Outdoor Measurements of Airborne Pollutants Dispersion in Presence of Green Trees

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Abstract:

In this research, state of the art experimental measurements are developed to quantify the outdoor dispersion of airborne hazard particles that are emitted from a combustion source in presence of green trees in an urban environment.

The main focus is to seek innovative nature-based solutions for risk mitigation of airborne pollutants dispersion, such as employig green urban design and planning roadmaps. The paper investigates for the first time the efficiency of implanting trees in specific urban locations in attempts to provide more resiliance of sensible infrastructures and buildings against the exposure to high concentrations of pollutant airborne paticles; for example in the case of fires (forest, wood, buildings, etc).

In this purpose, a new experimental wind-tunnel bench is developed at a lab's scale. Different in-space array-type configurations, using different types of representative trees are studied.

Results are presented and discussed for the quantitative impact of green trees different position parameters on reducing the local ppm concentrations of CO2 emitted from the combustion of wood

pellets. The caractersitic times of CO2 concentrations diffusion in surrounding air are measured, presented and discussed. Finally, the present bench constitutes primary important works toward risk assessment of airborne pollutants dispersion outdoors.

Keywords:

Air pollution, dispersion, urban environment, mitigation strategies, particulate matter, green infrastructures, urban design and planning.