



Urban air quality measurements using a sensor-based system

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Air pollution levels in urban areas have increased the interest, not only of the scientific community but also of the general public, and both at the regional and at the European level. This interest has run in parallel to the development of miniaturized sensors, which only since very recently are suitable for air quality measurements. Certainly, their small size and price allows them to be used as a network of sensors capable of providing high temporal and spatial frequency measurements to characterize an area or city and with increasing potential, under certain considerations, as a complement of conventional methods.

Within the frame of the LIFE PHOTOCITYTEX project (use of photocatalytic textiles to help reducing air pollution), CEAM has developed a system to measure gaseous compounds of importance for urban air quality characterization. This system, which allows an autonomous power supply, uses commercial NO, NO₂, O₃ and CO₂ small sensors and incorporates measurements of temperature and humidity. A first version, using XBee boards (Radiofrequency) for communications has been installed in the urban locations defined by the project (tunnel and school), permitting the long-term air quality characterization of sites in the presence of the textiles.

An improved second version of the system which also comprises a sensor for measuring particles and which uses GPRS for communications, has been developed and successfully installed in the city center of Valencia. Data are sent to a central server where they can be accessed by citizens in nearly real time and online and, in general, they can be utilized in the air quality characterization, for decision-making related to decontamination (traffic regulation, photocatalytic materials, etc.), in air quality models or in mobile applications of interest for the citizens.

Within this work, temporal trends obtained with this system in different urban locations will be shown, discussing the impact of the characteristics of the selected sites and the seasonal variability on the air quality levels observed.

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