

Community Air Sensor Network (CAIRSENSE) Project: Lower Cost, Continuous Ambient Monitoring Methods

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Abstract:

Advances in air pollution sensor technology have enabled the development of small and low cost systems to measure outdoor air pollution. The deployment of numerous sensors across a small geographic area would have potential benefits to supplement existing monitoring networks and significantly reduce the cost of longer-term community air pollution studies, if the data quality were sufficient. To understand the field performance and utility of the next generation of air quality monitoring instrumentation, the Community Air Sensor Network (CAIRSENSE) project deploys low cost, continuous and commercially-available monitoring methods for criteria pollutants – including PM_{2.5}, O₃ and NO₂ – in suburban Atlanta, GA. The study includes two aspects – 1) placement of multiple copies of the same sensor at the South Dekalb NCore site for side-by-side comparison with regulatory instruments, 2) testing the utility of a low cost wireless sensor network by installing multiple sensor nodes equipped with radio transmitters that locally transmit the data, followed by uploading using cellular communications. With a total of approximately 30 sensor devices running simultaneously and collecting one minute data, some of multiple pollutants at once, the data set under evaluation totals well over 2.5 million individual

sensor readings for comparison against NCore station instrumentation, to evaluate precision of identical sensors, and to understand the influence of environmental conditions and local sources on sensor trends.