Conference Agenda

Session

Poster Session Thursday

Time: **Thursday, 04/Sept/2025: 5:15pm - 6:45pm**

Location: **Studium2000 Building5**

V.le San Nicola corner, Via di Valesio, 73100 Lecce LE

Presentations

PO3: 1

Using low-cost sensors to monitor particulate matter in classrooms of a Portuguese high school

Nuno Canha[1,2], Carolina Correia[1], Sergio Mendez[1], Carla Gamelas[1,3], Miguel Felizardo[1]

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Recent advancements in low-cost sensor (LCS) and Internet of Things (IoT)-based solutions have enabled real-time monitoring of PM and other pollutants, addressing the limitations of traditional monitoring methods. However, calibration with reference equipment is essential.

This study conducted a monitoring campaign in nine classrooms (171 monitored classes) at a high school in inland Portugal. LCS-equipped monitoring boxes measured $PM_{2.5}$, PM_{10}, CO_2, VOCs, temperature, and relative humidity. The results demonstrate that LCS technology can provide extensive and successful air quality monitoring without disrupting teaching, and highlight that PM thresholds are often exceeded in this microenvironment.

EAC2025_PO3-1_227_Canha.pdf

PO3: 2

Solid fuel combustion as the dominant wintertime PM2.5 source in Irish towns: insights from the TownAir project

Vaios Moschos[1], Kirsten N. Fossum[1], Vignesh Prabhu[1], Lu Lei[1], Darius Ceburnis[1], Shona O'Sullivan[2], Niall O'Sullivan[2], Stig Hellebust[2], Colin O'Dowd[1], John Wenger[2], Jurgita Ovadnevaite[1]

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The *TownAir* project investigates air pollution in two Irish towns, where fine particulate matter ($PM_{2.5}$) from domestic heating, traffic, and industry poses health risks. In Enniscorthy, winter monitoring revealed frequent exceedances of WHO guidelines, with concentrations up to 200 µg/m^3. Using an ACSM and aethalometer, we identified organic aerosols (OAs, 52%) and equivalent black carbon (17%) as major $PM_{2.5}$ components. PMF analysis attributed most OA to residential combustion, while traffic emissions and secondary formation contributed smaller fractions. A follow-up campaign near Northern Ireland and comparisons with Dublin aim to inform strategies to reduce emissions and improve air quality in Ireland.

EAC2025_PO3-2_230_Moschos.pdf

PO3: 3

Characteristic of water-soluble inorganic ions in size-segregated aerosols of a typical industrial and mining city in central China

Hongxia Liu, Jiaquan Zhang, Changlin Zhan, Shan Liu, Ting Liu, Wensheng Xiao, Junji Cao

Hubei Polytechnic University, China, People's Republic of

Water-soluble inorganic ions (WSIIs) were determined in HS atmospheric aerosols across nine size fractions. Both PM and WSIIs reached peak concentrations in winter, with autumn and winter concentrations higher than those in spring and summer. Individual WSIIs exhibit distinct size distribution characteristics The size distribution patterns of WSIIs highlight their crucial role in PM formation and suggest that both natural and anthropogenic sources contribute to their presence in the atmosphere. The seasonal variations in size distribution underscore the importance of meteorological conditions and emission sources in shaping aerosol characteristics.

EAC2025_PO3-3_692_Liu.pdf

PO3: 4

High Optical and Temporal Resolution Investigations into Non-Ideal Resuspension Phenomena

Edward Neal[1], Lukesh K Mahato[1], Richard J Thomas[2], Maurice D Walker[2], Jack C Vincent[2], Simon T Parker[2], Virginia E Foot[2], Emily S Kruger[2], Jonathan P Reid[1]

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A novel methodology is employed to investigate the impact of particle-specific features on resuspension, partnering a quadrupole electrodynamic trap for controlled particle fabrication and deposition with a small-scale 3D printed wind tunnel. The resuspension behaviour of two distinct particle morphologies featuring cubic structures were investigated and the resulting resuspension efficiencies demonstrate the challenges of resuspending non-spherical particles. Additional high optical and temporal resolution measurements of particle detachment were recorded with high frame rate imaging to analyse particle orientation, particle-surface contact and particle rotation during resuspension. Together these two methodologies advance our understanding of non-ideal resuspension phenomena.

EAC2025_PO3-4_1047_Neal.pdf

PO3: 5

On the origins of atmospheric secondary organic aerosol (SOA): Double bonds facilitate rapid functionalization to aerosol precursors

Pyry Salomaa[1], Netta Vinkvist[1], Siddharth Iyer[2], Matti Rissanen[1,2]

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We have performed flow reactor investigations of three cyclic hydrocarbon autoxidation reactions under several short reaction times. A rich variety of oxidation products were recorded with several chemical ionization mass spectrometric methods.

EAC2025_PO3-5_782_Salomaa.pdf

PO3: 6

Flavor-Induced Inflammation and Cytotoxicity in Human Aortic Smooth Muscle Cells: Implications for E-Cigarette Safety

Mariam Bitar[1], Clément Mercier[1], Valérie Forest[1], Jérémie Pourchez[1], Laurent Bertoletti[2]

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E-cigarettes are marketed as safer than tobacco, but their cardiovascular effects remain unclear. Our study examined the impact of e-liquids and aerosol condensates with different PG/VG ratios, nicotine levels, and flavors (cinnamon, menthol, tobacco) on human aortic smooth muscle cells. Cytotoxicity (LDH release) and pro-inflammatory response (IL-8 production) were measured. Aerosol condensates, especially with cinnamon and high power settings, induced significant cytotoxic and pro-inflammatory effects. E-liquids had milder effects, suggesting that thermal degradation amplifies toxicity. These findings highlight the role of flavors and their degradation products in the cardiovascular risks of e-cigarettes.

EAC2025_PO3-6_120_Bitar.pdf

PO3: 7

Review of the mass absorption cross-section literature for mixed atmospheric black carbon

Eija Asmi[1], Joel Corbin[2], John Backman[1], Konstantina Vasilatou[3], Ernest Weingartner[4], Krzysztof Ciupek[5], Thomas Müller[6], Arun Babu Suja[6], Griša Močnik[7,8,9], Luka Drinovec[7,8], Kostas Eleftheriadis[10], Jorge Saturno[11]

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We compile more than 200 MAC_{BC} values from 63 studies and explore the effects of sampling location, study duration, instrumentation (photometers, photoacoustic; mass concentration (CBC) from thermal-optical analysis, or SP2), measurement wavelength, thermal–optical protocol. The data show that photoacoustic measurements of MAC_{BC} were consistently higher in remote relative to urban environments, indicating Eabs>1 in remote environments, as expected. This trend was not evident for filter-based measurements, and few other clear trends could be identified in general. Notably, wavelength-dependent trends were not evident. Our results do not support the use of simplistic generalizations or assumptions about MACBC in the atmosphere.

EAC2025_PO3-7_1007_Asmi.pdf

PO3: 8

Atmospheric New Particle Formation Enhanced by Tricarboxylic Acids

Astrid Nørskov Pedersen, Yosef Knattrup, Jonas Elm

Aarhus University, Denmark

This study investigates the role of tricarboxylic acids in new particle formation (NPF) within secondary organic aerosols (SOA). Using quantum chemical methods, we examined three tricarboxylic acids - carboxyheptanoic acid (CHA), 3-methyl-1,2,3-butanecarboxylic acid (MBTCA), and pinyl diaterpenylic ester (PDPE). The results suggest that these acids can act as organic nucleators in combination with sulfuric acid (SA) and bases like ammonia or amines. Our results show strong clustering interactions, indicating that acid-base interactions remain crucial even with organics present. Further research using the Atmospheric Cluster Dynamics Code will explore the importance of these tricarboxylic acids for NPF in more depth.

EAC2025_PO3-8_1057_Pedersen.pdf

PO3: 9

Coagulation of combustion-generated carbonaceous nanoparticles of ethylene and ethylene/ethanol flames in an atmospheric simulation chamber

Vincenzo Liguoro[1], Virginia Vernocchi[2], Gianluigi De Falco[1], Francesca Picca[3], Fabio Sasso[3], Alessia Sannino[4], Patrizia Minutolo[1], Andrea D'Anna[3], Tommaso Isolabella[5], Paolo Prati[5], Dario Massabò[5], Mario Commodo[1]

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Biofuels can emit ultrafine particles with distinct features compared to conventional fossil fuels. In this work, coagulation of soot nanoparticles was experimentally and numerically investigated using an atmospheric simulation chamber. Nanoparticles were produced in a laboratory flame of ethylene and ethylene/ethanol mixtures. Simulations based on Smoluchowski equation show that ethylene-flame particles coagulate with an enhancement factor β=2.2, while a larger β=2.6 is found for ethanol-doped flame. Fractal dimension optimization with a fixed β=2.2 also shows good agreement with experiments. These differences point to distinct surface functionalities potentially impacting particle-particle interaction or differences in particles' fractal properties to be further investigated.

EAC2025_PO3-9_788_Liguoro.pdf

PO3: 10

Effect of gas absorption on evaporation of acoustically levitated slurry droplets at constant and falling rate periods of drying

Yehonatan David Pour[1], Boris Krasovitov[1], Andrew Fominykh[1], Ziba Hashemloo[2], Abdolreza Kharaghani[2], Evangelos Tsotsas[2], Avi Levy[1]

[1]Ben-Gurion University of the Negev, Israel; [2]Otto von Guericke Universität Magdeburg

The process of drying suspension droplets includes two stages. The first stage starts when a slurry droplet is injected into a drying chamber, while the second stage begins when solid particles form an agglomerate. In this study, we developed models of convective heat and mass transfer of an acoustically levitated slurry droplet that evaporates in an atmosphere of air, water vapor, and soluble gas. It has been shown that the drying rate increases in the presence of active gas. We also found that drying time increases with increasing frequency and decreases with increasing sound pressure of the applied acoustic field.

EAC2025_PO3-10_160_David Pour.pdf

PO3: 11

Personal dose during cardiovascular exercise

Sofia Eirini Chatoutsidou, Eleftheria Chalvatzaki, Mihalis Lazaridis
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People usually practice outdoors, thus exercising in the ambient environment becomes another proxy for human health hazard. It is generally accepted that there is a trade-off between air pollution and exercise, which relates to a threshold beyond which the benefit of exercising becomes negative.The present work investigated the personal dose received by trainees during exercise in the outdoor environment. Dosimetry simulations were performed for different levels of physical exertion and particle mass concentrations for males and female trainees.

EAC2025_PO3-11_218_Chatoutsidou.pdf

PO3: 12

Photooxidation of Biomass Burning Emissions: Secondary Organic Aerosol Formation under varying NOx levels

Yarê Baker[1], Agata Błaziak[2], Peter Mettke[1], Laurent Poulain[1], Ricarda Gräfe[1], Mokshika Saxena[1], Simeon Schum[3], Hartmut Herrmann[1]
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Biomass burning (BB) contributes significantly to atmospheric aerosol through primary emissions and secondary organic aerosol (SOA) formation during aging in the atmosphere. One crucial parameter for SOA formation and properties is the availability of NOx. Thus, the OH oxidation of BB emissions was studied under varying NOx levels. Burning experiments of different fuels were performed in a residential heating stove and the resulting emissions were diluted and introduced into an atmospheric simulation chamber. Aerosol mass spectrometry was used for a detailed analysis of the organic aerosol phase, showing changes in aerosol oxidation state and composition at different NOx levels.

EAC2025_PO3-12_931_Baker.pdf

PO3: 13

Time-resolved measurements reveal the evolving oxidative potential of indoor-generated aerosols under simulated photochemical ageing

Rico K.Y. Cheung[1], Aristeidis Voliotis[2], Mathilde Delaval[3], Dawei Hu[2], Joseph Bainbridge[2], Rongrong Wu[2], Raghad Aldulaymi[4], Andrew Trafford[4], Cyrill Bussy[5], James Allan[2], Gordon Mcfiggans[2], Markus Kalberer[1], Steven J. Campbell[6]
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Exposure to indoor-generated aerosols is a public health concern, yet they remain underexplored compared to ambient pollution. We performed smog chamber experiments at the Manchester Aerosol Chamber to investigate how photochemical ageing influences the oxidative potential (OP) of aerosols from cooking, cleaning, and candle burning. Using high time-resolution instruments for measuring OP, we found that photochemical ageing elevates aerosol mass and OP on both a per-volume and per-mass basis. Once photochemistry ceased, OP decreased by about 40% within an hour, revealing the rapid decay of short-lived OP-active species and underlining the dynamic toxicity of indoor-generated aerosols.

EAC2025_PO3-13_749_Cheung.pdf

PO3: 14

Agricultural fire impacts on brown carbon during different seasons in Northeast China

Jiumeng Liu, Yuan Cheng, Xubing Cao, Yingjie Zhong
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Brown carbon (BrC) aerosols were explored in the northernmost megacity in China during two agricultural-fire-impacted seasons. Agricultural fires resulted in distinct peak in BrC's light absorption spectra at 365 nm, and enhanced the mass absorption efficiency of brown carbon (MAE). The enhancement was more efficient by fires with higher combustion efficiencies. After taking CE into consideration, Fire impacts on MAE showed converged patterns for different seasons. The presence of the ~365 nm peak also complicated the determination of absorption Ångström exponents (AAE). The ~365 nm peak became much less significant during the day, likely due to photobleaching of the relevant chromophores.

EAC2025_PO3-14_531_Liu.pdf

PO3: 15

Characteristics and source apportionment of water-soluble inorganic ions in TSP during the lockdown episode for epidemic outbreak of COVID-19 in Wuhan, 2020

Wen Sun[1,3], Chengkai Qu[2], Stefano Albanese[3]
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The lockdown held due to the COVID-19
pandemic in Wuhan, Central China, potentially improved
the air quality, from 23rd January to 24th March of 2020.
Daily observations of total suspended particulates (TSP)
in an urban area of Wuhan were performed to compare
9 water-soluble inorganic ions (WSIIs, Na+, K+, Mg2+, Ca2+,
NH4+, F-, Cl-, NO3-, SO42−) and secondary inorganic aerosol

(SNA, SO42−, NH4+and NO3−) reaction mechanisms during the pre-lock and the lockdown episode.

EAC2025_PO3-15_723_Sun.pdf

PO3: 16

Climatology of aerosol optical properties in Cyprus based on aerosol type classification from AERONET and Lidar data

Francesco Scarlatti[1,2], Rodanthi Elisavet Mamouri[1,2], Argyro Nisantzi[1,2], Athina Savva[1,2]

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A model for aerosol typing based on optical AERONET measurements is presented. It uses two main optical properties retrieved at several wavelengths by CIMELs of the network: the Single Scattering Albedo and the Angstrom Exponent. It is obtained by a Machine Learning methodology. It is then applied to the data of CIMEL in Limassol (Cyprus). we found the relative presence of various aerosol types in there. To cross-validate the ML method we use the optical data of a collocated depolarization Raman Lidar. the two have also been used to obtain a climatology of other optical properties from AERONET and Lidar.

EAC2025_PO3-16_950_Scarlatti.pdf

PO3: 17

Distinguishing the air quality impact from different types of stove for residential heating in central Italy

Arianna Marinelli[1,3], Fulvio Amato[2], Silvia Canepari[3], Lorenzo Massimi[3], Alessandro Domenico Di Giosa[1]

[1]Regional Environmental Protection Agency; [2]Spanish Research Council (CSIC); [3]Sapienza University of Rome

In Italy, domestic heating uses often wood (17%) and pellets (7.3%) and in most cases (about 70%), conventional fireplaces or stoves are still used.

This study investigates the impact of different types of stoves on local air quality in two different areas of Lazio Region in central Italy (Rome and Sacco Valley) analyzing existing datasets of PM chemical characterization.

The results highlight the importance of the role of different types of biomass heating systems and suggest that further investigations can provide important information for adopting best practices to reduce harmful effects on health and environment.

EAC2025_PO3-17_175_Marinelli.pdf

PO3: 18

Eulerian model of dilute suspensions of electrified particles

Karim Mehrabi, Francisco Higuera

Universidad Politécnica de Madrid, Spain

We present an analysis of the suspension of small, electrified solid particles in a gas.

EAC2025_PO3-18_530_Mehrabi.pdf

PO3: 19

Evaluating the impact of thermal conditions on emissions from tobacco heating systems

Dimitrios Zarvalis, Eleni Papaioannou, Daniel Deloglou, Kyriaki Tsortanidou, George Karagiannakis

CERTH, Greece

This study evaluates the impact of thermal conditions on emissions from heated tobacco products (HTPs) using a custom experimental heating device. HTPs operate below combustion temperatures (~300 °C), but combustion onset and soot formation were observed at 400 °C under ambient conditions. A catalytic stripping (CS) system was used to isolate solid particles from volatile emissions. Advanced measurement techniques analyzed particle number, soot mass, and gas concentrations. Results confirm that thermal degradation dominates below 400 °C, while combustion occurs above this threshold. These findings enhance understanding of HTP emissions and inform strategies to minimize harmful byproducts in tobacco heating systems.

EAC2025_PO3-19_232_Zarvalis.pdf

PO3: 20

Inflammatory effects of Saharan dust in co-cultures: the role of microbial constituents

Lara Boßmann[1], Gerrit Bredeck[1], Angela A. M. Kämpfer[1], Isabelle Masson[1], Martinique Frentrup[2], Ulrich Nübel[2], Tina Wahle[1], Roel P. F. Schins[1]

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We investigated the role of microbial components in the inflammatory potency of Saharan dust (SD). On the basis of the microbial composition of SD microbial cocktail, composed of Gram-positive and Gram-negative bacteria and fungi were prepared. The SD was then tested in a co-culture model of A549 lung epithelial cells and THP-1 macrophages in quasi air liquid interface exposure conditions. Heat-inactivation of SD abrogated the increased secretion of IL-1β and IL-8, and this could be restored upon addition of microbial mixtures to the heat-inactivated SD. Our results support importance of microbial constituents in the inflammatory effect of SD.

EAC2025_PO3-20_533_Boßmann.pdf

PO3: 21

Influence of the acceleration of the flow on microparticle resuspension

Mélanie Baptiste[1,2], Félicie Theron[2], Lionel Fiabane[1], Dominique Heitz[1], Laurence Le Coq[2]

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This study inverstigates the resuspension of microparticles submitted to accelerated flows. Existing study on particle resuspension usually omit the transient phase needed to reach the velocity of interest, yet it was shown that resuspension starts before reaching the steady phase. Moreover, turbulence usually appears during the acceleration phase and the onset of turbulence depends on the acceleration parameter. We investigate experimentally how the acceleration affects the flow and thus how it affects resuspension using smooth glass microparticles.

EAC2025_PO3-21_1061_Baptiste.pdf

PO3: 22

Investigation of particle collisions in air-flow resuspension phenomena with 4000Hz frequency acquisition camera

Alexis Abad[1], Célia Bonnefoy[2], Samuel Peillon[1], François Gensdarmes[1]

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In present work the key role of particle collisions effect during particle resuspension by turbulent airflow for monolayer deposit is investigated using high speed camera and image processing. The experiments are realised in a dedicated wind tunel for velocities between 1 and 3.5 m/s and particle median diameter of 36 µm. Set of particle trajectories are determined to calculate collision frequencies according to surface concentration and particle size distribution.

EAC2025_PO3-22_924_Abad.pdf

PO3: 23

Long-term characterization of Lung Deposited Surface Area of Ultrafine Particles in Athens, Greece

Panayiotis Kalkavouras[1,2], Georgios Grivas[1], Nikolaos Mihalopoulos[1]

[1]National Observatory of Athens, Greece; [2]Department of Environment, University of the Aegean, Mytilene, Greece

Ultrafine particles (UFPs, ≤0.1µm) pose significant health risks due to their deep penetration into the lungs, yet they are often overlooked in studies of air pollution. 7-year data from Athens, Greece is analyzed to calculate the lung deposition surface area (LDSA), using measured PNSD and ICRP/MPPD models. The majority of UFPs are deposited in the alveolar region, highlighting the potential impact on health. PMF source apportionment identified vehicular traffic as the main contributor (60%) to LDSA. Long-term trends provide insight into urban aerosol exposure, emphasizing the need for targeted mitigation strategies to reduce the health risks associated with UFPs.

EAC2025_PO3-23_808_Kalkavouras.pdf

PO3: 24

Measurements of Surrogate Respiratory Sessile Droplet pH and Implications for Exhaled Respiratory Aerosol and Airborne Disease Transmission

Jianghan Tian[1], Beiping Luo[2], Aidan Rafferty[3], Allen Haddrell[1], Ulrich Krieger[2], Jonathan Reid[1]

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The respiratory aerosol pH (above 9) has been proposed as a major driver for the infectivity loss of SARS-CoV-2 viruses and influenza A virus in exhaled aerosols, thus affecting the airborne transmission of respiratory diseases. Despite several studies utilising Raman spectroscopy to quantify atmospherically relevant aerosol pH, there is limited understanding of the kinetics of CO2 partitioning and pH variability within respiratory fluid-relevant droplets. In this work, a method to investigate the HCO3-/CO32- equilibrium in a surrogate respiratory fluid system within sessile droplets is proposed to elucidate the pH evolution of exhaled respiratory aerosol.

EAC2025_PO3-24_157_Tian.pdf

PO3: 25

Modeling Road Traffic Contributions to PM2.5 and Particle Number with LOTOS-EUROS

Ruud Janssen, Astrid Manders, Quinten Bohte, Tilman Hohenberger, Marya el Malki, Jeroen Kuenen, Martijn Schaap

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Road traffic significantly contributes to ultrafine particles and PM2.5. The impact of volatile organic compounds (VOCs), especially intermediate (IVOC) and semi-volatile (SVOC) organic compounds, on particle mass and number is uncertain due to incomplete emission inventories and simplified chemistry-transport model parameterizations (CTMs). The EASVOLEE project updated the LOTOS-EUROS CTM to better represent organic aerosol (OA) formation and particle size/number from road traffic. This includes the CB7 chemistry scheme, VBS scheme, and SALSA2 module. Future steps involve coupling organic vapors with SALSA2 and using new road emission data to assess road transport's contribution to particle concentrations and PM2.5 over Europe.

EAC2025_PO3-25_774_Janssen.pdf

PO3: 26

Modelling Atmospheric Cluster-to-Particle Transition

Haide Wu, Yosef Knattrup, Galib Hasan, Jonas Elm

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The point at which a given assembly of molecules represents a molecular cluster, or a particle
remains ambiguous. In this contribution, we give an overview of our recent endeavours in exploring the cluster-to-particle transition concept using quantum chemical methods.

EAC2025_PO3-26_511_Wu.pdf

PO3: 27

Multi-year gradient measurements of sea spray fluxes over the Baltic Sea and the North Atlantic Ocean

Piotr Markuszewski[1,2,3,4], E. Douglas Nilsson[2,4], Julika Zinke[5,4], E. Monica Mårtensson[6], Matthew Salter[5,4], Przemysław Makuch[1], Małgorzata Kitowska[1], Iwona Wróbel-Niedźwiecka[1], Violetta Drozdowska[1], Dominik Lis[1], Tomasz Petelski[1], Luca Ferrero[3], Jacek Piskozub[1]

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Ship-based measurements of sea spray aerosol (SSA) fluxes (0.5–47 µm) from 2009–2017 in the Baltic Sea and North Atlantic Ocean revealed lower SSA emissions in the Baltic. Elevated chlorophyll-a levels, indicating higher biological activity, reduced SSA fluxes, especially under strong winds. Wind speed, wave dynamics, and wave age were key factors, with younger Baltic Sea waves generating more SSA. Temperature and atmospheric stability showed weaker correlations. This study provides the first detailed comparison of SSA emissions between these regions, highlighting the need for region-specific models to predict aerosol fluxes and their climatic implications.

Markuszewski P. et al. ACP, 2024. https://doi.org/10.5194/acp-24-11227-2024

EAC2025_PO3-27_742_Markuszewski.pdf

PO3: 28

Size Ratio Dependent Enhancement Factor of Ultrafine Aerosol Coagulation Rates by Van der Waals Potential

Hui Ouyang, Brandon Boren, Deepak Sapkota
The University of Texas at Dallas, United States of America

Unequal-size nanoparticle coagulation plays a crucial role in atmospheric aerosol processes, influencing cloud condensation nuclei formation, aerosol growth and scavenging through coagulation. This study examines the impact of van der Waals (VDW) forces on coagulation enhancement factors using NaCl as a model aerosol. Theoretical modeling and chamber experiments show that enhancement factors vary with particle size and the size ratio of the coagulating pair, deviating from continuum and free molecular models. Assuming a size ratio-independent enhancement factor introduces minimal error (<15%) when nanoparticles coagulate with larger ones rather than smaller ones. These findings enhance the accuracy of coagulation rate predictions in aerosol modeling.

EAC2025_PO3-28_521_Ouyang.pdf

PO3: 29

Size-resolved PM Composition and sources in Saxony, Germany: A Decadal Comparison (2013/14 vs. 2023/24)

Vanessa Engelhardt, Dominik van Pinxteren, Uwe Käfer, Manuela van Pinxteren, Hartmut Herrmann
Leibniz-Institut für Troposphärenforschung e.V. (TROPOS), Germany

PM2.5 and PM10 remain key air pollutants in Europe, often exceeding WHO air quality guidelines despite emission reductions. This study investigates size-resolved PM concentrations, chemical composition and PM sources at three sites in Saxony, Germany, comparing 2023/24 data to 2013/15. PM10 levels were lower across all sites, particularly with eastern air masses, suggesting reduced anthropogenic contributions. Carbonaceous aerosols at the traffic site decreased significantly, reflecting changes in the local contribution of this PM source from direct exhaust emissions. These findings provide insights into long-term air quality trends. Detailed source apportionment will help determine changes in the contribution of each sector.

EAC2025_PO3-29_355_Engelhardt.pdf

PO3: 30

Sparsity introduction in Bayesian Autocorrelation Matrix factorization for organic aerosol source apportionment

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The Positive Matrix Factorisation (PMF) algorithm (Paatero and Tapper, 1994) has been the most widely used receptor model for a long time and has only recently been challenged with new methodologies. The novel Bayesian auto-correlated matrix factorisation method (BAMF, Rusanen et al. 2024) integrates an auto-correlation term emulating real-world pollutant sources time evolution has produced higher accuracy compared to PMF. However, both PMF and BAMF struggle to provide well-separated profiles manifested as mixed time series contributions. This work aims to introduce an sparsity prior called horseshoe regularisation (Piironen and Vehtari, 2017) on BAMF in order to improve profile unmixing.

EAC2025_PO3-30_453_Via.pdf

PO3: 31

Spatial variability of aerosol optical properties in the European Arctic

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This study examines the vertical variability of aerosol optical properties from 2018 to 2023 near Ny-Ålesund, Svalbard, using observations at two sites: Gruvebadet (61 m) and the Zeppelin Observatory (475 m). Scattering coefficients were measured using an integrating nephelometer, while absorption coefficients were obtained using MAAP, PSAP, and AE33. Seasonal trends reveal that both coefficients are enhanced during the cold season due to Arctic haze from mid-latitude pollution. Radiosonde data indicate that in winter thermal inversions, Zeppelin experiences higher scattering coefficients. In the warm season, Gruvebadet consistently shows higher scattering and absorption when Zeppelin is cloud-surrounded due to scavenging effect.

EAC2025_PO3-31_921_Meroni.pdf

PO3: 32

Using clustering approaches to dynamically determine the number of sources of organic aerosol in PMF analyses

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PMF is widely used to apportion aerosol sources, while current PMF techniques still struggle to adapt to changing source profiles over time. This study proposes a new method that combines PMF with machine learning to dynamically determine the number of sources, leading to more accurate source identification and quantification. Tested on European datasets, the method showed potential to improve PMF results via better-separating sources like cooking activities, and biomass burning. Wider adoption of this approach promises to enhance air quality models, health assessments, and policymaking by providing a clearer picture of PM2.5 sources in diverse environments.

EAC2025_PO3-32_769_Schneider.pdf

PO3: 33

Atmospheric reactive nitrogen and its dry deposition regimes under emission reduction: Insights from intensive and long-term monitoring in Switzerland

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Fifteen years of long-term measurements at an agricultural site in Switzerland revealed trends in nitrogen deposition and aerosol chemistry, complemented by high time-resolution observations. Aerosol pH was lower in summer due to meteorological factors, while NH_3 buffering prevented an expected pH increase despite declining SO_2 emissions. HNO_3 partitioned into particles at night, whereas NH_3 remained in the gas phase, regulated by high aerosol pH. Seasonal variations in dry deposition showed faster nitrate removal in summer, while ammonium consistently deposited rapidly. These findings highlight the complex interactions governing nitrogen deposition and aerosol acidity, informing strategies for air quality management.

EAC2025_PO3-33_710_Zhang.pdf

PO3: 34

Comparative genome copies reduction of MS2 and T4 Bacteriophages Using UVA and UVC in a Controlled Atmospheric Chamber: Implications for Indoor Air Hygiene

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Our results show that conducting experiments in a 19 m^3 atmospheric volume comparable to real-world indoor environments, combined with the use of a mucin mixture to simulate human respiratory emissions, significantly increases the required UV dose for effective genome copy reduction compared to studies using small-scale reactors. These findings are crucial for designing effective UV-based air disinfection systems, as they provide more realistic dose requirements necessary for mitigating airborne virus transmission in indoor spaces.

EAC2025_PO3-34_345_Mohamadi Nasrabadi.pdf

PO3: 35

Evaluation of the PM mitigation using a green barrier in a high traffic site

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The study investigates air pollution mitigation using a green barrier along Viale Fulvio Testi, a high-traffic area in Milan, within the "TESTI" project framework. Preliminary data collection measured PM10, PM2.5, PM1, black carbon, and gaseous pollutants using various instruments. Results showed peak pollution levels during rush hours, with a PM2.5/PM10 ratio of 0.65 due to traffic-induced resuspension. Vertical and horizontal particle profiles indicated a 20% reduction in ultrafine particles (≤50 nm) behind the vegetation. These findings highlight the potential of urban greenery in reducing airborne pollutants and provide insights for designing effective green barriers in urban environments.

EAC2025_PO3-35_1035_Cefalì.pdf

PO3: 36

Gaining insights into filter-based measurements of the aerosol absorption coefficient: an integrated approach

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In this work we performed sensitivity tests on a free parameter needed to obtain aerosol light absorption measurements by on polar photometry. We tested aerosol emitted by a moto-generator in an atmospheric simulation chamber and collected in parallel on different types of filters (both fibre and membrane filters). Light-absorption characteristics of emissions by different fuels were investigated (i.e. diesel and HVO available in petrol stations).

After measurement optimisation, the role of particle size distribution on Ångström Absorption Exponents (AAE) was experimentally investigated and the results were corroborated using discrete dipole approximation simulations considering different geometric assumptions.

EAC2025_PO3-36_434_Acton-Bond.pdf

PO3: 37

Giant Particle Size Distribution and Composition Near and In Dust Sources

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Mineral dust is one of the key players in the Earth's atmosphere. Dust spans a large size range of particle diameters from 100 nm to more than 100 µm. Owing to the negligence and difficulty in measurement, few information is available on the super-coarse and giant dust size range. We collected deposition samples from field campaigns inside Saharan, Arabian and Arctic dust sources and analyzed them by electron microscopy for size and composition. We present size distributions along with particle composition, e.g. minor compositional differences between Arabian and Saharan dust, or coarser particles particular in the Arctic.

EAC2025_PO3-37_240_Kandler.pdf

PO3: 38

FROM BIOMASS PELLETS TO AIR POLLUTION: HOW FUEL QUALITY DETERMINES EMISSIONS

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In light of climate goals, biomass pellets are promoted as renewable energy sources, yet their combustion may emit harmful pollutants. This study assessed 30 wood and non-wood pellets sold in Poland, revealing major quality inconsistencies—even among certified products. Many failed key standards due to high ash content, poor durability, or contamination. Emission tests showed that especially agro-pellets release excessive levels of PM, CO, NO_2, H_2S, NH_3, Cl_2, SO_2, and HCHO. Statistical models linked emission levels to pellet properties. The findings underscore the need for stricter certification, better labeling, and advanced quality control to ensure cleaner biomass energy and protect public health.

EAC2025_PO3-38_1201_Widziewicz-Rzońca.pdf

PO3: 39

Spatial variability of air pollution from residential heating in a small settlement in the Czech Republic

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Detailed air quality monitoring in a small settlement Rožďalovice was conducted in February 2024. Measurements were carried out simultaneously at four locations throughout February. The aim of the study was to assess the spatial variability of benzo(a)yrene (BaP) and PM10 concentrations in small municipalities during the heating season. A preliminary evaluation of the data reveals significant differences in PM10 and BaP concentrations between the monitoring sites. The findings provide valuable insights into the limited representativeness of measurements in areas influenced by local heating sources, also known as 'village hot spots.

EAC2025_PO3-39_182_Schreiberova.pdf

PO3: 40

Investigation of coating thickness and black carbon mass absorption cross-section variation during winter campaign in Ljubljana (Slovenia)

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An ambient measurement campaign was conducted in an urban background site in Ljubljana (Slovenia) during winter 2024/2025. The aim was to determine the influence of coating on absorption enhancement of black carbon and to investigate the factors influencing the generation of coating. The coating thickness was measured by selecting particle mass using CPMA and measuring rBC with SP2-XR. Photothermal interferometer PTAAM-2λ was used to measure aerosol absorption. First results show a varying mixture of moderately and highly coated particles.

EAC2025_PO3-40_827_Drinovec.pdf

PO3: 41

Long-term composition and optical properties of Amazonian aerosols measured at the ATTO tower

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In central Amazonia, aerosol sources, weather, and chemical processes create a highly variable aerosol population. This study connects aerosol optical measurements from the Amazon Tall Tower Observatory (ATTO), at 60 and 325 m heights, to particle composition and sources, characterizing different aerosol populations, assessing their vertical gradients, and associating them with the influence of various emission sources and atmospheric processes. TSI SMPS, AE33 Aethalometers, Ecotech nephelometers, and Aerodyne ACSM monitors were continuously operated at 60 and 325 meters in height. The results show a complex mixture of biogenic sources with organic aerosols from VOC oxidation.

EAC2025_PO3-41_1194_Artaxo.pdf

PO3: 42

Physico-chemical characterization of indoor airborne particulates emitted in plastics processing workplaces

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Through the CELLOPHAN project indoor airborne particulate matter (PM) with special focus on micro-nano particles (MNP) emitted by different workplaces has been investigated and analysed by different techniques. Optical particle counters (OPC) were employed to detect particle concentrations, whereas filter PM samples were analysed by Electron microscopy and microanalysis (SEM-EDS). Three different site types were considered for each workplace in order to represent different exposure conditions (direct emission, average exposure, office). Results of particle size and number concentration obtained with different techniques were cross-compared and some preliminary results are reported in this contribution.

EAC2025_PO3-42_492_Rossi.pdf

PO3: 43

PM10 and PM2.5 variability over Italy (2021–2023): Data-driven mapping and causal inference analysis

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This study proposes high-resolution daily maps of $PM_{2.5}$ and PM_{10} concentrations covering the Italian territory from 2021 to 2023 at ~1 km spatial resolution. The work uses machine learning models trained on data from over 300 monitoring stations combined with spatial and spatiotemporal predictors such as land cover, human presence, elevation, atmospheric state, and aerosol optical depth. Among the evaluated models, Ensemble Bagged Trees explained up to 67% of PM variance. The SHAP analysis identifies key predictors impacting the PM variations. These findings improve air quality assessments and policymaking by increasing understanding of PM variability and its underlying causes.

EAC2025_PO3-43_1103_Mansour.pdf

PO3: 44

Predicting the influence of the Planetary Boundary Layer at the Helmos Hellenic Atmospheric Aerosol & Climate Change (HAC)2 station using a combination of in-situ measurements and remote sensing techniques

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The Helmos Hellenic Atmospheric Aerosol and Climate Change ((HAC)²) station in Greece (2314 m a.s.l.) is the only high-altitude station in the eastern Mediterranean, suitable for climate change-related studies. Two intensive campaigns with the scope of unravelling aerosol-cloud interactions took place at (HAC)2 station; the CALISHTO campaign during autumn-winter 2021-2022 and the CHOPIN campaign during autumn-winter 2024–2025. This study establishes a set of metrics for identifying the influence of Planetary Boundary Layer at (HAC)2 by a synergy of in-situ and remote sensing measurements and applying a statistical model to test their effectiveness.

EAC2025_PO3-44_910_Zografou.pdf

PO3: 45

Source assessment of atmospheric lead reaching Ny-Ålesund (Svalbard)

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PM10 has being sampled in Ny-Ålesund (Svalbard, Norwegian Arctic) since 2010 to assess sources, transport pathways and seasonal variations of pollutants. The latest findings (2022-2024) are here presented. Samples were analyzed for lead content and isotopic composition, evaluating the potential source areas of aerosol. The main contribution of Pb was anthropogenic, with a relevant seasonal trend both for concentration (higher in winter-spring) and geographical origin (Russia in winter-spring, with North American contributions in summer). Preliminary results from the analysis of wet depositions and surface snow samples highlighted the influence of Rain-On-Snow events on the local environment.

EAC2025_PO3-45_784_Ardini.pdf

PO3: 46

Volatility of molecular components of □Pinene SOA modulated by inorganic seed composition

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The Log C^*_{eff} of a molecule represents an important atmospheric variable. The oxidation of volatile organic compounds creates a complex mixture, making C* determination challenging. Furthermore, SOA can be mixed with inorganic salts, impacting the non-ideality of the aerosols. We have generated SOAs in an atmospheric simulation chamber and determined the C^*_{eff}'s of the underlying SOA with either ammonium sulfate or iron/ammonium sulfate seed aerosols. The presence of iron in the seed exhibits non-ideal interactions resulting in ~x10 decrease in C*, which indicates that knowing the underlying seed composition is important for understanding C^*_{eff}.

EAC2025_PO3-46_641_Bell.pdf

PO3: 47

A new approach for source apportionment of Black Carbon from Raman Spectroscopy

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Black Carbon is a major contributor to air pollution and climate change. Current techniques using an Aethalometer can differentiate biomass burning and fossil fuel combustion aerosols, but their accuracy is limited by assumptions and BC properties. This study explores using Raman spectroscopy, statistical analysis and machine learning to improve BC source apportionment, considering more BC emission sources: diesel, gasoline, and biomass burning. Preliminary results indicate over 95% accuracy in classifying BC sources, providing a promising innovative method for effective air quality management.

EAC2025_PO3-47_205_Drudi.pdf

PO3: 48

Developing an algorithm to determine woodsmoke events

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It is challenging to distinguishing woodsmoke from other sources. Levoglucosan (specific marker of woodsmoke) is determined on 24-hour filters, lacking high temporal resolution. In this study, we developed an algorithm to automatically identify woodsmoke events from measured black carbon and particulate matter concentrations. The ACSM (estimating levoglucosan from m/Q channel 60) was used to verify the algorithm showing that it performed very well. In an ongoing campaign, we assess whether woodsmoke events can be distinguished by combining BC and PM sensors. By integrating spatially resolved measurements, we aim to provide actionable insights into localized pollution patterns, enabling targeted interventions.

EAC2025_PO3-48_444_van Dinther.pdf

PO3: 49

Distinguishing Total and Solid Particle Emissions from Household and Office Devices using a Catalytic Stripper

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People spend most of their time indoors where they are exposed to a very complex mixture of aerosol. Especially household appliances which produce heat, like toasters, hair driers, and also printers, are prone to generate a large number of particles. Here we present various studies on household and office devices, like a printer, where we used a Catalytic Stripper in combination with other particle measurement techniques to determine the concentration and size of solid and semi-volatile particles. This information could help to develop new mitigation strategies and foster future particle emission regulations for household and office devices.

EAC2025_PO3-49_1116_Bauer.pdf

PO3: 50

Elevated NOx concentration in urban plumes increases volatility of secondary organic aerosol over the suburban region

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In this study, we investigated how increased NO_x level within urban plumes affect the evolution of OA volatility at a downwind site. Source analysis was performed on the thermogram data of organic compounds measured by a FIGAERO-CIMS. Increasing NO_x levels mainly affected the SOA formation through gas-particle partitioning, suppressing the formation of low-volatile organic vapors, and thus promoting the formation of relatively high volatile OA. The rise in FIGAERO OA volatility in the afternoon was predominantly driven by high-NOx-like pathway, especially during the urban air masses period.

EAC2025_PO3-50_555_Cai.pdf

PO3: 51

Characterizing Aerosol Optical Properties at the Payerne Monitoring Site Using Polarimetric Observations

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Polarimetric light scattering measurements enhance understanding of aerosol optical properties, improving aerosol classification and remote sensing validation. However, in situ observations remain scarce. This study presents in situ aerosol polarimetric measurements at Payerne using the IMAP-100 polarimeter to analyze scattering phase functions and polarization-resolved data at different cut-off sizes. Laboratory calibration ensured accurate data processing, and retrievals were performed using the GRASP algorithm. Preliminary results reveal temporal variations in light scattering coefficients and aerosol size distributions. Future work focuses on refining retrievals, integrating multi-instrument datasets, and advancing aerosol characterization techniques to better connect in situ and remote sensing observations.

EAC2025_PO3-51_916_Christodoulou.pdf

PO3: 52

Organic and emerging pollutants in indoor suspended particles hospitals before, during and after SARS-CoV2 pandemic.

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Four indoor chemical characterisation campaigns were conducted in five Italian hospitals. Measurements were performed before the peak of SARS-CoV2 (autumn 2019), during (spring 2021) and after the lifting of the pandemic restrictions (winter 2022 and 2023). Deposition dust (DD) and its comparison with atmospheric particulate matter (PM) were analysed. In this study, PM samples were collected using an air conditioning filter, which can represent indoor particulate matter. The air conditioning filter has a good effect on particle retention and is contaminated by ultrafine particles, which can be resuspended and follow the air conditioning back into the indoor air.

EAC2025_PO3-52_1110_Romagnoli.pdf

PO3: 53

Germicidal effects of UV irradiation on viral aerosols

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COVID-19 highlighted the impact of infectious particles on daily life. We explored UV-light-based methods for indoor air disinfection. Therefore, we have tested their efficiency on phages and feline coronaviruses-loaded aerosols, exposing them to UVA and UVC radiation. Thereafter, the aerosols are sampled and quantified genome equivalents (qPCR) and recovered viruses (microscopy). The survivability of all viruses is reduced even with UVA light (53.15 J/cm²) and a clear reduction in genome equivalents is observed under UVC irradiation. Based on that, we outlined currently ongoing experiments focusing on microscopic visualization and the application of UV disinfection in real-world environments.

EAC2025_PO3-53_301_Eckstein.pdf

PO3: 54

Hunting for the sources of rural air pollution: waste burning

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This study investigates air pollution from waste burning and wood combustion, focusing on rural Hungary. Waste burning, particularly in uninformed communities with poor waste management, emits high levels of particulate matter and toxic pollutants, exacerbating respiratory diseases. Two winter measurement campaigns used advanced aerosol spectrometers and filter analysis to monitor PM and black carbon emissions. Results show extreme pollution levels, however based on the measurement results, it was possible to distinguish between dry wood combustion and illegal waste burning. This research enhances emission source apportionment, supporting targeted air quality mitigation strategies and sustainable pollution management.

EAC2025_PO3-54_901_Farkas.pdf

PO3: 55

Investigating the viable to total respiratory particles concentration ratio using a BioTrak in various indoor environment configurations

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Viable particles refer to biological particles, such as bacteria, viruses, fungi, or spores, that are capable of growing, reproducing, or causing infections under the right conditions. In the context of bioaerosols, these particles can remain airborne and potentially spread diseases or impact indoor air quality. Characterizing the viability of airborne particles is therefore very important to accurately analyze infection risk in indoor environments.In this study, we propose a new approach in the real time physical characterization of viable particles in indoor environments with a focus on respiratory particles

EAC2025_PO3-55_443_Ait Ali Yahia.pdf

PO3: 56

Investigation of Optical Properties of Different Fuels Diesel Exhaust by an Atmospheric Simulation Chamber experiment

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Carbonaceous aerosols, comprising 20% to 50% of total aerosol mass, significantly impact climate and human health. This study examines the optical properties of aerosols from different fuel combustion processes, analyzing emissions for particle size distribution and carbon content. Experiments in the ChAMBRe chamber at Genoa University/INFN used a propane-fueled soot generator and a diesel engine running on conventional diesel and HVO. Diesel combustion produced the most light-absorbing particles, with MAC values up to 9.4 $m^2 g^{-1}$. Findings highlight the need for accurate correction factors in optical measurements and support real-time monitoring for environmental and workplace safety.

EAC2025_PO3-56_814_Danelli.pdf

PO3: 57

ML analysis for absorption measurements correction schemes – A test study

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The absorbing properties of aerosols is typically measured using instruments like filter photometers, with the aethalometer AE33 being the most widely deployed. However, FPs are sensitive to scattering, which can lead to measurement errors, especially at high scattering levels. A correction scheme to address this was proposed but requires scattering data, often unavailable in networks. To overcome this, we are testing Machine Learning algorithms using a gradient boosting regressor on a 2023 summer campaign in Granada, yielding accurate compensation results. The model is being expanded to 23 European sites to validate and refine the algorithm and cross-validate with other instruments.

EAC2025_PO3-57_958_Yus Díez.pdf

PO3: 58

Optical properties and size distributions of particulate matter produced by diesel B7 and Hydrotreated Vegetable Oil combustions in an atmospheric simulation chamber

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Here we present the results of several experiments, performed at ChAMBRe (Chamber for Aerosol Modelling and Bio-aerosol Research) with the aim to measure the optical properties and size distribution of aerosol generated by combustion of HVO (Hydrotreated Vegetable Oils) and diesel B7 (conformed to EN590).Results in terms of size distribution (NanoMoudi), optical properties (MWAA and BLAnCA) and EC/OC ratio (thermal-optical analyses) at each stage of fresh and aged aerosol will be presented at the conference.

EAC2025_PO3-58_467_Mazzei.pdf

PO3: 59

PM10 Source assesment in rural olive areas of Spain: Implications for 2030 Air Quality Standards

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This study analyses PM10 and CO levels from June 2018 to June 2024, as well as the chemical composition of PM10 from 2021 to 2023, to determine source apportionment using the US-EPA PMF5 model. After discounting North African dust apportionment, a 25% reduction in combustion emissions is required to meet the 2030 directive's target. Therefore, it is crucial to maintain, until at least 2030, the measures outlined in the Air Quality Plan of Villanueva del Arzobispo by the Junta de Andalucía, specifically targeting biomass combustion emissions.

EAC2025_PO3-59_979_Romero Pereifa.pdf

PO3: 60

Source Apportioned Particle Number Concentrations during Winter Season before COVID19 lock in the City Center of Belgrade, Serbia

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This study apportioned the sources of PNSDs by analysing the data collected between January 20th and March 9th 2000., during the winter season period of 40 days before COVID19 lockdown. Source profiles, obtained by application of EPA PMF5 software, were interpreted considering the potential regional sources, local sources and the fact that level of air pollutant including PM fractions are variable over the time and depend from a combination of source emission rates and meteorological conditions. It is investigating the influence of on ultrafine particle (UFP) sources to determine the success of the mitigation strategies and to plan future actions.

EAC2025_PO3-60_672_Cirovic.pdf

PO3: 61

Submicrometric aerosol using Q-ACSM and Positive Matrix Factorization at remnants of the Atlantic Forest in Metropolitan Area of São Paulo (MASP)

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Air pollution has become a major problem in large urban conglomerates, particularly in megacities. The objective of this study was to investigate the chemical composition of the submicrometric aerosol particles during the intensive campaign of the "BIOgenic emissions, chemistry and impacts in the MASP: BIOMASP+" project. The BIOMASP+ took place at two sites the Matão-IAG (urban forest site) and Reserva Morro Grande (RMG, Atlantic Forest site) from April 22 to May 22, 2023. The PM1 (18 and 5.2 µg.m-3) measurements were performed a using the Quadrupole Aerosol Chemical Speciation Monitor (Q-ACSM). Positive matrix factorization was performed on the organic fraction.

EAC2025_PO3-61_639_Chiari.pdf

PO3: 62

Three-wavelength Lidar for aerosol optical and microphysical properties characterisation at Mount Etna (Italy): system upgrades and first measurement results

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Lidar measurements have become essential for near-real-time atmospheric monitoring. At Mount Etna, within the VULCAMED project, lidar observations of volcanic aerosols have been conducted since 2010, initially with a single-wavelength prototype and later with an advanced multi-wavelength system developed. Originally designed to operate in the UV and IR spectral regions, the system was upgraded with VIS channels, improving aerosol characterization. It now acquires elastic and Raman signals at multiple wavelengths, enabling measurements of aerosol optical and microphysical properties. Calibration and validation procedures are required to optimize performance; the implementation and preliminary measurement results will be presented.

EAC2025_PO3-62_517_Spinosa.pdf

PO3: 63

Optimizing Uncertainty Reduction in Air Pollution Health Impact Assessments: A Tradeoff Analysis Using Information Entropy

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We study how estimates of the relationship between air pollution and mortality may be improved with more information on air pollution concentrations or death records, and compare the impacts of improved air pollution data alone versus improved death data alone. We also study the effect of social inequalities by comparing what happens when there is missing data in the majority demographic. Because different groups face different pollution levels, minority data is statistically more informative, offering insights unavailable from majority data alone. This highlights the importance of inclusive data for accurate environmental health assessments.

EAC2025_PO3-63_528_Crippa.pdf

PO3: 64

Black carbon emission factors of household wastes co-burned with firewood in stoves

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The combustion of household waste in fireplaces negatively affects air quality, among other factors, due to the increased emission of soot. In this work, various plastic waste types were co-burned with firewood, and legal fuels were also burned separately in a fireplace under controlled conditions. The emission factor of soot was calculated and discussed for the burning of specific waste types.

EAC2025_PO3-64_899_Hoffer.pdf

PO3: 65

Black carbon pollution and sources in gas-heated Moscow megacity: Upgrade to European phenomenology

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Major peculiarity of BC pollution and sources are highlighted in Moscow, largest northernmost European megacity, with gas-fueled heating system and absence of residential biomass burning. Upgrade to European phenomenology supports the harmonization of BC measurements allowed for comparisons between cities; two and a half-year mean BC in Moscow urban background is found significantly less than in France, Spain and Greece, and no difference with UB sites in Northern, North-Western, Eastern Europe, and in Netherlands, Germany. Annually average Moscow monthly eBC concentrations characterized by increased values in August and September, different from European UB with prominent winter SF residential heating impact.

EAC2025_PO3-65_616_Popovicheva.pdf

PO3: 66

PFAS monitoring in Flanders, Belgium

Jan Peters
VITO, Belgium

In response to elevated PFAS concentrations in soil, water and air in the wider Antwerp region, the Government of Flanders decided in June 2021 to map out the problem and to initiate a coordinated approach and perform extensive monitoring campaigns on a regular basis throughout Flanders. This contribution reports about the results from air monitoring campaigns that were conducted at a range of monitoring sites including industrial, urban residential and rural sites in Flanders, with the purpose to survey and assess the **PFAS concentrations and fingerprints in ambient air and deposition**.

EAC2025_PO3-66_930_Peters.pdf

PO3: 67

A Multi-year Characterization of Black Carbon at Regional, Urban, and Urban Background Locations in Qatar

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This study analyzes black carbon (BC) concentrations in Qatar from 2022 to 2024 across urban and background sites. BC levels were highest near traffic-heavy areas and declined over time due to improved urban management post-2022 FIFA World Cup. Seasonal peaks occurred during the hot-humid months, while diurnal patterns followed traffic trends, with morning and nighttime peaks. The ΔBC/ΔCO ratio confirmed diesel vehicles as a dominant source. Comparisons with SO_2 and NO_x indicated BC's traffic-related origin, while SO_2 peaks suggested industrial contributions. These findings provide insights into BC pollution trends and influencing factors in Qatar's environment.

EAC2025_PO3-67_600_Puthukkadan Moosakutty.pdf

PO3: 68

Analysis of the spatial-temporal variability of chemical-physical properties of PM2.5 in two sites of Southern Italy

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Two measurement campaigns were performed, in cold and warm periods, simultaneously at two sites, urban and suburban background, about 4.3 km apart, in the area of Lecce (Southern Italy). Daily PM2.5 samples were collected simultaneously on quartz and Teflon substrates by a dual-channel low-volume (2.3 m3/h) automatic sampler. Additional measurements were particle number concentration in the range 0.3-10 μm, using two optical particle counters (OPC), and size distributions in the range 0.01-0.8 μm using two scanning mobility particle sizers (SMPS). Meteorological data were also collected at both stations. Chemical characterization included elemental composition analysis by energy dispersive X-ray fluorescence (ED-XRF).

EAC2025_PO3-68_398_Dinoi.pdf

PO3: 69

Assessing indoor and outdoor air quality interactions in urban environments: a case study in Bologna within the ECOSISTER Project

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Indoor air quality (IAQ) is crucial globally and in Europe, where people spend 90% of their time indoors. It is influenced by internal emissions (activities, materials) and outdoor air quality (OAQ), depending on ventilation rates. The ECOSISTER project studies IAQ in a Bologna's district using low-cost sensors to monitor indoor and outdoor CO_2, PM, VOCs, NO_x, O_3, and meteo parameters. Preliminary results show a strong impact of outdoor pollution on indoor PM levels and the predominance of indoor VOC sources. The study aims to develop smart solutions to reduce human exposure to pollutants while optimizing indoor comfort and energy efficiency.

EAC2025_PO3-69_436_Paglione.pdf

PO3: 70

BC concentrations and spectral absorptions at regional background stations in Greece

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This study examines the seasonality of BC and its components related to fossil fuel combustion and biomass burning (BC_{ff}, BC_{bb}), as well as the spectral absorptions related to BC and Brown Carbon (BrC) at two regional-background sites in Greece. The first site is at Finokalia, Crete, a well-known measuring station for atmospheric composition in the eastern Mediterranean and the second is located at a continental background site in NW mountainous Greece (ZEP, Kozani). Both stations are mostly affected by regional-background aerosol plumes of different optical and physico-chemical characteristics (continental vs. marine), and are sensitive in detecting long-range transported aerosol plumes.

EAC2025_PO3-70_417_Gkogiasvili.pdf

PO3: 71

Brown carbon characterization and impacts of absorbing aerosol in Eastern Mediterranean

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Absorbing atmospheric aerosol constitutes an essential contributor to Earth's climate system, since it possesses the ability to absorb solar radiation, affecting radiative forcing. The area of Europe constitutes a scarce context for the investigation of absorbing aerosol, since it is characterized by a vast diversity of emission sources and atmospheric conditions. The current research utilizes a multi-faceted approach, employing ground-based observations combined with chemical analyses, to quantify aerosol properties. The results indicate that absorbing aerosol demonstrates pronounced seasonal and temporal variability, while high absorption coefficients of BC and BrC, appear to be associated with intense biomass burning and residential heating.

EAC2025_PO3-71_1168_Paraskevopoulou.pdf

PO3: 72

CAPE-k CHEM: Precursors vapors and chemical composition of the Southern Ocean aerosols at Cape Grim

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As part of the larger Clouds and Precipitation Experiment at kennaook (CAPE-k) campaign, CAPE-k CHEM performed online measurements of aerosol precursor vapors using state-of-the-art aerosol instrumentation deployed for the first time at kennaook/Cape Grim. This abstract describes the motivation, purpose, methodology, and show first results. CAPE-k CHEM ultimately aims to elucidate the sources, transformations, and fate of natural aerosols in the Southern Ocean as well as their effects on cloud properties by incorporating air mass back trajectory analysis, meteorological reanalysis data, and satellite products as well as utilizing statistical tools such as Positive Matrix Factorization (PMF) and machine learning.

EAC2025_PO3-72_214_Pernov.pdf

PO3: 73

Characterization of a Novel Laminar-Flow Oxidation Reactor for Simulating Atmospheric Multiple-Day Oxidation

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The newly developed Laminar-Flow Oxidation Reactor (ILOx), with a total internal volume of 8 liters, enables the simulation of multi-day atmospheric oxidation processes within minutes. Depending on the total flow, typical residence times range from 2 to 16 minutes. A surrounding 480 W UVA LED lamp (365 nm) provides direct irradiation over 72% of the reactor's surface. The outlet is optimized for simultaneous sampling of VOCs and particles. We will present a comprehensive characterization of the ILOx Reactor, highlighting its oxidation potential. The results will be validated through comparison with the F0AM-4.3 model.

EAC2025_PO3-73_455_Beckmann.pdf

PO3: 74

Characterization Of Gas and Particle-Phase Chemistry from Rice Straw Burning and Aerosol Aging Under Light and Dark Conditions in EUPHORE Chambers

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Biomass burning (BB) significantly impacts air quality, health, and climate by emitting gases and particulate matter. In the Valencian Community (Spain), around 60 kt of rice straw is burned annually, raising environmental concerns. A recent campaign at EUPHORE chambers (Jan–Feb 2025) investigated gas- and particle-phase chemistry and aerosol aging from rice straw combustion under light and dark conditions. Using advanced instruments like HR-ToF-CIMS, the study identified degradation pathways, including the formation of phenolic, furanic, nitrogen-containing compounds, and other BB tracers such as levoglucosan. This ongoing research provides new insights into BB pollutant chemistry.

EAC2025_PO3-74_396_Soler.pdf

PO3: 75

Collision rates of multiply-charged aerosol particles in the CERN CLOUD chamber

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Results of experiments conducted at the CERN CLOUD chamber to study the interactions of unipolar small ions and multiply-charged small particles (<10 nm diameter) with large aerosol particles in the CCN size range (50-100 nm). We will report new insights into the impact of electric charge on particle-particle and particle-ion collision rates in unipolar environments.

EAC2025_PO3-75_733_Rato.pdf

PO3: 76

Comparison of the Four-Wavelength Photoacoustic Spectrometer PAAS-4λ and Aethalometer AE33 for Long-Term Measurements in Rural Northern and Southern Finland

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This study presents long-term measurements of light absorption by atmospheric black carbon (BC) in Northern and Southern Finland, using the PAAS-4λ four-wavelength photoacoustic aerosol absorption spectrometer. The data were compared with MAAP and Aethalometer AE33 measurements to evaluate their accuracy in determining BC mass concentrations (eBC). The study identifies periods influenced by long-range transported combustion aerosols and investigates the variability of the Aethalometer multi-scattering correction factor, C, and its relation to source regions. Further analysis explores BC's mixing state using light scattering and single scattering albedo (SSA). These findings enhance understanding of BC's impact on the Arctic climate.

EAC2025_PO3-76_606_Schnaiter.pdf

PO3: 77

Comparison of ultrafine particles volatility at a traffic site and a suburban station in Athens, Greece

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Human exposure to the ultrafine fraction of particulate matter, (UFP), has serious health effects due to their ability to penetrate deep into the lungs. Traffic exhaust emissions are a major source of particulate matter in urban environments.

Volatility is one of the most important physical properties of aerosol particles, as it can provide real-time information on the particle mixing state for UFPs.

This work aims to study the volatility of aerosol particle number. The measurement campaign took place at a traffic site in Athens and compared with those recorded at a suburban research station located at the N.C.S.R. 'Demokritos'.

EAC2025_PO3-77_709_Spitieri.pdf

PO3: 78

Contamination of the soils with dust fallout from a smelting site in Lubumbashi city, RD Congo

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The bioaccumulation of metals can increase human health risks through several pathways, including particle inhalation, etc.This study aimed to distinguish lithogenic metal sources from anthropogenic soil contamination caused by dust fallout from smelting operations. Topsoils (28), soil profiles (5), dust fallout (17), total suspended particles (TSPs) (10) were collected around the mining site. Mass concentration of metals (Co, Cu, etc.) associated with smelting activities in the topsoil exceeded their background value found in the deeper layer, indicating anthropogenic contamination. In addition, enrichment factors showed that TSPs reflect recent contamination, while dust fallout and top soils show contamination integrated over time.

EAC2025_PO3-78_127_Kasongo.pdf

PO3: 79

Determination of the relative contributions of the disc and pad to the particles emitted by mechanical braking

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Particles emitted by the mechanical braking of commuter trains are part of the non-exhaust particles. The concentrations of these metallic particles with potential adverse health effects are high in confined underground train stations. It is therefore important to understand which component of the braking system, pads or disc, contributes mostly to the emission of particles, in order to design low-emission materials. To this purpose, a mass balance approach has been applied to metals, tracers of the friction materials. The results are discussed and compared to independent measurements of the volume loss of the materials.

EAC2025_PO3-79_1260_Al Kaderi.pdf

PO3: 80

Cytotoxicity, intracellular oxidative stress, and acellular oxidative potential of PM2.5: a study in South Italy

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The study investigates the toxicity of fine particulate matter (PM2.5) sampled at two sites (urban and urban background) in South Italy, focusing on oxidative stress and cytotoxicity. Both acellular assays (ascorbic acid and DTT) and cellular assays based on A549 cells were used. Most samples showed cell viability inhibition below 20%, some between 20%-50%, none exceeded the 50% value. A correlation between oxidative stress and reduced cell viability was observed. Urban PM2.5 induced higher oxidative stress than suburban samples. The results suggest that the chemical composition of PM2.5, rather than its mass concentration, plays a crucial role in its toxicity.

EAC2025_PO3-80_648_Giordano.pdf

PO3: 81

Detection and 23-year climatology of Saharan dust at the high-altitude site Jungfraujoch

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Different methods to detect Saharan dust events (SDE) based on in-situ aerosol optical parameters or size distribution and on FLEXPART back trajectories are evaluated and compared to CAMS dust products at the high-altitude site Jungfraujoch. The method based on negative single scattering albedo exponent is more efficient in winter but depends on the type of nephelometer and absorption photometer. The method based on the size distribution is more efficient in summer. A 24 years climatology of the SDE hours and mass allows to see a trend toward more dust influence since 2020.

EAC2025_PO3-81_344_Collaud Coen.pdf

PO3: 82

Determining source specific organic aerosol and black carbon emission rates by coupling source apportionment and atmospheric dynamics

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This study focuses on determining emission rates of source-specific black carbon (BC) and organic aerosol (OA) using a combination of source apportionment and atmospheric modeling. Measurements were conducted in Nova Gorica, Slovenia, using an Aerosol Chemical

Speciation Monitor (ACSM) and an aethalometer over three months in 2024. A box model approach estimated emission rates by incorporating atmospheric dynamics through planetary boundary layer height inferred from radon measurements. Results showed distinct diurnal patterns for traffic and biomass burning emissions, while secondary OA can be linked to photochemical production and long-range transport.

EAC2025_PO3-82_1097_Stavroulas.pdf

PO3: 83

Evaluating ALI Cell Exposure in Transient Driving Cycles in CNG vehicle

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This study examines the health impact of **ultrafine particle (UFP) emissions** from a **Compressed Natural Gas (CNG) passenger vehicle**, despite CNG being considered a cleaner alternative to gasoline and diesel. A **Euro 6 CNG taxi** was tested under **two real-world driving cycles** using a chassis dynamometer, with emissions analyzed through **Air-Liquid Interface (ALI) in-vitro cell exposure**. **A549 human epithelial cells** were exposed to diluted exhaust, revealing **cell mortality, increased cytokine production, and inflammatory responses**. The **mRDE driving cycle** had a significantly stronger impact, indicating that different driving conditions influence emission toxicity and potential health risks.

EAC2025_PO3-83_400_Papaioannou.pdf

PO3: 84

Evaluation of the toxicological effects of primary and aged logwood stove emissions on alveolar cells exposed at the air-liquid interface

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Experiments were conducted following the beReal test protocol to simulate real-world combustion conditions. A comprehensive physicochemical characterization of gaseous (VOCs, CO, NO_x) and PM phases (mass, size, number, morphology, BC, EC-OC, ions, metals, molecular composition) was conducted, alongside an extended analysis of toxic species (PAHs, nitro- and oxy-PAHs, nitrophenols, carbonyls).

For toxicological assessment, cells were simultaneously exposed to primary and aged emissions. Particular attention was given to determining the PM mass deposited on the cells.Inflammatory markers (Nrf2, NFkB, TNF-a, IL-1b, IL-6, IL-8) and oxidative stress (carbonylated proteins), cell membrane damage (4-HNE), and DNA oxidation (8-OHdG) were assessed.

EAC2025_PO3-84_1151_Alunni.pdf

PO3: 85

Experimental determination of the Atmospheric Heating Rate due to Light Absorbing Aerosols at the Jungfraujoch high altitude remote station

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Available observations suggest that some mountain regions (including Alps) are experiencing seasonal warming rates that are greater than the global land average. The reasons behind the magnitude of climate change in mountains are not entirely clear. However, there are some known mechanisms that can produce enhanced warming rates.In particular light absorbing aerosol absorbs solar radiation and warms the mid-troposphere. Therefore, we carried out a measurement campaign from 1/05 to 31/10 2023 at the Jungfraujoch facility in order to experimentally determine the atmospheric LAA HR in the free troposphere. Preliminary results showed an average value of 0.035 ± 4*10-4 K/day.

EAC2025_PO3-85_1085_Losi.pdf

PO3: 86

Exploring the chemical aging of urban organic emissions: Results from the POSEIDON campaign

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The POSEIDON campaign, conducted in September 2024 on Poros, a Greek island downwind of Athens, the capital of Greece, aimed to study the chemical aging of urban emissions. Advanced instruments measured aerosol and gas phase pollutants, while additional measurements were conducted in Athens for comparison. Organic aerosol (OA) accounted for 52% of PM_1, with more-oxidized OA comprising 64%. Aged biomass burning OA (15%) was associated with the more-oxidized OA factor. The study analyzed air mass trajectories, VOC ratios, and OH concentrations to assess oxidation processes. These findings provide valuable insights into the atmospheric transformation of urban emissions.

EAC2025_PO3-86_309_Vasilakopoulou.pdf

PO3: 87

Firefighter exposure and health risks: linking exposure concentrations to health outcomes

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Firefighters face health risks from air pollutants in fire smoke, classified as carcinogenic. A study in Catalonia (2022–2024) measured exposure using PM2.5, black carbon (BC), and PAHs. Biological samples (urine, nasal mucosa, dried blood) assessed short-term health effects. Torch operators had higher BC and PAH exposure, while line operators faced lower doses but sometimes stronger immune responses. IL-8 levels indicated inflammation, varying by task. Findings suggest task-dependent immune effects and individual susceptibility. Further research on blood and urine samples aims to clarify the link between wildfire smoke exposure and health impacts.

EAC2025_PO3-87_508_Gili.pdf

PO3: 88

Fractional Soaring of Bacteria and Fungi Aerosols in a Chicken Farm

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A new paradigm for transport channel-resolved failure mode biosecurity assessment is under research in HE-FARM project. Among the potential channels for transportation of pathogens, aerosols play a key role. In this context the new Counterfog® BIAFTS method (del Álamo, 2022) has been used to sample bioaerosols in a chicken farm at two different heights. Culture of active bacteria and fungi from these samples shows a variation of predominance and ratios of the different species evidencing a fractional soaring of the species. This demonstrates the strong interaction of air dynamics with the aerosolization processes and an example of spatial heterogeneity.

EAC2025_PO3-88_255_Pérez-Díaz.pdf

PO3: 89

Glycolic Acid Sulfate Formation in Aqueous Aerosols Analyzed with Hydrophilic Interaction Liquid Chromatography-Mass Spectrometry

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Glycolic acid sulfate, the sulfate ester of glycolic acid, has been detected across many locations in the atmosphere, though its formation mechanism remains unclear. This study develops a method for quantification using ultra-high performance liquid chromatography with a HILIC column coupled to Orbitrap mass spectrometry. Atomizer experiments with glycolic acid and sulfuric acid show that glycolic acid sulfate only forms in the aerosol phase, and not in the bulk phase. Further atomizer experiments and chamber studies aim to shed light on its formation mechanisms and potential relevance to the formation of other organosulfates.

EAC2025_PO3-89_489_Kjær.pdf

PO3: 90

Impact of War on Air Quality: PM2.5 Aerosol Composition in Beirut During the 2024 Conflict

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This study examines air pollution caused by the September-October 2024 war in Lebanon. PM2.5 samples collected in Beirut showed a threefold increase in particulate matter near the conflict zone compared to pre-war levels (2018–2021). Gravimetric and PIXE analyses revealed high concentrations of toxic metals (Pb, Zn, Cu, Ni) from weapon fumes and debris, as well as increased sulfur and chlorine from combustion. These findings highlight severe air quality deterioration due to warfare.

EAC2025_PO3-90_976_Giardi.pdf

PO3: 91

In vitro toxicological evaluation at the air-liquid interface of aerosols generated by POD vaping device using nicotine salts

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Electronic cigarettes (EC) have gained popularity, with the introduction of fourth-generation devices based on e-liquids containing nicotine salts that promise a smoother vaping experience than freebase nicotine. However, the toxicological effects of nicotine salts are still largely unknown. Human lung epithelial cells were exposed to undiluted aerosols of e-liquids containing various ratios of solvents, freebase nicotine, organic acids, nicotine salts, and flavoured commercial e-liquids. Cytotoxicity, inflammation, and oxidative stress, were assessed 24 h after exposure. Results showed that aerosols from fourth-generation devices can cause different toxicological effects, the nature of which depends on the chemical composition of the e-liquid.

EAC2025_PO3-91_728_Mercier.pdf

PO3: 92

Influence of NOx on the physical and chemical properties of isoprene SOA

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In this work we studied the effects of NO_x concentration on isoprene SOA density, oxygen-to-carbon ratio (O:C) ratio, volatility, volatility distribution and vaporization enthalpy. Dark ozonolysis or photo-oxidation experiments of isoprene were conducted in an environmental chamber at varying NO_x concentrations. The particulate phase was analyzed using an Aerodyne High-Resolution Time-of-Flight Aerosol Mass Spectrometer (HR-ToF-AMS) and a Scanning Mobility Particle Sizer (SMPS). A thermodenuder system was used for the SOA volatility characterization.Our results indicate that RO_2 chemistry has a non-linear effect on SOA density, O:C ratio and volatility.

EAC2025_PO3-92_253_Tzouvaras.pdf

PO3: 93

Investigation of the properties and factors affecting concentrations and size distribution of ultrafine aerosol particles in the city of Zagreb, Croatia

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This study presents the first investigation of UFP in Zagreb, Croatia. We studied the influencing factors on physical and chemical properties of UFPs, using the scanning mobility particle sizer during two contrasting seasons (winter and summer 2024). On-line black carbon (eBC) concentrations were measured by aethalometer, while particle size fractions (13 stages; from 10 nm to 32 µm) were collected with an MOUDI impactor and analysed for mass and organic carbon content. Data were correlated with meteorological parameters, biomass burning (BC_{bb}) versus fossil fuel (BC_{ff}) contributions to eBC, and NO_2, SO_2, and O_3 concentrations

EAC2025_PO3-93_560_Horn.pdf

PO3: 94

Key Factors Affecting Indoor PM2.5 in New Dwellings in London

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This study investigates indoor $PM_{2.5}$ in new London flats. High indoor emissions, particularly cooking, cause sharp peaks (up to 600 µg/m³), while non-emission periods stay below 50 µg/m³. Outdoor $PM_{2.5}$ averages15 µg/m³ with moderate infiltration (0.4–0.5), rendering outdoor contributions negligible. Seasonal variations in ventilation, cooking patterns, and weekend occupancy further influence pollutant levels. Open-plan layouts yield strong coupling between kitchens and lounges, with bedrooms showing relatively lower levels (max 60 µg/m³ even when kitchens peak at 300 µg/m³). Building airtightness also modulates infiltration. Future work will expand to TVOCs and CO_2 for a comprehensive assessment of indoor air quality.

EAC2025_PO3-94_1152_Gao.pdf

PO3: 95

Molecular-Scale Mechanism of Adsorption and Ice Nucleation on the Copper Oxide (CuO) Surface

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This study explores ice nucleation on copper oxide (CuO) surfaces using Grand Canonical Monte Carlo (GCMC) and molecular dynamics (MD) simulations. Findings reveal that water adsorption is initially dominated by chemisorption at Cu-O sites, followed by multilayer physisorption. Adsorption isotherms and energy calculations (~8.23 eV) confirm strong surface-water interactions, influencing ice formation. Reactive MD simulations highlight dissociative and molecular chemisorption, with water clustering around active sites. These insights improve atmospheric modeling and material design. Future research will refine adsorption models and integrate experimental validation to enhance understanding of heterogeneous ice nucleation and surface wettability engineering.

EAC2025_PO3-95_874_Roudsari.pdf

PO3: 96

Particulate air pollution in the heart of the European Union: lessons learned from SAFICA 2017-2018 and SAAERO 2022-2023 projects

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Particularly during winter, urban areas of the Southeast Europe (SEE) are experiencing some of the poorest air quality globally. It imperative to understand SEE urban air pollution, 1st locally (emission sources, processing, and the adverse health effects) and 2nd regionally (transboundary outflow). This presentation will give the results of two major projects centered at supersite in Sarajevo, Bosnia and Herzegovina (BiH). Sarajevo, BiH is an excellent case study for the SEE urban air pollution: it is situated in a basin surrounded by mountains, and during cold winter months, topography and meteorology cause trapping of the pollutants in its basin.

EAC2025_PO3-96_581_Dzepina.pdf

PO3: 97

Physico-optical properties of atmospheric aerosols over North-East India

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The study analysed atmospheric particulate matter in North-East India during the post-monsoon season of 2023, using SEM-EDX and FTIR to assess morphology, elemental composition, and different functional groups. Particles ranged from 1 to 70 µm, with major elements like C, O, Si, and hazardous elements such as Cr and Fe. Sources were identified using Enrichment Factor, Pearson Correlation, and PCA, revealing dust aerosols are the dominant species. Optical properties were simulated using DDSCAT-7.0, showing higher extinction and scattering efficiencies at shorter wavelengths for non-spherical particles. Shape significantly influenced optical properties, with rectangular particles exhibiting higher light attenuation than spherical ones

EAC2025_PO3-97_674_Das.pdf

PO3: 98

Ship emissions profiles from ambient measurements in Dublin Port

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Emissions profiles of commercial ships are changing and new studies are needed to quantify and trace these ship emissions from new alternate marine fuels. A research project, *PortAIR*, took place in the Dublin port area. The analysis of aerosol chemical speciation monitor data using combined organic and sulfate ion positive matrix factorization. idenitified three types of ship fuel emissions: sulfate-rich (S-Ship), organic-rich (O-Ship), and Marine Gas Oil (MGO). Overall, S-Ship and O-Ship plumes were observed frequently and contributed to at least 28%-47% of PM_1, but MGO were somewhat 'invisible' to the scientific and regulatory mass measurements, posing a problem.

EAC2025_PO3-98_1176_Fossum.pdf

PO3: 99

Site-selectivity of Phl p 5 modifications and their influence on the inflammatory potential

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Over the past three decades, pollen allergies have increased, possibly due to air pollutants like ozone and nitrogen dioxide modifying allergens such as Phl p 5. These modifications, including dityrosine and nitrotyrosine, influence the allergen's interaction with the TLR4 receptor, a receptor central in inflammation. Ozone exposure only leads to dityrosine formation, increasing TLR4 activity. Nitrogen dioxide exposure results in both nitrotyrosine and dityrosine, also increasing TLR4 activity but less than Phl p 5 after ozone exposure alone. The reaction with peroxynitrite, also causing both modifications, significantly increases TLR4 activity, highlighting the impact of site-specific tyrosine modifications on TLR4 activity.

EAC2025_PO3-99_649_Bothen.pdf

PO3: 100

Source Apportionment of wide range particle number concentration during summertime in Istanbul

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Istanbul is one of the major metropoles in the world with more than 16 million inhabitants, providing access through motorway, maritime and air transportation between Asia and Europe. These activities represent different pollution sources causing a complex air pollution profile across the province. This is the first study on measuring a wide range of particle number size distribution (10 nm to 10 um) conducted in Istanbul and measured at the urban background, urban and traffic sites in Istanbul using a NanoScan SMPS and Palas for 20 days in summer. Source apportionment analysis showed the main source of particles is traffic.

EAC2025_PO3-100_335_Uzun Ayvaz.pdf

PO3: 101

Urban particulate matter SRM 1648 as a reference material for Oxidative Potential determination

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Given its importance in assessing the health impacts of PM, OP, aligned with information from the sources and composition of PM, can be of extreme importance in creating new directives on air quality. However, the lack of a standard method makes it difficult to compare results and effectively create new legislation. This study aims to test a reference standard for the OP analysis, providing a useful tool for quality assurance and results comparison.

EAC2025_PO3-101_1153_Reis.pdf

PO3: 102

A Novel Breath-Taking Hood for COVID-19

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From the perspective of engineering control hierarchy, source control is always the most cost-effective option compared to pathway and receptor control. A novel breath-taking hood has been developed to completely capture respiratory aerosols exhaled by infected people to protect the environment. It could replace negative pressure wards, remove the need for isolation and quarantine, and make city or national lockouts redundant. The source control device demonstrated in the study could revolutionize infection prevention and control.

EAC2025_PO3-102_147_Huang.pdf

PO3: 103

Analysis of aerosol optical properties using aethalometer and nephelometer over 3 years in an urban and suburban places

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Understanding aerosol optical properties is essential for assessing their climate and air quality impacts. This study characterizes aerosol absorption and scattering in León, Spain, based on a three-year sampling campaign (2021–2024). Measurements were conducted at urban and suburban sites using an AE33 Aethalometer and an Aurora 3000 nephelometer. Extreme absorption and scattering values were recorded during Saharan dust intrusions and fossil fuel emissions. Findings highlight the relevance of combining optical coefficients to identify aerosol sources, contributing to improved climate models and air pollution management strategies, particularly in urban environments.

EAC2025_PO3-103_556_Blanco-Alegre.pdf

PO3: 104

Assessing human exposure to air pollution in microenvironments using portable Low-Cost Sensor units

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This work focuses on the HypnosAIR project approach to assess and reduce air pollutant exposure during sleep, integrating daily AQ exposure characterization (indoor and outdoor microenvironments), and exposure-response analysis. The methodology chosen involves 80 volunteers. A key component of this study was the deployment of portable low-cost sensor monitoring units (MUs) to monitor real-time AQ parameters to characterize the daily human exposure to air contamination. The results obtained so far confirm previous findings from studies conducted by the authors (Ramos et al., 2022), which demonstrate that some IAQ parameters may influence the sleep quality of the individuals.

EAC2025_PO3-104_1173_Mendez.pdf

PO3: 105

Assessment of children's exposure to airborne microorganisms indoors

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Measurements of viable, cultivable, airborne bacteria and fungi using passive sampling and culture-based analysis were performed in different indoor environments where children spend their time to assess their airborne microbial exposure. The presented results allow to assess that the airborne microbial contamination indoors depends mostly on different environmental conditions (such as temperature, relative humidity), as well as on activities, such as occupancy and cleaning rates, and ventilation conditions. The bacterial contamination indoors is related to the occupancy rates and the ambient temperature. As the ambient temperature decreases, a reduction in bacterial contamination was observed inside schools.

EAC2025_PO3-105_286_Katsivela.pdf

PO3: 106

Biomonitoring polycyclic aromatic hydrocarbon levels in domestic kitchens using commonly grown culinary herbs

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PAH emissions from cooking significantly affect indoor air quality. In our study a one-month biomonitoring was carried out in Hungarian kitchens using basil (*Ocimum basilicum*), rocket (*Eruca sativa*), parsley (*Petroselinum crispum*) and chives (*Allium schoenoprasum*). The two main objectives were to follow PAHs accumulation pattern in the kitchen vegetables, and to find out if this pattern can be associated with the different cooking habits (methods: deep fry, pan fry, oven baking, boiling; used materials: lard, butter, oil).

EAC2025_PO3-106_135_Eck-Varanka.pdf

PO3: 107

Characterization of physical, chemical, and toxicological properties of fine Particles emitted from pork and mackerel Grilling

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This study examines fine particles (PM2.5) from grilling pork and mackerel, focusing on composition and toxicity. Mackerel grilling emitted more PM2.5, while pork grilling had higher organic carbon (OC). Both generated toxic aerosols, with mackerel showing higher oxidative potential and pork inducing stronger inflammatory responses. Findings provide insights for air quality and health policies.

EAC2025_PO3-107_347_Sim.pdf

PO3: 108

CHEMICAL COMPOSITON AND SOURCE APORTIONMENT OF PM10 IN TRAFFIC MONITORING STATIONS IN THE CITY OF SEVILLE

Daniel Algarrada, Pablo Pérez-Vizcaino, Ana M. Sánchez de la Campa, Daniel A. Sánchez-Rodas, Jesús De la Rosa

University of Huelva, Spain

This study analyzes the levels and chemical composition of PM10 at two monitoring stations of the Air Quality Network of Andalusia in the city of Seville (684k population): Torneo and Príncipes, both significantly influenced by traffic emissions. Sampling was performed between 2021 and 2023. Based on the chemical composition, source apportionment study to PM10 were determined using PMF5. Simultaneously, a study on vehicle flux near both stations under varying weather conditions (primarily wind and rain) was correlated to daily traffic apportionment in order to calculate que equivalence of concentration of PM10 and number of vehicles every day.

EAC2025_PO3-108_984_Algarrada.pdf

PO3: 109

CIAO - CNR-IMAA Atmospheric Observatory: the first year of aerosol in-situ measurements

Teresa Laurita, Caterina Mapelli, Francesco Cardellicchio, Canio Colangelo, Emilio Lapenna, Serena Trippetta, Davide Amodio, Lucia Mona
CNR-IMAA, Italy

The CIAO atmospheric observatory at CNR-IMAA in Southern Italy has been upgraded with an aerosol in-situ observational component, complementing over two decades of remote sensing studies. Located in a Mediterranean-influenced mountainous region, CIAO is ideal for studying natural aerosols like desert dust and volcanic particles. In February 2024, it was accepted as an ACTRIS National Facility, enabling advanced aerosol measurements. Continuous monitoring, starting November 2024, will enhance aerosol characterization, support improved typing methods, and contribute to understanding particle transport. The first-year data will be presented at the conference.

EAC2025_PO3-109_759_Laurita.pdf

PO3: 110

Comparison of oxidative potential and composition of fine (PM2.5) and ultrafine (PM0.1) particles at an urban and a background site in Greece

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Fine and ultrafine particles affect human health through oxidative stress. This study examines how PM2.5 and PM0.1 composition influences oxidative potential (OP) using aerosol samples from two field campaigns (summertime and wintertime) in Greece. The water-soluble OP of PM2.5 and PM0.1 were compared and linked to their composition and sources. Initial results showed that wintertime PM0.1 composition is strongly influenced by calcium and sulfur, with refractory black carbon contributing 10% of PM0.1. PM0.1 concentration exhibited strong temporal correlation with potassium, indicating significant contribution from combustion-related emissions. Further statistical analysis is needed to clarify these associations and their contribution to OP.

EAC2025_PO3-110_962_Georgopoulou.pdf

PO3: 111

Contamination of the atmosphere with size segregated PMx in selected seaports of northern Europe and on transects between them

Anna Waleczek[1], Adam Krzysztofik[1], Morgane Perron[2], Matthieu Waeles[2], Aneta Oniszczuk-Jastrząbek[1], Ernest Czermański[1], Anita Lewandowska[1]

[1]University of Gdansk, Poland; [2]University of Brest, France

The aim of the research was to determine the air quality in terms of aerosol pollution in selected ports of northern Europe and on transects between them. During the research cruise from Gdynia (Poland) to Bodø (Norway) in the period from June 5 to July 2, 2024, size segregated aerosols samples were collected using the Tisch Environmental TE-6000 high-flow impactor. Aerosol samples were collected in 3 seaports (Bergen and Bodø in Norway and Malmö in Sweden) and at 12 stations located on transects between ports. The aerosol research was supplemented with the analysis of meteorological parameters and air mass trajectories.

EAC2025_PO3-111_228_Waleczek.pdf

PO3: 112

Cytotoxicity assessment of ambient air aerosol using a novel “Cells-on-Particles” in vitro model

Gailė Pocevičiūtė[1], Violeta Kaunelienė[1], Edvardas Bagdonas[2], Darius Čiužas[1], Dainius Martuzevičius[1]

[1]Kaunas University of Technology, Lithuania; [2]Department of Regenerative Medicine, Centre for Innovative Medicine, Lithuania

Air pollution poses serious health risks, necessitating improved toxicity assessment methods. This study evaluates a novel "Cells-on-Particles" in vitro model for cytotoxicity testing of ambient air aerosols. The nanofibrous polycaprolactone (PCL) platform efficiently captures fine particles while providing a cell-friendly surface. Samples were collected near a high-traffic street, and exposure doses were normalized to platform surface area. BEAS-2B cell viability decreased in a dose-dependent manner, with significant cytotoxicity at 50 μg/cm². The LDH assay confirmed cell damage only at the highest concentration (50 μg/cm²). This platform enables direct cell exposure, providing a rapid and representative assessment of aerosol toxicity.

EAC2025_PO3-112_1198_Pocevičiūtė.pdf

PO3: 113

Enhancing Air Quality through Stricter Regulations on Ship Fuel Oil in East China

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In this study, a long-term online field measurement (from 2016 to 2019) of shipping emission tracers, i.e., vanadium (V) and nickel (Ni), was carried out at a downwind sampling site (i.e., the Dian Shan Lake (DSL) supersite) which is ap-proximately 50 km from the Shanghai waters. Despite the long distance, the decreasing trend in V concentrations from the phase of DECA 1.0 (5.1 ng m-3) to DECA 2.0 (2.4 ng m-3) reflected a positive response due to the strengthened emission control.

EAC2025_PO3-113_338_Wang.pdf

PO3: 114

HIGH-TEMPORAL AND SPATIAL RESOLUTION MONITORING OF VOLATILE ORGANIC COMPOUNDS (VOCs) IN THE COMPLEX INDUSTRIAL AND PORT AREA OF TARANTO (ITALY)

Valentina Pizzillo, Jolanda Palmisani, Alessia Di Gilio, Marirosa Rosaria Nisi, Lucia Pastore, Miriana Cosma Mazzola, Gianluigi de Gennaro
University of Bari "Aldo Moro", Italy

Volatile Organic Compounds are airborne pollutants of concern extensively investigated by the International scientific community for the potential adverse effects on human health and environment. The present study based on the development and validation of a sensor network for high temporal resolution monitoring of total VOCs and BTEX concentration at selected sites nearby the industrial and port area of Taranto allowed to discriminate the contributions of the multiple emission sources, to identify short-emission events not otherwise detectable through the application of conventional methodological approaches and to raise the issue of the inhalation exposure of the population living in the surroundings.

EAC2025_PO3-114_269_Pizzillo.pdf

PO3: 115

Impact of residential biomass burning emissions on the wintertime particulate pollution in the Guanzhong Basin, China: a case study

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It remains elusive about the effect of residential biomass burning (RBB) emissions on the particulate matters (PM) pollution and regional climate. The results oof WRF-Chem model simulations of persistent air pollution episodes show that the total contribution of RBB emissions to the near-surface $PM_{2.5}$ mass concentration during the simulation period is around 29.2% (18.4 μg m^{-3}) averaged over the GZB, with an average contribution of 52.6% to the SOA, suggesting that the RBB emissions should be considered in the air pollution control strategies for further alleviation of the wintertime PM pollution in the GZB under current conditions.

EAC2025_PO3-115_586_Li.pdf

PO3: 116

Neural Network Interatomic Potentials for Atmospheric Chemistry

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Atmospheric aerosols influence climate and air quality, but their molecular formation is not well understood. Computational methods can provide insights into molecular-level dynamics but are limited by system size. An alternative is machine learning interatomic potentials (MLIPs). We trained an MLIP using active learning on atmospheric organic molecules from the GECKO-A dataset. The model achieves good predictive performance for small to medium molecules but shows higher errors for larger accretion products. These errors can be addressed with further training and transfer learning. This MLIP offers an alternative to quantum chemistry, enabling studies of larger systems and advancing aerosol research.

EAC2025_PO3-116_817_Bandeira.pdf

PO3: 117

Particle number and black carbon concentrations in Helsinki – spatial variation and trends

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We studied the spatiotemporal variation of particle number (PN) and black carbon (BC) concentrations in Helsinki, Finland, using annual datasets from 20 sites (2009-2024). In addition, the trends of PN, PN size distribution, BC and other pollutants were analyzed at a traffic supersite. The highest PN levels were at the airport terminal, highway and street canyon sites. At traffic sites, BC and NOx levels have decreased rapidly and PN more slowly. Annual mean BC concentrations are currently similar in busy traffic sites and detached housing areas with wood burning. Wood burning significantly impacts BC but has less impact on PN.

EAC2025_PO3-117_853_Niemi.pdf

PO3: 118

PM10 Composition in an African Megacity: Weekly and Monthly Trends

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Urban air quality is a major challenge in rapidly developing cities such as Luanda, Angola, where traffic and industrial emissions contribute to high PM_{10} levels, increasing cardiorespiratory risks. This study analysed PM_{10} composition from June to November 2023, using thermo-optical analysis for carbon fractions, ICP-OES/MS for elements, and ion chromatography for water-soluble ions.PM_{10} concentrations peaked on weekdays at 62.2 ± 15.5 μg/m³, with major oxides comprising 38%, elemental carbon 18%, and organic matter 27%, reflecting urban activities and climatic influences. The highest PM_{10} levels occurred during the dry season, highlighting the impact of seasonal pollution dynamics.

EAC2025_PO3-118_252_Silva.pdf

PO3: 119

PM2.5 in European Classrooms: A Comparative Study

Tiago Faria[1], Joana Lage[1,2], Miguel Felizardo[1], Ricardo Chacartegui[3,4], Israel Marques-Valderrama[3], José António Becerra[3,4], Marian Constantin[5], Anna Lehtonen[6], Niina Mykrä[6], José Alberto Díaz[7], Maria Nuria Sánchez[7], Antonis Stratis[8], Susana Marta Almeida[1]

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This study assesses PM2.5 and CO_2 levels in classrooms across Spain, Portugal, Finland, and Romania, analyzing ventilation efficiency in primary, secondary, and university settings. Measurements from sensors in 20 classrooms show higher PM2.5 levels in Portugal (10.74 µg/m³) and Romania (10.11 µg/m³), while Finland had the lowest (2.23 µg/m³). CO_2 levels followed a similar trend, indicating poor ventilation contributes to particulate accumulation. Schools with mechanical ventilation had lower pollutant levels, underscoring its importance. Findings emphasize the need for improved ventilation strategies, particularly in naturally ventilated schools, to reduce exposure risks. This study is part of the ECF4CLIM project.

EAC2025_PO3-119_1195_Faria.pdf

PO3: 120

Regional and Long-Range Transport Sources of PM2.5 Identified in Seoul, South Korea

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In Seoul, combustion-related components have been continuously observed. however, specific sources have not been clearly identified. In contrast, long-range transported PM2.5 exhibits a sharp increase during winter, accounts for a significant portion of PM2.5 mass, and primarily consists of secondary ionic components
In this study, the chemical composition of PM2.5 was analyzed, and emission sources were identified using the EPA PMF model. Organic marker compounds were utilized to distinguish PET & wood burning sources and tire wear. Additionally, long-range transported pollutants, including firework combustion, were comprehensively verified as non-regional sources.

EAC2025_PO3-120_420_Oh.pdf

PO3: 121

Supervised Machine Learning Approaches for Black Carbon Estimation in Rural Areas

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Black carbon (BC) is an important primary species of particulate matter and a major contributor to air pollution. While BC proxy models have been successfully developed for urban environments, their application in rural areas remains poorly explored. In this study, machine learning models were developed to estimate BC concentrations in rural Slovenia. Using multiple linear regression, decision tree, random forest, and artificial neural networks, we predicted BC concentrations one hour in advance. The results show that the ANN model outperforms the other models, demonstrating its potential for estimating BC concentrations in areas with limited air quality measurements.

EAC2025_PO3-121_1012_Koren Likar.pdf

PO3: 122

The role of the atmosphere in the contamination of the sea surface microlayer with heavy metals in selected seaports of northern Europe and on transects between them

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The main goal of the research was the determination of heavy metals concentration in aerosols in six size classes (7.2-10 μm; 3.0-7.2 μm; 1.5-3.0 μm; 0.95-1.5 μm; 0.49-0.95 μm; <0.49 μm) at 3 seaports (Bergen and Bodø, Norway and Malmo, Sweden) and at 12 stations between them. During the cruise from Gdynia (Poland) to Bodø (Norway) in the period from June 5 to July 2, 2024, in addition to aerosols, the microlayer and underwater samples were collected. It aimed to compare the degree of SML contamination in heavy metals in every single location under the influence of atmospheric dry deposition.

EAC2025_PO3-122_229_Krzysztofik.pdf

PO3: 123

Traffic emissions and air quality in Alpine regions: a two-site study on the Mont Blanc Tunnel closure

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The Mont Blanc Tunnel (Italy–France) is undergoing an 18-year renovation plan with scheduled full closures for consecutive months each year. This presents a unique opportunity to investigate the impact of traffic emissions in surrounding Alpine areas. Nearly 180 PM10 samples were collected at both entrances (Courmayeur, Italy; Chamonix, France) between 2023 and 2024. Comprehensive chemical analyses (140 species/sample, including EC/OC, ions, metals, sugars, polyols, and organic acids) and oxidative potential assays were performed. Single-site PMFs identified key sources, but only a combined multi-site PMF approach ensured factor stability. Random forest meteorological normalisation enhanced traffic impact assessment.

EAC2025_PO3-123_370_Diémoz.pdf

PO3: 124

Workplace assessment: inhalable particles formed during the laser ablation of hazardous GaAs materials

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It is well known that nanoparticles form during laser treatment of solid materials. However, as long as the treated material does not represent a health hazard on its own, the formed aerosol is usually not of worker's concern and studies of produced particles are relatively scarce. We had a unique opportunity to support a high technology company during the development of laser ablation (LA) systems, investigating

aerosols formed during the laser ablation of GaAs wafers and proposing appropiate safety measures accordingly. Particle concentration, size distribution, morphology and chemical composition were studied at the source and behind the filtration unit.

EAC2025_PO3-124_721_Kočman.pdf

PO3: 125

Acute episodes of particulate matter pollution: the role of day-night atmospheric vertical stratification

Francesca Calastrini[1,3], Andrea Orlandi[2], Gianni Messeri[1,3], Riccardo Benedetti[3], Roberto Vallorani[1,3], Alessandro Zaldei[1], Carolina Vagnoli[1], Beniamino Gioli[1], Giovanni Gualtieri[1], Tommaso Giordano[1], Simone Putzolu[1], Silvia Becagli[4], Rita Traversi[4], Mirko Severi[4], Silvia Nava[5], Franco Lucarelli[6]

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Meteorological conditions favoring PM10 accumulation occur mainly in winter, with high pressure, vertical stability, and weak circulation. Thermal inversions in valleys and lack of precipitation worsen pollution episodes. Strong day-night temperature variations also influence pollutant accumulation. The LaMMA Consortium applied a weather classification method to analyze the correlation between PM10 pollution and recurring meteorological patterns. Critical areas in Tuscany were identified using AirQino network data and WRF model outputs. Particulate matter compositional analyses revealed biomass burning from domestic heating as a major emission source, using techniques like ion chromatography, PIXE, and ICP-AES.

EAC2025_PO3-125_889_Calastrini.pdf

PO3: 126

Aerosol light absorption alleviates particulate pollution during wintertime haze events

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Aerosol light absorption can reduce near-surface PM2.5 during wintertime haze events. Absorbing aerosols create a “warm bubble” above the planetary boundary layer, generating secondary circulations that lower PM2.5. Additionally, aerosol absorption of UV light reduces photolysis, hindering ozone formation and suppressing secondary aerosols. Combined, these interactions decrease PM2.5 by 7.4%. This negative feedback should be considered in weather, climate, and health models.

EAC2025_PO3-126_675_Wu.pdf

PO3: 127

Alternative approach to the determination of Cr(VI) in a Cr(III)-rich particulate matter for occupational exposure assessment

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This study aims to assess the performance of official methods in the challenging determination of Cr(VI) in Cr(III)-rich particulate matter and to develop a novel, robust analytical protocol to address this issue. This study involves the application of the developed method in the analysis of Cr(VI) in welding fumes, in occupational environments characterised by the processing of chromium-rich steels. The aim is to verify the reliability of the protocol in complex matrices, ensuring accuracy in chromium speciation and minimising false positives. A previous study was conducted in tannery environments.

EAC2025_PO3-127_144_Zellino.pdf

PO3: 128

Ammonia and ammonium nitrate in the Po Valley: monitoring, sources, and impacts on Air Quality

Beatrice Biffi, Cristina Colombi, Luca D'Angelo, Umberto Dal Santo, Eleonora Cuccia, Guido Lanzani

ARPA Lombardia, Italy

Since 2007, ARPA Lombardia has monitored ammonia concentrations, a key precursor of ammonium nitrate, at urban and rural sites. Agriculture and slurry storage account for 96% of ammonia emissions in Lombardy, mainly from livestock farming and fertilizer use. Since 2017, intensive campaigns have analyzed ammonia emissions and particulate composition, studying different slurry spreading techniques. Data on PM_{10}, NH_3, NO_x, SO_2, and meteorological parameters were collected, along with particle size distribution. Measurements at farms and Milan’s urban site (Milano-Pascal) were compared to assess aerosol formation conditions. Findings from 2019-2025 will focus on aerosol size distribution and fertilization phases.

EAC2025_PO3-128_410_Biffi.pdf

PO3: 129

Assessing chemical PM10 concentrations in school settings over two seasons

Isabella Charres Fandino Beames[1], Yago Cipoli[1], Estela D. Vicente[1], Leonardo Furst[1], Teresa Nunes[1], Ana M. Sánchez de la Campa[2], Manuel Feliciano[3], Célia Alves[1]

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This study examines particulate matter (PM10) exposure at a school near an industrial estate in Portugal. Samples from classrooms and the schoolyard were analysed during winter and spring. Indoor PM10 concentrations averaged 24.0 µg/m³ in winter and 29.4 µg/m³ in spring, while outdoor levels were higher in winter (28.2 µg/m³). Major PM10 sources included fuel burning, sea salt, resuspended dust, and industrial activity. The study highlights the importance of identifying these sources to mitigate PM10 exposure, which can negatively impact children's health and academic performance.

EAC2025_PO3-129_244_Charres Fandino Beames.pdf

PO3: 130

BIOINFO – the internet database on risks associated with exposure to harmful biological aerosols in the work environment

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The BIOINFO database is a unique information platform about biological threats in the work environment.

The database contains: information on applicable European laws, information necessary to assess occupational risk related to exposure to biological agents, checklists supporting occupational risk , description of qualitative and quantitative methods used in identification of air microbiological pollutants, characteristics of available measurement methods and the ways of interpreting their results, a list of major biological agents related to the professional activities in different work environments, and methods of protection and prevention against adverse effects of biological agents.

EAC2025_PO3-130_105_Gołofit-Szymczak.pdf

PO3: 131

Chemical Composition of Deposition Particles in the Riotinto Mining District (Huelva, Spain)

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University of Huelva, Spain

This study examines the deposition levels and chemical composition of the insoluble fraction and heavy metals in deposition particles (DP) from the Riotinto Mining District. To achieve this, three monitoring stations were selected, located in La Dehesa and the municipalities of Nerva and Minas de Riotinto, during the period 2022–2023.

EAC2025_PO3-131_974_Vásquez.pdf

PO3: 132

Comparison of statistical spatial modelling and machine learning algorithm to assess population exposure to PM10 and PM2.5

Maria Antonietta Reatini[1], Giorgio Cattani[1], Massimo Stafoggia[2], Federica Nobile[2], Michele Stortini[3], Roberta Amorati[3], Giorgio Verratti[4,5]

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Our objective is to conduct a sensitivity analysis between spatio-temporal models, based on different methods: Random Forest (RF) models, which have been widely used for exposure estimates in Italy, and statistical models based on the INLA-SPDE approach, in order to evaluate the potential for creating an integrated model (ensemble model).

We also aim to demonstrate the capability of both RF and INLA-SPDE methods to improve the surface concentration estimates produced by chemical diffusion and transport models as well as the spatial resolutions of these estimates, while maintaining sufficient temporal resolution for the main application purposes.

EAC2025_PO3-132_870_Reatini.pdf

PO3: 133

Correction of CAMS PM10 Reanalysis Improves AI-Based Dust Event Forecast

Yinon Rudich, Ron Sarafian
Weizmann Institute, Israel

Dust storms affect air quality, climate, and health, making early warnings crucial. The Copernicus Atmosphere Monitoring Service (CAMS) provides PM10 estimates for forecasting, but existing discrepancies with ground measurements impact accuracy. AI-based models struggle due to scarce dust event data. This study proposes a machine-learning approach to correct CAMS PM10 fields using in-situ data. A gradient-boosting model predicts CAMS errors across the Eastern Mediterranean, improving accuracy by 12 μg m^{-3} on average. A deep neural network trained on bias-corrected PM10 fields enhances city-scale dust event forecasting (0–72 h) over the Balkans, improving AI-based predictions across all metrics.

EAC2025_PO3-133_618_Rudich.pdf

PO3: 134

Determination of Tire-road Wear Particle (TRWP) Emission Factor Under Realistic On-road Driving Conditions

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This study aims to evaluate the impact of tire wear on airborne PM emissions through real-world on-road driving experiments using actual vehicles. When sampling particles under real driving conditions, particles from various sources are mixed. To selectively analyze tire-road wear particles (TRWPs), pyrolysis gas chromatography-mass spectrometry (GC–MS) was employed, as described in ISO/TS 20593. A tracer gas experiment was conducted to correlate TRWP concentrations obtained using the pyrolysis GC-MS method with an emission factor. The results revealed that 3.1% of tire wear particles fall within the PM10 fraction, of which 14% belong to the PM2.5 fraction.

EAC2025_PO3-134_130_Lee.pdf

PO3: 135

Efficient numerical analysis for performance evaluation of an electrostatic precipitator under varied jet flow velocity profiles

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This study evaluates electrostatic precipitator (ESP) aerosol collection efficiency under different jet flow velocity profiles using a 2D axisymmetric model in COMSOL Multiphysics 6.3. Simulating laminar flow at 0.3 L/min with a 25 kV potential, it compares uniform and fully-developed inlet flows. Results indicate uniform flow enhances collection efficiency. Since real-world inlet pathways are often too short for fully developed flow, the study emphasizes the need to consider velocity variations when assessing ESP performance. These findings align with prior research and commercial applications of ESPs for aerosol sampling.

EAC2025_PO3-135_167_Kwon.pdf

PO3: 136

HIGH TEMPORAL AND SPATIAL RESOLUTION MONITORING APPROACH FOR INDOOR AIR QUALITY EVALUATION IN NATURALLY VENTILATED CHURCHES

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This study aims to investigate the time profiles of pollutants concentrations in a church and basilica during the liturgical celebrations in order to estimate the emissions dynamic induced by incense burning and its potential health impacts, so were carried out two high-time and spatial resolved monitoring campaigns. The preliminary results showed that during the hours of greatest crowd of faithful and in correspondence of incense use significant concentrations increment of all investigated pollutants were registered. Therefore, this study allowed to highlight the significant impact of the incense burning on IAQ and, thus, health of priests and altar boys.

EAC2025_PO3-136_226_Pastore.pdf

PO3: 137

InAPI: Indoor air pollution inventory tool to visualise activity-based concentrations and emission rates of pollutants for the UK

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Indoor air pollution poses a serious risk to public health. People can encounter different pollutants in places like homes, workplaces, vehicles, and recreational areas. There is a uneed to understand how different sources and activities contribute to air pollution over time in these spaces. The InAPI tool is built on a database of indoor air pollutants in the UK. It organizes information about pollutants, environments, and occupants' activities, and provides data on indoor pollutant concentrations and their emission rates. This is vital for researchers and policymakers to inform interventions as well as guide future research in managing indoor air quality.

EAC2025_PO3-137_1142_Nasar.pdf

PO3: 138

Advancing analytical approaches to improve bioaerosols detection and characterisation

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While knowledge about the physico-chemical and biological properties of bioaerosols from various man-made and natural environments is increasing, significant gaps still exist that hinder our understanding of the role and impact of bioaerosols on public health, climate, and ecosystems. This project seeks to harness the advancements in sensing and molecular analysis technologies and data analytics for the real-time detection and characterization of bioaerosols in varied environments, enhancing our understanding of their nature, magnitude, fate, behaviour, and the resultant impact pathways.

EAC2025_PO3-138_1292_Nasar.pdf

PO3: 139

Monitoring of size distribution of ultrafine particles in Tuscany Region

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The new European Directive for air quality 2024/2881 poses new monitoring needs. Among these there are the Ultrafine Particles (UFP) for which it is recommended the monitoring in sites where high levels are expected. In particular: traffic roads, harbours, airports, sites affected by biomass burning. The study presents results for all the monitored sites.

The aim of the study is to characterize the granulometric distribution according to the source, in particular the biomass burning. This work is the starting point for the definition of the new regional network according to the criteria of the new air quality Directive.

EAC2025_PO3-139_956_Collaveri.pdf

PO3: 140

Origin and hourly variation of metals and metalloids in industrial and mining areas of Huelva (SW Europe)

Pablo Pérez-Vizcaíno, Ana María Sánchez de la Campa, Daniel Sánchez-Rodas, Jesús Damián de la Rosa
University of Huelva, Spain

Emissions of metals and metalloids as a result of industrial processes and mining activities, entail a risk to human health. The use of near real-time techniques allows high time resolution (1-h) studies to be carried out to know more precisely their origin and hourly behaviour. In Huelva (SW Spain), two main areas where anthropogenic activities are carried out, are recognized: the Ría of Huelva and the mining district of Riotinto. This study emphasizes the need for continuous monitoring of these elements to control and minimize their exposure to the population.

EAC2025_PO3-140_224_Pérez-Vizcaíno.pdf

PO3: 141

PM10 concentrations at different locations in the Dominican Republic

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This study investigates PM10 concentrations in the Dominican Republic, a region where emission controls are limited and air pollution poses potential health risks. PM10 samples were collected every six days from January to December 2022 at four urban sites using high-volume samplers. Results show that the annual PM10 limit (50 μg/m³) was exceeded at all but one site, with concentrations comparable to other Caribbean coastal cities. A moderate correlation (r = 0.66) was observed between two sites in Santo Domingo, highlighting the influence of local meteorological conditions. These results highlight the need for stricter air quality regulations in the region.

EAC2025_PO3-141_752_Binet Álvarez.pdf

PO3: 142

Potential effect of inhalation exposure to the organic and inorganic constituents of ambient PM2.5 could modulate Amyotrophic Lateral Sclerosis progression

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Amyotrophic Lateral Sclerosis (ALS) is a progressive motor neuron disease, with 90% sporadic and 10% genetic cases linked to Single-nucleotide polymorphism. $PM_{2.5}$ exposure is associated with neurodegenerative diseases, including ALS, by inducing oxidative stress and mitochondrial dysfunction. This study examines *TDP43* aggregation in a yeast ALS model using screened $PM_{2.5}$ constituents from Bangalore, India. Organic and inorganic compounds of $PM_{2.5}$, including PAHs like B[a]A, B[a]P, B[b]F, D[ah]A, Ind and metals such as Cd^{2+}, Fe^{2+}, Cr^{6+}, and Ni^{2+}, significantly increased *TDP43* aggregation. This study suggests $PM_{2.5}$ potentially exacerbates ALS, highlighting environmental pollution as a potential risk factor for neurodegeneration.

EAC2025_PO3-142_321_Kanikaram.pdf

PO3: 143

Relationship between atmospheric electric field, precipitation and air ions

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The objective of the present study is to understand the influence of meteorological processes on the atmospheric electric field (AEF). We present a dataset of AEF and air ion measurements from a hemiboreal forest region, at Järvselja (SMEAR Estonia) in southeastern Estonia, to investigate the influence of local meteorological and air pollution processes on the AEF.

EAC2025_PO3-143_1074_Vana.pdf

PO3: 144

Size-resolved condensation sink in different urban environments

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Condensation of gaseous components on existing particles is important in terms of aerosol health and climate effects. Condensation sink (CS) is a useful parameter, which has been widely utilised to estimate the condensation growth rate of existing particles. Typically, only total CS is considered in atmospheric aerosol studies. In this study, we demonstrate how CS size distribution could be a highly important parameter in terms of both aerosol health and climate effects. We report CS size distributions measured in different urban environments, including road/river traffic sites, airports, detached housing areas and industrial sites, in Finland, Germany, Czechia and India.

EAC2025_PO3-144_857_Lepistö.pdf

PO3: 145

Size-resolved microphysical and optical properties of atmospheric aerosols in an urban area of the northern Tibetan Plateau

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Aerosols at high altitudes on the Tibetan Plateau (TP) influence regional climate and hydrology. This study analyzes the microphysical and optical properties of aerosols in northern TP using a ground-based tandem system. The particle number size distribution follows a lognormal pattern, peaking at ~70 nm. Refractory black carbon (rBC) accounts for 17.7% of particles in the 100–750 nm range, with larger particles showing higher rBC fractions. Most rBC particles are externally mixed, with non-spherical structures. The study provides key insights for improving aerosol radiative forcing estimates and understanding aerosol–climate interactions in high-altitude regions.

EAC2025_PO3-145_348_Wu.pdf

PO3: 146

Statistical evaluation of particulate matter (PM1) concentrations in indoor and outdoor air of households in Zagreb, Croatia

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Different sources of indoor air pollutants are expected to significantly affect the concentration of indoor air pollutants and therefore make significant differences in PM concentration between households. A pilot study of air quality in households is being conducted in Zagreb (Croatia) as part of the EDIAQI (Evidence Driven Indoor Air Quality Improvement) project, in which one of the key aspects is concentrations of particulate matter with an aerodynamic diameter of less than 1 μm (PM_1). This study aims to showcase the differences in measured levels of PM_1 in different households.

EAC2025_PO3-146_887_Lovrić Štefiček.pdf

PO3: 147

The contribution of chemical components and the particle core to the toxicity of diesel exhaust particles

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A key objective of the ULTRHAS project is clarifying which physical and chemical characteristics are the main drivers of the effects of particles from transport mode emissions. The present study found that the harmful effects of diesel exhaust particles (DEP) were mainly due to adsorbed chemical constituents, not the carbon core. Using a 3D airway cell model, RNA sequencing analysis revealed that DEP and its chemical extracts caused significant gene expression changes, while the residual washed particles had minimal impact. These finding emphasize the key role of soluble chemicals in DEP toxicity.

EAC2025_PO3-147_706_Grytting.pdf

PO3: 148

Utilization of Airmodus Condensation Particle Counters in the Net4Cities Network for Long-Term Air Quality Monitoring

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The Net4Cities project enhances air and noise pollution monitoring in 11 European cities, supporting Zero Pollution Action Plans and the EU Green Deal. With 24 CPCs deployed, the study compares n-butanol and propylene glycol as CPC working fluids, assessing detection performance, stability, and suitability for long-term monitoring. Standardized sampling systems ensure data consistency across diverse environments. Findings contribute to real-time pollution assessments, source apportionment modeling, and policy decisions on transport-related emissions. This research advances air quality monitoring technologies, providing insights into sustainable alternatives for ultrafine particle measurement in urban settings.

EAC2025_PO3-148_831_Pajunoja.pdf

PO3: 149

Enhancing Information on COPD Exacerbations Through the Integration of Qualitative Approaches in Non-Hospitalized Patients with Mild COPD

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This study highlights the value of integrating qualitative and quantitative methods in environmental epidemiology, focusing on the progression of COPD in urban areas. By combining social, demographic, and clinical data, the research explores how factors like residential environment influence lung function variability. Through a systematic review using the PRISMA methodology, 15 peer-reviewed articles were selected, demonstrating the importance of contextual and cultural factors in shaping health outcomes. The findings emphasize that qualitative research enhances quantitative analyses, providing a deeper understanding of environmental health challenges and offering insights for personalized, localized interventions to improve air quality and public health.

EAC2025_PO3-149_131_Salimbene.pdf

PO3: 150

Estimating PM2.5 Concentrations in Classrooms Installed with Fresh Air Units Through the Determination of the Indoor PM2.5 Generation Rate and Non-Ventilation Removal Rate

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This study develope a technique to quantify indoor PM2.5 generation (G) and non-ventilation removal (K) rates in classrooms with Fresh Air Units (FAUs). A well-mixed room modelling approach and first-order Runge-Kutta method were used to assess the PM2.5 exposure concentration. A typical elementary classroom equipped with FAUs was monitored was selected for PM2.5 and CO2 measurements. Results showed significant PM2.5 reductions and acceptable CO2 levels. A first-order Runge-Kutta method minimized differences between measured and predicted PM2.5, yielding G (GM (GSD)) as 10.7 (2.1) and 19.2 (1.2) μg/min respectively for lecture sessions and noon rest periods, and K consistently as 0.

EAC2025_PO3-150_125_Chen.pdf

PO3: 151

Air quality assessment on the central campus of the national University of Equatorial Guinea: aerosol monitoring and its impact on the university community

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The study assesses air quality at the central campus of the National University of Equatorial Guinea (UNGE) in Malabo. Monitoring of PM_1, $PM_{2.5}$, PM_{10}, CO_2, and TVOC from August 2023 to January 2025 showed significant variability in pollutant concentrations. PM_{10} levels exceeded WHO guidelines during the dry season, posing risks to vulnerable populations. A general decline in PM_{10} was observed over the study period, but concerns remain about data quality for $PM_{2.5}$ in 2025. The study highlights the importance of continuous air quality monitoring and mitigation strategies.

EAC2025_PO3-151_1135_Osa-Akara.pdf

PO3: 152

Indoor air quality in schools of Malabo, Equatorial Guinea: health risks and environmental factors in the African context

Lucrecia Osa-Akara[1], Ana Isabel Calvo[1], C.N. Nve Mikue[2], Cátia Vanessa Maio Gonçalves[1], Carlos del Blanco Alegre[1], José Manuel Borilo Aranda[2], Ramón Castelo Alvarez[2], Maximiliano Fero Meñe[2], Darrel Baumgardner[3], Roberto Fraile[1]

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The study assesses indoor air quality in four schools in Malabo, Equatorial Guinea, measuring levels of $PM_{2.5}$, PM_{10}, and CO_2. The results reveal that all schools exceeded the air quality guidelines established by the WHO. The "Virgen María de África" school recorded the highest $PM_{2.5}$ concentrations, exceeding the WHO's recommended daily limit by a factor of three. The study highlights the substantial health risks associated with this exposure, including respiratory infections and asthma exacerbation.

EAC2025_PO3-152_1136_Osa-Akara.pdf

PO3: 153

Analysing bioaerosols regarding their impact on human health in freely-ventilated pig and cattle barns

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Agricultural employees are constantly exposed to high concentrations of inhalable dust containing microorganisms, toxins and other biological substances, which poses them to a risk for adverse health effects. Freely-ventilated pig and milk cow barns meet higher standards for animal welfare but also change the composition of bioaerosols. Using high volume sampling in the barns as well as at the interface to the environment the subsequent combination of advanced metaproteomic analyses and toxicological *in vitro* studies on lung epithelial cells together with culture-dependant microbiological and molecular biological screening is aimed to identify main parameters relevant for occupational health.

EAC2025_PO3-153_854_Schwenke.pdf

PO3: 154

Assessment of measures to reduce the impact of climate change on indoor air quality

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Climate change impacts indoor air quality (IAQ) as changing outdoor conditions are also reflected indoors. This study evaluated preventive measures on a test house using the Indoor Air Quality Climate Change (IAQCC) model under the SSP5-8.5 climate scenario by 2100. Measures studied include natural and mechanical ventilation, shading and smart control. Results show that indoor overheating is significantly reduced by window shading and smart ventilation. Mechanical ventilation with coarse filters could lead to increased indoor $PM_{2.5}$ and ozone levels. Results underline the need for a balanced approach that considers both thermal comfort and pollution levels in future IAQ improvement strategies.

EAC2025_PO3-154_322_Zhao.pdf

PO3: 155

Can air purifiers remove radioactive aerosol particles from household air in radiation hazard situations?

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This study evaluates air purifiers' effectiveness in reducing radioactive aerosol particles in households during radiation hazards. Using natural radon as a radiation source, air purifiers with activated carbon and HEPA13 filters were tested in a controlled space. Preliminary results show these purifiers efficiently reduce aerosol particle concentrations, especially in the accumulation mode, but have minimal impact on ultrafine particles and unattached radon. The findings suggest that while air purifiers can reduce certain radioactive contaminants indoors, their ability to mitigate all forms of radioactive exposure is limited. Future experiments will explore filter contamination management post-incident.

EAC2025_PO3-155_395_Laitinen.pdf

PO3: 156

Changes in cholesterols profile in THP-1 cells and mice lung tissue after exposure to PbO nanoparticles

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PbO NPs exposure lead to the accumulation of Pb in the lungs, stimulation of the immune system of exposed mice and caused changes in cholesteryl ester levels in macrophage cells.

EAC2025_PO3-156_184_Mikuška.pdf

PO3: 157

Characteristics of Particle-bounded Air Toxic Emissions and Exposure Risk By Cogeneration System Using Solid Waste Recovered Fuel

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Cogeneration boilers in Taiwan use Solid Recovered Fuel (SRF) to reduce coal consumption. In 2020, 38.5 thousand metric tons of SRF were co-fired with coal in many boilers. This study analyzed emissions of air toxics (As, Pb, Cd, dioxins) and assessed potential health risks in surrounding areas. Results showed significant variation in PM and air toxic emission factors, influenced by SRF composition, mixing ration, and air pollution control devices. The maximum exposure risk in surrounding areas caused by the case was below 10^{-6}.

EAC2025_PO3-157_605_Tsai.pdf

PO3: 158

Citizen Science and Nature-Based Solutions to Reduce Particulate Matter Exposure in Schools

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Educational spaces must promote sustainability and well-being, especially in polluted areas. This study co-designed a multifunctional space in the Basic School of Camarate, Portugal, integrating Nature-Based Solutions (NBS) for air quality improvement and community well-being. Given the school's proximity to major pollution sources – airport and high-traffic streets – students, teachers, staff and environment and architecture researchers, identified the need for NBS to mitigate exposure to particulate matter ($PM_{2.5}$, PM_{10}), black carbon, and ultrafine particles. Air quality was assessed pre- and post-implementation and results highlight the effectiveness of NBS in mitigating pollution and the value of interdisciplinary collaboration in sustainable school design.

EAC2025_PO3-158_1050_Almeida.pdf

PO3: 159

Comparison of Airborne In-Situ and Ground-/Satellite-Based LIDAR-Derived Aerosol Light Extinction Coefficients During the JATAC/CAVA-AW Campaigns in 2021 and 2022

Marija Bervida Mačak[1], Jesus Yus-Díez[1], Sangita Gautam[1], Luka Drinovec[1,2], Uroš Jagodič[2], Blaž Žibert[2], Matevž Lenarčič[3], Eleni Marinou[4], Peristera Paschou[4], Nikolaos Siomos[5], Holger Baars[6], Ronny Engelmann[6], Annett Skupin[6], Athina Augusta Floutsi[6], Cordula Zenk[7,8], Thorsten Fehr[9], Griša Močnik[1,2]

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Here we compare the optical product of ESA's space-borne ALADIN lidar with the in-situ airborne measurements obtained during the JATAC campaign over Cabo Verde in 2021–2022. In-situ measurements of aerosol optical properties were matched to Aeolus overpasses and extrapolated to 355 nm. Despite the spatial and temporal resolution differences, results of comparison between the in-situ and space-borne aerosol light extinction coefficients show good agreement (regression slope of 0.99, geometric R_g^2 of 0.54). Additional comparisons of the in-situ aerosol light extinction coefficient with ground-based lidars (Polly^{XT} and eVe) data show regression slopes of 0.69–0.94 and $R_g^2 > 0.74$.

EAC2025_PO3-159_1215_Bervida Mačak.pdf

PO3: 160

Effect of air purifiers on indoor air pollution in beauty salons

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This study compared indoor/outdoor mass ratios (I/O) for respirable particulate matter and its organic (OC) and elemental carbon (EC) components in beauty salons before and after air purifier installation. Measurements from 2015 and 2024 show all I/O ratios exceeding unity, confirming significant indoor pollutant sources. Respirable PM and EC ratios increased in 2024, while OC ratios decreased. Notably, the variability in data diminished with air purifiers, indicating more stable pollutant levels indoors. These findings suggest that air purification improves consistency in air quality. Extended measurements over different seasons are recommended to better establish indoor air quality standards for beauty salons.

EAC2025_PO3-160_968_Rogula-Kopiec.pdf

PO3: 161

Environmental contamination of antibiotics in Swedish hospitals

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Antibiotics are pharmaceuticals used for treatment of bacterial infections. Occupational exposure to antibiotics may cause hypersensitivity reactions and occupational allergy as well as due to risk of bacterial resistance development.

The aim of this study was to map the level of environmental contamination of currently used antibiotics in healthcare and to propose hygienic guidance values (HGV)s for antibiotics based on wipe test measurements in Swedish hospitals.

A wipe test sampling method combined with mass spectrometric analysis of six antibiotics was developed. A screening campaign was performed at in total 16 wards located at five different public hospitals.

EAC2025_PO3-161_707_Nilsson.pdf

PO3: 162

Experimental study of aerosol emission and flow exiting a wound during mock-up tracheostomy operations

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Following the SARS-CoV-2 pandemic, awareness of indoor aerosols has increased, emphasizing the need to identify aerosol sources. During the pandemic, tracheostomies were performed on patients with respiratory distress. Two types of procedures, Surgical Tracheostomy (ST) and Percutaneous Dilatation Tracheostomy (PDT), are associated with high risks of airborne disease transmission due to aerosolized bronchial secretions. This study compares the emission rates and particle numbers during both procedures and examines the flow exiting the wound. Using a mannequin, aerosol injection, and flow visualization techniques, the study found PDT to be riskier due to its longer duration and higher total particle emission.

EAC2025_PO3-162_1127_DAlicandro.pdf

PO3: 163

Exploring the Impact of Bioaerosols: Pollen, Cyanobacteria, Microalgae and Fungi in Diverse Environments

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Bioaerosols are airborne organisms, their excrements, or by-products originating from aquatic and terrestrial environments. Bioaerosols were studied at two sites in Poland: Gdynia (coastal) and Wrocław (inland).This study presents key findings on the presence of pollen, cyanobacteria, microalgae, and fungi in the atmosphere and compares sampling and analytical methods, including Hirsch Trap, TISH Environment impactor, and SWISENS POLENO. The results confirm the year-round presence of bioaerosols, some of which may pose health risks. Understanding bioaerosol composition and improving quantification methods are crucial for assessing their environmental and health impacts. This study highlights the significance of methodological advancements in bioaerosol research

EAC2025_PO3-163_719_Wiśniewska.pdf

PO3: 164

Exposure to particulate matter during rural, urban and highway asphalt work

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We attended 20 days of paving rural and urban roads, and highways in the period 2022-2024 and evaluated the max concentrations og particulate matter (PM) in 81 near-field plumes from 11 locations. Bitumen fumes in the submicron particle fraction dominated PM and the highest concentrations were observed near the paving machine. The concentrations were lowest on rural locations and highest during highway work. The observed differences could largely be ascribed to asphalt type and temperature, wind speed and number of paving machines operating in close vicinity.

EAC2025_PO3-164_1048_Nojgaard.pdf

PO3: 165

Exposure to traffic-related particulate matter in schools and hospitals in a city quarter

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Traffic emissions of particulate matter in urban environments are related to higher risk of asthma, lung cancer, and cardiovascular diseases, especially among the vulnerable groups, such as school children and the elderly. In this study, simulations were conducted for 2023 with two urban dispersion models, ADMS-Roads 5 and EPISODE-CityChem, to assess the air quality in an inner-city urban area in Hamburg. Long-term exposure to PM2.5 levels at hospitals, schools and nurseries exceeded the WHO's recommendation guidelines. We intend to conduct scenario simulations in accordance with the Hamburg mobility strategy for the year 2030.

EAC2025_PO3-165_323_Karl.pdf

PO3: 166

Five-year trend of levoglucosan levels in winter at the urban station in Zagreb, Croatia

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Despite the extansive natural gas infrastructure, biomass burning for residential heating remains common in Zagreb, contributing to poor air quality mostly during wintertime. This study assessed levoglucosan (LG), a biomass burning tracer, in PM_1 fraction over a five-year period (2019–2023) to evaluate its long-term trends. LG was quantified using ion chromatography, and results showed strong correlations between LG and PM_1 levels. LG concentrations ranged from 0.689 to 1.023 μg/m³, with a slight decreasing trend. The LG/PM ratio remained stable (4.8–6.2%). Findings suggest biomass burning is a significant and persistent source of particulate matter in urban site of Zagreb City.

EAC2025_PO3-166_1206_Sopčić.pdf

PO3: 167

How can we determine the level of particles that impact our health? Development of laboratory studies with the PolluRisk platform.

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To estimate the levels of particles that impact health, we conduct exposure studies using the POLLURISK platform. The principle is to expose biological models to a realistic atmosphere simulated in a smog chamber. In this study, the aim was to simulate an atmosphere with PM10 concentration around 20 μg/m3, typical of a European city. The results showed that particulate compounds (NH4 and organic) were representatives of those in a real atmosphere of an urban city in proportion. However, the stability of the concentration can be improved (the coefficient of variation is 22%).

EAC2025_PO3-167_1001_Delater.pdf

PO3: 168

Impact of Return Air Ratios and Filtration on Airborne Infection Risk in Healthcare Settings

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Efficient ventilation strategies are critical for controlling airborne transmission of respiratory pathogens in healthcare environments. This study investigates the influence of return air ratios and return air filtration on individual exposure risks to infectious aerosols in a full-scale ISO-5 clean chamber. Results reveal that distance to the index patient is the primary factor of the airborne infection risk. Reducing the return air ratio, or implementing of HEPA filters at the return air terminal didn't lower the inhalation exposure. It indicates that return air from the building ventilation system is not the key to minimize person-to-person transmission of respiratory aerosols.

EAC2025_PO3-168_1202_Liu.pdf

PO3: 169

In-human performance characterisation of laparoscopic surgical smoke management technologies on the example of sleeve gastrectomy

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Cutting of organic tissue by means of modern energy-driven surgical instruments is accompanied by the formation of surgical smoke, i.e., aerosols composed i.a. of water vapour, soot, cell debris, bacteria and viruses. Surgical smoke interferes during laparoscopic interventions not only the surgical view but poses also a health risk for surgical staff. Thus, laparoscopic surgical smoke management technologies were designed to remove surgical smoke. Although the use of surgical smoke management technologies is strongly recommended, only limited performance data for such technologies exist. The present in-human study attempts to confirm the findings of previous studies under realistic conditions.

EAC2025_PO3-169_925_Göhler.pdf

PO3: 170

Indoor air quality at the Sephardic Museum (Toledo, Spain): PM and bioaerosol study

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An often overlooked aspect of cultural heritage conservation is the indoor air quality (IAQ) in heritage buildings and museums. IAQ plays an important role in the longevity and integrity of historic materials, as it influences both their chemical stability and their physical state.

The objective of the study was to analyse the IAQ in The Transito Synagogue, a significant historical and cultural monument in Toledo, Spain. The level of PM of different sizes were measured, the bioaerosols using culture-dependent and culture-independent analyses were quantified, and the presence of genes which codifying proteins that biodegrade relevant materials was determined using qPCR.

EAC2025_PO3-170_452_Rodriguez Cervantes.pdf

PO3: 171

Indoor air quality in school: Key influencing factors

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Children are particularly susceptible to air pollution as their bodies are still developing. In schools, both indoor and outdoor air pollution is important as children spend their breaks outdoors. The ratio of indoor and outdoor particle number concentrations was analysed, as well as the differences in the lognormal profiles of indoor and outdoor particle number and mass concentrations during different episodes and activities in the classroom. The rate of removal of air pollutants such as PMs from the classroom after school hours was calculated for different episodes, taking into account ventilation options and outdoor air pollution.

EAC2025_PO3-171_375_Davuliene.pdf

PO3: 172

Industrial particulate matter, characterization and collection for an animal-free prediction of nanomaterial-induced adverse outcomes

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Airborne particles smaller than 2.5 µm of nine different industrial materials, representing both established high-production materials and advanced nanomaterials for emerging technologies, as well as different life cycle stages, have been collected and characterized in terms of size distribution, size-resolved chemical composition, morphology, and endotoxin levels. The materials will be used to calibrate and validate in-silico models developed for quantitative prediction of adverse outcomes in vivo.

EAC2025_PO3-172_603_Isaxon.pdf

PO3: 173

Investigation of fungal microbiome in indoor environments of public-use facilities in Korea

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Indoor fungi affect health, requiring constant monitoring. We analyzed fungal compositions in environmental samples from Korean public facilities in 2022. Results showed indoor fungal microbiota are influenced by both environmental and human-originated fungi from occupants. Some samples contained opportunistic pathogenic fungi. This study enhances understanding of indoor fungal microbiota in Korea and highlights the potential of microbiota analysis for pathogen monitoring. Such analysis can help detect emerging pathogens and support effective preventive measures against health risks. Continuous surveillance of indoor fungi is essential for controlling harmful proliferation and ensuring healthier indoor environments for occupant

EAC2025_PO3-173_846_Wee.pdf

PO3: 174

Occupational inhalation exposure to welding fumes

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This study seeks to fill these gaps by measuring welders' inhalation exposure to welding fumes and assessing associated health impacts. An integrated protocol was developed and implemented among shipyard welders, focusing on: (1) welding fume concentrations in the breathing zone and small airways, (2) chemical analysis of welding fumes, and (3) evaluating health effects through inflammation, oxidative stress, and lung injury biomarkers. This approach establishes a generalizable framework for precision occupational exposure and health risk assessment, guiding targeted exposure control strategies and safety interventions.

EAC2025_PO3-174_1203_Duan.pdf

PO3: 175

ODESSA: A collaborative WebGIS platform for predicting hospital admissions related to air pollution exposure

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Artificial intelligence and predictive analytics use the increasing data generated nowadays to enhance business and research activities by enabling the prediction of complex real-world dynamics. Environmental data helps relate variables and predict public health problems, monitor and prevent diseases. The COVID-19 pandemic highlighted the need to anticipate pressure on hospital systems to reduce overcrowding. The ODESSA project addresses these challenges by developing a collaborative open-source WebGIS platform to predict hospital admissions linked to air pollution. By integrating historical data on hospital admissions, meteorology and air quality, the tool will support health authorities, policymakers, and citizens to identify risk areas and allocate resources effectively.

EAC2025_PO3-175_1209_Martins.pdf

PO3: 176

Assessing the contribution of road traffic to airborne microplastics: the iMPact project

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The growing interest in the effects of particles on human health and local environments has spurred research towards defining and characterising their sources. Road traffic is considered a major source of airborne particles in urban areas. The abrasion of tyres is one of the most dominant sources of microplastics (MPs) in the environment. The iMPact project is investigating the contribution of road traffic as a potential vector of MPs pollution in the environment, extending the knowledge on MPs found in the air and exploring their occurrence to assess the potential personal exposure.

EAC2025_PO3-176_1299_Martins.pdf

PO3: 177

Overview of indoor air pollution measurements in elementary schools in Denmark: a case study

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Air pollution is a major global health risk, with children spending 90% of their time indoors, making them highly vulnerable. Under the Horizon Europe project LEARN, we measured indoor air quality in Danish schools. We performed measurements of particulate matter (PM) mass, particle number (PN), black carbon (BC), and total volatile organic ocmpounds (TVOCs) using a single-blind crossover design with real and sham interventions. Preliminary data show high PM exposure to children during school hours. Going further, we will analyze pollution sources, mitigation strategies, and the effects of PM on children's cognitive functions, and test afficacy of purification devices.

EAC2025_PO3-177_1003_Kumar.pdf

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Particle emissions from dry herbs vaping

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The purpose of this work is to study emissions generated from dry herbs vaping. Four dry herbs were heated using dry herb vaporizer.

The results show that more than 99% of the emitted particles have a diameter less than 1 μm.

Under the experimental conditions used, Levander was found to emit higher quantities of particles, followed by Chamomile, Eucalyptus and Green tea. Intense vaping and temeprature results to higher Particle emissions

The results show that dry herb vaping is not a safe alternative to tobacco, as it emits high concentrations of particles.

EAC2025_PO3-178_1161_Zervas.pdf

PO3: 180

PM-related organic and elemental carbon in hair and nail salons in Poland

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Analysis of organic matter associated with PM particles is an effective method of identifying specific sources of contamination. We have shown that the differences in air quality between beauty salons and atmospheric air can be attributed to the use of specific beauty salons, ventilation systems, window types and volume. The results presented highlight the need to prioritise the air in beauty salons.

EAC2025_PO3-180_640_Rogula-Kopiec.pdf

PO3: 181

Pollution Routes: Ship Emissions Impact on Volatile Organic Compounds in the Atmosphere

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Italy's geographical positioning and abundance of ports render it highly susceptible to air pollution caused by ship emissions. A recent study carried out on the Amerigo Vespucci in the Tyrrhenian Sea utilised low cost, high-resolution instruments to investigate these emissions. The study found that levels of VOCs increased significantly due to motor propulsion and port activities, emphasising the importance of standardised methods for monitoring short-term emission events and suggesting the potential for implementing targeted mitigation strategies within the shipping sector, particularly in variable operating environments.

EAC2025_PO3-181_1069_Nisi.pdf

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Pseudomonas spp. in metalworking fluids – potential bioaerosol contamination of occupational environment in metal industry and phage-based biocontrol method

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This study examines the contamination of metalworking fluids (MWF) with *Pseudomonas* species, including *Pseudomonas aeruginosa*, which may be emitted as bioaerosols during manufacturing processes, posing health risks to workers. The analysis of MWF samples revealed that *Pseudomonas* bacteria constituted up 37.7%, while *P. aeruginosa* up to 9.2% of the total microbiota. The application of bacteriophage 16 resulted in a significant reduction in *P. aeruginosa* concentration, achieving a 99.9% decrease after 8 hours. These results suggest that phage-based biocontrol may be an effective method for reducing pathogenic bacteria in MWF and bioaerosols, highlighting the need for further research in occupational environments.

EAC2025_PO3-182_141_Stobnicka-Kupiec.pdf

PO3: 183

Real-Time Detection of Dusts from Narcotics using Single-Particle Mass Spectrometry

Haseeb Hakkim[1], Petra Hehet[2], Morphy Dumlao[3], Marco Schmidt[1], Aleksandrs Kalamašņikovs[1], Ellen Iva Rosewig[1], Guanzhong Wang[4], Heinrich Ruser[4], Michael Pütz[2], Martin Seipenbusch[5], Simone Vinati[5], Karsten Wegner[5], Thorsten Streibel[1], Robert Irsig[6], Andreas Walte[6], Sven Ehlert[6], Johannes Passig[1], Ralf Zimmermann[1]

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This study addresses the urgent need for real-time detection of hazardous dusts, particularly drugs and explosives, using an integrated approach. The core technology, single-particle mass spectrometry (SPMS), enables chemical characterization of individual particles in complex aerosols. A specialized sampling system, incorporating gas-pulse particle redispersion and aerosol enrichment, facilitates direct surface sampling. Field tests at a DHL hub and a former illegal drug lab demonstrated successful identification of drug residues. Machine learning algorithms, particularly supervised learning, enhanced real-time data analysis, outperforming traditional methods in speed and accuracy. This system offers a robust solution for real-time risk assessment and emergency response.

EAC2025_PO3-183_661_Hakkim.pdf

PO3: 184

Respiratory aerosol emission during various phonatory tasks

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Airborne transmission plays a key role in spreading respiratory pathogens. This study investigated how different phones, vocalization types, and individual characteristics affect aerosol emission. Forty-one infection-free singers phonated [a], [o], and [r], spoke, whispered, breathed, and coughed in a controlled setup. Whispering generated more aerosols than speaking, and [o] produced more particles than [a]. The alveolar trill [r] emitted more small particles than vowels. While sound pressure level consistently increased emission, exhaled flow rates showed no significant variation between phones. Age, BMI, and exhaled flow rate influenced emission in some activities, but no consistent link was found across tasks.

EAC2025_PO3-184_1004_Tuhkuri Matvejeff.pdf

PO3: 185

Secondary organic aerosol formation potential from vehicles under real-world driving conditions in a tunnel

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We provide a comprehensive investigation on the parimary emissions and secondary aerosol formation from vehicles under real-world driving conditions in the Fréjus tunnel . The VOC composition and volatility in the tunnel and OFR were compared to understand the evolution of SOA formation. The SOA compositions were characterized at molecular formula level. Furthermore, the emission factors of secondary aerosols in the tunnel were reported and compared with the chassis dynamometer measurements. The gap between field measurements and laboratory studies will also be discussed.

EAC2025_PO3-185_1214_Chen.pdf

PO3: 186

Shape factor characterization of dry powder aerosol drugs

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In the aerosol drug deposition modelling, particles are mainly approximated by regular spheres. However, according to microscope images taken after drug formulation, their shape is irregular in most cases. This work aims to combine experimental measurements and numerical simulations to reveal the shape factors of the particles of 3 different commercialized aerosol drugs and the effect of non-sphericity on the lung deposition distribution of these drugs.

The results of computer simulations of deposition distribution suggest that neglecting the irregular shape does not lead to a major distortion of the simulation results unless fiber-shaped particles are also present after the formulation.

EAC2025_PO3-186_1072_Kugler.pdf

PO3: 187

Spatial Distribution and Concentration of BaP in PM10 Across Six Locations in Croatia

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Polycyclic aromatic hydrocarbons (PAHs) are harmful air pollutants, with heavier PAHs bound to PM_{10} particles and lighter ones existing in the gas phase. Benzo(a)pyrene (baP) indicates PAH presence, with a European limit of 1 ng m^{-3}. The main sources of PAHs include the combustion of wood, waste, and fossil fuels. In Croatia, BaP concentrations were measured across six locations throughout all seasons. The highest levels occurred in winter, particularly in Slavonski Brod (9.030 ng m^{-3}), while the lowest were recorded in summer. Results indicated strong seasonal and spatial variability influenced by emission sources and transport.

EAC2025_PO3-187_1205_Jakovljević.pdf

PO3: 188

Study of drug exposure during magistral preparation of medicine

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Magistral drug compounding is common practice in Hungarian pharmacies. Pharmacist exposure can be caused by inhaled substances or absorption through the skin during the preparation of the medicine. Drug preparation processes, such as mixing in a mortar or sieving, can generate the formation of airborne particles. The purpose of this study was to investigate the potential occupational health risks of extemporaneous preparation of medicine in Hungarian practice.

EAC2025_PO3-188_515_Baka.pdf

PO3: 189

Temporal variability of PM_{10} and PM2.5 in Puerto Plata, Dominican Republic (2020-2024)

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This study analyzes the temporal variability of $PM_{2.5}$ and PM_{10} concentrations in Puerto Plata (located on the north coast of the Dominican Republic) over the past five years. The average concentrations were 8.4 µg/m³ and 31.7 µg/m³, respectively. PM_{10} levels were generally higher between June and October, possibly due to lower precipitation rates, increased tourism activity, and the higher incidence of Saharan dust transport to the Caribbean during boreal summer. The average $PM_{2.5}/PM_{10}$ ratio for the whole study period was 0.28, indicating a clear dominance of coarse particles.

EAC2025_PO3-189_897_Nicolás.pdf

PO3: 190

Urban Pollution Island (UPI) for ultrafine particles – characteristics and influencing factors

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This study examines the spatial and temporal variability of fine and ultrafine particles on the urban scale of Dresden, Germany. Continuous measurements of the particle number size distribution (PNSD) were carried out at a total of seven locations during a five-month measurement period. Six of the locations are located in the city of Dresden while one characterizes the rural background concentration level. The aim of this study is to characterize the Urban Pollution Island phenomenon by exploring intra-urban differences of PNSD and to quantify the influence of factors such as meteorological parameters using descriptive and exploratory statistical analysis.

EAC2025_PO3-190_1019_Kramer.pdf

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Use of green infrastructure as filtration panels for biological and mineral aerosols

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This study explores the potential of plants as natural air filters for indoor spaces, focusing on their ability to remove airborne pollutants, including fungal allergens. Two plant species, *Banksia spinulosa* (dry flowers) and *Tillandsia incarnata* (living plants), were assessed in a laboratory setup with an aerosol chamber. The plants were arranged in panels, and their filtration efficiency was tested with various aerosols, including bacteria, fungi, and particles. Results demonstrated significant filtration capabilities, with *Tillandsia* plants excelling in bacterial removal. These findings suggest that plants can improve indoor air quality and public health by reducing airborne microorganisms in various settings.

EAC2025_PO3-191_680_Tomson.pdf

PO3: 192

MODIS versus AERONET Aerosol Optical Properties in Central-East Europe

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This study evaluates MODIS Terra satellite AOD retrievals against AERONET data from 29 stations in 10 Central-East European countries over 2010–2023. Correlation with AERONET improves seasonally, with R^2 increasing from 0.58 in winter to 0.76 in summer. Mean negative biases are found at 16 out of 29 sites, suggesting that MODIS Terra AOD retrievals are mostly overestimated. Larger deviations in biases are attributed to factors such as limited matching retrievals or site-specific conditions. Aerosol classification reveals mixed types dominate (>30%), followed by polluted (>22%) and continental (22–24%), with the rest from biomass burning, dust, and marine sources.

EAC2025_PO3-192_1223_Deaconu.pdf

PO3: 193

Effectively constraining aerosol radiative forcing using remote sensing and in-situ observations

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We use a Perturbed Parameter Ensemble (PPE) to constrain a global aerosol-climate model with respect to black carbon (BC) radiative forcing uncertainties. We perturbed three key parameters: BC number, wet deposition, and the imaginary refractive index. The ensemble was constrained using AERONET AAOD and airborne BC mass concentration . Results show a shift toward more absorbing particles and lower BC emissions. The effective radiative forcing (ERF) constrained from -1.42 ± 0.17 W/m² to -1.47 ± 0.04 W/m². Analyses included Gaussian mixture clustering and Sobol sensitivity analysis to identify dominant sources of uncertainty and the structure of the constrained parameter space.

EAC2025_PO3-193_1224_Deaconu.pdf

PO3: 194

Measurement of On-road Brake Wear Particle(BWP) Emissions of Electrification Vehicle and Regenerative Effect Analysis

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Road transport emissions have declined due to regulations, but non-exhaust emissions (NEE), especially brake wear particles (BWPs), are rising with more and heavier vehicles. From November 2026, Euro 7 will regulate BWP emissions, with UN GTR No.24 providing an indirect estimation method using friction braking ratio. This study developed an on-road BWP measurement method for ICEV, HEV, and PEV, using tracer gas and data filtering. Results showed BWP emissions decrease with higher regenerative braking ratio, and emissions were highest in urban areas, followed by rural and motorways, correlating with regenerative braking usage.

EAC2025_PO3-194_1225_Woo.pdf

PO3: 195

Biomonitoring of Airborne Particulate Matter Using Plane Tree Bark: Method Development and First Insights into Oxidative Potential measurement

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Exposure to particulate matter (PM) has harmful health effects, but the underlying physiological mechanisms remain poorly understood. A key hypothesis involves oxidative stress induced by reactive oxygen species (ROS). The oxidative potential (OP) of PM, a key indicator of its toxicity, depends on its chemical composition. However, data on PM's spatial variability are limited. Biomonitoring using trees, such as plane trees in Paris, offers a cost-effective monitoring solution. This study presents an ultrasound-based extraction method to analyze PM composition and assess their toxicity and OP using AA and DTT assays.

EAC2025_PO3-195_325_Audoux.pdf

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Oxidative potential of PM1 and PM10 at a Mediterranean urban site

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PM_1 and PM_{10} samples collected at an urban area close to the Spanish Mediterranean coast were analysed in order to determine their chemical composition and oxidative potential (OP) using the dithiothreitol (DTT) assay. Volume and mass-normalised OP values were higher in winter than in summer, most likely because OP sources vary depending on the season of the year. Although the average OP_V values in the submicron and coarse fractions were similar, the mass-normalised DTT activity was considerably higher in PM_1 than in PM_{10-1}, which suggests that fine particles are potentially more harmful for human health than coarse particles.

EAC2025_PO3-196_297_Alfosea-Simón.pdf

PO3: 197

First results of In-Situ Measurement Campaign for Cloud Studies at the Milešovka Observatory, Czechia

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From Winter 2024 on, the cloud droplet analyser is used for determination of icing events, liquid water content and size distribution of cloud droplets. The Milešovka Observatory is part of the international ACTRIS (Aerosol, Clouds and Trace Gases Research Infra Structure) infrastructure with various monitors for fog, clouddroplet analysers and auxiliary devices.

Setup of the campaign and first results will be presented, focussing on parameters of interest like effective diameter, liquid water content and in addition mean volume diameter and particle size distribution.

EAC2025_PO3-197_964_Sel.pdf

PO3: 198

Analysis of the nano fraction content in the atmospheric air of the SE part of Warsaw

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In the context of the nanoparticles impact on human health and the environment, research has been conducted in atmospheric aerosol. The measurements covered different seasons and various weather conditions in the SE part of Warsaw. Due to weather conditions, the particle size distributions for July and August of 2024 are almost identical. The increase in the share of particles below 100 nm in September and October may be the result of increased road traffic and higher exhaust emissions. SEM analysis confirmed the presence of nano-objects in the form of agglomerates in the atmospheric aerosol.

EAC2025_PO3-198_203_Jankowski.pdf

PO3: 199

High-resolution temporal and size-resolved analysis of atmospheric particulate matter using OPC: source apportionment

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This study investigates the impact of particulate matter (PM) from biomass combustion, burning during winter in various urban areas of the Apulia region, Italy. Real-time measurements were conducted using Fidas 200s (Palas) optical particle counters (OPC), which is certified according to the UNI EN 16450 standard. This instrument allows to quantify particle number and size distribution in the 0.18–18 µm range.

The study was carried out at two different urban sites located in small towns. The investigation aims to identify and characterize PM concentration increase cycles, which are likely associated with the ignition of domestic fireplaces.

EAC2025_PO3-199_1192_Nocioni.pdf

PO3: 200

The OASIS 2024 Campaign: The Role of VOCs in the Nucleation Particle Growth

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The OASIS 2024 campaign studied new particle formation (NPF) in the atmosphere, focusing on the role of volatile organic compounds (VOCs) in particle nucleation and growth. Conducted from April to July 2024 at the CIEMAT site in Madrid, it collected nearly 500 VOC samples and recorded 38 nucleation events. Various atmospheric parameters were measured to assess the relationship between biogenic and anthropogenic VOCs and nucleation. Statistical analyses revealed significant differences in β-pinene concentrations between nucleation and non-nucleation days, with a 95% confidence level, highlighting its potential role in the nucleation process.

EAC2025_PO3-200_1218_Rojas.pdf

PO3: 202

Chemical-physical characterization of atmospheric particulate matter collected in the Lecce area (South Italy) by ED-XRF and ATR-FTIR spectroscopy

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In this study a chemical-physical characterization of $PM_{2.5}$ by means of ED-XRF and ATR-FTIR analysis was performed. The $PM_{2.5}$ was collected om Teflon filters in the framework of TOX-IN-AIR project during two measurement campaigns in two sites, an urban site and an urban background site in Lecce (Puglia, South Italy). Acquisition and processing of ATR-FTIR spectra of particulate samples were optimized to collect solid and accurate information on functional groups which represent the particulate composition. In addition, ED-XRF investigation allows to determine the elemental composition of the air particulate matter, useful to focus on the role of anthropogenic activities and natural sources.

EAC2025_PO3-202_1160_Semeraro.pdf

PO3: 203

Techniques and measurement methods comparison for determination of the water-soluble fraction of atmospheric particulate matter

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This study compares two water-soluble organic carbon measurement methodologies: the method that measures total organic carbon obtained by the difference between total carbon and inorganic carbon, and the method that measures non-volatile organic carbon. The water-soluble nitrogen, measured simultaneously with soluble carbon and without requiring an additional sample, was compared with the inorganic nitrogen fraction measured using a different analytical technique, i.e., ion chromatography. In conclusion, there is an excellent correlation of the values obtained with the two methods used to measure water-soluble organic carbon. Furthermore, the same instrumental technique allows for obtaining the water-soluble nitrogen content in the sample.

EAC2025_PO3-203_1159_Bloise.pdf

PO3: 204

On the use of low-cost PM sensors for controlling ventilation system of production facilities on demand

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The applicability of low-cost PM sensors for the control of HVAC systems on demand in production facilities has been investigated. Low cost sensors were tested in different industries, including surface treatment by electroplating and the manufacture and processing of carbon fibre-based composite materials. A filter sampler and a scientific-grade optical aerosol spectrometer (Grimm 11-D) were operated in parallel and served as references. It was found that the sensors require workplace-specific calibration in order to provide meaningful estimates of the PM concentration. Upon this calibration, they are well suited to control HVAC systems, based on the actual concentration.

EAC2025_PO3-204_988_Asbach.pdf

PO3: 205

Suspect and untargeted characterization of total suspended particles collected in Porto Marghera, an industrial site in the Northeast of Italy

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The Porto Marghera industrial site, in the Venice lagoon, has hosted various manufacturing activities for over a century, heavily impacting the environment and public health. Since the 1980s, deindustrialization has reduced pollution. This study analyzes new contaminants by examining Total Suspended Particles (TSP) collected near the site. Using UHPLC-HRMS analysis, over 130 compounds were identified, including pesticides, pharmaceuticals, biocides, personal care products, and plastic additives. The research aims to characterize the current contamination fingerprint and assess the site's ongoing environmental impact.

EAC2025_PO3-205_711_Zangrando.pdf

PO3: 207

Evaluation of the impact of climate change on air quality in Alpine valleys

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Arpa Liguria, Italy

ARPAL is involved in the ALP'Aerà project, a project funded by the Interreg Italy-France ALCOTRA program 2021-2027. The main objective is to characterize the future impacts of climate change on air quality in the Alpine valleys, to propose new indicators for climate change monitoring and to establish new integrated mitigation strategies. Thhe project faces the cross-border economic and social challenges with deepen study of the evolution of pollutant emissions and climate change in the medium and long term. ARPAL is responsible for air quality diagnostic in the Alpine valleys and for the coordination of the measurement campaigns.

EAC2025_PO3-207_1009_Bove.pdf

PO3: 208

Intercomparison of online and offline XRF spectrometers for determining the elemental composition of PM10 at an urban site in Milan

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This study assessed the Xact 625i Ambient Metals Monitor performance and evaluated the data quality and robustness. Xact data were aggregated to 24-h daily means and compared to 24-h PM_{10} data retrieved by ARPA Lombardia in the same station in Milan (Italy) and analysed offline by a benchtop ED-XRF spectrometer. The intercomparison focused on Al, Si, S, Cl, K, Ca, Ti, Cr, Mn, Fe, Ni, Cu, Zn, Br, Sr, and Pb. Xact data were found to be highly correlated to the offline XRF analyses (R^2 ranging from 0.67 to 0.99) and slopes (online vs offline) ranging from 0.79 to 1.3.

EAC2025_PO3-208_353_Cadeo.pdf

PO3: 209

Impacts of summertime photochemical aging on the physicochemical properties of aerosols in a Paris suburban forest region

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An experiment was conducted in a suburban forest area in the Paris region to systematically study the evolution of OOA. The submicron organic aerosol (OA) and their primary and secondary sources were characterised by an aerosol mass spectrometer (AMS) with positive matrix factorization (PMF) analysis. Our results show that the photochemical processes drove significant increases in OOA derived from both biogenic and anthropogenic emissions. Under elevated pollution and intense solar radiation during continental air mass-dominated periods, rapid formation of More-Oxidized OOA (MO-OOA) occurred. Our findings underscore the dual role of photochemistry in shaping aerosol optical properties and climate impacts.

EAC2025_PO3-209_1226_Yu.pdf

PO3: 210

A novel laboratory experimental platform to explore jet engine combustion and lubricant oil aerosols interactions

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This laboratory study investigates the interaction between oil and combustion aerosol emissions from aircraft engines. The experimental setup combines oil aerosol generation and combustion particulate matter (both volatile and non-volatile) using a swirl mixing device. Emission aging is simulated with an oxidation chamber to study vPM formation. Emissions are characterized using a CPC and a SMPS. By varying fuel type, oil concentration, combustion, and aging conditions, the study examines how oil and soot interactions affect aerosol emissions. The preliminary results show the control of particle size distributions, simulating a range of aircraft engine emission scenarios.

EAC2025_PO3-210_1230_Berthier.pdf

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RECETOX Research Infrastructure services offer – Core facility of the Central Laboratories

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The RECETOX Research Infrastructure at Masaryk University, Czech Republic, supports advanced environmental and health research focusing on the exposome and persistent organic pollutants. As a key partner of ACTRIS-CZ and contributor to the pan-European ACTRIS initiative, RECETOX provides analytical expertise, long-term POPs monitoring, and support for atmospheric research at the National Atmospheric Observatory Košetice. Its Central Laboratories offer accredited trace analysis, microbiome profiling, and biomarker detection. RECETOX ensures open, merit-based access via schemes such as IRISCC and ATMO-ACCESS, and advances capacity-building through activities like the 2023 ATMO-ACCESS training, promoting interdisciplinary collaboration in atmospheric and environmental sciences.

EAC2025_PO3-211_1232_Ruzickova.pdf

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RECETOX, ACTRIS_CZ Research infrastructures

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Masaryk University, Czech Republic

ACTRIS-ERIC is a European research infrastructure focused on aerosols, clouds, and trace gases. The Czech node, ACTRIS-CZ, includes Masaryk University (RECETOX), which contributes advanced analytical capacity and long-term POPs monitoring at the Košetice Observatory. RECETOX supports international agreements like the Stockholm Convention and operates the GENASIS database, providing open access to validated environmental data. Monitoring includes active and passive air sampling, deposition, and biota sampling, with comprehensive analysis of organic pollutants and metals. ACTRIS-CZ offers physical, virtual, and remote access, supports capacity building, and provides services to projects like ACTRIS, ATMO-ACCESS, and EIRENE.

EAC2025_PO3-212_1233_Přibylová.pdf

PO3: 213

Are low-cost sensors suitable for detecting smoke generated during laser surgery?

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The question of whether low-cost sensors are suitable for measuring the smoke generated in the operating theatre during laser surgery and thus assessing the risks is a complex, multidisciplinary problem. Indeed, low-cost sensors can be helpful for preliminary or supplementary measurements, such as monitoring trends or general characterisation of smoke generation, but are not a substitute for professional, standardised instrumentation for detailed risk analysis and regulatory compliance.

EAC2025_PO3-213_1235_Nagy.pdf

PO3: 214

High-resolution PM prediction at intra-urban scale: the APEMAIA project in preparation for the MAIA mission

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Air pollution represents one of the greatest contemporary environmental and health threats. The APEMAIA project develops machine learning methodologies to estimate PM concentrations at intra-urban scale (300m), supporting preparatory studies for NASA's MAIA mission (Multi-Angle Imager for Aerosol).The framework integrates multi-source data including satellite AOD, meteorological variables and urban morphological characteristics. The XGBoost model demonstrates good performance in capturing complex relationships between different data sources, obtaining high spatio-temporal resolution maps in the metropolitan city of Bari (2019-2022) identifying the most critical urban areas. This methodology provides a solid foundation for assessing population exposure to atmospheric particulate matter in urban environments.

EAC2025_PO3-214_1237_De Lucia.pdf

PO3: 215

Machine Learning-Based Forecasting and Impact Assessment of Black Carbon over Indo-Gangetic Basin City

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Black carbon (BC), a potent climate forcer and air pollutant, was studied in Agra, India (2022–2024) to assess its seasonal dynamics, radiative impacts, and health risks. BC peaked in winter (20–25 μg/m³) due to biomass burning and shallow boundary layers, while monsoon rains caused declines. Despite a moderate BC–$PM_{2.5}$ correlation (r=0.53), BC–AOD linkage was weak (r=0.12), suggesting vertical decoupling. BC reduced solar (r=-0.30) and thermal radiation (r=-0.41). XGBoost predicted BC accurately (R^2=0.88) using AOD and soil temperature. Health analysis showed up to 10% excess winter mortality. Results stress season-specific emission controls and integrated climate-health policies for the Indo-Gangetic Basin.

EAC2025_PO3-215_1238_Bartaria.pdf

PO3: 216

A charger-less, pump-less electrostatic precipitator utilizing triboelectric charging for collecting brake-wear-particles

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This study presents an electrostatic precipitator utilizing triboelectric charging for collecting brake wear particles without a particle charger or pump. Experiments using a brake dynamometer and LM, NAO pads showed the device reduced PM_{10} emissions to 3.3 mg/km and 1.4 mg/km, respectively, meeting EURO 7 limits. Efficiency averaged 61% under WLTC conditions, with 74–75% during acceleration. Simulations guided design optimization, focusing on collector size and voltage. The developed collector presents an energy-efficient and eco-conscious approach to collecting brake wear particle emissions.

EAC2025_PO3-216_1246_Jo.pdf

PO3: 217

Bioaerosol Sensing for Environmental Health: A Proof-of-Concept Study

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This study aims to develop a proof-of-concept for a portable bioaerosols sensor system exploiting novel physical principles where electron-photon interactions within a solid-state device platform is used to mimic this interaction. Absorbed photons can transfer energy to the electrons in the semiconductor device, which can then be used for detection purposes. Our prototype design aims to cover a wide fluorescence spectral range (298–735 nm), capturing key bioaerosol signatures through ultraviolet laser-induced fluorescence (UV-LIF).

EAC2025_PO3-217_1277_Khalid.pdf

PO3: 218

Chemistry in nanometer-sized aerosol particles: Investigating the dependency of peptide formation on particle size using online-APCI-MS

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This study investigates the size-dependent formation of peptides in nanometer-sized aerosol particles, serving as a model for condensation reactions relevant to atmospheric growth processes. Laboratory experiments using a flow tube reactor, SMPS, and online APCI-MS analyze how particle size influences reaction rates and product formation. Smaller particles offer unique nanoscale chemical environments that can enhance specific reactions, thereby affecting particle survival and growth. These findings enhance our understanding of size-dependent particle-phase chemistry and how it bridges the gap between initial particle embryos and growth into sizes with higher survival probability.

EAC2025_PO3-218_1270_Rautenberg.pdf

PO3: 219

Comparison of Aerosol Absorption Ångström Exponent Between Photoacoustic and Filter-Based Methods in a Rural Environment

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The aerosol absorption Ångström exponent (AAE) is commonly used to distinguish black and brown carbon sources. However, its reliability is limited due to sensitivity to aerosol microphysics and filter artifacts. We present a long-term intercomparison between a four-wavelength photoacoustic spectrometer (PAAS-4λ) and an AE33 Aethalometer at two Finnish sites: Pallas (sub-Arctic) and Hyytiälä (boreal forest). PAAS-4λ revealed broader AAE distributions, likely reflecting real atmospheric variability, which AE33 underrepresents. We further investigate AAE variability using supporting microphysical data, numerical simulations, and correlations with seasonal, meteorological, and transport patterns to better constrain absorption-based source apportionment.

EAC2025_PO3-219_1247_Järvinen.pdf

PO3: 220

Contribution of BTEX on secondary organic aerosol formation potential at a Mediterranean site (Heraklion, Crete, Greece)

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BTEX monitoring is challenging in the Eastern Mediterranean area under enhanced photochemistry conditions and regional transport, especially by taking into consideration their increased reactivity and their aerosol formation potential. BTEX were monitored during two years (2023-2024) at Heraklion, Crete, Greece by means of an automatic gas chromatograph with 15 minutes time resolution, along with other gaseous and particulate pollutants and meteorological parameters. The SOA formation potential of the measured BTEX was estimated for winter given the important contributions from local sources, including residential biomass burning sources, and found to account for almost 40% of the locally produced organic mass.

EAC2025_PO3-220_1275_Raptaki.pdf

PO3: 221

Delayed respiratory response to wildfire smoke

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Wildfires pose significant challenges to public health. This study utilized a retrospective repeat measures cohort study design (n=842) by collecting multiple peak flow measures made by an allergist among his patients before, during, and after two wildfire events in the Dismal Swamp area of North Carolina USA. Changes in peak flow were temporally correlated with the wildfire occurrences by comparing peak flow measures before, during, and after the wildfire. An assessment of wind direction was also assessed to determine if there were differences between peak flow measurements when the wind was blowing directly from the fire to the community affected.

EAC2025_PO3-221_1249_Blando.pdf

PO3: 222

Electrode material transport and its role in the temporal variation of the composition of Cu/Ag NPs generated by high-frequency spark discharge

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Binary Ag/Cu nanoparticles were synthesized using a high-frequency spark discharge generator operating in unipolar mode. This setup enables asymmetric electrode erosion, leading to cross-contamination between the electrodes. By combining ex situ ICP-MS and SEM-EDX analysis, the time evolution of nanoparticle composition and electrode surface coverage was investigated over 10-minute intervals. Results show that copper gradually covers the silver electrode surface, while silver contributes less significantly to the copper side. This asymmetric material transport strongly influences the resulting nanoparticle composition, confirming the key role of electrode surface contamination in spark ablation-based BNP synthesis.

EAC2025_PO3-222_1273_Villy.pdf

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Evaluation of Particle Collection and Cleaning Performance of an Electrostatic Precipitator Equipped with EDS System

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Electrostatic precipitators (ESPs) are widely used for fine dust removal due to their high collection efficiency and low pressure drop. However, dust accumulation on collection plates over time reduces efficiency, highlighting the need for improved cleaning methods. In this study, we developed an ESP incorporating an electrodynamic screen (EDS) system, which was fabricated by coating the surface of the collection plates with a dielectric film printed with interdigitated electrodes. Experimental results showed that, after the particle collection efficiency dropped to approximately 70% due to dust accumulation, activation of the EDS system effectively restored the collection efficiency to its original level.

EAC2025_PO3-223_1244_Lee.pdf

PO3: 224

Evaluation of the Role of Benzo(a)pyrene as Carcinogenic Index of PM10-bound PAHs in Italy and Europe

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A study was conducted in Italy to assess the effectiveness of Benzo(a)pyrene (BaP) as the sole marker of PAH toxicity, as defined by the European directive. The results obtained in Italy were compared with available European data. The study showed that BaP can represent the general behavior of Polycyclic Aromatic Hydrocarbons (PAHs), confirming its role as a suitable indicator. However, its ability to reflect the overall carcinogenicity of PAHs is limited, accounting for approximately 60% of total PAH-related toxicity. These findings suggest that relying solely on BaP may underestimate the health risks associated with PAH exposure in the environment.

EAC2025_PO3-224_1278_Balducci.pdf

PO3: 225

Indoor air quality and health effects in elementary schools: preliminary results of MISSION project

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In this contribute, passive sampling results of VOC (Volatile Organic Compounds), ozone, formaldehyde and nitrogen dioxide concentration trends of four elementary schools in Lecce and four in Milan are shown and discussed, also considering their relative outdoor trends. Results shown are referred to the basal monitoring campaign of the project performed during the winter 2024/2025. Children and teachers can be exposed to indoor sources of pollutants which can sometimes be more relevant than outdoor ones. Results of spirometry and FeNO test will be discussed.

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Modelling oxidative potential (OP) of atmospheric particle: A 2-year study over France

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In this work, OP, a promising indicator of the effects of PM on health, is modelled over France with the CHIMERE model for two years. We described the methodology develloped to simulate OP based on data from field measurements and a PMF approach.

Evaluation of the simulation against observations (PM mass, speciation, source modelling and OP) allows to evaluate our method. It highlights the need to get larger OP datasets and improve our capacity to model sources and PM speciation. The analysis of the results do confirm the large differences of source contribution to OP and to PM mass.

EAC2025_PO3-226_1269_Foret.pdf

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Highly perforated ZnO/PLA nanofibers fabricated via humidity-assisted electrospinning for antimicrobial filtration of bioaerosols

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We developed highly perforated ZnO/PLA nanofibers (HP-ZnO/PLA NFs) via a one-step, humidity-assisted electrospinning process. This method leverages the breath-figure effect to form porous architectures and simultaneously expose ZnO nanoparticles on the fiber surface without post-treatment. The resulting nanofibers exhibit strong antimicrobial activity against bacteria (E. coli, S. aureus) and viruses (MS2, H1N1, HCoV-229E/-OC43). Their high porosity and surface functionality make them promising antimicrobial filters for bioaerosol control in indoor environments such as schools and healthcare facilities.

EAC2025_PO3-227_1253_Kim.pdf

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Improving Ultrafine Particle Measurements with an Innovative UFSMPS Dual-CPC System

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We present the University of Helsinki's ultrafine scanning mobility particle sizer (UFSMPS), developed in collaboration with the ACTRIS Cluster Calibration Centre. The UFSMPS measures aerosol particle size distributions between 2.5-30 nm, using a unique dual-CPC setup (TSI ultrafine and TSI standard CPC) combined with a short Vienna-type DMA. Sampled simultaneously, it improves data reliability by correcting for poor counting statistics common in ultrafine measurements. A non-complex design in combination with a short sampling line and dilution system further minimize uncertainties. This design offers improved precision for long-term ultrafine aerosol measurements under both laboratory and ambient conditions.

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Implementing bioaerosols in the EC-Earth3-AerChem model

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This study presents the implementation of primary biological aerosol particles (PBAPs)—bacteria, fungal spores, and pollen—into the EC-Earth3-AerChem model. The model introduces soluble and insoluble PBAPs, simulating aging processes based on ozone and relative humidity. Global PBAP flux is estimated at ~84 Tg yr^{-1}, with a lifetime of ~1.4 days. Results also show strong seasonal patterns and good agreement with site observations. This work demonstrates that including biological aerosol sources improves model accuracy and therefore enhances our understanding of coarse-mode organic aerosol climate effects.

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Long-term monitoring of New Particle Formation influencers in Ny-Ålesund leads to understanding novel nucleation pathways in the Arctic

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The Arctic is rapidly warming, impacting ecosystems and atmospheric processes. To understand new particle formation (NPF), measurements since 2017 at Ny-Ålesund, Svalbard, monitor the particle size distribution and NPF inflencers such as key vapors of sulfuric acid, methane sulfonic acid (MSA), and iodic acid. Since 2024, upgraded instrumentation enables tracking of both neutral molecules and ion clusters, revealing ion-driven clustering on a year-round base. Exracted from this data set, a case study captured the first field evidence of MSA-ammonia nucleation in the arctic field, highlighting the importance of continuous observations of an everchanging Arctic atmosphere.

EAC2025_PO3-230_1261_Quéléver.pdf

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Study of Cs-Mo reactivity through RCS transport in PWR accident conditions

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Understanding fission product (FP) behavior under severe nuclear accident conditions is critical for improving source term models. This work focuses on Cs–Mo interactions, particularly the formation of $CsHMoO_4$, which could influence iodine transport. A dedicated campaign in the SPARC facility studies experimentally species transport and deposition under a strong thermal gradient. Various Cs–Mo precursors are tested; resulting aerosols, deposits, and gases are analyzed (SEM-EDX, XRD, ICP-MS). Early results confirm $CsHMoO_4$ formation in predicted zones and highlight molybdenum's effect on cesium behavior. These findings support improved ASTEC modeling by refining the chemical mechanisms affecting volatile FP transport in reactor coolant systems.

EAC2025_PO3-231_1254_Mechiche.pdf

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The LowC-project: Safe and sustainable Low-Carbon fuels for heavy-duty, aviation, and maritime sectors.

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Heavy-duty road and non-road machinery, aircrafts and ships are contributing significantly to emissions of green-house gases and air pollutants, including fine particulate matter ($PM_{2.5}$) and emerging pollutants. New low or zero carbon fuels (LCF/ZCF) are considered to decarbonize the sector. An important question is how these potential new fuels will influence emissions of air pollutants and climate relevant compounds. LowC will address the impact of LCF/ZCF on the emissions of air pollutants and climate-drivers, evaluate health and environmental impacts and provide guidance and recommendations to ensure that solutions to reduce CO_2 emissions and prevent climate change are safe and sustainable.

EAC2025_PO3-232_1284_Øvrevik.pdf

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Urban Air Quality Hotspot Detection Through High-Resolution Mobile Measurements: Budapest Case Study

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Traditional air quality monitoring relies on sparse fixed stations, limiting spatial resolution of urban pollution patterns. This study presents a bicycle-based measurement campaign conducted in Budapest using TSI DustTrak II (8532) for PM_{10}/$PM_{2.5}$, GPS tracking, and meteorological sensors. Over 200 measurement runs across four representative urban routes captured fine-scale concentration variations. Automated data processing pipeline performed quality control, temporal synchronization, and spatial gridding. Statistical analysis identified persistent air quality hotspots using 90th percentile thresholds, revealing distinct pollution patterns associated with traffic corridors, industrial areas, and urban topography. Results demonstrate mobile monitoring potential for urban planning applications and cycling route optimization.

EAC2025_PO3-233_1285_Tordai.pdf

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Study on Cleaning Performance and Dust Emissions of Bag Filters Depending on Surface Treatment

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A baghouse is widely employed as effective particle precipitator from diverse industrial sources such as power plant, steel industry, cement production industry and waste incineration facilities. Eventhough a baghouse shows high particle collection efficiency, the emission is sharply incresing during the cleaning process using pulse jet(Shim et al.,2017; Simon et al., 2014). Many efforts have been made to mitigate this, one of which is the modification of the filter surface. In this stydy, we aimed to investigate the effect of surface treatment of filter media on the performance of bag filters.

EAC2025_PO3-234_1302_Kim.pdf

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Introduction and First Test Results of a Portable Dual Channel Water CPC

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The newly developed OmniCountTM, portable Water-CPC (Model 3002, TSI Incorporated) incorporates two synchronized CPC “engines”. It was originally designed for respiratory protection testing of face masks in the field, allowing for simultaneous determination of particle number concentrations upstream and downstream of a filter or barrier. Due to its compact design, which among others allows operation in any orientation, this WCPC is also well suited for a wide range of additional applications, including the uses on unmanned aerial systems, weather balloons, and mobile measurement platforms

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The impact of wildfire emissions on oxidative potential of aerosol particles in Canada

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Wildfires are increasing in frequency and magnitude worldwide, and there is growing interest in understanding their impacts on air quality and population health. Here we investigate the impact of 2023 wildfires on oxidative potential (OP) of ambient air across Canada, with the aim to identify molecular carriers of OP. The productions of reactive oxygen species and OP were modelled using KM-SUB-ELF and KM-SUB-OP models, and the aerosol speciation data. Contributions of emission sources, aerosol composition, transformation, and acidity on OP were determined. Significant increases in concentrations of biomass burning markers and reactive species were observed during wildfire season.

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Spectral aerosol light absorption measurements with a self-calibrated photothermal interferometer

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Photothermal interferometry (PTI) is a diagnostic method that provides direct and accurate measurement of aerosol light absorption coefficient. Here, we present a self-calibrating PTI capable of high-resolution multi-wavelength measurements. By combining a supercontinuum light source with an optical wavelength filter, we enable the selection of excitation beams with wavelengths ranging continuously from 405 nm to 850 nm with bandwidth resolution as small as ±5 nm. We developed a calibration procedure for the instrument and demonstrated its applicability by measuring the spectral absorption coefficient of nigrosin aerosol samples and extracting the complex refractive index based on the PTI measurements.

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