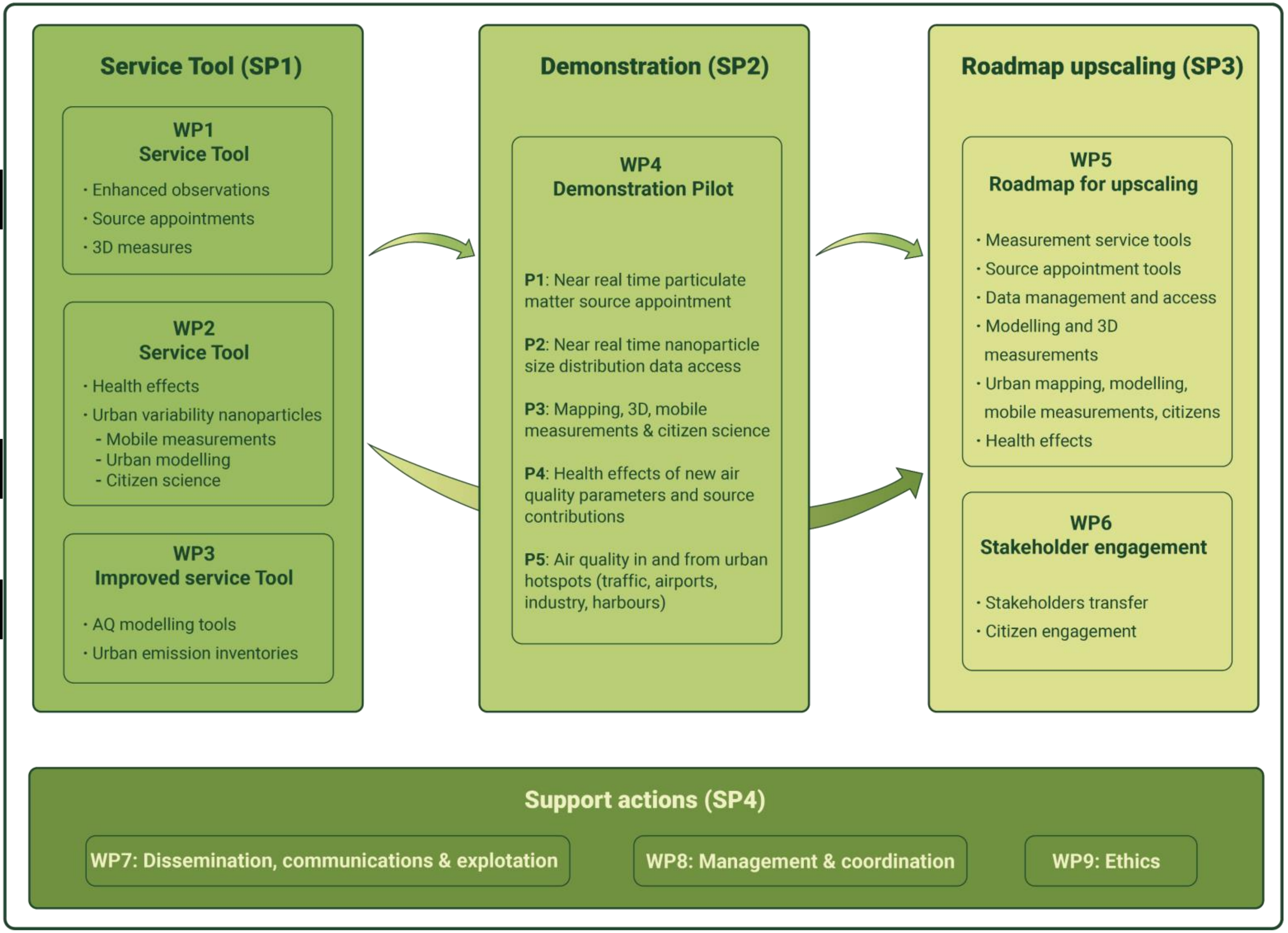
RI URBANS

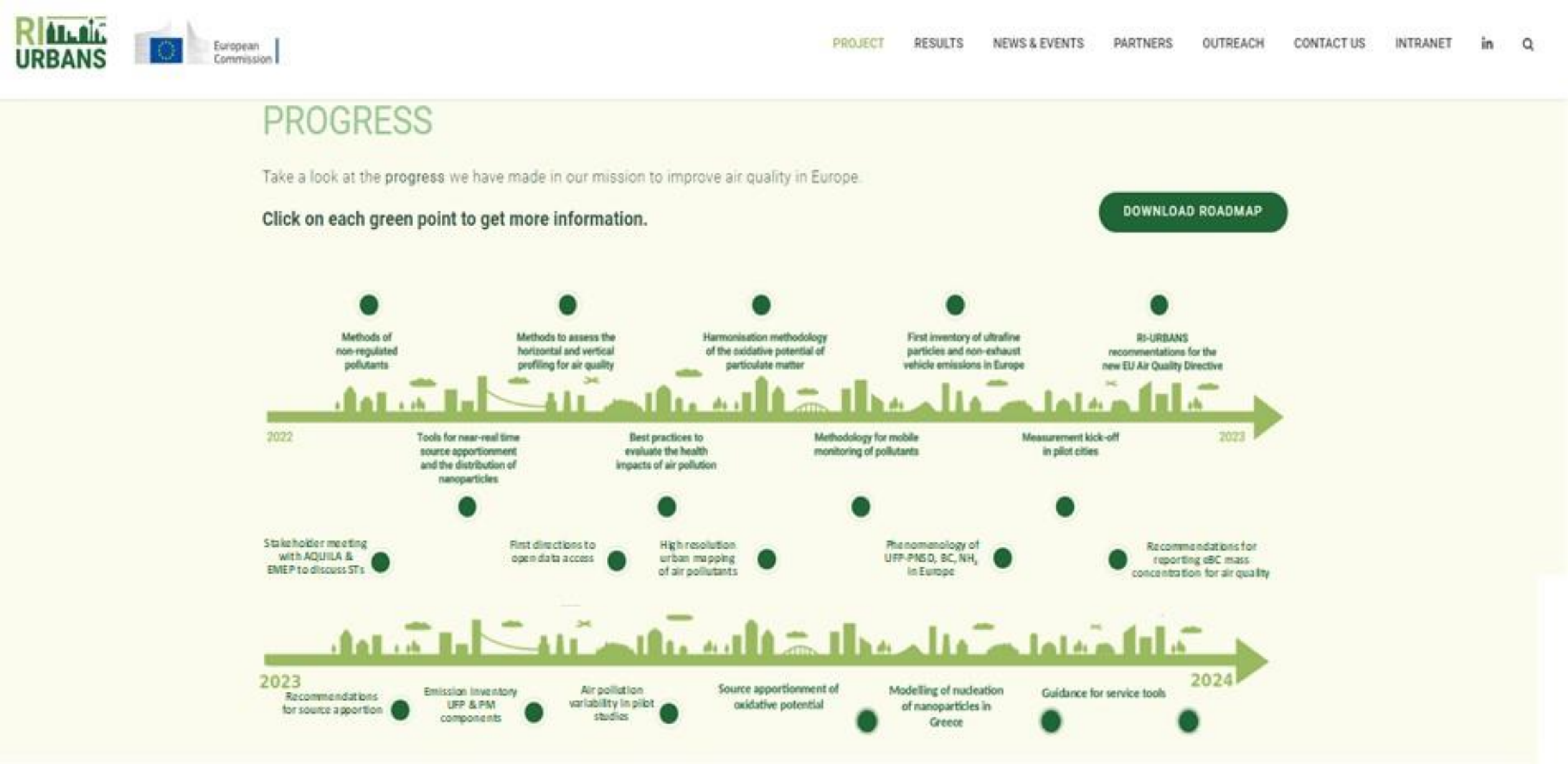
14 countries, 26 beneficiaries, 1 associated beneficiary, starting with 11 cities, 17 associated collaborators
October 2021 – September 2025

RI-URBANS’ concept and service tools

UFP-PNSD
BC
Offline PM speciation
Online PM speciation
Source apportionment
NH_3
VOCs







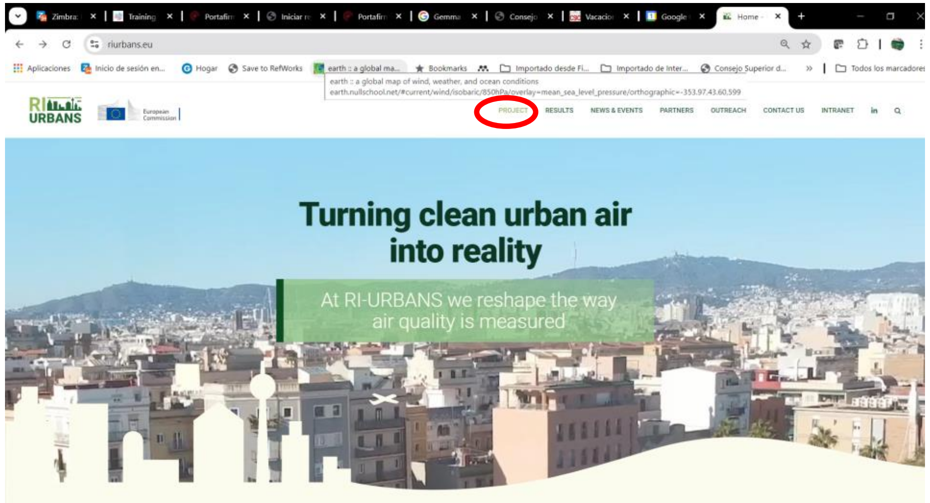
UFP, BC, OP, PM chemistry, VOCs, NH_3, source apportionment mapping, 3D measurements recommended for supersites in 2021 to DG ENV

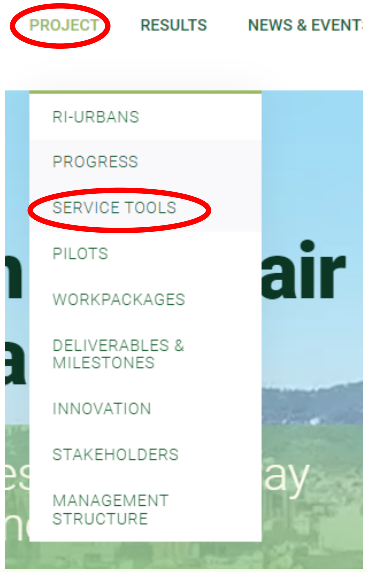
Recommendations sent to the drafts of the new AQD, with ACTRIS

Guidance documents elaborated & openly available, webinars for AQMN experts along 2024 & 2025

RI-URBANS' service tools

https://riurbans.eu/project/#service-tools





Explore all our advanced Service Tools for optimised urban air quality management:

- Protocols for the measurement of novel air quality variables
- Methodologies for vertical profiles of pollutants and meteorology
- Methodologies for source apportionment receptor modelling
- Methodologies for urban mapping of novel air quality variables
- Methodologies for evaluating the health effects of novel air quality variables
- Obtaining emission inventories for novel air quality variables
- Modelling methodologies for novel air quality variables

RI-URBANS' service tools

https://riurbans.eu/project/#service-tools

Protocols for the measurement of novel air quality variables

ST1: Ultrafine (=nano)-Particle Number Size Distributions (UFP-PNSD)

ST2: Black Carbon (BC)

ST3: Offline and Online particulate matter (PM) speciation

ST4: Oxidative potential of particulate matter (PM)

ST5: Volatile Organic Compounds (VOCs)

ST6: Ammonia (NH3)

Methodologies for vertical profiles of pollutants and meteorology

ST7: Measurements of boundary level height

ST8: Measurements of vertical profiles of aerosols

ST9: Measurements of vertical profiles by commercial aircrafts

Methodologies for source apportionment receptor modelling

ST10: Source apportionment of PM based on offline and online PM speciation

ST11: Source apportionment of UFP, BC, OP and VOCs using receptor modelling

Methodologies for urban mapping of novel air quality variables

ST12: Deterministic urban modelling of fine PM and PNC

Methodologies for evaluating the health effects of novel air quality variables

ST14: Evaluation of health effects of novel air quality parameters

Obtaining emission inventories for novel air quality variables

ST15: Emission inventories for regional and urban scale modelling applications

Modelling methodologies for novel air quality variables

ST16: UFP-PNSD multiscale modelling

The advanced air quality variables and RI-URBANS' ST

Article 10 & Annex VII

Table 1 - Pollutants to be measured at supersites at urban [background] locations

Pollutant	*Type of measurement*
PM_{10}, $PM_{2.5}$, UFP, BC	*Fixed measurements*
NO_2, O_3	*Fixed measurements*
SO_2, CO	*Fixed or indicative measurements*
Size distribution of UFP	*Fixed or indicative measurements*
Benzo(a)pyrene, other polycyclic aromatic hydrocarbons (PAH) as relevant (1)	*Fixed or indicative measurements*
Total deposition (2) of benzo(a)pyrene, and other polycyclic aromatic hydrocarbons (PAH) as relevant	*Fixed or indicative measurements*
Arsenic, cadmium, lead, and nickel	*Fixed or indicative measurements*
Total deposition (2) of arsenic, cadmium, lead, nickel and mercury	*Fixed or indicative measurements*
Benzene	*Fixed or indicative measurements*
Chemical composition of $PM_{2.5}$ in accordance with Section 1 of Annex VII	*Fixed or indicative measurements*

Table 2 - Pollutants to be measured at supersites at rural background locations

Pollutant	*Type of measurement*
PM_{10}, $PM_{2.5}$, UFP, BC	*Fixed measurements*
NO_2, O_3 and ammonia (NH_3)	*Fixed measurements*
SO_2, CO	*Fixed or indicative measurements*
Total deposition of benzo(a)pyrene and other polycyclic aromatic hydrocarbons (PAH) as relevant	*Fixed or indicative measurements*
Total deposition of arsenic, cadmium, lead, nickel and mercury	*Fixed or indicative measurements*
Benzo(a)pyrene, other polycyclic aromatic hydrocarbons (PAH) as relevant (1)	*Fixed or indicative measurements*
Arsenic, cadmium, lead, and nickel	*Fixed or indicative measurements*
Chemical composition of $PM_{2.5}$ in accordance with Section 1 of Annex VII	*Fixed or indicative measurements*
Total gaseous mercury	*Fixed or indicative measurements*

(1) *benzo(a)pyrene and the other polycyclic aromatic hydrocarbons referred to in Article 9(8)*

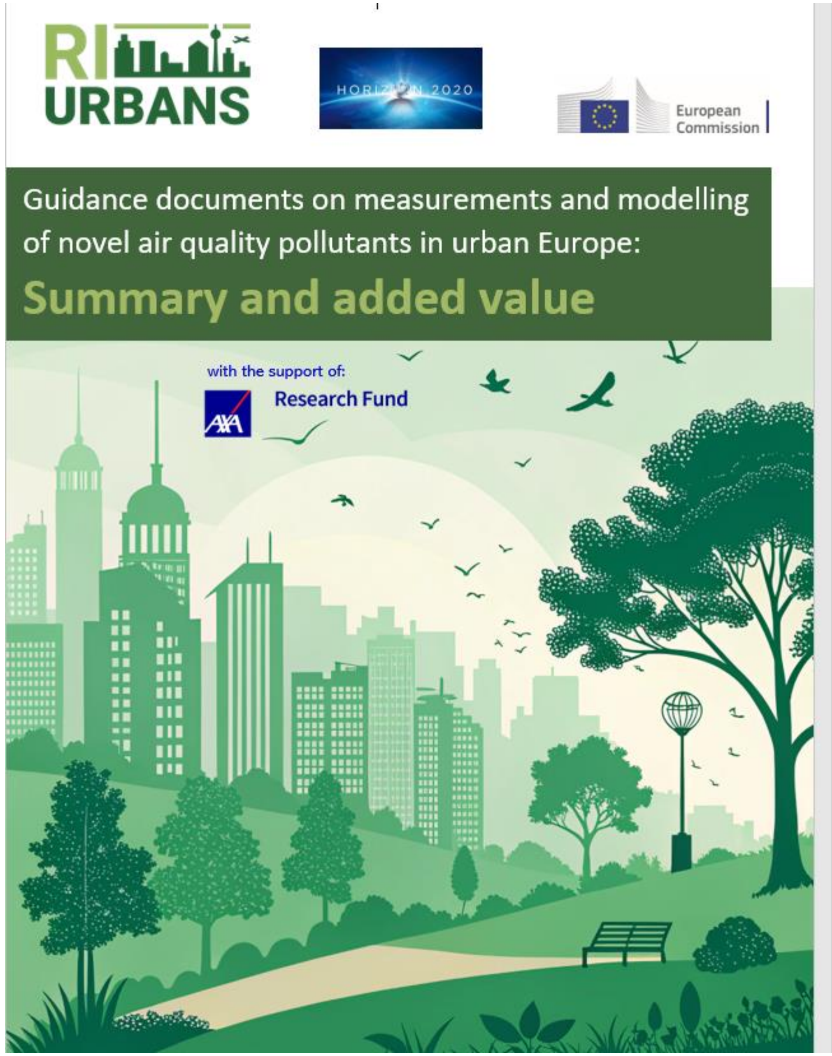
Table 3 - Pollutants recommended to be measured at supersites at urban and rural locations if not covered by the requirements of Tables 1 and 2

Pollutant	*Type of measurement*
Size distribution of UFP	*Fixed or indicative measurements*
Particulate matter oxidative potential	*Fixed or indicative measurements*
Total deposition of benzo(a)pyrene and other polycyclic aromatic hydrocarbons (PAH) as relevant	*Indicative measurements*
Ammonia (NH3)	*Fixed or indicative measurements*
Levoglucosan to be measured as part of the chemical composition of PM2.5	*Fixed or indicative measurements*
Total gaseous mercury	*Fixed or indicative measurements*
Particulate and gaseous divalent mercury	*Fixed or indicative measurements*
Nitric acid	*Fixed or indicative measurements*

In many cases following WHO (2021) recommendations, in others support assessing policies

The 16 RI-URBANS’ ST & the booklet

The RI-URBANS' booklet



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Authors & Reviewers: See Table 2.2.

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Research Infrastructures Services Reinforcing Air Quality Monitoring Capacities in European Urban & Industrial AreaS (RI-URBANS)

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The RI-URBANS' booklet

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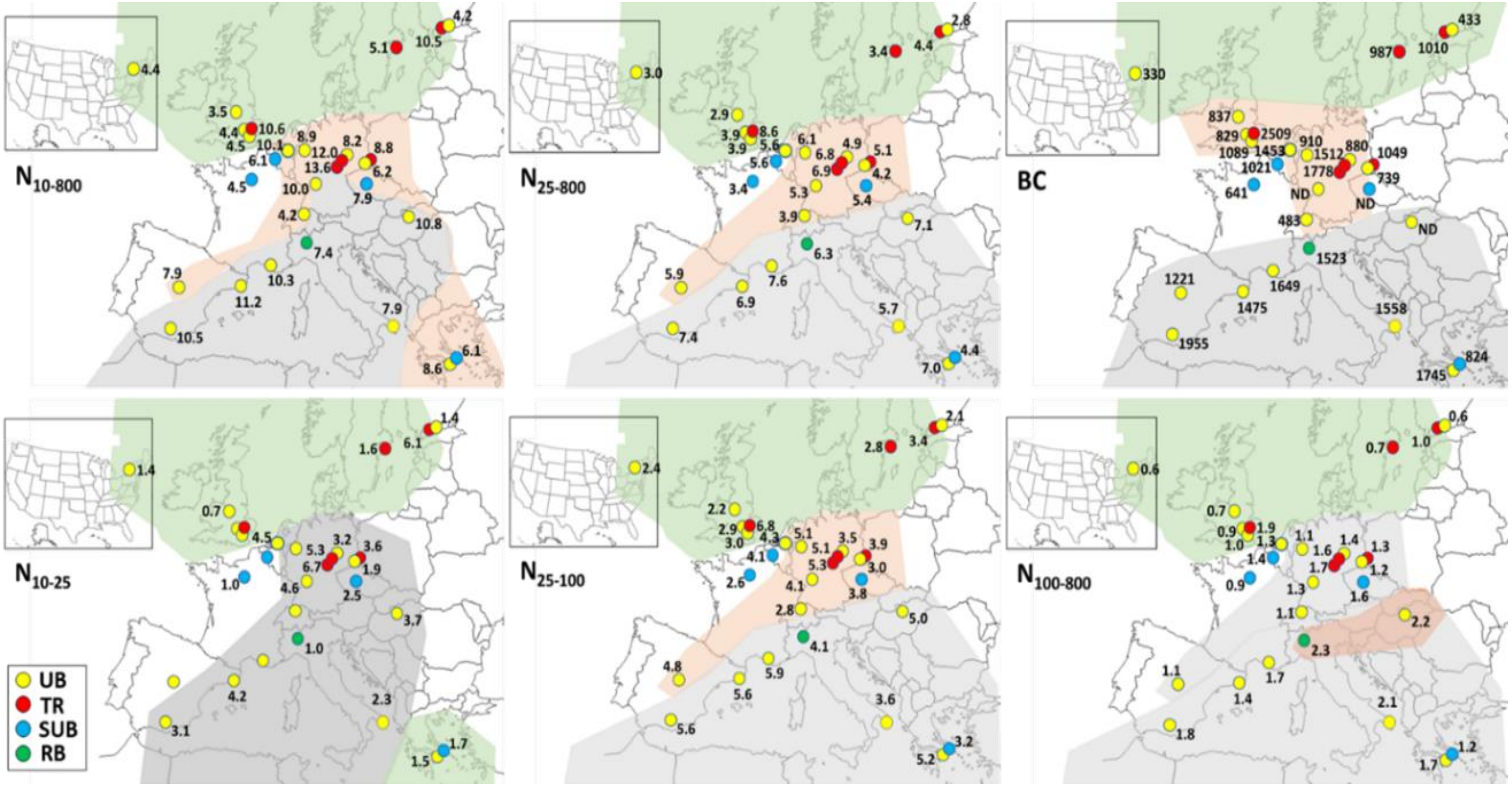
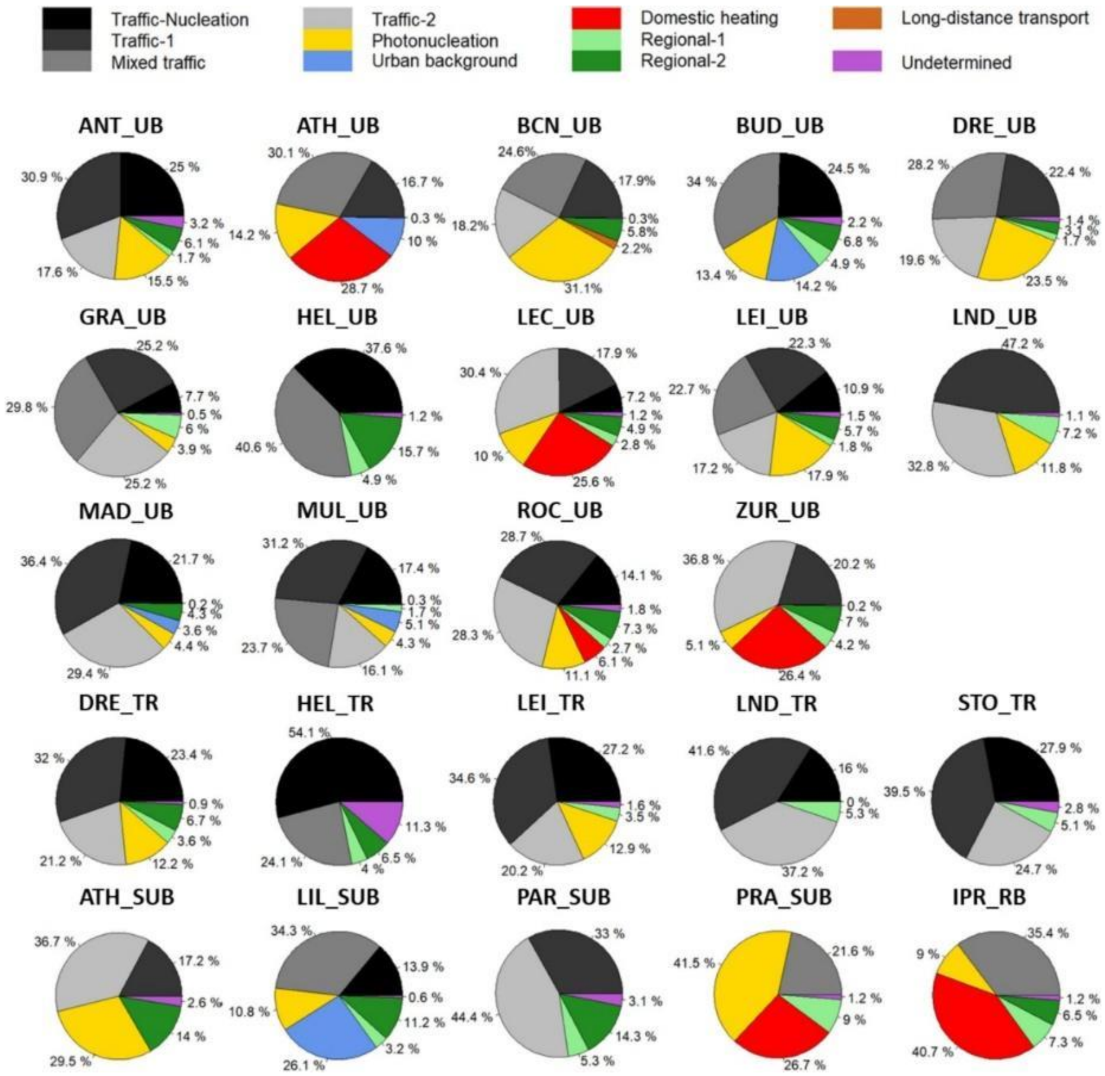


Trechera et al., 2023, ENV INT

Source apportionment of ultrafine particles and PNSD

ST11

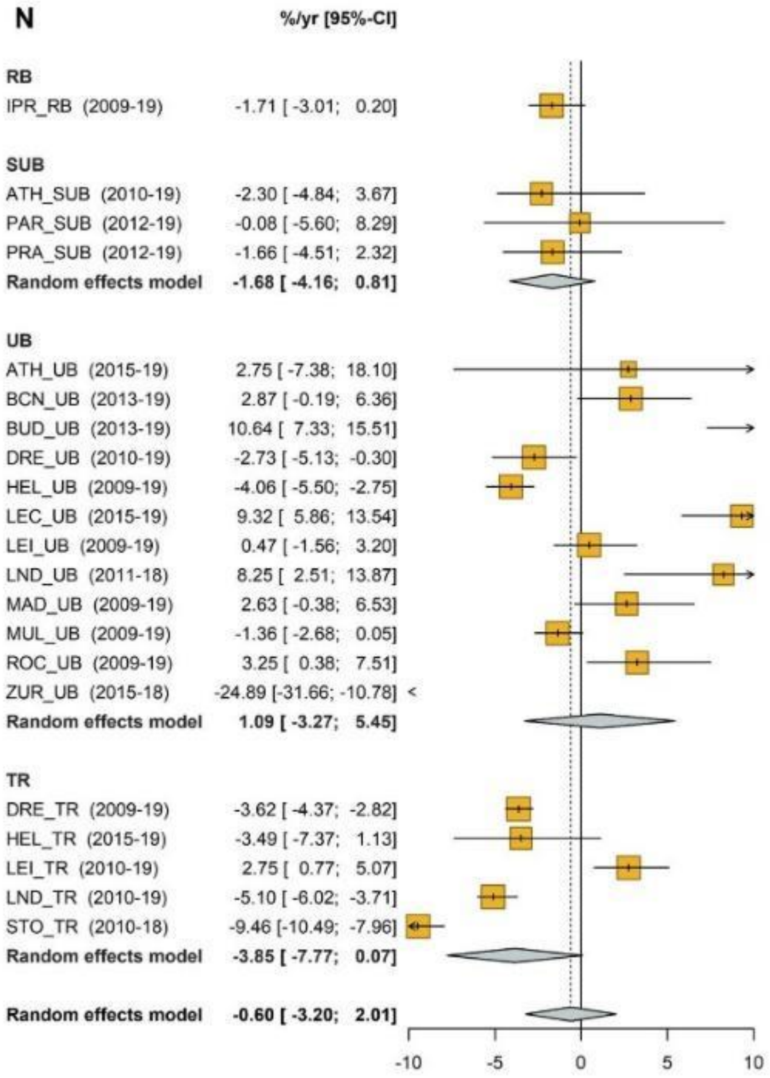
Garcia-Marlès et al., 2024a, ENV INT

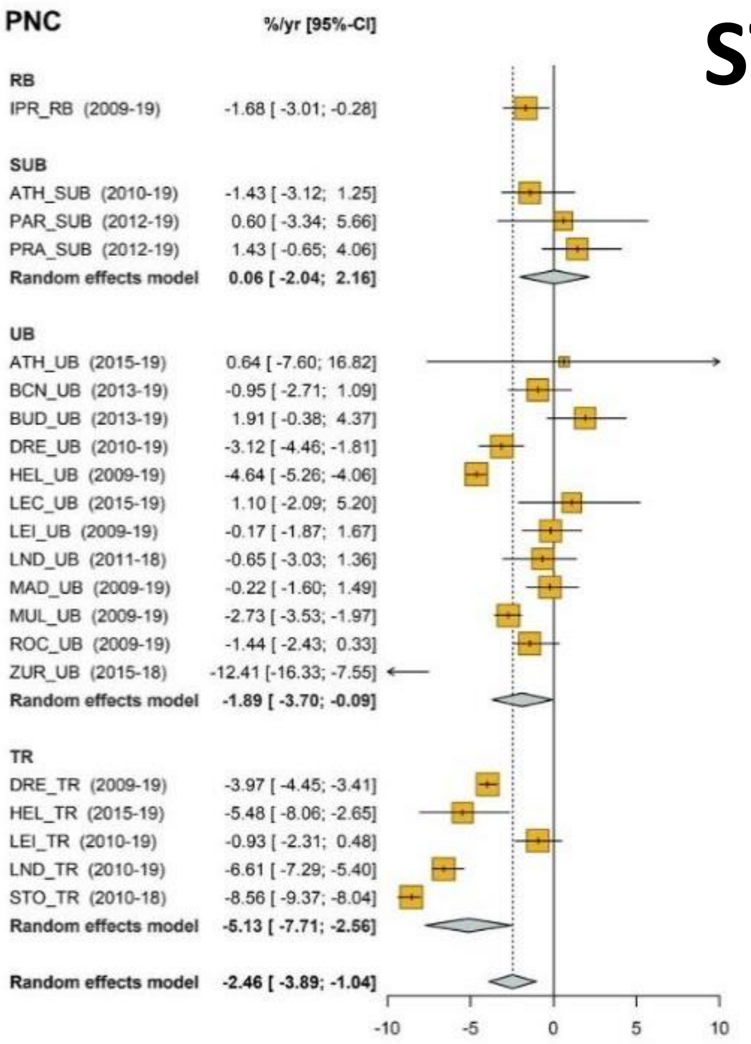


The trends of ultrafine particles and PNSD in urban Europe

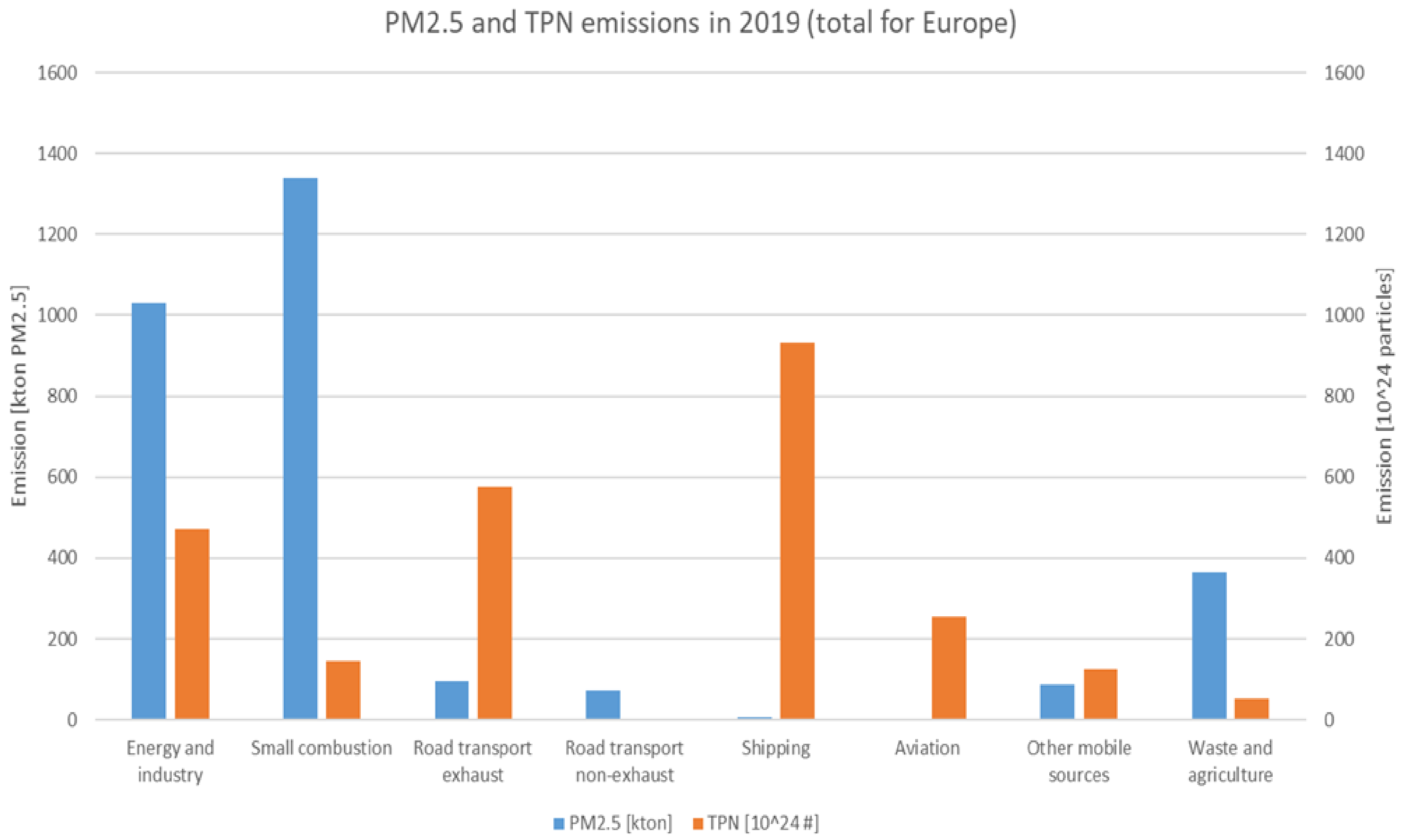
Garcia-Marlès et al., 2024b, ENV INT

ST1 &11



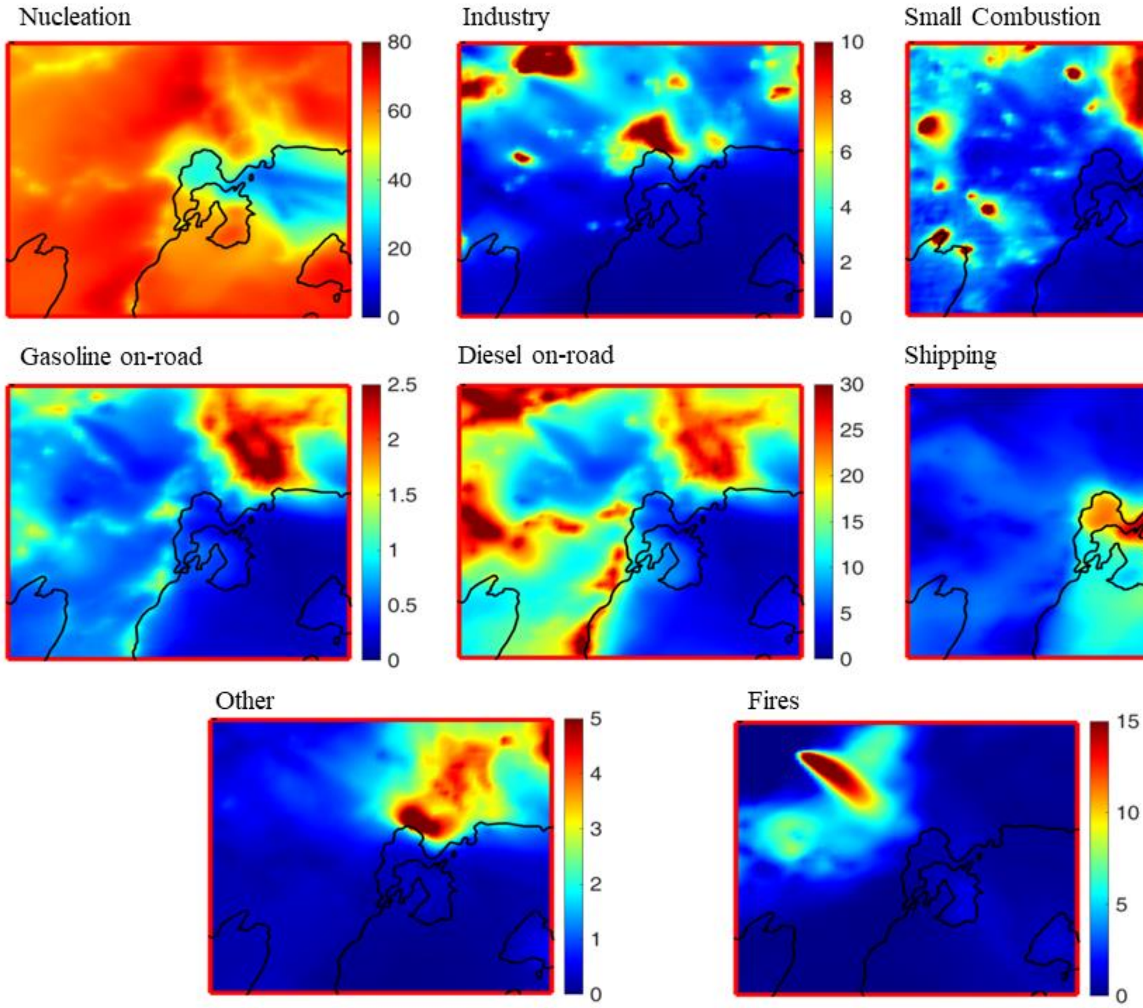


Emission inventory of ultrafine particles and PNSD in Europe
ST15



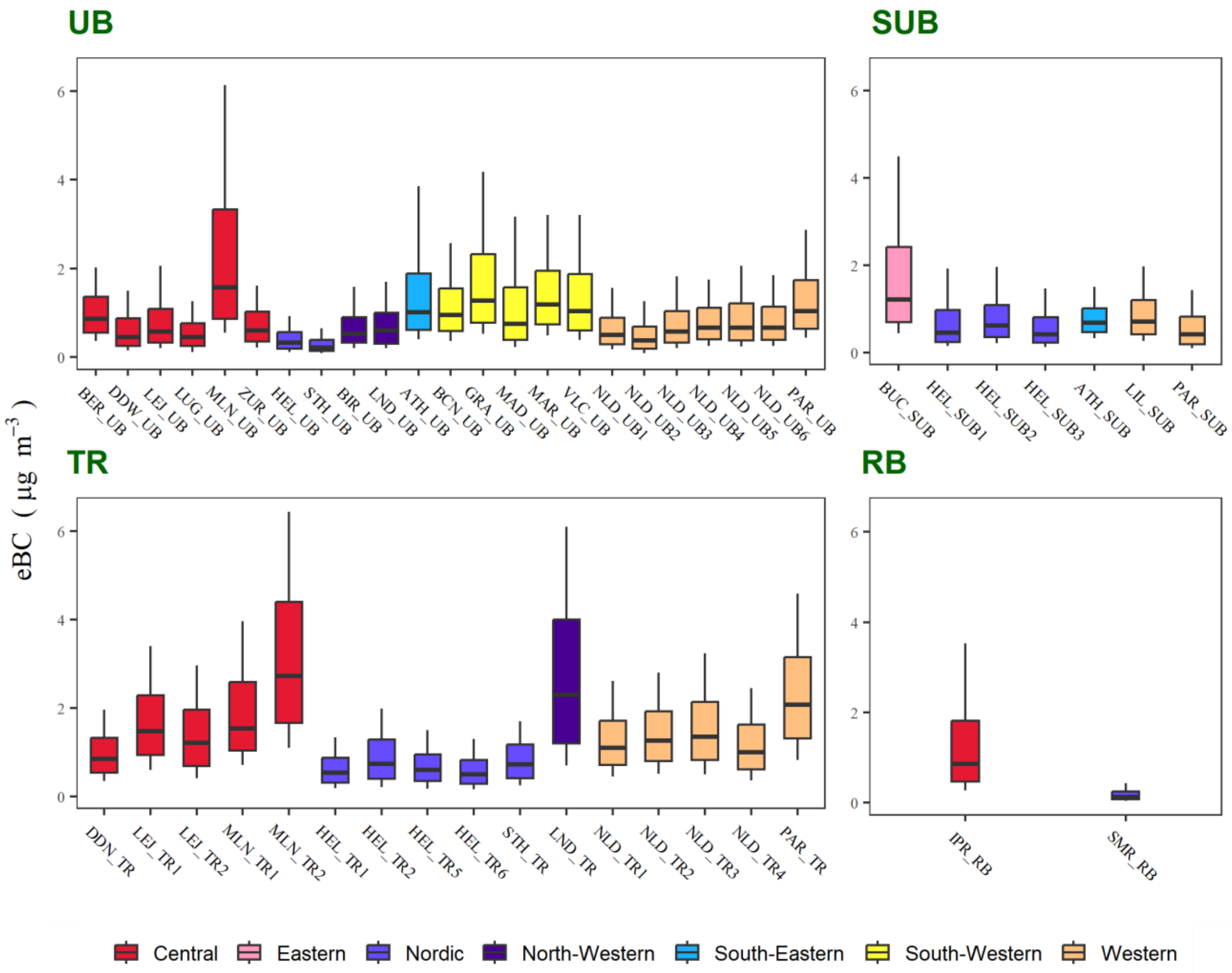
Multiscale modelling of ultrafine particles in Europe

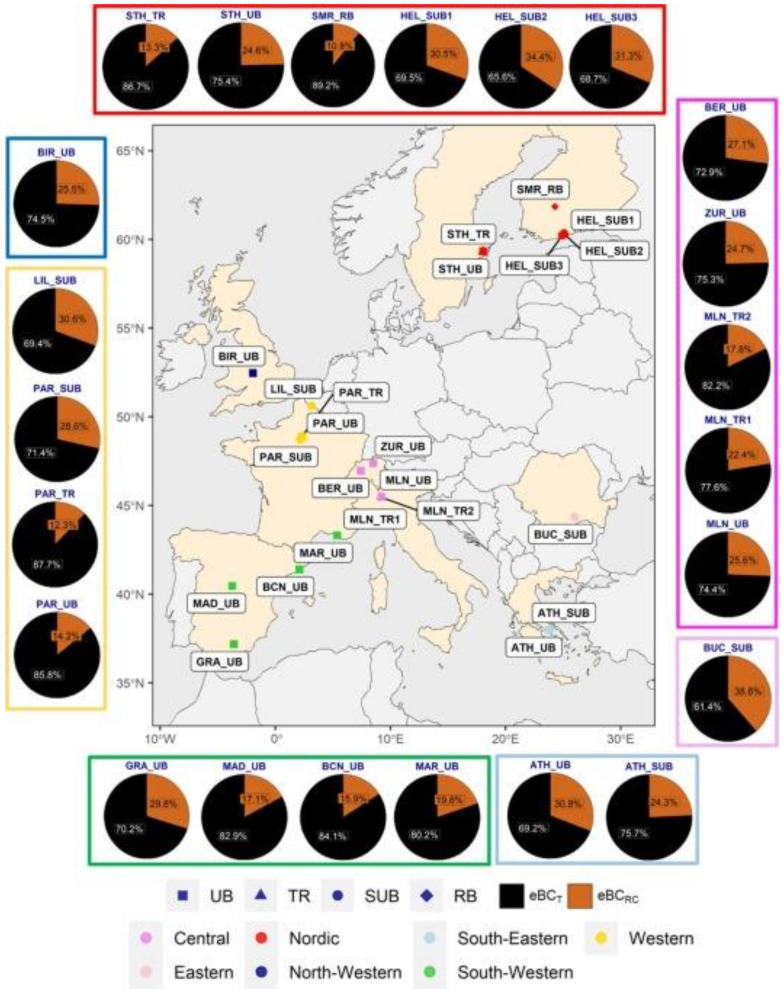
ST16



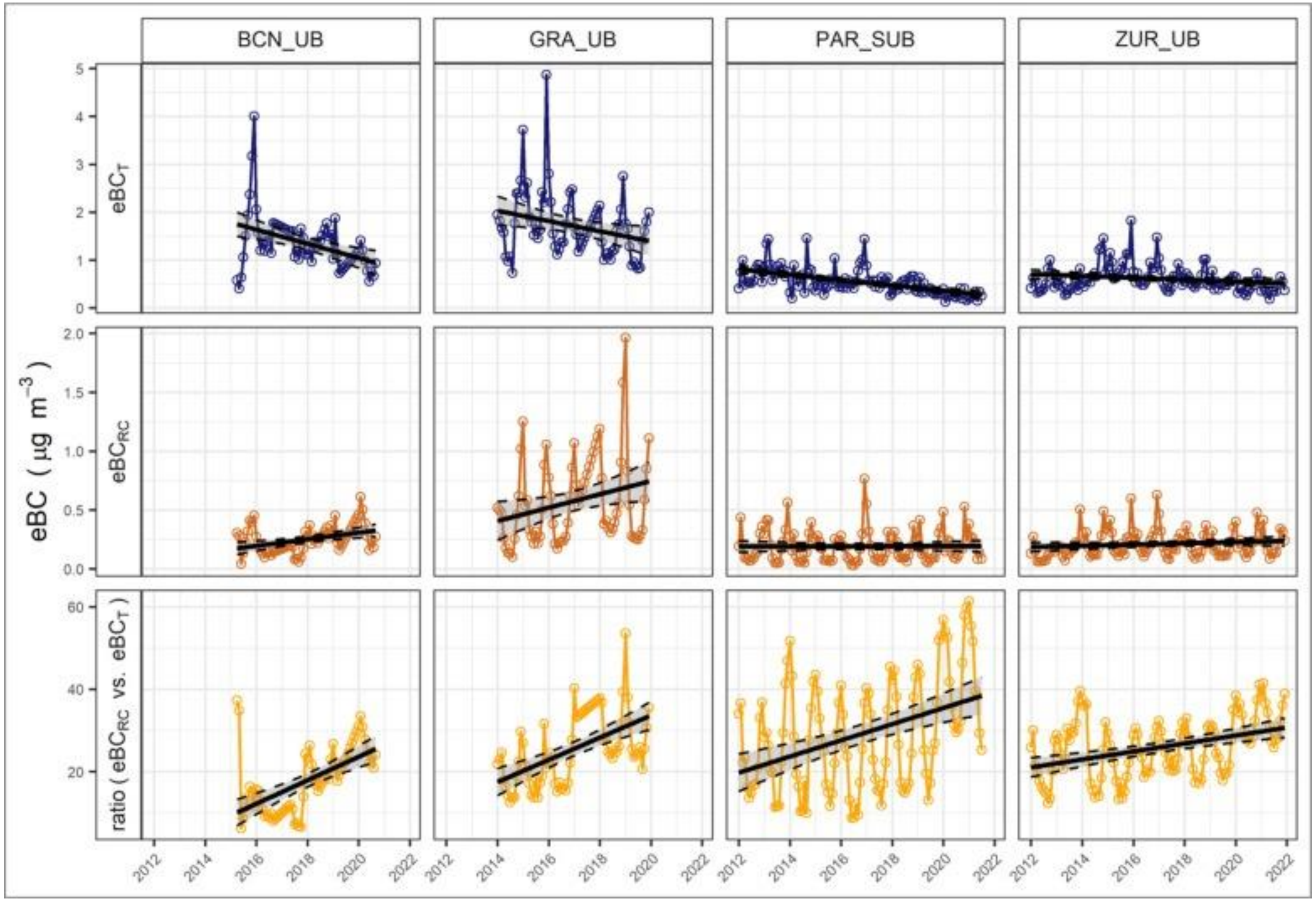
Black carbon in Urban Europe

ST2 & 11





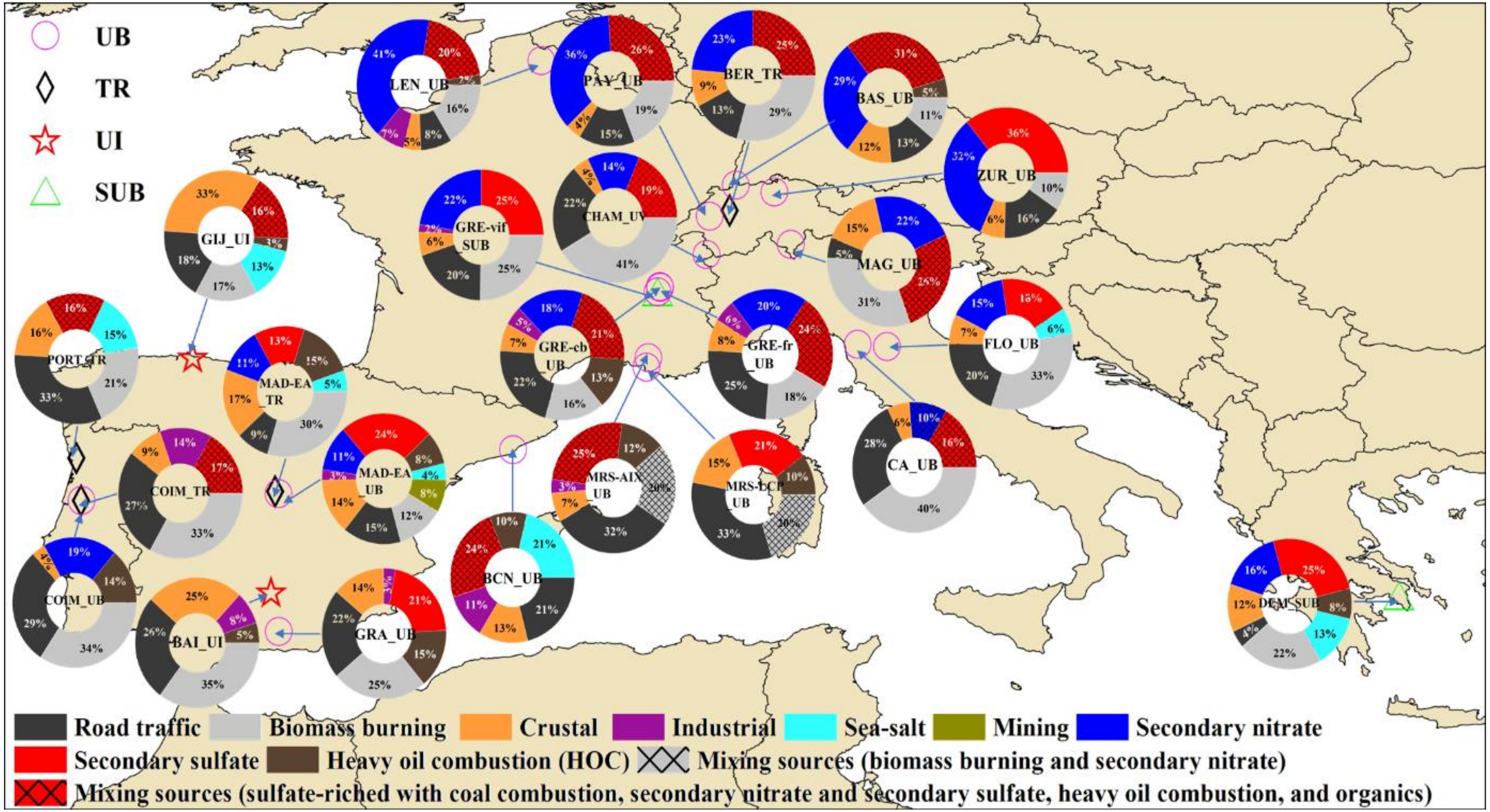
Trends and source contributions of black carbon in Europe



ST2 & 11

PM speciation and source contributions in urban Europe

ST3 & 10



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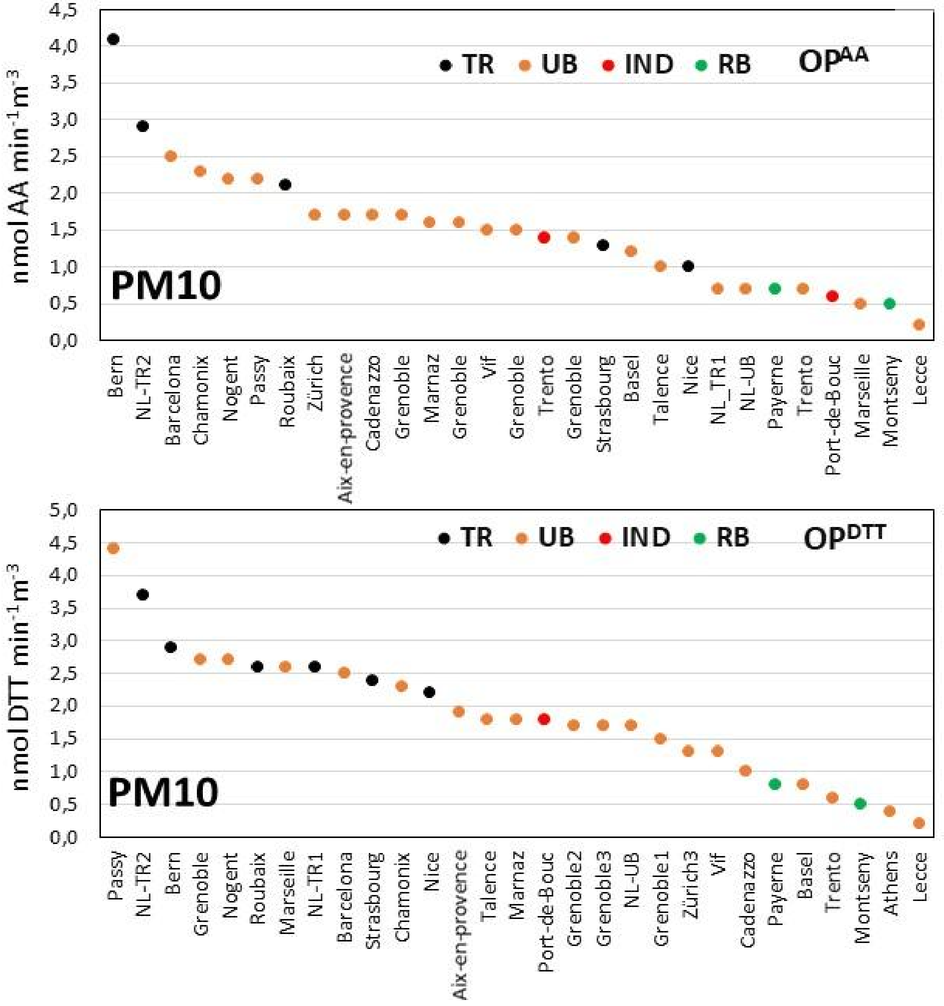
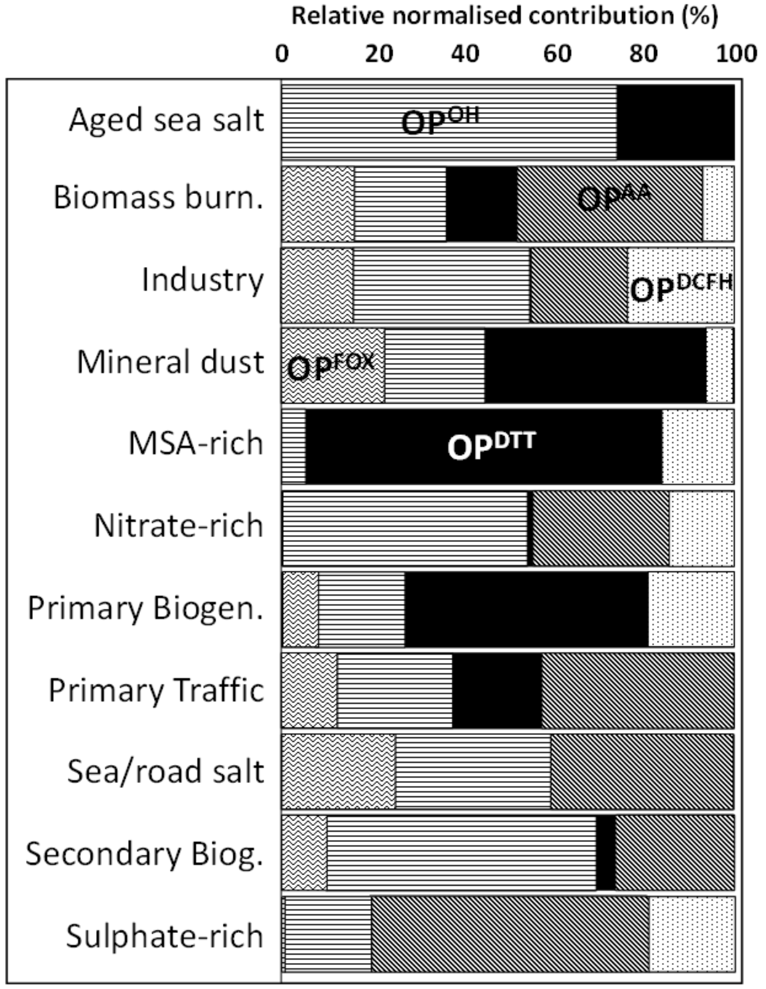
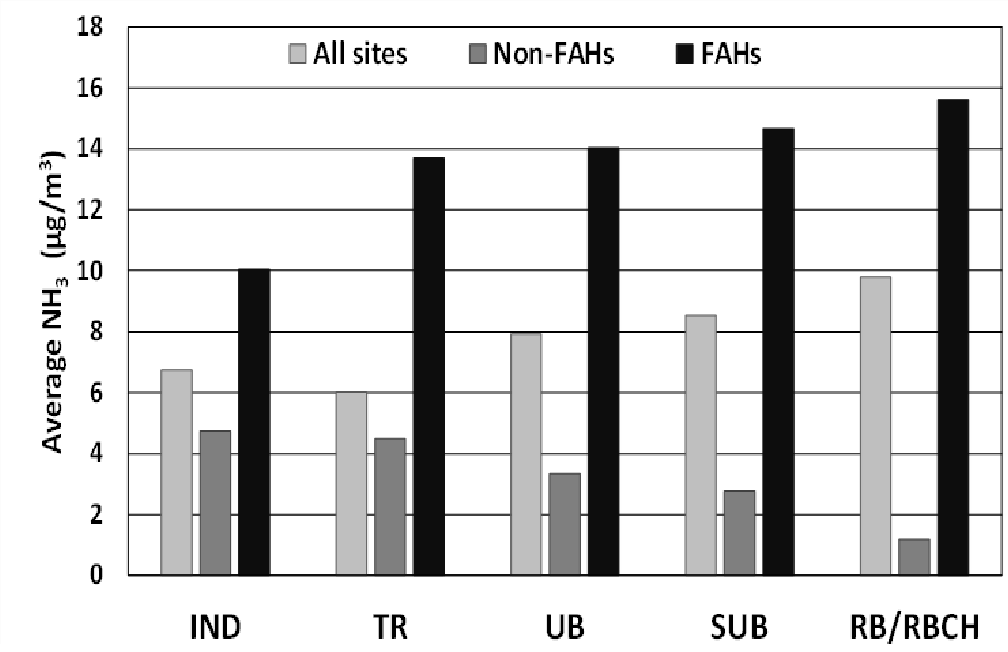
Measurements and source contribution to OP in urban Europe ST4 &11

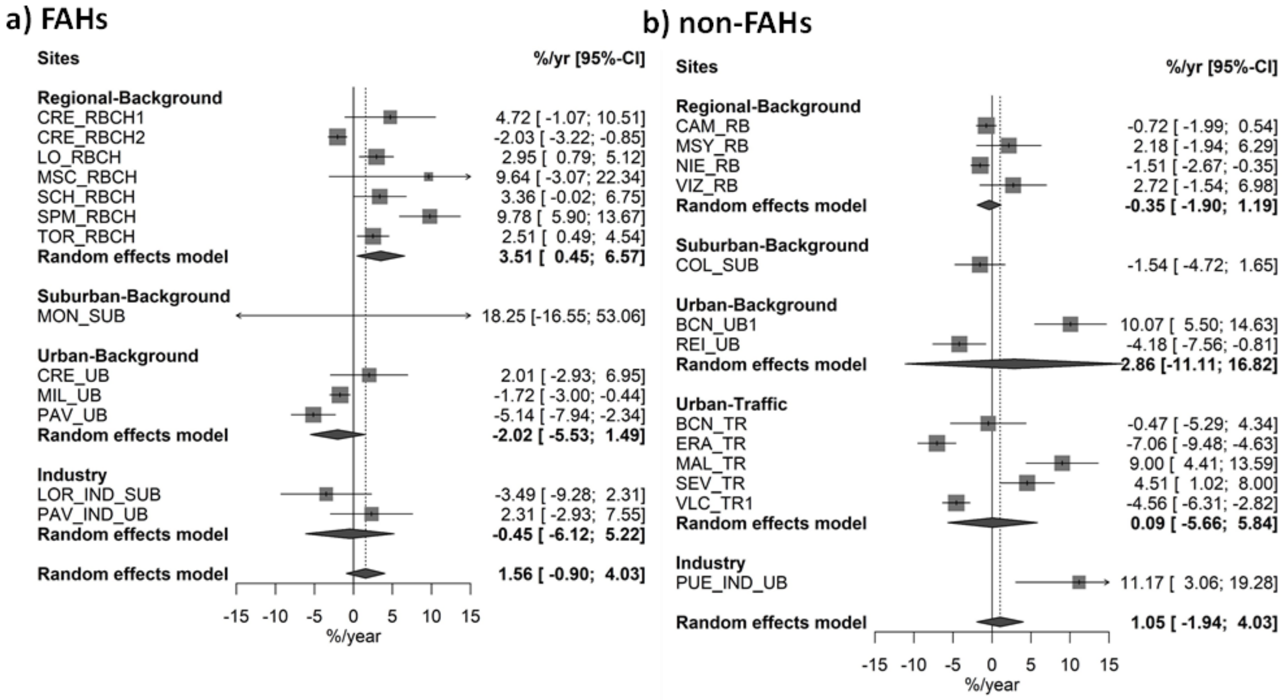




Dominutti et al., 2023. Environmental Science: Atmospheres

Concentrations and trends of NH_3 in Europe






Ultrafine particles / size distribution
Black Carbon (BC) determinations
PM (offline and online) speciation
Atmospheric boundary layer dynamics
Urban mapping & citizen science
Modelling health effects of novel AQ parameters
Emission inventories for regional & urban scale modelling applications
Ultrafine particles modelling
Vertical profiles of aerosols
Ammonia (NH_3)
Oxidative potential of particulate matter
Volatile organic compounds
Source Apportionment Techniques For PM
IAGOS profiles of AQ parameters
Source apportionment of eBC, UFP, OP and VOCs
Deterministic urban modelling: PM & PN

Accesss to RI-URBANS Progress, open data, STs

https://riurbans.eu/#progress
https://riurbans.eu/results/#open-data
https://riurbans.eu/project/#service-tools
https://riurbans.eu/results/#publications

16th April Webinar to present these

Thank you very much for your attention!!

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