

ST1 – Ultrafine particles / size distribution

Xavier Querol & Andres Alastuey CSIC



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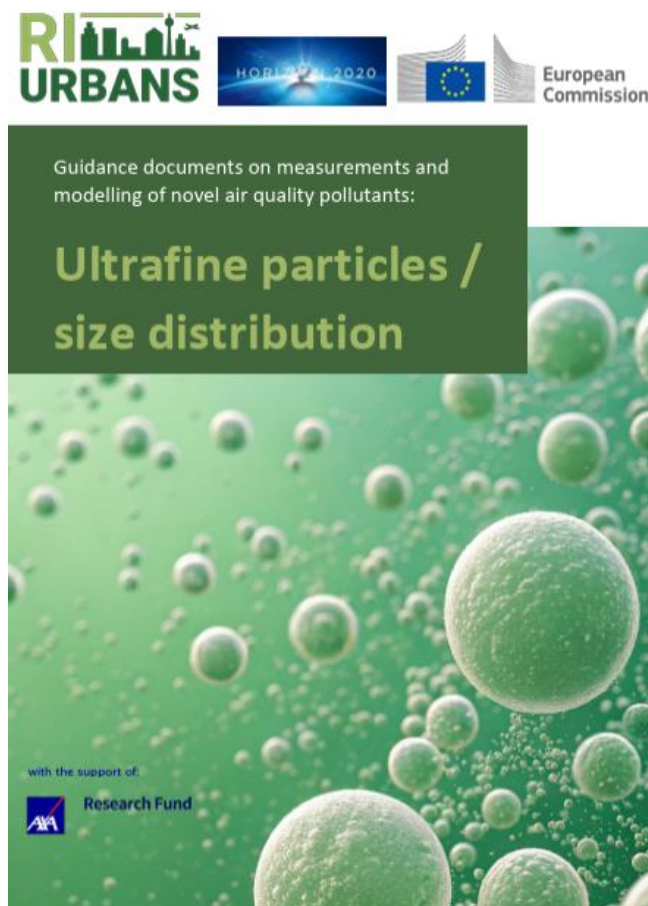


ST for Ultrafine particles / size distribution

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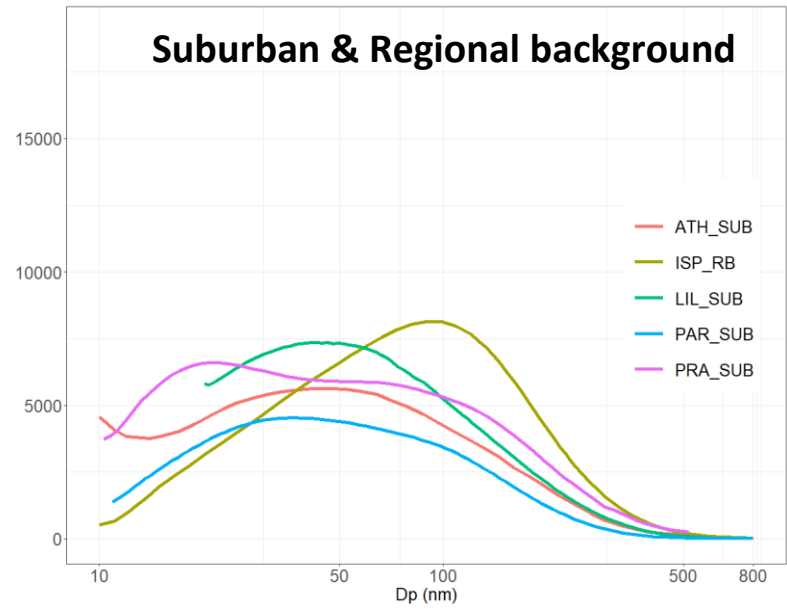
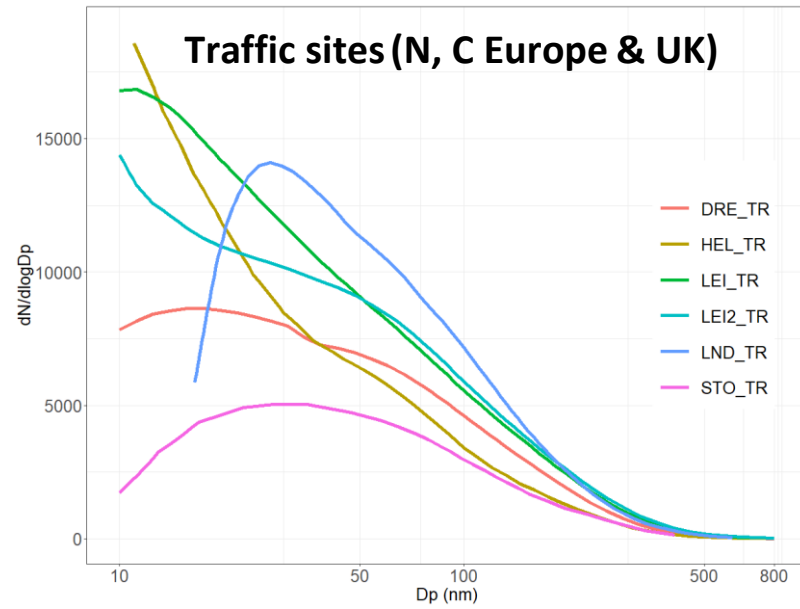
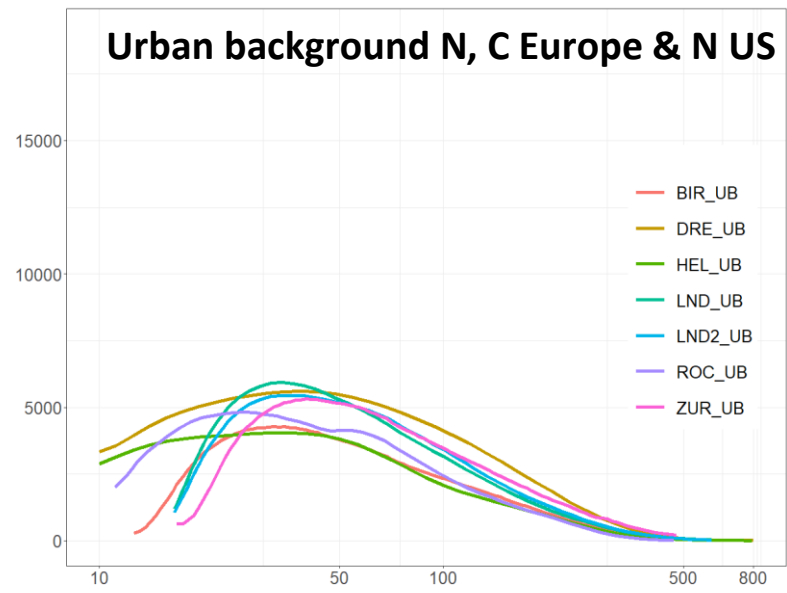
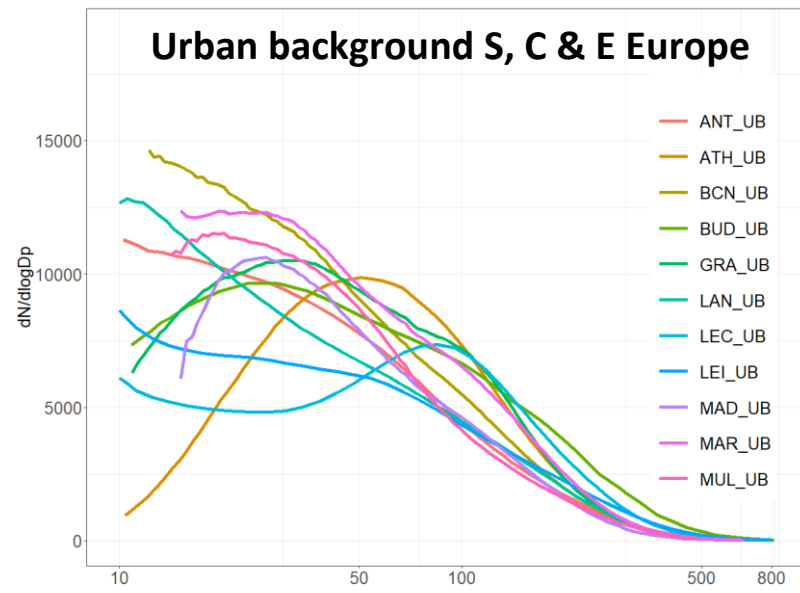
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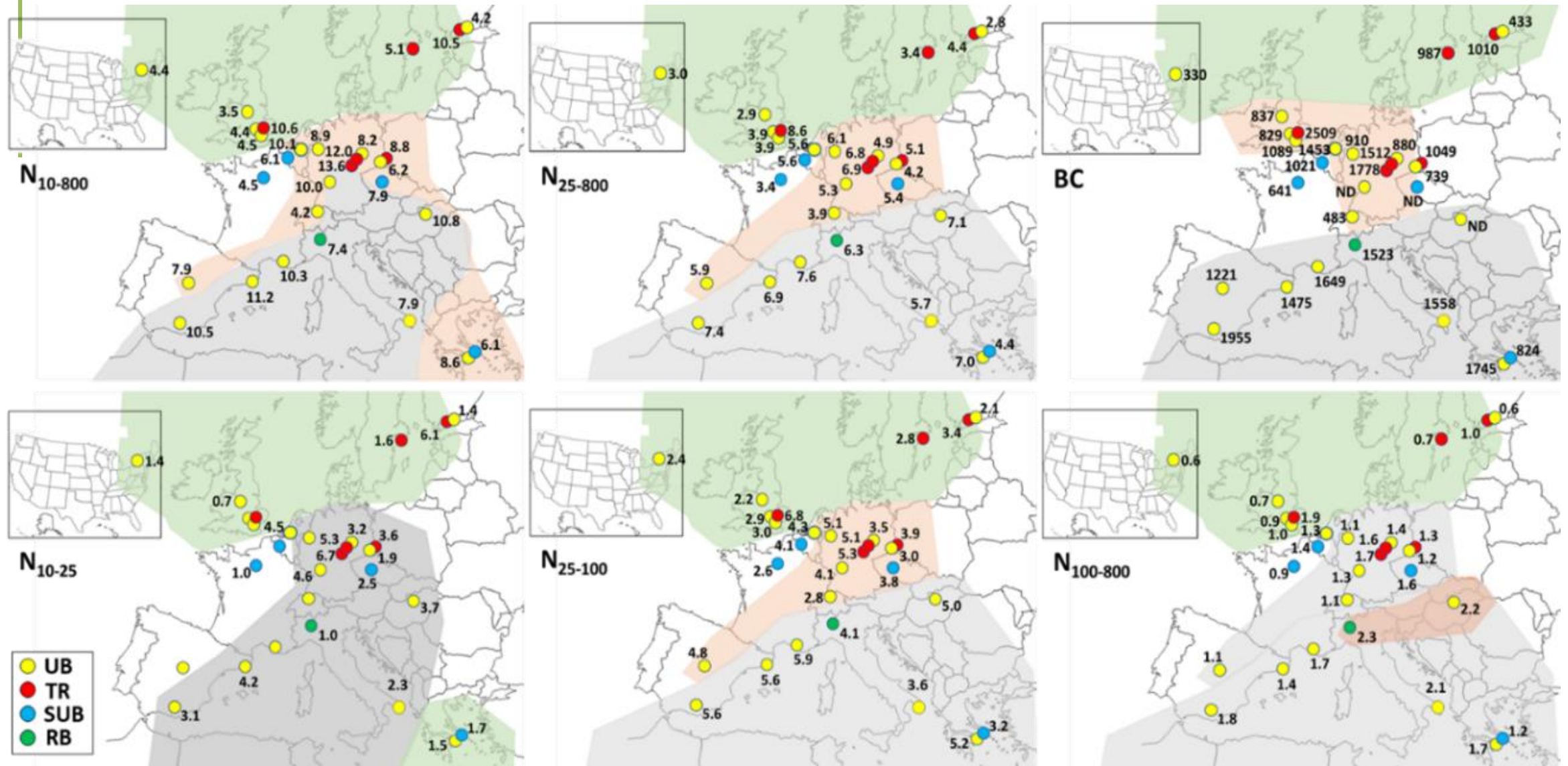
- The aim of this document on UFP and PNSD measurements (included as mandatory in urban supersites in the NAQD) is to **facilitate upscaling** of measurement techniques within the AQ monitoring networks (AQMN).
- It is provided an up-to-date summary of the harmonized methodologies related to UFP and PNSD measurements, summarizes recent scientific synthesis of Pan-European observations and provide concise recommendations on the measurements of UFP and PNSD in urban environments.

Measurement protocols, UFP and PNSD

- Use of ACTRIS, EN and CEN guidance
- Soon a reference method will be supplied based on the above
- The issue of Calibration Centers and associated cost should be defined
- EN/ACTRIS recommends standard volume and AQ standards for aerosols are in ambient conditions
- Data management: Use EBAS format and produce a tool to make comparable size bins, and use V_s and V_a . Have the original data with possibility of using the tool for those interested in comparing datasets
- Very important to obtain complete annual data coverage



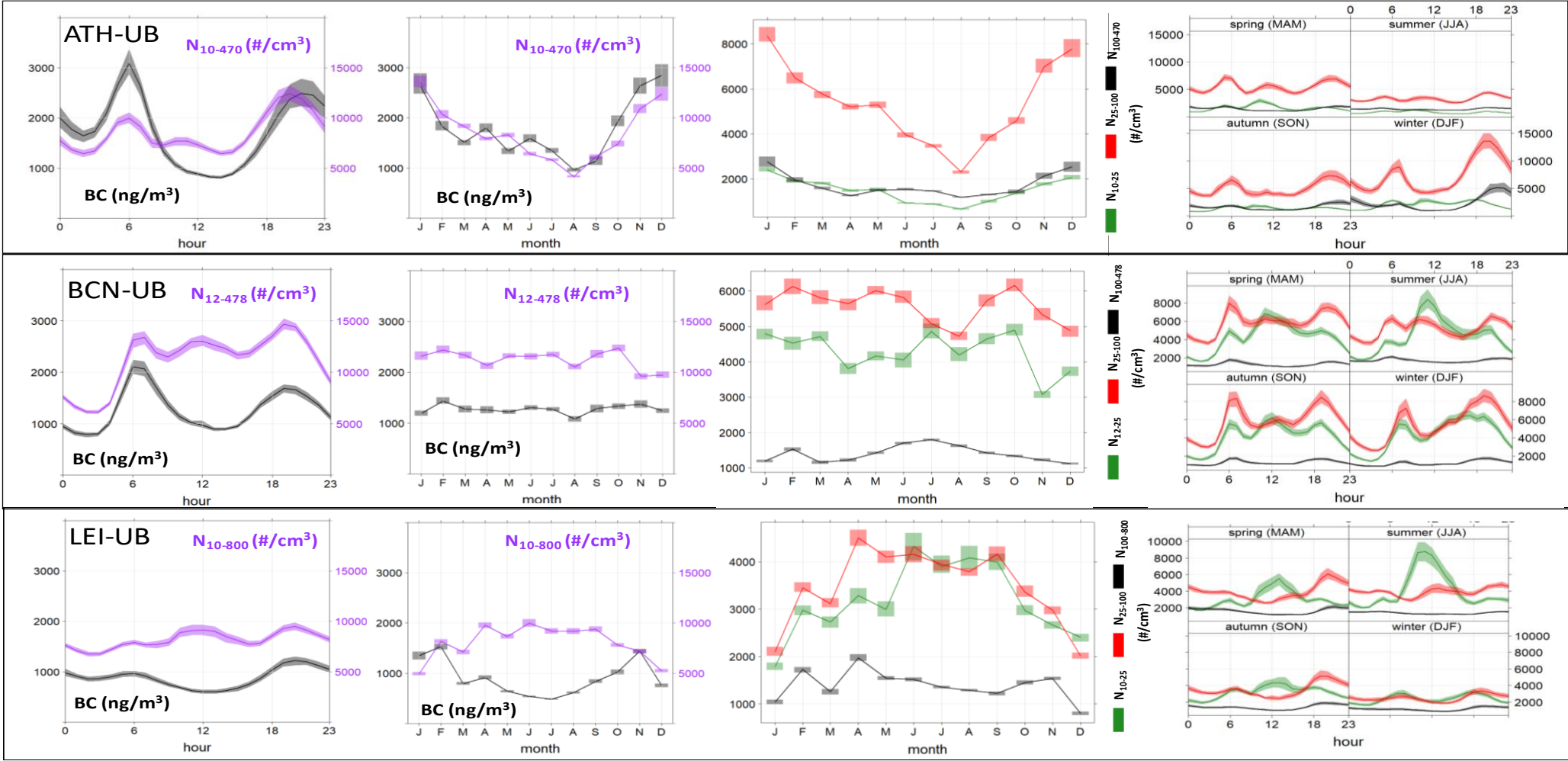
UFP & BC CONCENTRATIONS ACROSS URBAN EUROPE



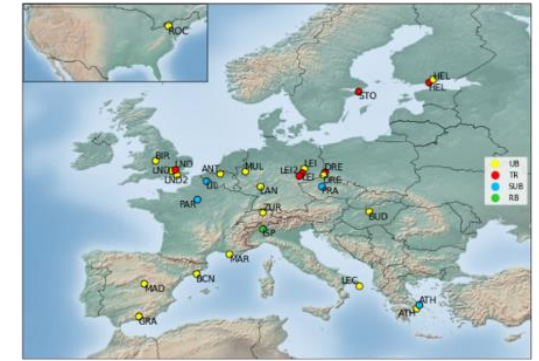
UFP CONCENTRATIONS ACROSS URBAN EUROPE

- UFP traffic > UB> SUB >RB
- No traffic sites in S and E Europe
- The issue of harbours and airports

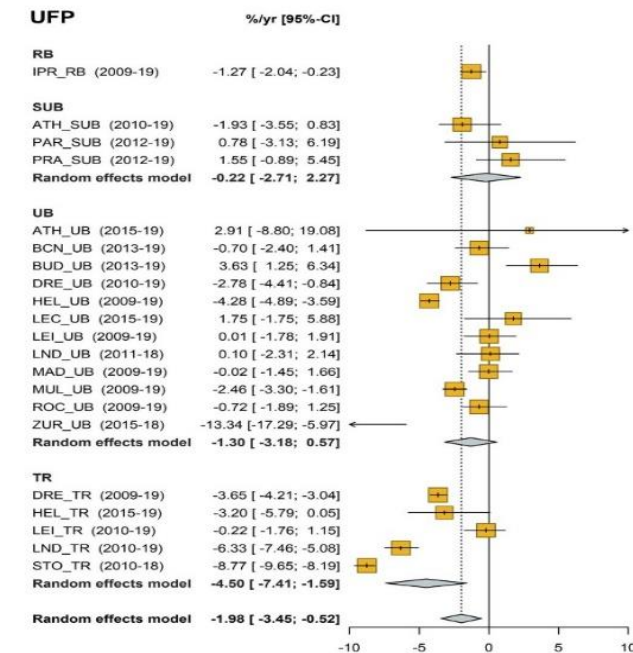
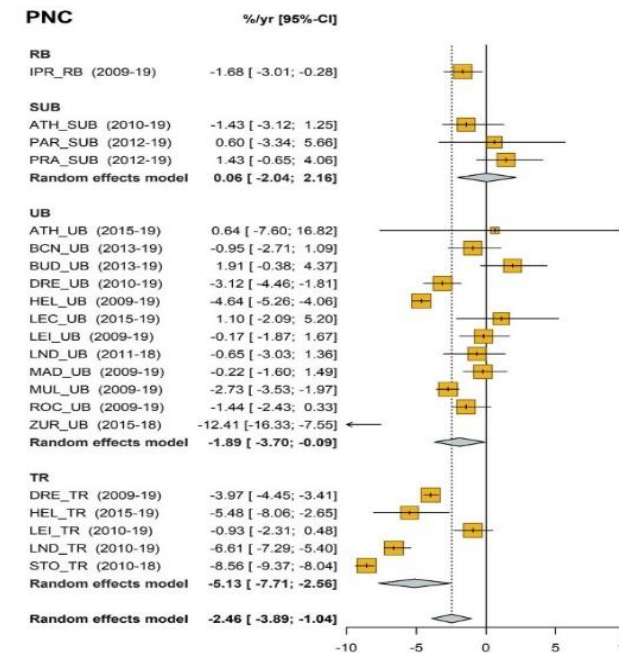
DAILY, WEEKLY & SEASONAL PATTERNS



UFP TREND ANALYSIS 2009-2019



- UFP – PNSD from 29 European site (AQMN and research supersites): 18 UB; 6 TR; 4 SUB; 1 RB
- Long-time trends of UFP and the different PNSD and ancillary pollutants,
- Clear positive effect of the EU policies in abating road traffic emissions, but less for the traffic-nucleation



[Garcia-Marlès et al., 2024](#). Inter-annual trends of ultrafine particles in urban Europe.

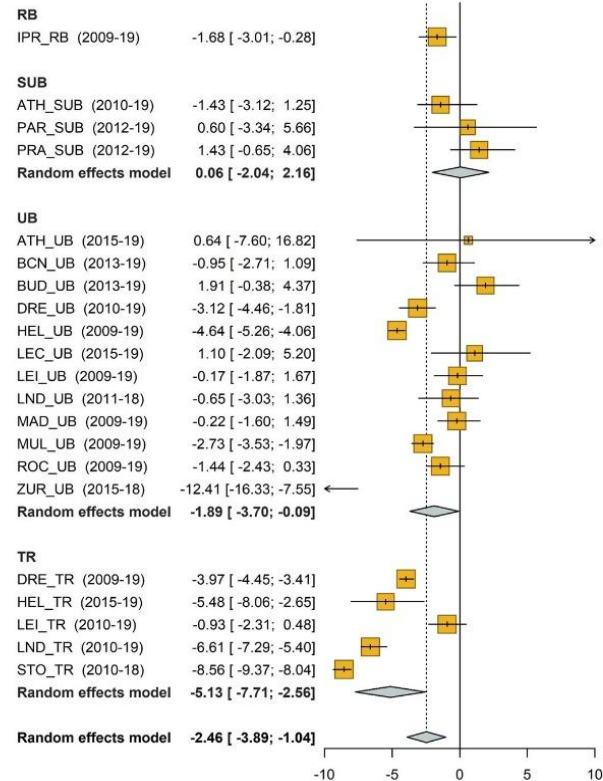
Environ. Int., 185, 108510. <https://doi.org/10.1016/j.envint.2024.108510>

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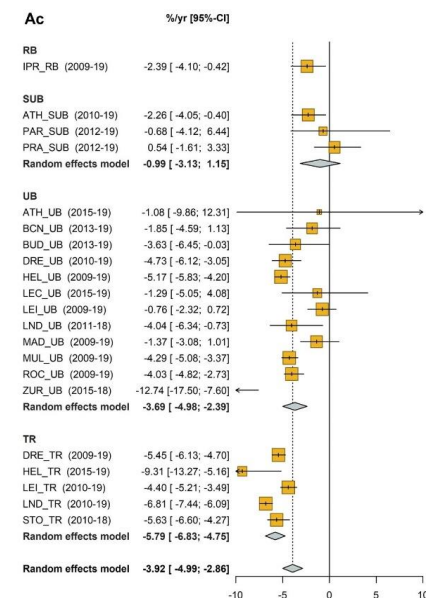
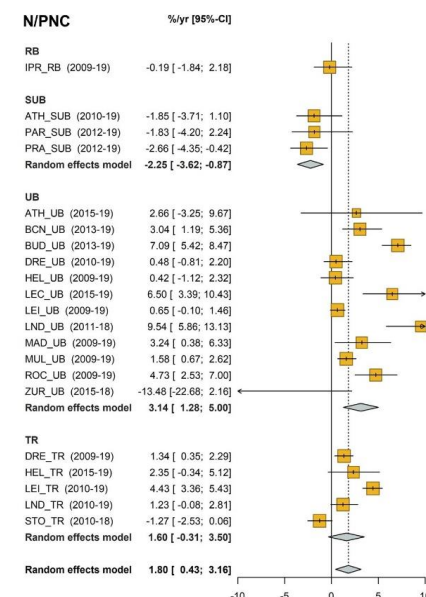
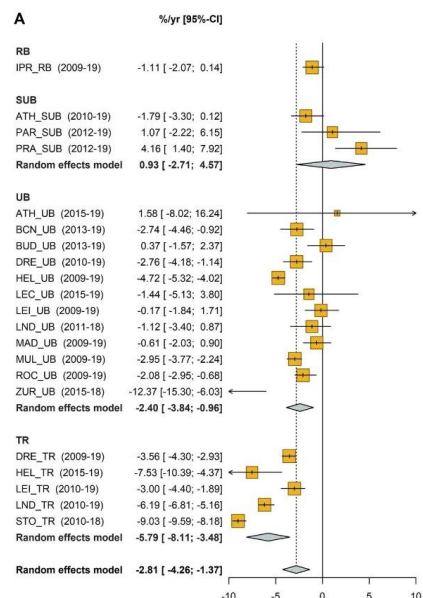
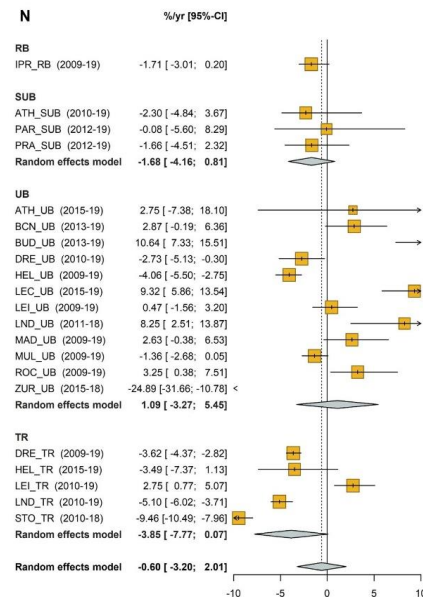
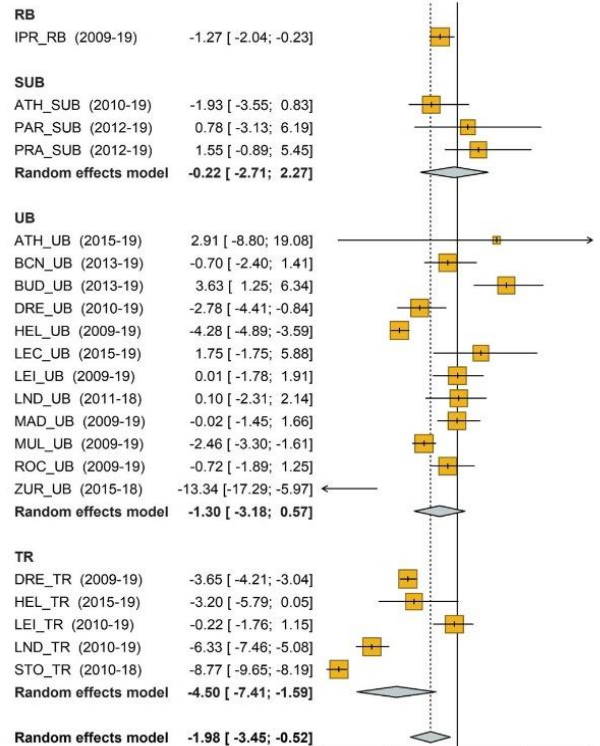
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UFP TREND ANALYSIS 2009-2019

PNC



UFP



FINAL CONSIDERATIONS

- Harmonization can be reached by using the reference method based on ACTRIS, EN and CEN guidance
- Questions to be solved: calibration Centers and data management
- Very important to obtain complete annual data coverage
- For N10-800 and N25-800: Gradient to decrease $S > C > N$ Europe, and (as expected) $T > UB > SUB$
- The proportions of Nucleation/Aitken/Accumulation, seasonality and daily patterns, widely vary
- High midday photochemical nucleation is not always higher in S-Europe (higher insolation)
- Seasonal patterns might completely differ
- Clear downward trend for Aitken and Accumulation modes. Less clear for nucleation. Clear effect of EURO 5&6 DPFs and road traffic measures

Thank you very much for your attention!!!