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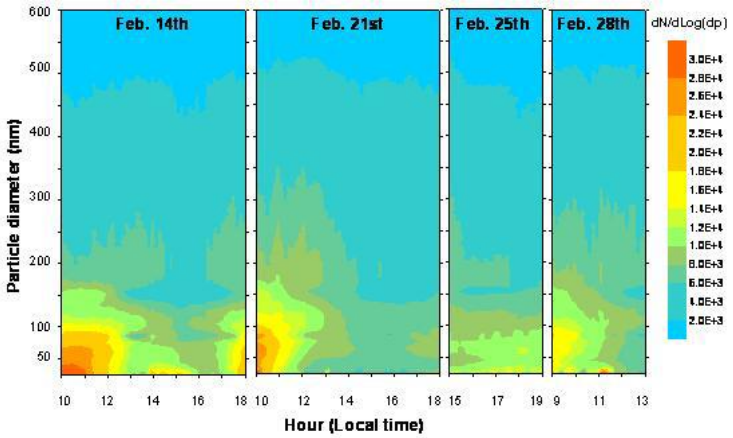
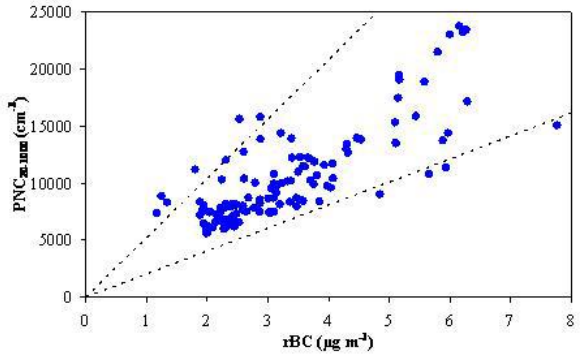
Publication title	Ultrafine Particles and Black Carbon Measurements at an Urban Background Site in Milan (Italy)
Publication type	Poster
Introduction & Background	Ultrafine particles (UFPs) and black carbon (BC), even though not considered by air quality standards, have been recently attracting growing attention for the related impacts on atmospheric processes and for their adverse effects on human health. In urban areas, size-resolved UFP data and BC data can profitably trace the activity of combustion sources, namely fresh traffic emissions and diesel engine exhaust. In particular, high time-resolved measurements can offer great advantages if compared to hourly-resolved data for criteria pollutants considered for air quality assessment.
Methodology	During the PoAir extensive air quality monitoring campaign over Northern Italy, collocated UFP and BC measurements were performed at an urban background site in Milan for a few days in February 2014. Size-resolved particle number concentration data in 6 size intervals in the 20-1000 nm range have been collected by means of a TSI 3031 UFP monitor. Carbonaceous nanoparticles have been measured through both Laser-Induced Incandescence (LII) technique and by light absorption through a one-wavelength Aethalometer AE51. Size segregated chemical composition data for nr-PM1 (non-refractory particles with aerodynamic diameter below 1 µm) were obtained through a High Resolution – Time of Flight – Aerosol Mass Spectrometer (HR-TOF-AMS). All measurements were taken at 10-min high time resolution, enabling to track the diurnal pattern of the concentration levels.
Results & Conclusions	Total particle number concentration (PNC, 20-1000 nm range), BC, and nr-PM1 averaged 10000 cm-3, 3.3 µg m-3, and 28 µg m-3, respectively, but measurements were able to capture the short-period fluctuations. On average, particles in the 20-100 nm range (PNC20-100) accounted for 75% of the total PNC but up to 85% in the morning, hours when they reached concentrations in the orders of 18000-19000 cm-3 (Feb. 14th and Feb. 21st). In the afternoon PNC20-100 levels were generally in the orders of 5000-7000 cm-3 with a relative contribution to the total PNC of about 70%. Using rBC as a tracer of the primary emission from combustion processes, the total PNC was split into two components: a first component directly associated with primary combustion emissions, and a second component associated with secondary aerosol formation and atmospheric ageing. The former component accounted for 65% of the total PNC, but with higher contributions (71-77%) for the size bins between 30 nm and 100 nm; conversely, the latter component, accounting for only 35% the total PNC, displayed the highest contribution (70%) to the particle number between 200 and 1000 nm. In spite of the limited extension of the dataset, the resuts suggest that the concurrent measurements at high time resolution of different features of the aerosol (optical properties, number size distribution, chemical composition) can be extremely useful for a better understanding of the nature and origin of ultrafine particles in urban environments.

Caption Figure 1:



Time patterns of the particle size distribution during the monitoring days

Caption Figure 2:



Scatter plot of PNC20-1000 vs. rBC.