

RI-URBANS

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



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UNECE Air Convention (LRTAP)
6th Expert Panel on Clean Air in Cities (EPCAC)
18-19 November 2025



EPCAC, 19th November 2025

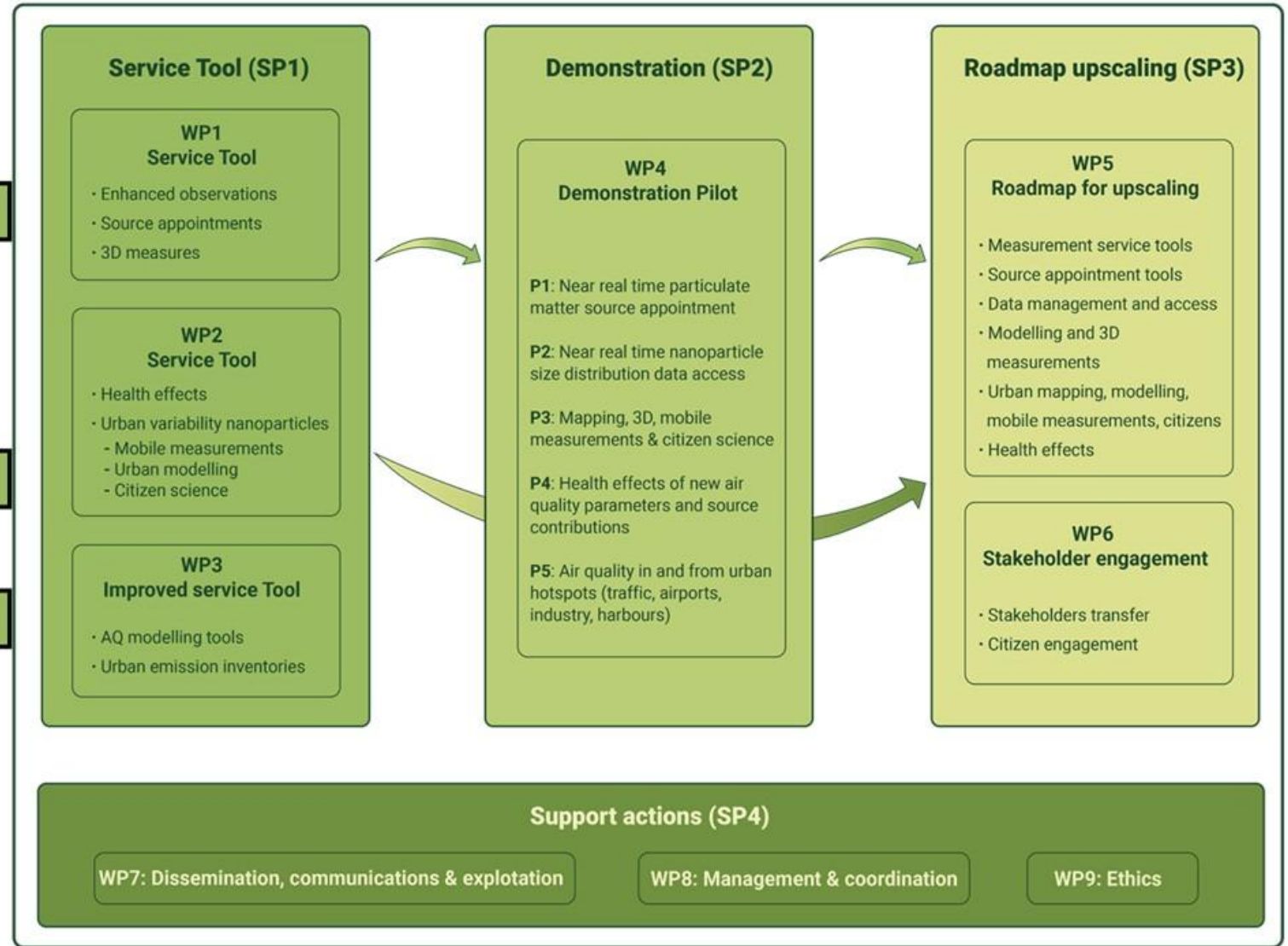
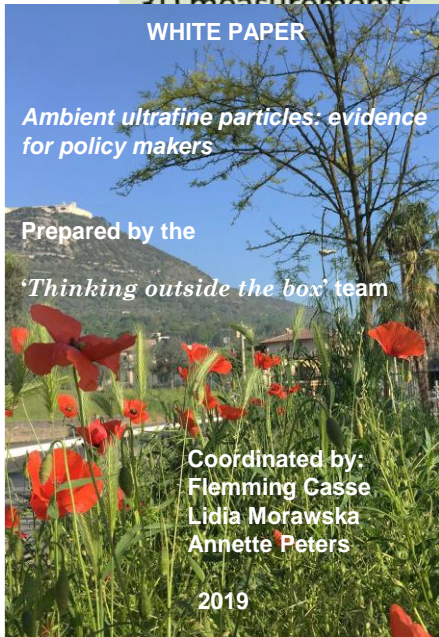


14 countries, 26 beneficiaries, 1 associated beneficiary, starting with 11 cities, 19 associated collaborators
 October 2021 – September 2025



RI-URBANS' concept and service tools

UFP-PNSD
 BC
 Offline PM speciation
 Online PM speciation
 Source apportionment
 NH₃
 VOCs
 3D measurements



RI-URBANS' service tools

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

Summary booklet

Summary booklet

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

ST13: Mapping ultrafine particles and citizen science

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

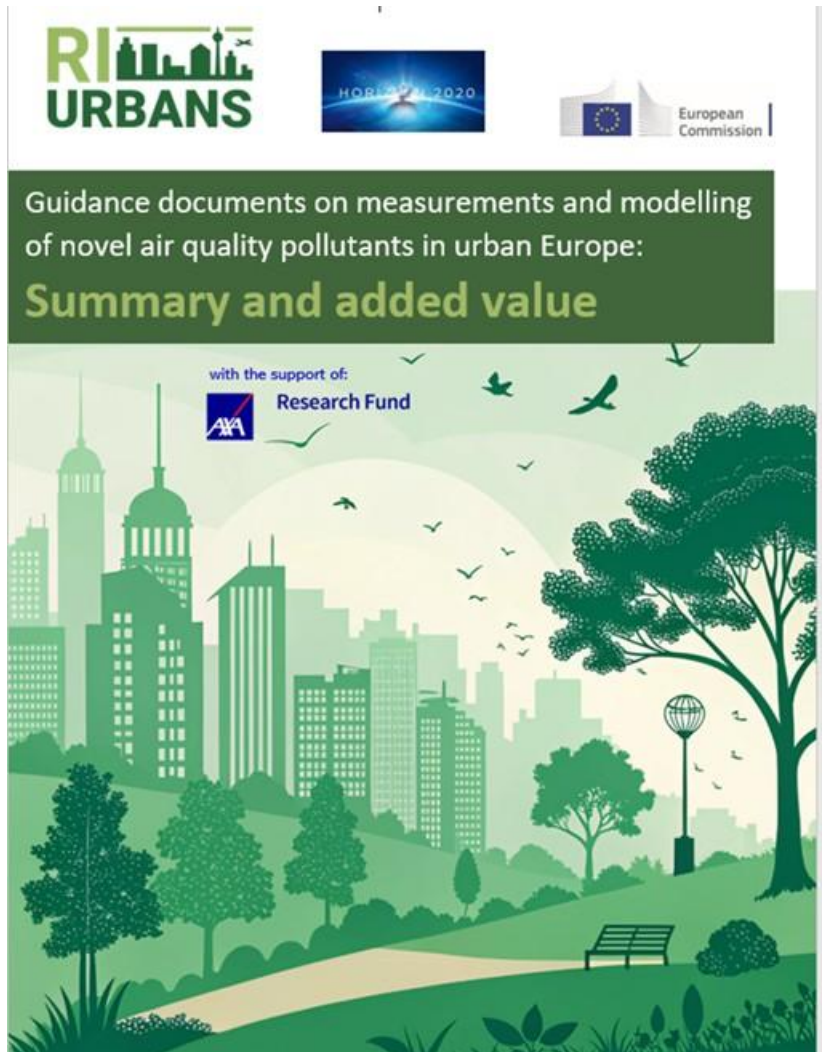
ST16: UFP-PNSD multiscale modelling

The 16 RI-URBANS' ST & the booklet

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



The RI-URBANS' booklet



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

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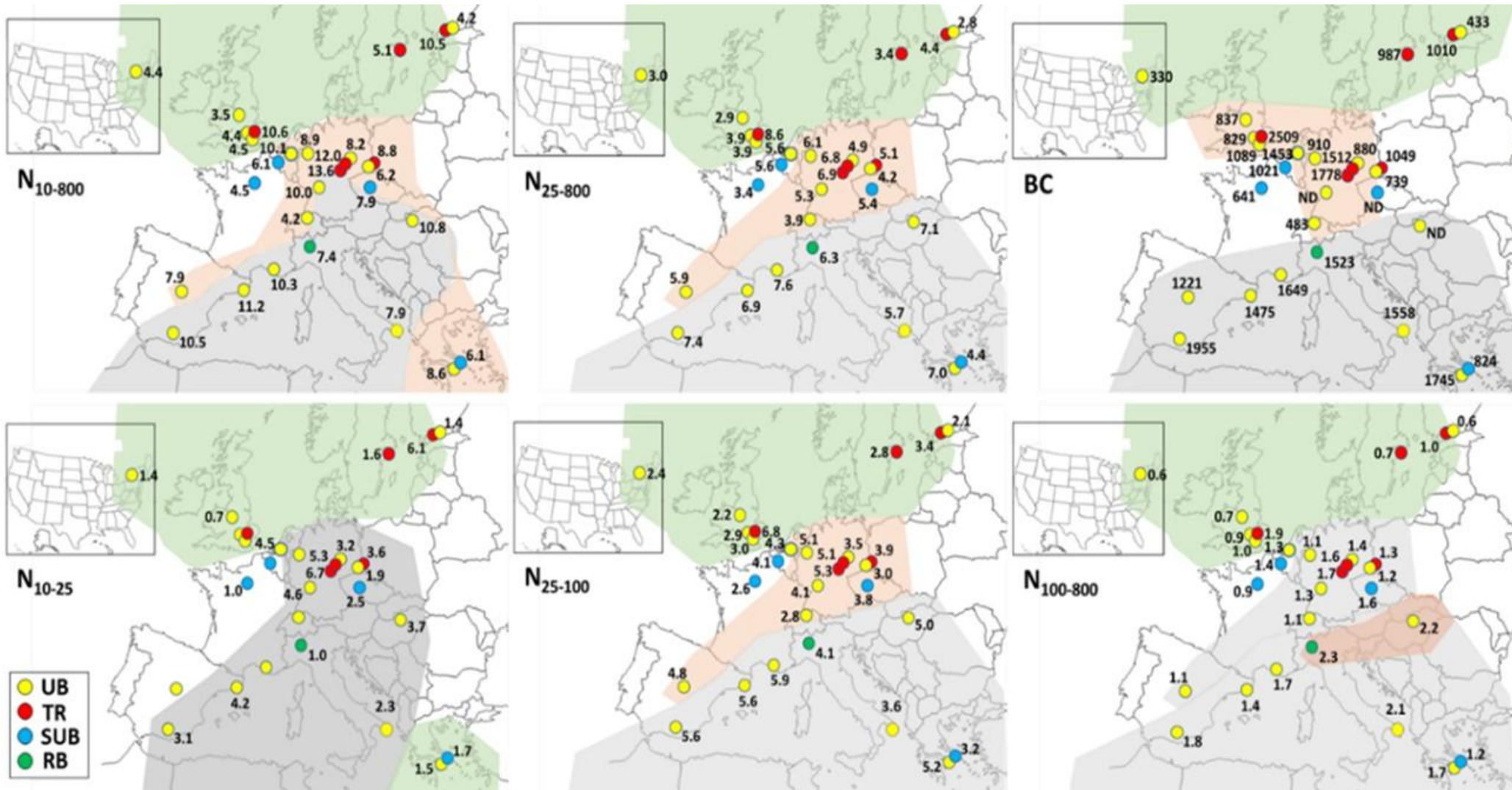


The RI-URBANS' booklet

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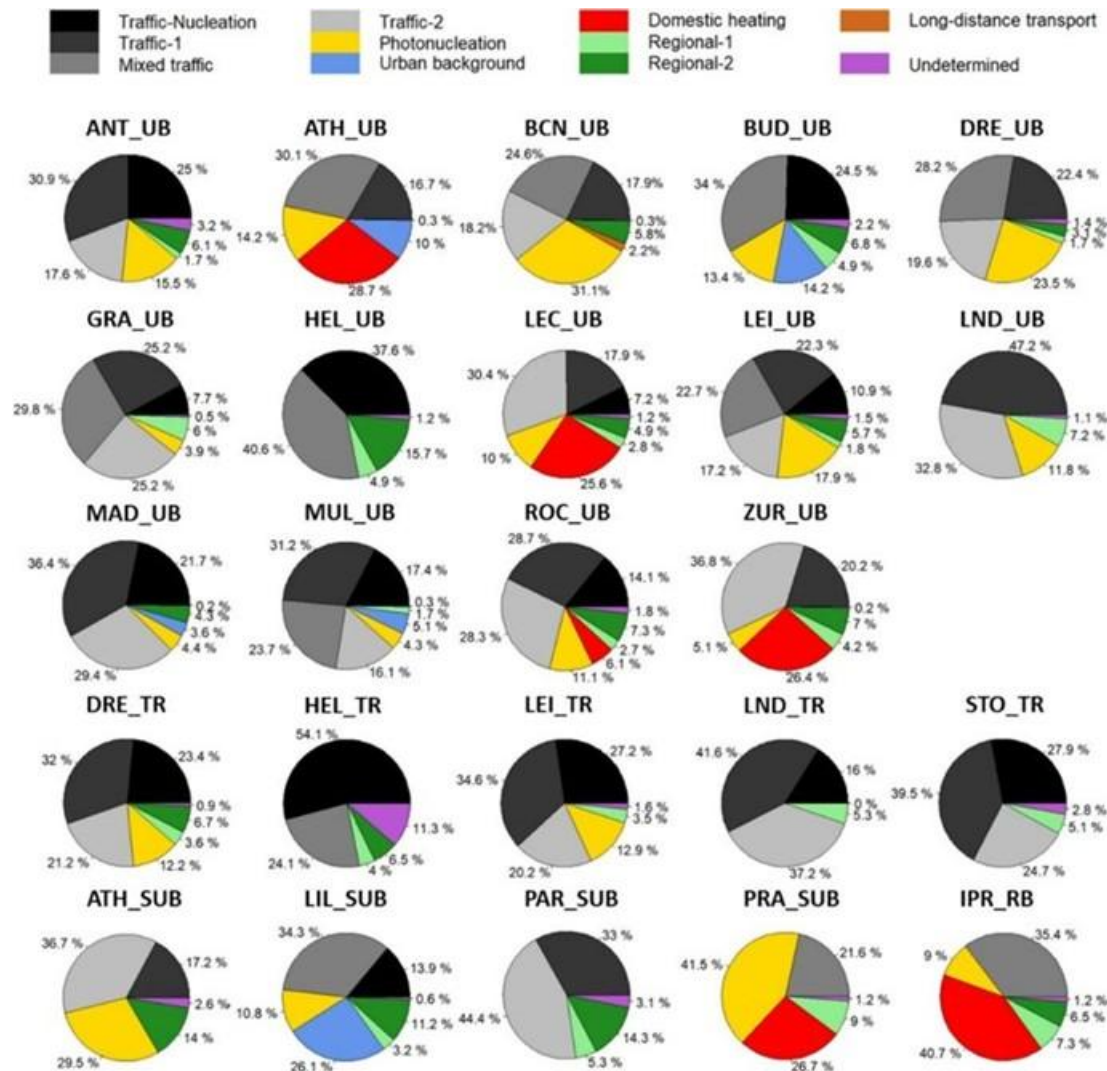
Ultrafine particles and PNSD in urban Europe ST1



Trechera et al., 2023, ENV INT, <https://doi.org/10.1016/j.envint.2023.107744>

Source apportionment of ultrafine particles and PNSD

ST11

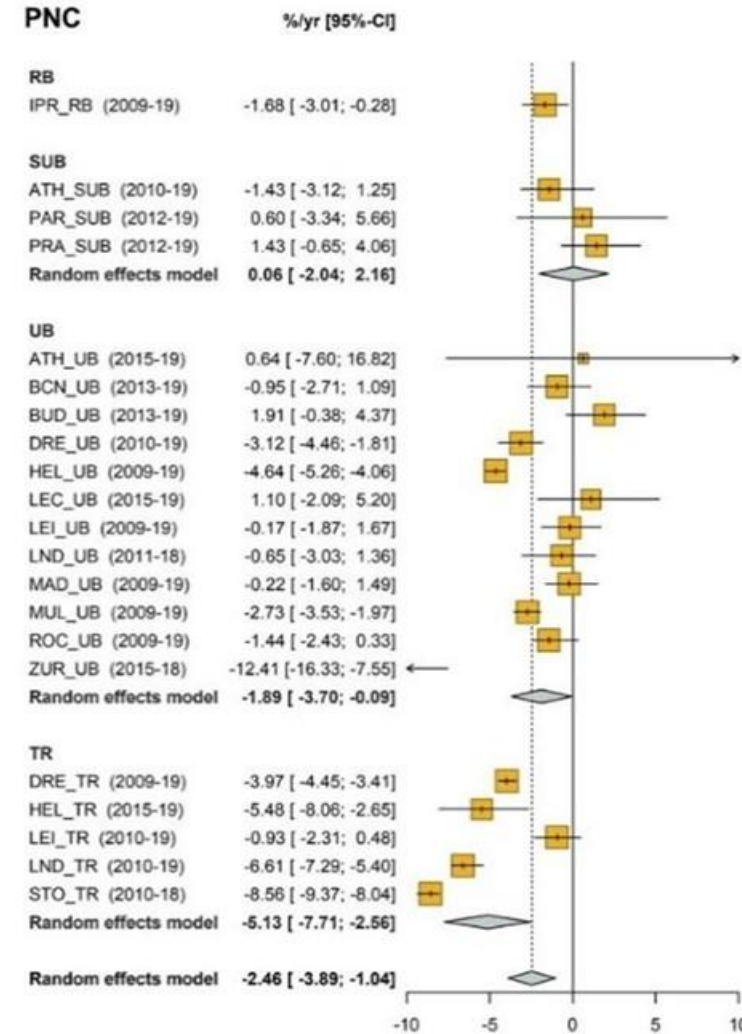
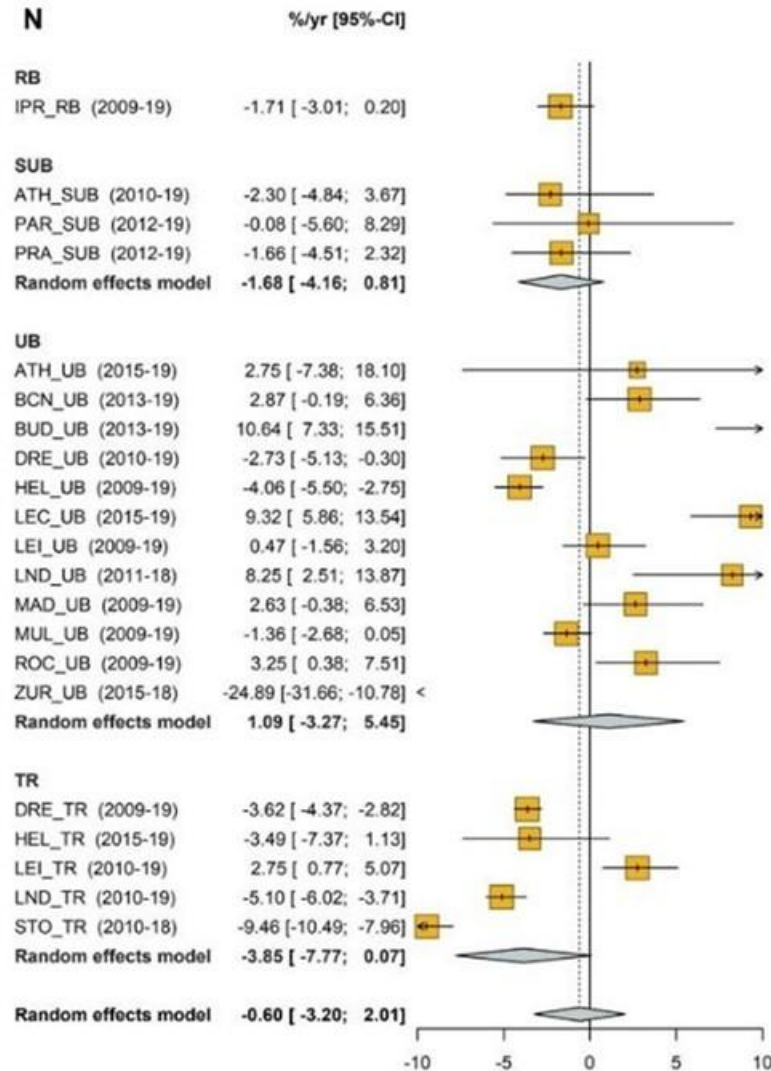


Garcia-Marlès et al., 2024a, ENV INT
<https://doi.org/10.1016/j.envint.2024.109149>

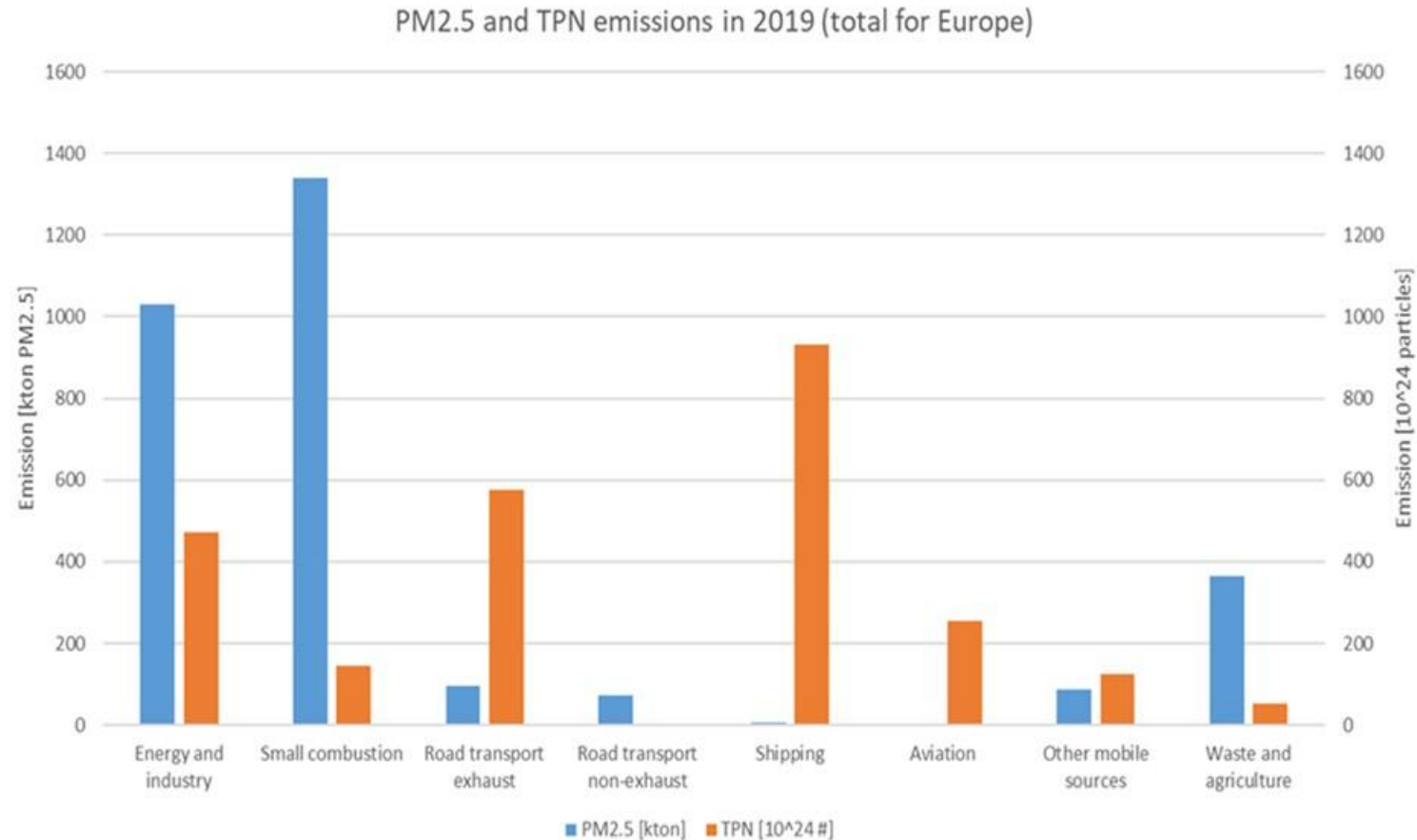
The trends of ultrafine particles and PNSD in urban Europe

Cercia Morillo et al. 2024b. ENV/INT. <https://doi.org/10.1016/j.envint.2024.108510>

ST1 &11

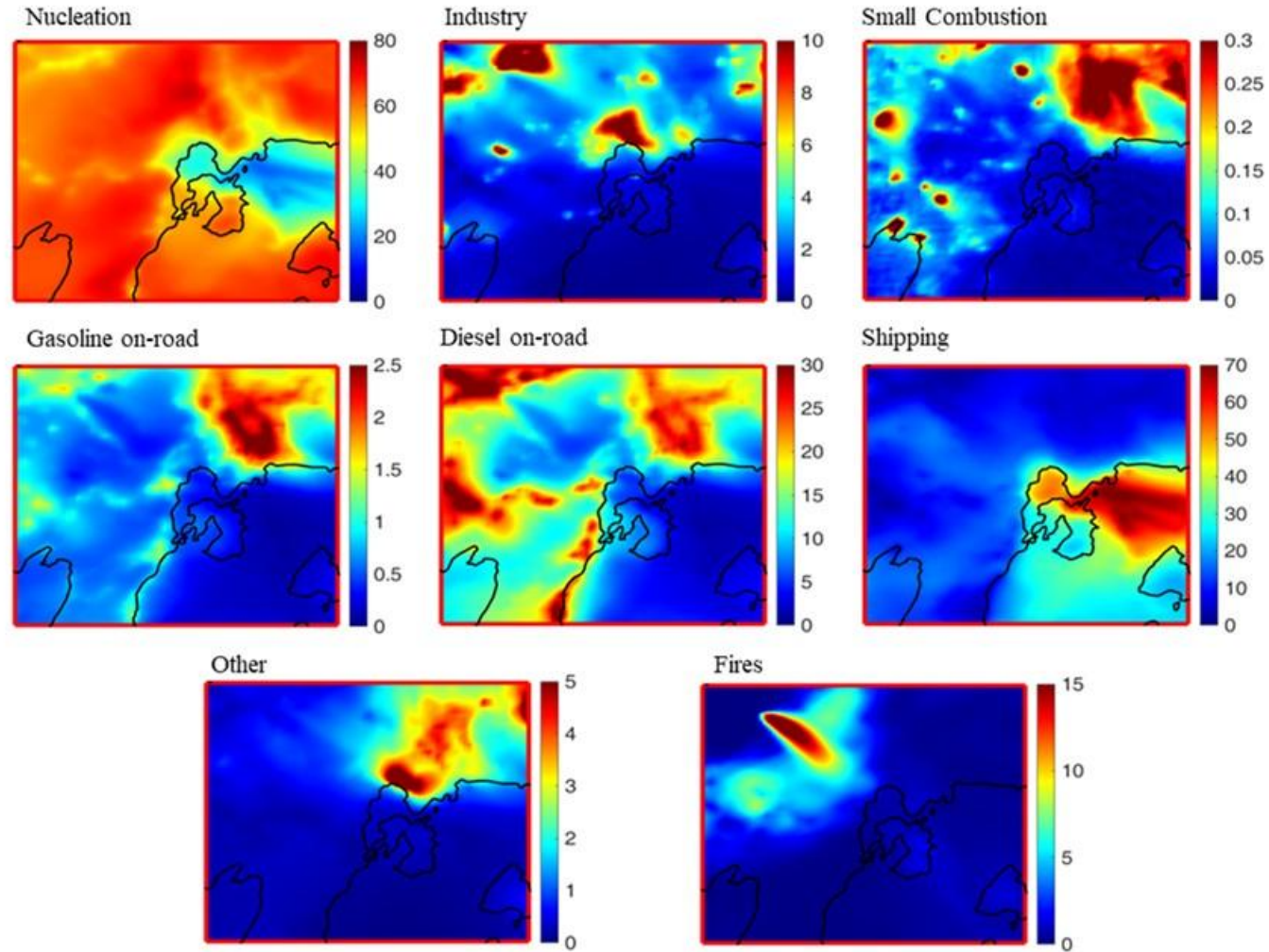


Emission inventory of ultrafine particles and PNSD in Europe ST15



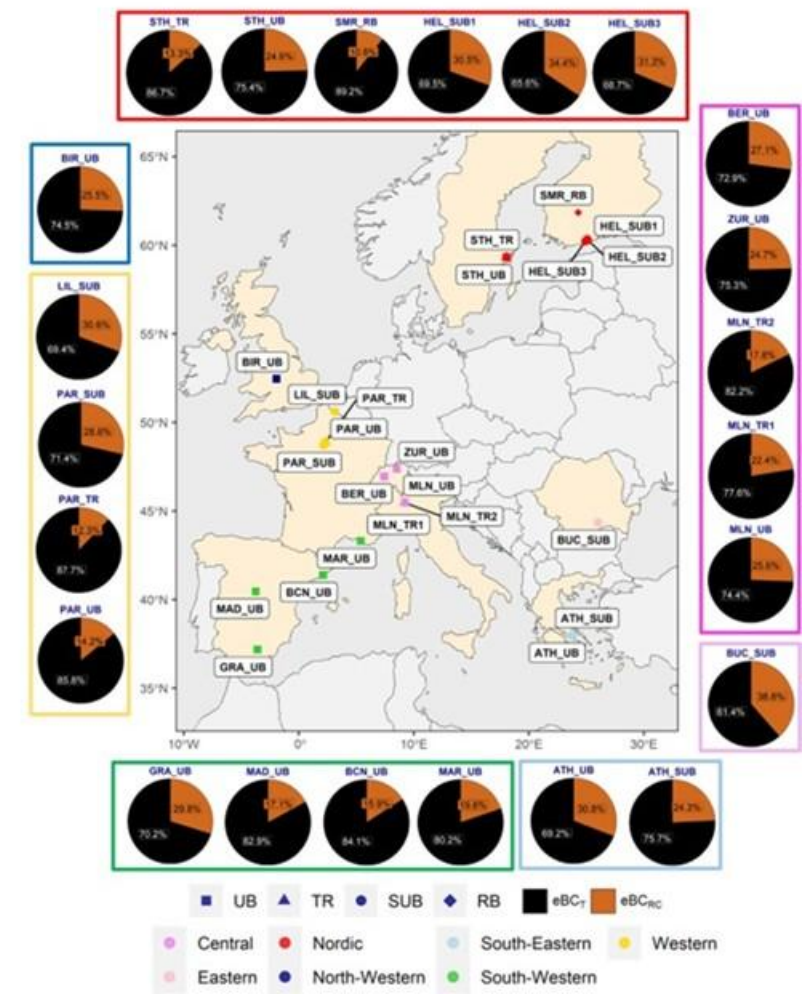
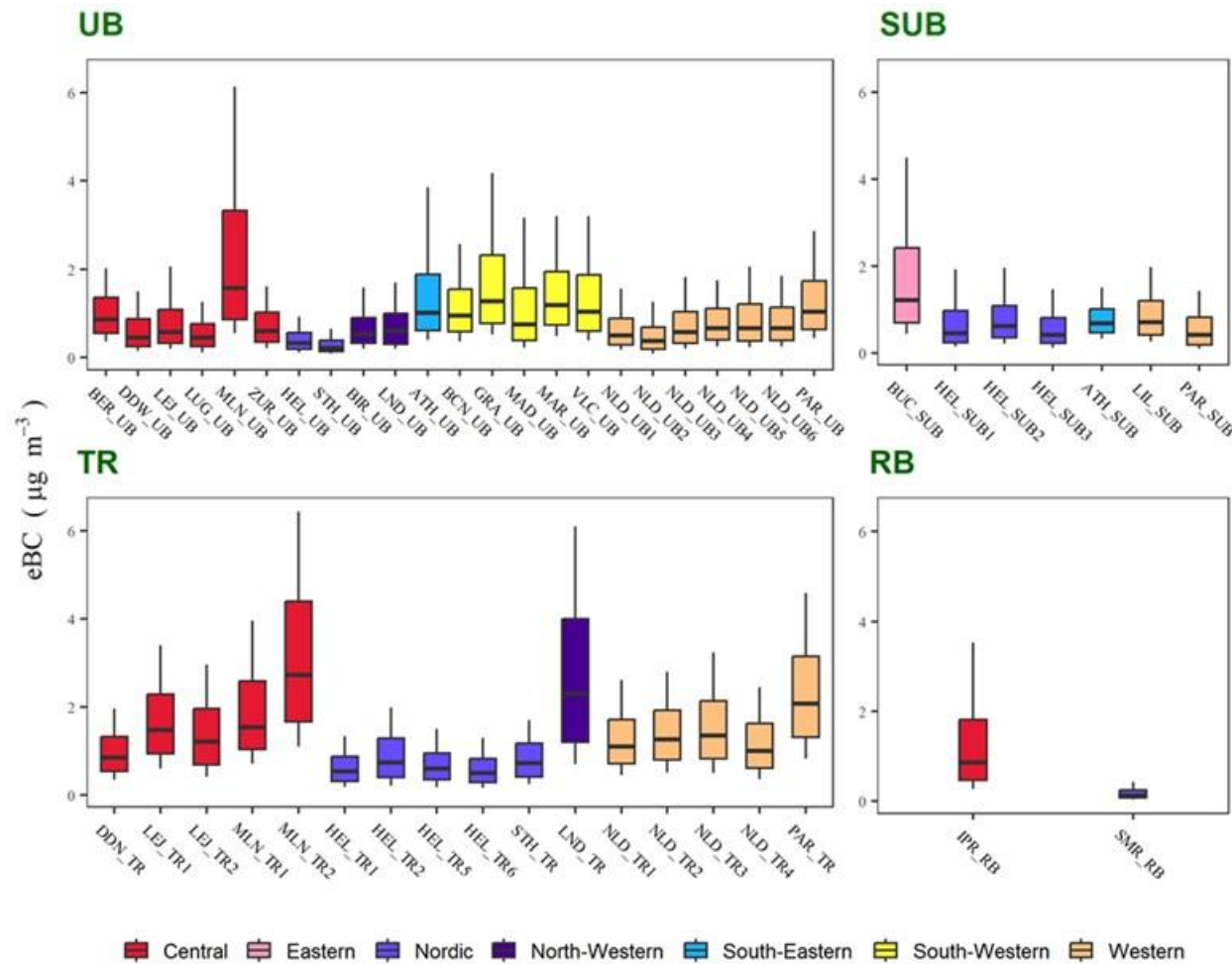
Multiscale modelling of ultrafine particles in Europe

ST16



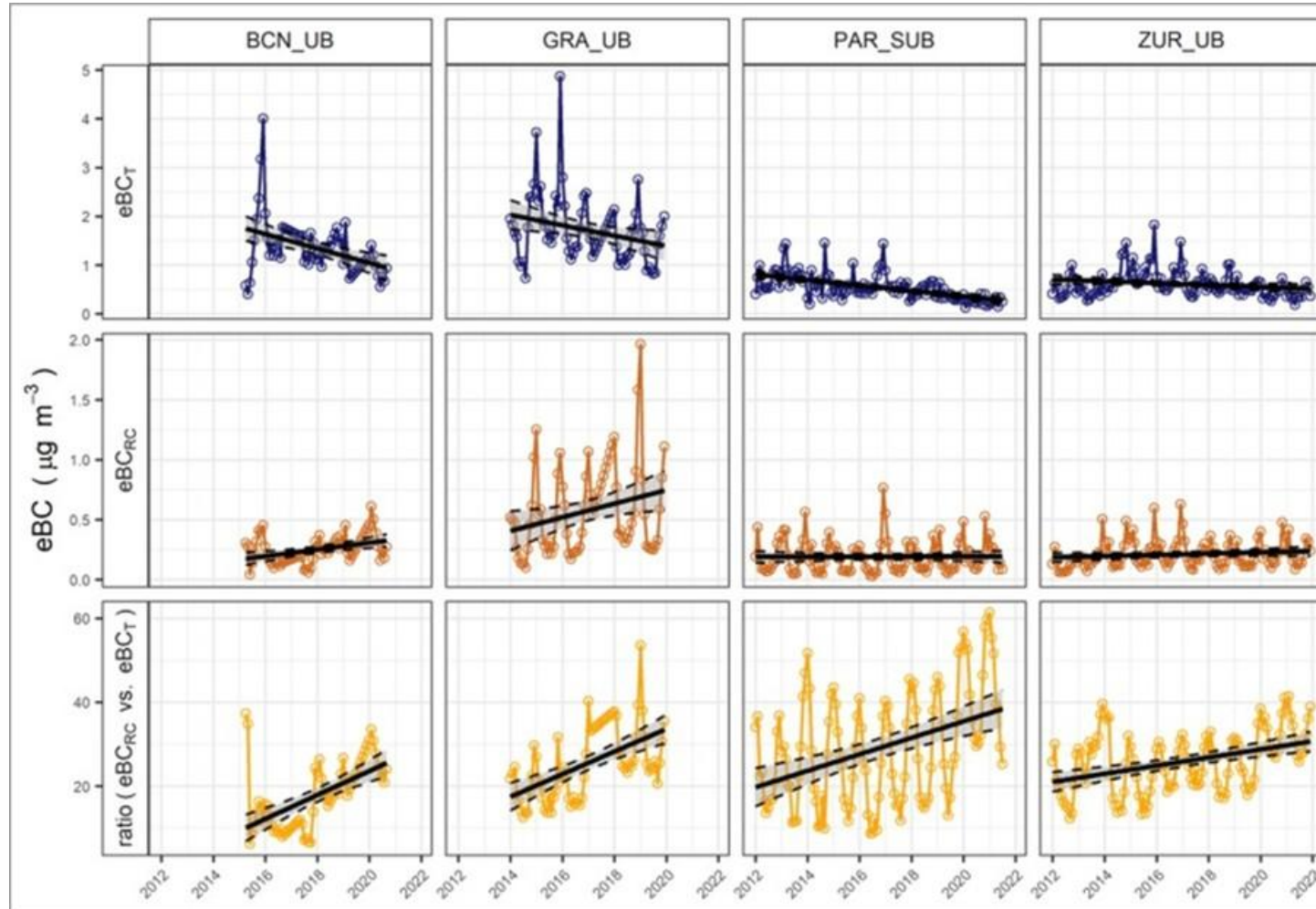
Black carbon in Urban Europe

ST2 & 11



Savadkoochi M., 2023. Environment International <https://doi.org/10.1016/j.envint.2023.108081>

Trends and source contributions of black carbon in Europe

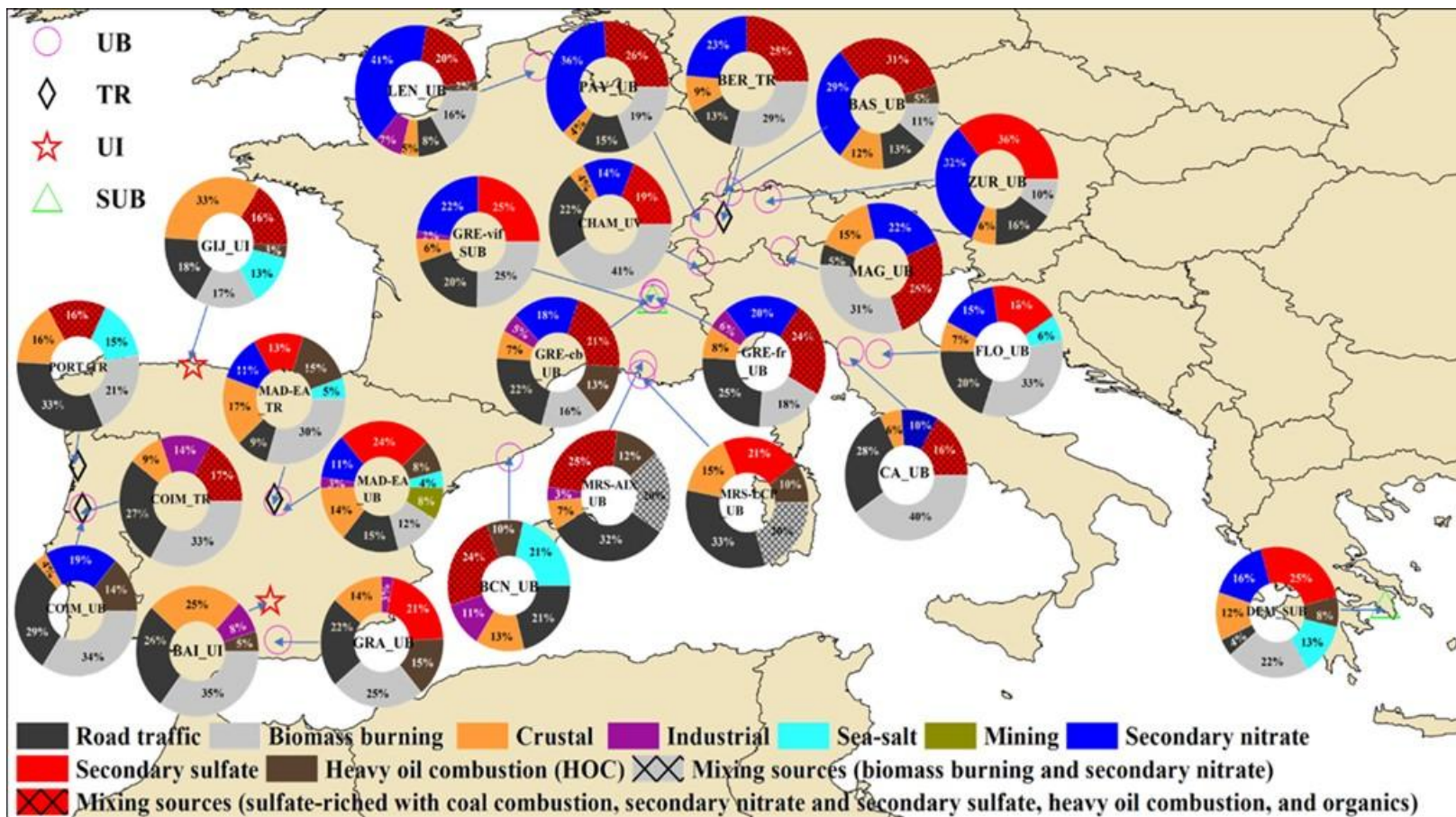


ST2 & 11

Savadkoochi M., 2023. Environment International <https://doi.org/10.1016/j.envint.2023.108081>

PM speciation and source contributions in urban Europe

ST3 & 10

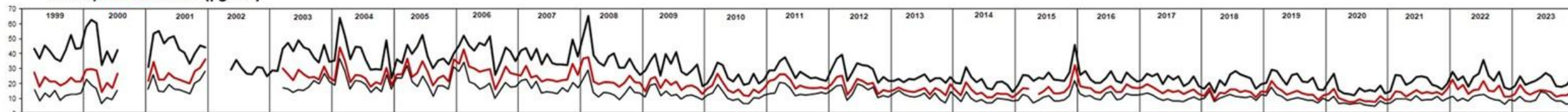


Liu X., npjc, 2025, <https://www.nature.com/articles/s41612-025-01097-7>

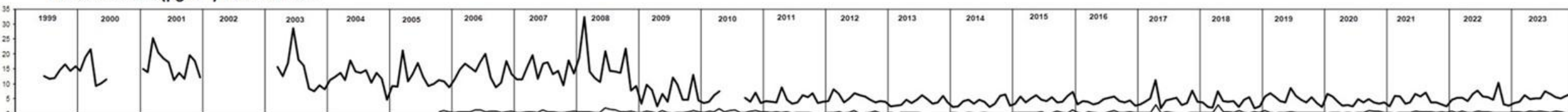
PM speciation and source contributions in urban Europe

BARCELONA PM & PM COMPONENTS 1999-2023

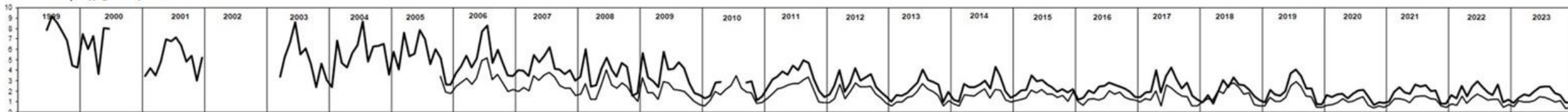
PM10, PM2.5 & PM1 ($\mu\text{g m}^{-3}$)



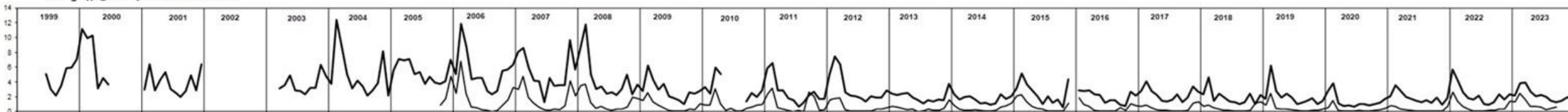
Mineral matter ($\mu\text{g m}^{-3}$) PM10 & PM1



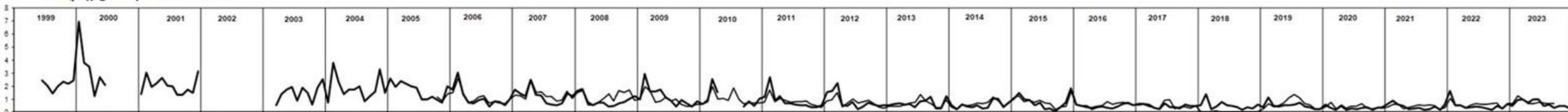
SO₄²⁻ ($\mu\text{g m}^{-3}$) PM10 & PM1



NO₃⁻ ($\mu\text{g m}^{-3}$) PM10 & PM1

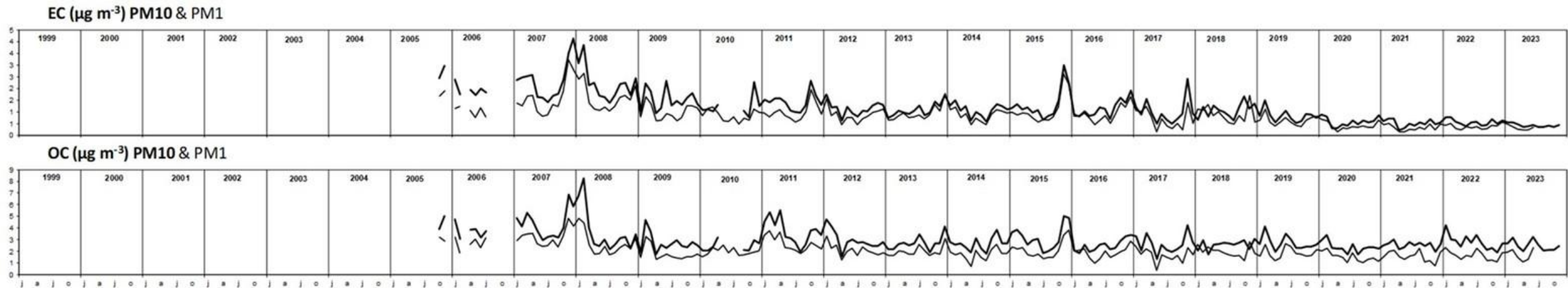


NH₄⁺ ($\mu\text{g m}^{-3}$) PM10 & PM1



PM speciation and source contributions in urban Europe

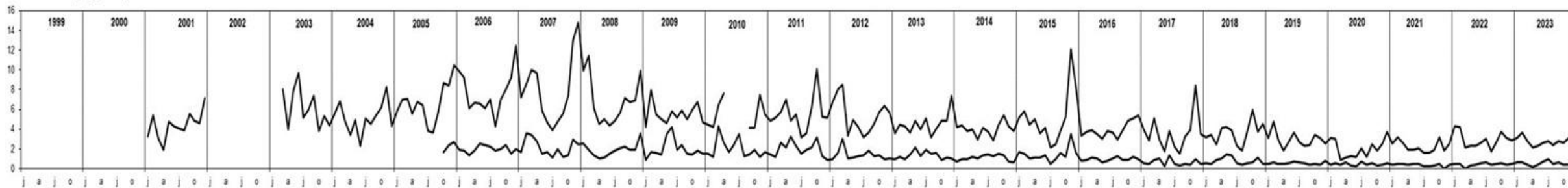
BARCELONA PM & PM COMPONENTS 1999-2022



PM speciation and source contributions in urban Europe

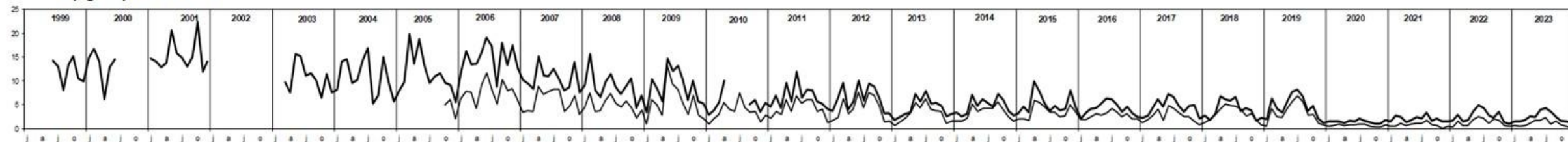
Brake wear & road dust

Sn (ng m⁻³) PM10 & PM1



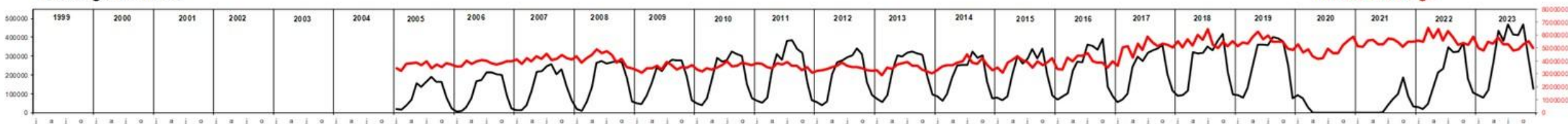
Shipping

V (ng m⁻³) PM10 & PM1

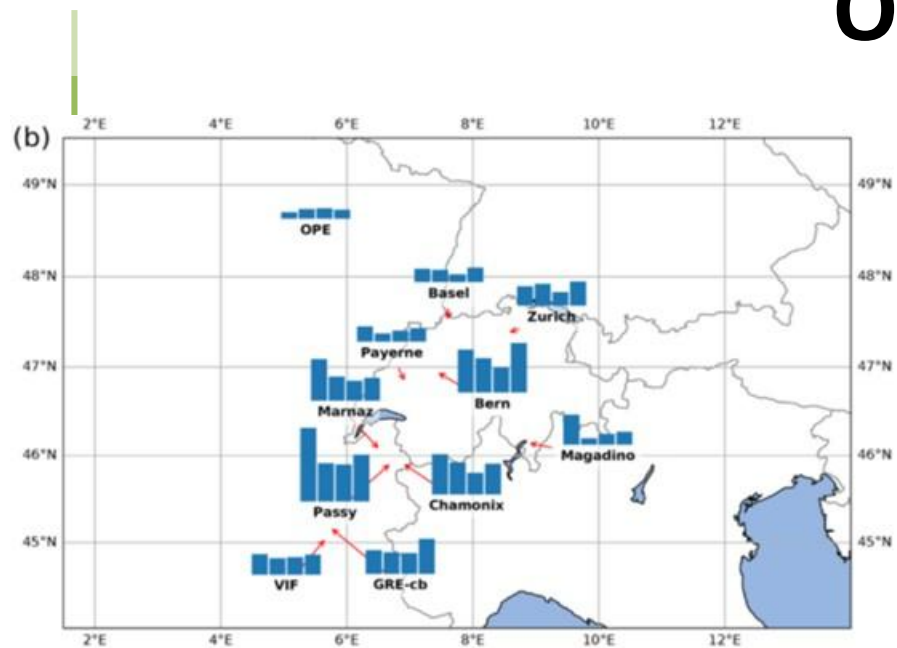


Passengers cruises

Tonnes discharge

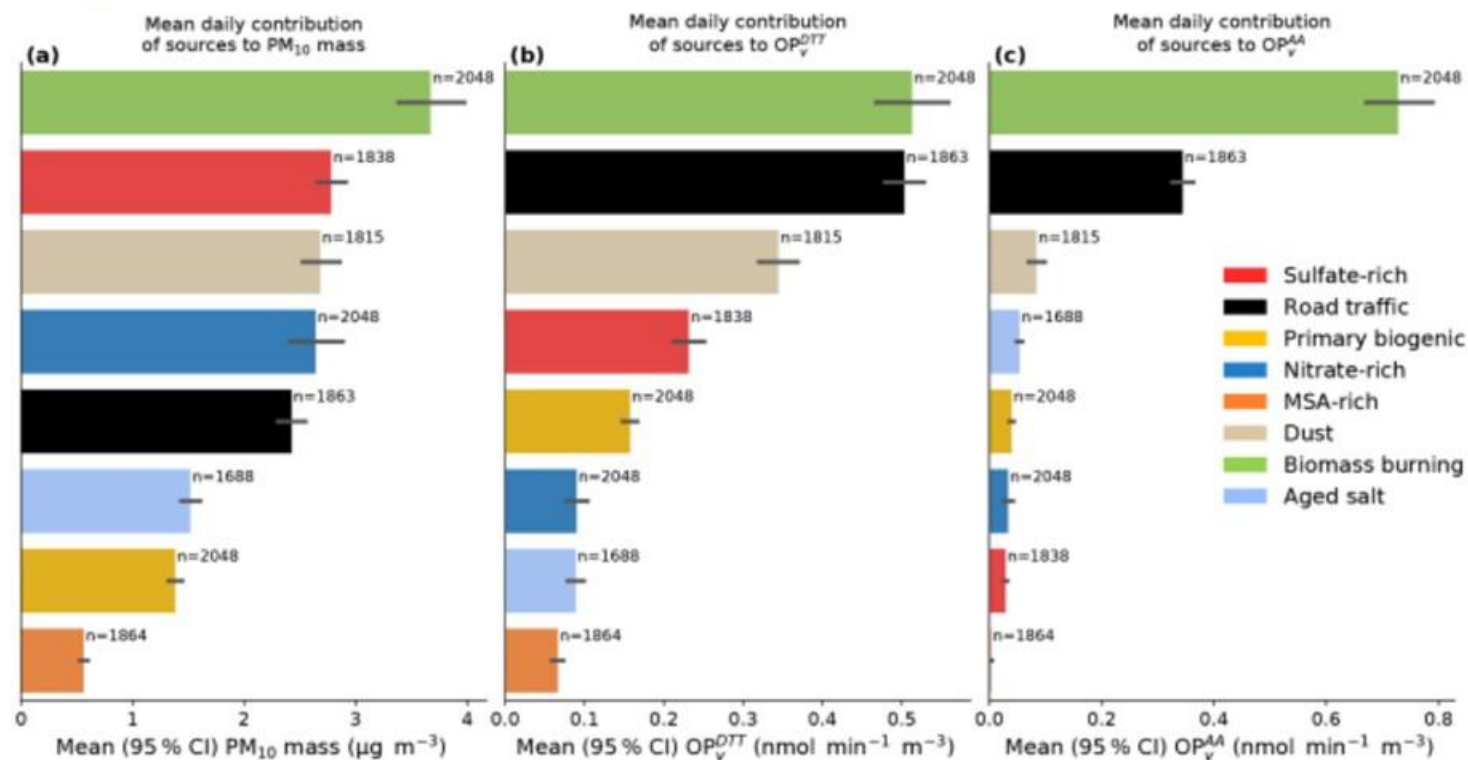


Oxidative potential

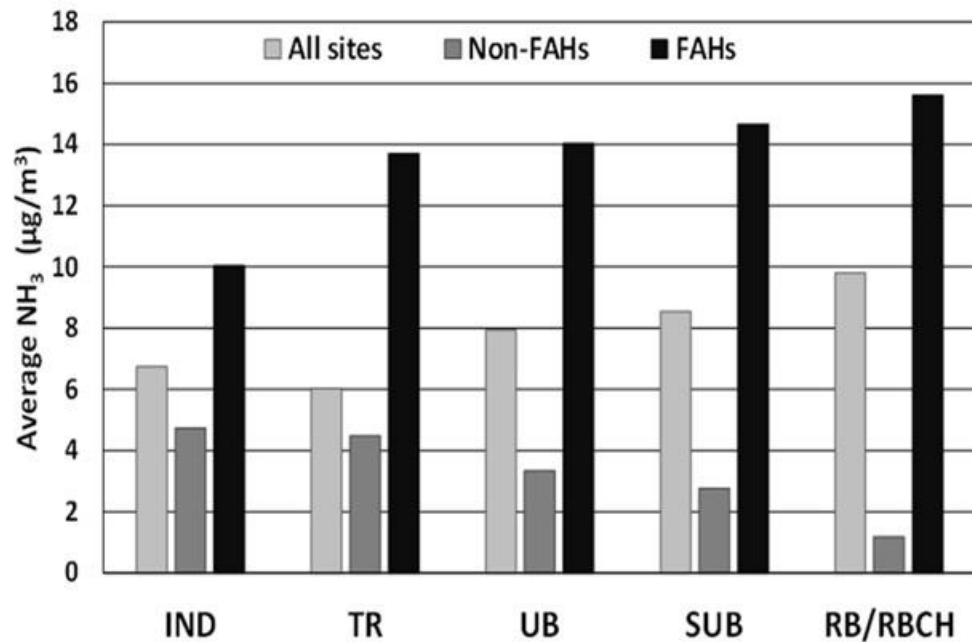


Weber et al., 2021, <http://getopstandop.u-ga.fr/>

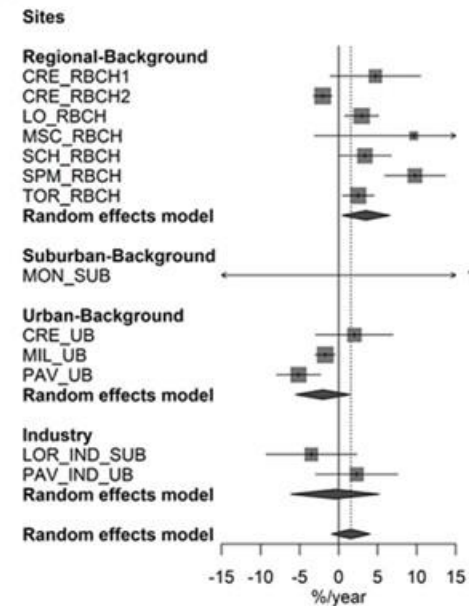
Grange et al., 2022. Atmospheric Chem. Phys. 22, 7029–7050.



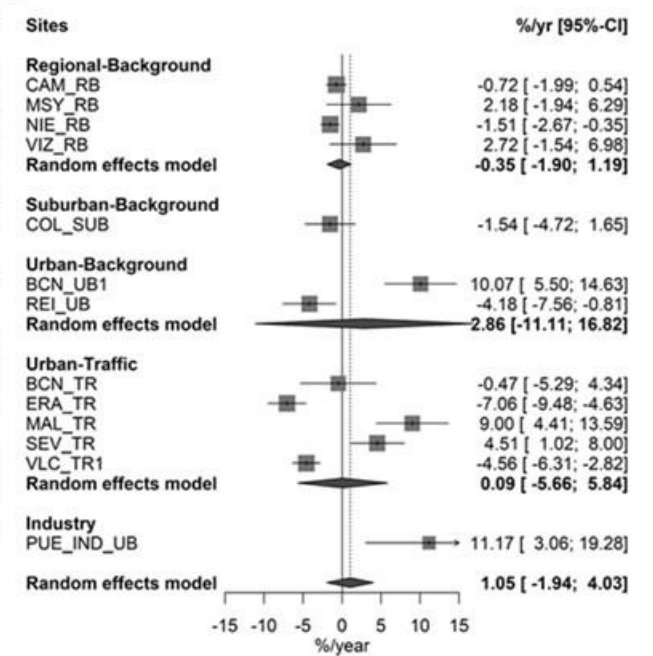
Concentrations and trends of NH₃ in Europe



a) FAHs



b) non-FAHs



Liu X., 2024. Environment International
<https://doi.org/10.1016/j.envint.2024.108519>

Access 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>

Will be present in the Clean Air Forum 1-2 Dec 2025

Thank you very much for your attention!!



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